DOI 10.15826/vestnik.2025.24.4.038 Original Paper

Tax Structure and Inclusive Growth in Nigeria: The Mediating Role of Income Inequality

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Abstract. Despite decades of economic growth, income disparities and widespread poverty persist in Nigeria, raising concerns about the inclusiveness of the country's development trajectory. Nigeria's tax system remains heavily reliant on indirect taxes, which disproportionately affect the poor, while direct taxes critical for redistributive equity are underutilized. This study investigates how tax structure influences inclusive growth, with a specific focus on the mediating role of income inequality in Nigeria. Utilizing annual time series data from 1993 to 2023, the study adopts the Barro-Sala-i-Martin (1992) augmented endogenous growth model and employs the Autoregressive Distributed Lag (ARDL) estimation technique. The model accounts for both short-run dynamics and long-run equilibrium relationships, and is validated through robust diagnostic tests including the Breusch-Pagan-Godfrey test for heteroskedasticity, the Ramsey RESET test, Breusch-Godfrey LM test for serial correlation, and the Jarque-Bera normality test. The results reveal that tax structure positively and significantly influences inclusive growth in the short run, but has a negative and statistically insignificant impact in the long run. Income inequality has a short-term positive impact but a significant negative effect in the long run, suggesting that its persistence undermines sustainable development. Labour force participation and capital formation exhibit time-dependent effects, with long-run benefits for inclusive growth. Inflation was found to be insignificant in both periods. These findings highlight the need for fiscal reforms that prioritize efficient tax utilization, progressive redistribution, and inclusive public investments. Strengthening Nigeria's fiscal policy framework and enhancing equity in tax collection and spending could facilitate a broad-based, sustainable development.

Key words: tax structure; inclusive growth; income inequality; ARDL; Nigeria.

JEL D31, H20, O15, O40

1. Introduction

A nation's tax system plays a critical role in determining its socio-economic development, particularly in addressing income disparities and fostering inclusive growth. A tax system comprises a mixture of direct taxes (such as personal income tax and corporate income tax) and indirect taxes (notably Value Added Tax and excise taxes) [1]. While these levies are intended to fund public goods and services, their design and administration critically influence who bears the tax burden and how benefits accrue across different income groups [2]. The tax system in Nigeria is imbalanced, heavily dependent on indirect taxes like Value Added Tax (VAT) and excise levies, which disproportionately affect lower-income groups [3]. Conversely, direct taxes levied on income and wealth offer greater potential for equitable redistribution but are underutilized in Nigeria's fiscal framework [4]. This

imbalance has limited the tax system's capacity to reduce inequality and support sustainable development [5].

Income inequality, characterized by disparities in income and living standards, has intensified in Nigeria over the decades. Between 1985 and 2004, the country's Gini coefficient increased from 0.43 to 0.49, driven by corruption and uneven distribution of resources [6]. Despite efforts to improve revenue mobilization, the tax burden remains inequitably distributed, excluding the vast informal sector and weakening redistribution mechanisms [7, 8]. The consequences are evident in Nigeria's persistent poverty, unemployment, and poor human development indicators [9], all of which highlight the need for a more inclusive fiscal approach [10].

Despite Nigeria's average growth rate of 5.7 % from 2010 to 2020, over 40 % of its population remains impoverished[1]. This disconnect illustrates that economic growth alone does not guarantee improved welfare or equitable opportunity [11]. As the World Bank emphasizes, growth must be inclusive to translate into tangible social progress [12]. As a result, inclusive growth, which ensures that everyone has an equal opportunity to benefit from economic growth, has emerged as a more realistic approach to development [13, 14]. However, Nigeria's lack of inclusivity in its growth process is rooted in several issues, including weak governance, corruption, [15] and underinvestment in infrastructure [16].

Globally, there is growing recognition that taxation can be an effective tool for achieving inclusive growth by narrowing income gaps and funding social programs [17]. As a result, many African countries, including Nigeria, are increasingly advocating for inclusive growth to improve living standards [18, 19]. This agitation has, at times, led to political unrest, such as the Arab Spring in North Africa, the Fees Must Fall movement in South Africa and EndSARS in Nigeria [20]. Additionally, the country's tax system is skewed in favour of the formal sector, ignoring the vast informal economy that employs a large share of the labour force. This exclusion has been recognized as a significant barrier to achieving inclusive growth [21, 22].

The role of tax systems in fostering inclusive and sustainable societies has become a central topic in development debates [23]. However, much of the literature on taxation and inclusive growth focuses on developed countries, with limited insights from developing nations like Nigeria [24]. Given Nigeria's poor performance on inclusive development metrics, ranking last in Africa in the 2018 Inclusive Development Index (World Economic Forum, 2018), it becomes crucial to assess how the tax system can better reduce income inequality and enhance inclusive growth.

To address this gap, the following *research questions* are provided to:

1. Does tax revenue ratio have impact on inclusive growth in Nigeria?
2. Does income inequality affect inclusive growth in Nigeria?

[1] WDI (2024). World Bank Development Indicators Database. https://databank.worldbank.org/source/world-developmentindicators

This study investigates how tax structure influences inclusive growth, with a specific focus on the mediating role of income inequality in Nigeria from 1993 to 2023.

Research hypotheses:

H01: Tax revenue ratio does not have significant effect on inclusive growth in Nigeria.

H02: Income inequality does not have significant effect on inclusive growth in Nigeria

Structure of the article. The rest of the paper is structured as follows: Section two provides a review of the relevant literature; Section three outlines the materials and methods employed; Section Four presents and analyzes the results; and Section Five concludes with policy implications.

2. Literature Review

Tax structure refers to the composition and significance of various tax types within a country's tax system. It reflects revenue sources and the design principles of equity and efficiency Uhuaba & Siyanbola [25]. An efficient tax system is built on three critical elements: the tax rate, the tax base, and tax rate variability. These elements determine whether a system is proportional, regressive, or progressive. A proportional tax applies to a uniform rate to all income levels, aiming to balance average and marginal tax rates. Proponents argue that the approach encourages productivity by avoiding tax penalties on higher earnings. When personal allowances are granted, proportional taxes can become progressive for low-income earners Adefolake & Omodero [26]. Progressive tax structure which makes high income earners pay a large tax-income share, can help reduce income inequality.

Conversely, regressive taxes like VAT disproportionately impact the poor, deepening inequality Brys et al. [17]. A well-structured tax system also supports public spending and shields populations from poverty and risks [21].

Income inequality denotes the uneven distribution of earnings across individuals or households. It is basically measured by the Gini coefficient, a statistical measure that ranges from 0, representing perfect equality to 1, indicating complete inequality Mdingi & Ho [27].

Anyaduba & Otulugbu [4] further characterizes extreme income inequality as the concentration of wealth within a small elite. High inequality not only constrains economic growth and underutilized human capital but can also spark social unrest Alves & Afonso [28]. In Nigeria, entrenched regional disparities, chronic unemployment, systemic corruption, and unequal access to education and public services have produced persistent "growth without equity", where broad-based economic gains fail to reach most citizens Ibekwe and Ibekwe [10].

Early debates focused on pro-poor growth, a concept formalized by Kakwani & Pernia [29], which measures how much income gains accrue to the poorest segments. Subsequent work shifted toward inclusive growth, defined as expansion that reduces both poverty and inequality while raising the poor's share of national

income Ekong et al. [21]. In developing countries, inclusive growth aims to remove barriers and create equal opportunities for all, particularly the underprivileged and middle classes, by ensuring an unbiased regulatory environment and broad access to resources Pere-Ere [22].

The framework of the Asian Development Bank describes inclusive growth as generating new economic opportunities and guaranteeing equitable access for every citizen, especially the poor. Olayinka [12] emphasizes its role in improving material well-being, while the International Policy Centre for Inclusive Growth highlights both active participation in growth and fair distribution of its returns. Thus, GDP growth alone cannot sustain improvements in living standards without equitable outcomes. Inclusive growth is inherently multidimensional, encompassing both income and non-income dimensions across socioeconomic strata and relying on two pillars: robust economic expansion and the equitable sharing of its benefits Anand et al. [30].

Achieving inclusive growth requires not only aggregate expansion but also targeted investments that enhance human capital and social protection. Key drivers include education and health spending Barro [31], social safety nets Omodero & Igodo [32], employment creation, Okuneye et al. [33] and a tax system designed to redistribute income equitably Uhuaba & Siyanbola [25]. Without these complementary measures, economic growth risks deepening existing inequalities rather than alleviating them.

A growing body of empirical literature has explored the tax structure, inequality, and economic development, revealing diverse outcomes across countries. In the European Union, Balasoiu et al. [19] found that higher direct taxes tend to impede economic growth, as revealed through panel data analysis of 28 member countries. Similar findings emerged in Jordan, where Basha [5] established that while direct taxes had no short-run impact, and exerted a significant negative impact on long-term growth. In Malaysia, Abd-Hakim [34] discovered that although indirect taxes supported economic development, direct taxes had a detrimental impact. Interestingly, direct taxes contributed more significantly to total revenue despite their adverse developmental impact. Neog & Gaur [35], examining India's tax structure, concluded that income, excise, and corporate taxes negatively influenced long-term economic progress, while short-term reductions in corporate tax rates were also found to hinder growth.

In Nigeria, several studies have investigated the impact of tax policy on inclusive growth and human development. Okere et al. [36] applied the ARDL technique and found a positive link between fiscal policy and human development, particularly noting that recurrent expenditure significantly improves the Human Development Index (HDI), while tax revenue, although negatively related, was statistically insignificant. Similarly, George-Anokwuru [37] discovered that company income tax, VAT, and petroleum profit tax negatively and significantly affected inclusive growth, which aligns with the findings of Olaniyi et al. [38]. Okoh et al. [39] however, found that personal income tax had a positive and significant

impact on income inequality in Nigeria, thereby reducing income inequality. This is similar to the findings of Tanchev [40].

The effectiveness of fiscal policies in enhancing inclusive growth has also been examined beyond Nigeria. In Turkey, Avci & Tonus [41] evaluated the effect of public spending on education, health, social transfers, and indirect taxes on inclusive growth. Their findings were mixed: while social transfers enhanced inclusive growth, education and health expenditures had a diminishing effect. Indirect taxes were also found to reduce inclusivity, reinforcing the view that transfers are more effective than taxes in promoting equity. The findings are consistent with the result of Tendengu [42] on South Africa.

Income inequality and its impact on growth have been subjects of significant academic inquiry. Topuz [43] conducted a broad cross-country analysis across 143 nations from 1980 to 2017 and emphasized the nuanced channels through which inequality influences growth, calling for carefully tailored policy interventions. In Kenya, Chemwok et al. [44] found a weak but positive long-term effect of inequality on growth, with stronger effects in the short run. Similarly, Danso & Boateng [45], studying Africa's largest economies, established a long-run positive correlation between inequality and growth. They also found that educational attainment and gross savings boosted growth, while unemployment reduced it.

Collectively, these empirical findings suggest that while certain forms of taxation, particularly direct taxes, may hinder growth and inclusivity, other fiscal tools such as social transfers can mitigate inequality. Moreover, the relationship between inequality and growth remains context-specific, often mediated by policy design, institutional effectiveness, and the structure of public expenditures.

3. Materials and Methods

This study utilized time series data from Nigeria spanning 1993–2023 to analyze the impact of tax structure on inclusive growth, as well as the mediating role of income inequality in Nigeria. The augmented endogenous model developed by Barro & Sala-I–Martin [31] was utilized to achieve the study objectives.

The Barro & Sala-I–Martin [31] extends the Romer [46] AK framework to demonstrate that tax-financed public spending can endogenously enhance growth to an optimal tax rate. However, the tax structure influences its redistributive effects on income inequality. Integrating this model into broader endogenous growth frameworks reveals the fundamental equilibrium between diminishing inequality and maximizing growth.

The Barro & Sala-I–Martin [31] model incorporates public spending into the Romer [46] AK model.

$$Y = BK^{1-\alpha}G^{\alpha}. \tag{1}$$

Where K is the level of capital and G is government spending on investment: $G = \lambda Y$.

Substituting into the production function and solving for Y:

$$Y = K^{1-\alpha}\left(\lambda Y\right)^{\alpha}, \tag{2}$$

$$Y = B^{\frac{1}{1-\alpha}}\left(\lambda^{\frac{\alpha}{1-\alpha}}\right)K = \dot{B}\left(\lambda\right)K. \tag{3}$$

Where: $\dot{B}\left(\lambda\right) = B^{\frac{1}{1-\alpha}}\left(\lambda^{\frac{\alpha}{1-\alpha}}\right)$.

Where the growth rate of capital:

$$\bar{K} = s\left(1-\lambda\right)Y - dK. \tag{4}$$

Then:

$$\frac{\bar{K}}{K} = s\left(1-\lambda\right)\dot{B}\left(\lambda\right) - d = s\left(1-\lambda\right)B^{\frac{1}{1-\alpha}}. \tag{5}$$

Thus, at steady state and optimal taxation that redistribute income:

$$s\left(1-\lambda\right)\dot{B}\left(\lambda\right) > d \Rightarrow \frac{\bar{K}}{K} > 1. \tag{6}$$

According to Barro & Sala-I–Martin [31] growth model and the modified macro concept of the concentration curve developed by Anand et al. [30], the tax structure is integrated into the production function as a determinant of output. This integration is essential for enhancing the welfare of the entire population and fostering inclusive economic growth.

This analysis centers around the utilitarian social utility function, positing that growth and its distribution are fundamental elements of inclusive growth. The baseline model specified in linear form is presented as:

$$LGRT_{it} = \beta_0 + \beta_1\frac{TAX}{GDP_{it}} + \beta_2 LFPR_{it} + \beta_3 INQ_{it} + \beta_4 GCF_{it} + \beta_5 INF_{it} + U_{it}, \tag{7}$$

where $LGRT_{it}$ is to the log of GDP per person employed (the proxy for inclusive growth).

The literature disagrees on inclusive growth's definition and measure. The rationale for our selection is based on the premise that it reflects the income earned by the individual worker rather than the income of the entire population Oyinlola & Adedeji [9]. GDP per person employed reflects the average income earned by individuals engaged in the production process.

Furthermore, it captures the range of opportunities accessible to the population, how these opportunities are distributed among citizens, and the extent to which individuals contribute to economic growth and sustainability Ali & Son [47]. It reflects critical dimensions such as income inequality, unemployment and poverty

within a country Raheem et al. [48]. Therefore, GDP per person employed is appropriate for this study, as it reflects the part of the population that contributes to productivity growth.

$\frac{TAX}{GDP_{it}}$ is the ratio of the tax to GDP see Pere-Ere et al. [22] and Mansour [49].

INQ measures income inequality proxied by gini coefficient, *LFPR* represents labour force participation rate as a percentage the total population aged 15 to 64, inflation *INF* reflects the degree of economic instability and uncertainty, which can influence the growth process and *GCF* represents the stock of capital (gross fixed capital formation as a percentage of GDP).

These variables are considered traditional determinants in economic growth models see Barro & Sala-i-Martin [31] and Solow [50]. While the parameters are β_{0-5} *Uit* is the error term. The time dimension is represented $t = 1, \ldots, T$, while $i = 1, \ldots, N$ represents the number of countries (Table 1).

Table 1. **Definition of Variables**

Variables	Description	Source
LGRT	Log of GDP per employee (constant US dollar)	WDI (2024)
$\frac{TAX}{GDP}$	The ratio of the tax revenue to GDP	Mansour (2014)
LFPR	Labour force participation rate as a percentage the total population aged 15 to 64	WDI (2024)
INQ	Income Inequality, GINI Coefficient	WDI (2024)
GCF	Gross fixed capital formation (% of GDP)	WDI (2024)
INF	Inflation, consumer prices (annual %)	WDI (2024)

Source: Author, 2025

4. Results

4.1. Stationarity Test

To assess the stationarity of the data set used in this study, unit root tests were performed using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) methods. These tests are based on standard regression frameworks and help determine the order of integration of the time series variables.

$$\Delta X_t = \alpha + \beta X_{t-1} \sum_{j=1}^{p} \gamma_j \Delta X_{t-j} + \mu_t, \quad (8)$$

Where: Δ is the difference operator; X consists of each of the six variables in the model; $t - 1$ represents the time index; ΔX_{t-j} the lagged first differences are

included to address serial correlation in the error term; and μ_t denotes the stochastic error term.

Table 2 presents the findings of the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) unit root tests for each time series at both the level and first difference. The null hypothesis *H*0: $\sigma = 0$ posits that the variable is non-stationary, whereas the alternate hypothesis *H*1: $\sigma = 0$ asserts that the variable is stationary.

From Table 2, stationarity test result showed that *LGRT*, $\frac{TAX}{GDP}$ and *GCF* are stationary at first difference for both ADF and Pp. However, *LFPR*, *INQ* and *INF* are stationary at levels for both ADF and Pp. Consequently, the variables in our study are classified as I(0) and I(1). Given that the variables are linked in different orders, there exists a potential for cointegration. The ARDL bound testing approach was employed to ascertain this.

Pesaran et al. [51] highlighted that ARDL allows the estimation of the cointegration, and both short and long-run relationship for variables of different orders simultaneously. It also tests for the non-existence of all regressors of order 2 or above to avoid an invalid F-statistics computation and the possibility of spurious regression.

The ARDL model is characterized by its autoregressive nature, incorporating p lags of the dependent variable, and its classification as a distributed lag model, which includes q lags of independent variables. It is typically presented as follows:

$$y_{it} = \sum_{k=1}^{m} \alpha_{ij} y_{it-j} + \sum_{k=0}^{n} \beta_{ij} x_{it-k} + u_i + \varepsilon_{it}. \quad (9)$$

Where $i = 1, 2, \ldots n$, time dimension $t = 1, 2, 3, \ldots T$, k denotes number of lags.

Table 2. **Unit root test**

	ADF			PP		
Variable	T-Stat.	Critical Value	Order	T-Stat.	Critical Value	Order
LGRT	–2.7601	–2.6230	I(1)	–2.7435	–2.6230	I(1)
$\frac{TAX}{GDP}$	–5.6217	–4.310	I(1)	–5.6838	–4.3098	I(1)
LFPR	–3.9896	–3.2967	I(0)	–3.3899	–3.6793	I(0)
INQ	–7.0944	–4.2967	I(0)	–6.6106	–4.2967	I(0)
GCF	–4.5580	–4.3098	I(1)	–4.7972	–4.3098	I(1)
INF	–2.9036	–2.6210	I(0)	–3.3171	–2.9639	I(0)

Source: Authors' Compilation, 2025

Thus, Eq. (7) becomes:

$$LGRT_{it} = \beta_0 + \phi LGRT_{it-1} + \beta_1 \frac{TAX}{GDP_{it-1}} + \beta_2 LFPR_{it-1} + \beta_3 INQ_{it-1} + \\ + \beta_4 GCF_{it-1} + \beta_5 INF_{it-1} + \sum_{k=1}^{m-1} \alpha_{ik} \Delta LGRT_{it-k} + \sum_{k=0}^{n-1} \beta_{ik}^1 \Delta \frac{TAX}{GDP_{it-k}} + \\ + \sum_{k=0}^{n-1} \beta_{ik}^2 \Delta LFPR_{it-k} + \sum_{k=0}^{n-1} \beta_{ik}^3 \Delta INQ_{it-k} + \sum_{k=0}^{n-1} \beta_{ik}^4 \Delta GCF_{it-k} + \\ + \sum_{k=0}^{n-1} \beta_{ik}^5 \Delta INF_{it-k} + \varepsilon_{it}. \quad (10)$$

The variables with the differences are the short-run variables while those without the difference are the long-run while the summation signs in the model represent the error correction dynamics.

4.2. ARDL Bound Test for Cointegration

The Bound test for co-integration evaluates the joint significance of the coefficients within the specified conditional ARDL model. The Wald test is conducted for this equation by imposing restrictions on the estimated long-run coefficients of all lagged level variables. The F-statistic of 4.92988 surpasses the upper bound critical value of 4.15 at the 1 percent significance level, suggesting that the null hypothesis of no co-integration can be rejected at this significance level.

Consequently, evidence supports a long-run co-ingratiation between *LGRT* and the independent variables in the model, as shown in Table 3. Therefore, we will estimate the long-run coefficients of our model.

Table 3. **Bound Test**

Model		F-Stat. = 4.92988
$LGRT_{it} = F\left(\frac{TAX}{GDP_{it}}, LFPR_{it}, INQ_{it}, GCF_{it}, INF_{it}\right)$		**K** = 5
Significance	Lower Bound	Upper Bound
5 %	3.06	4.15

Source: Authors' Compilation, 2025.

4.3. ARDL Results

Table 4 presents the result of the short-run, long-run relationship of study variables as well as the diagnostic test. In the short run, the tax-to-GDP ratio $\frac{TAX}{GDP}$ positively and significantly impacts inclusive growth, with a coefficient of 0.0027

with inferences drawn at 5 % significance level. This suggests that a one-unit rise in tax revenue ratio enhances inclusive growth by approximately 0.27 percent. This indicates that immediate increases in tax revenue positively influence inclusive growth, likely because the government is able to mobilize more resources for short-term expenditures, such as social services or infrastructure projects. This finding aligns with the idea that fiscal space enhances public investment in the short run, particularly when those resources are deployed efficiently.

Table 4. **ARDL Short-run and Long-run Results**

Short-run Coefficients and (ECM) Dept. Variable ($\Delta LGRT_t$)				
Variables	Coeff.	Std error	t-statistics	Prob.
C	6.3655	3.0040	2.1190	0.0631
$\frac{TAX}{GDP}$	0.0027	0.0011	2.4104	0.0392
$LFPR$	–0.1385	0.0574	–2.4259	0.0389
INQ	0.0088	0.0029	3.0181	0.0145
GCF	–0.0695	0.0213	–3.2641	0.0098
INF	0.0009	0.0007	1.2561	0.2407
$ECM(-1)$	–4.2996	0.8915	–4.8229	0.0009
Estimated Long run Coefficient with Dependent variable ($\Delta LGRT_t$)				
$\frac{TAX}{GDP}$	–0.0018	0.0010	–1.7527	0.1136
$LFPR$	0.0935	0.0092	10.1713	0.0000
INQ	–0.0059	0.0024	–2.4431	0.0372
GCF	0.0470	0.0188	2.4852	0.0347
INF	–0.0006	0.0005	–1.1769	0.2694
Diagnostic Test				
Tests			Critical Value	P-Value
Normality: Jarque-Bera			2.2578	0.3234
Serial Correlation: Breusch-Godfrey LM Test			0.2652	0.7744
Heteroskedasticity: Breusch-Pagan-Godfrey			0.4092	0.9490
Model Specification: Ramsey RESET			0.5332	0.6084

Source: Authors' Compilation, 2025

However, in the long run, the effect of tax-to-GDP ratio has a negative (–0.0018) but statistically insignificant (p = 0.1136) effect on inclusive growth. Thus, a unit rise in tax-to-GDP ratio leads to 0.002 percent decrease in inclusive growth. This suggests that over time, the positive effects of tax revenue may be offset by inefficiencies, distortions, or poor investment decisions. If taxation is not accompanied by transparent and equitable spending, or if the tax burden disproportionately affects lower-income groups or productive sectors, the long-term benefits of taxation may erode. This reinforces concerns about the quality of fiscal management in many developing economies, like Nigeria where tax revenue often fails to translate into inclusive, growth-enhancing outcomes.

Income inequality (*INQ*) however demonstrates an interesting pattern. In the short run, it exhibits a positive effect (0.0088) that is statistically significant (0.0145) on inclusive growth with inferences drawn at 5 % level of significance. This seemingly paradoxical finding may indicate that in the immediate term, high-income groups, who often drive investment and capital accumulation contribute to growth, even if the distribution of benefits is unequal. In this context, inequality might reflect concentrated productivity among a few, rather than structural inefficiencies. However, the effect becomes negative (–0.0059) and statistically significant (0.0372) in the long-run.

This aligns with theoretical and empirical literature which argues that persistent inequality harms long-term growth by limiting access to education, health, and productive opportunities for the broader population. It also increases social tensions and reduces the potential for cohesive development. The shift from short-term gains to long-term losses emphasizes the importance of addressing inequality through progressive policies and inclusive institutions.

Labour force participation (*LFPR*) shows opposing signs across time horizons. In the short run, the coefficient is negative (–0.1385) and statistically significant (0.0389), which implies that increases in the active labour force may initially depress per-worker productivity or average income. This could occur when the economy cannot absorb the expanding labour supply into productive employment, leading to underemployment or informal sector growth. Conversely, in the long run, *LFPR* has a positive and highly significant impact (0.0935, p = 0.0000). Over time, an expanding labour force supports inclusive growth as more people are integrated into the economy, provided there are sufficient jobs and appropriate skill development. This long-term benefit underscores the importance of not just labour participation but also labour productivity and job creation strategies.

Gross capital formation (*GCF*) exhibits a negative short-run effect but a positive long-run impact. In the short run, the coefficient is (–0.0695, p = 0.0098), indicating that investment projects may initially slow growth. This lag could be due to implementation delays, misallocation of capital, or a lack of immediate returns from infrastructure or equipment investments.

However, the relationship turns positive and significant (0.0470, p = 0.0347) in the long-run. This supports the view that capital accumulation, when well-managed

contributes to sustainable and inclusive growth. Over time, infrastructure and capital investments reduce production costs, improve connectivity, and boost overall productivity, leading to higher income per worker which in turn enhances inclusive growth in Nigeria.

Inflation (*INF*) exhibits an insignificant positive effect in the short run (0.0009, p = 0.2407) and an insignificant negative impact in the long run (–0.0006, p = 0.2694). These findings suggest that price movements have no immediate or consistent effect on inclusive growth in Nigeria. However, the long-run negative sign is consistent with the broader economic view that inflation, particularly when uncontrolled can undermine investment, distort consumption, and erode real incomes. The lack of statistical significance may reflect relatively stable inflation during parts of the sample period or mitigating fiscal/monetary responses.

The diagnostic test results in Table 4 show that the Jarque–Bera normality test produces a statistic of 2.2578 and a p-value of 0.3234. The p-value surpasses conventional significance thresholds, we fail to reject the null hypothesis that the residuals are normally distributed. In practical terms, this indicates that the error terms from our ARDL model conform to the assumption of normality, which underpins the validity of t-tests and F-tests for our coefficient estimates.

An F-statistic of 0.2652 and a p-value of 0.7744 are the results that are obtained from the Breusch–Godfrey (LM) test applied to serial correlation. Thus, the high p-value indicates that we are unable to reject the null hypothesis that there is no autocorrelation. This result reassures us that the residuals in our dynamic specification are not serially correlated, and there is no lingering pattern in the errors that might bias our standard errors or inference. For heteroskedasticity, the Breusch–Pagan–Godfrey test indicates an F-statistic (0.4092) and p-value (0.9490). With such a large p-value, we accept the null hypothesis of constant error variance. This homoskedasticity suggests that the dispersion of the residuals does not systematically vary with the level of the regressors, supporting the efficiency of our ARDL estimates.

Finally, the Ramsey RESET test result for model specification with F-statistic (0.5332) and p-value (0.6084) indicates that our chosen ARDL specification appears correctly specified. There exists no major misspecification bias, meaning the model's functional form adequately captures the relationships among inclusive growth, tax structure, inequality, and the control variables. Thus, this robust diagnostic profile lends confidence to our short-run and long-run coefficient estimates and supports the reliability of the policy conclusions we draw from the model.

5. Discussion

The empirical findings of this study offer important insights into the relationship between tax structure, income inequality, and inclusive growth in Nigeria. The results confirm some of the formulated hypotheses, while others are only partially supported, providing a nuanced understanding of the dynamics at play.

Hypothesis *H01*, which posits that the tax-to-GDP ratio has a significant effect on inclusive growth, is confirmed in the short run but not in the long run. In the short term, increased tax revenue contributes positively to inclusive growth, suggesting that government expenditure financed by tax revenue can generate immediate social and economic benefits.

This aligns with Abd-Hakim [34] findings on Malaysia, where higher tax receipts, particularly indirect taxes, supported growth-enhancing public investments. However, the long-run effect is negative and statistically insignificant, indicating that over time, inefficiencies in tax administration and public spending may erode these gains. This is consistent with the findings of the studies of Balasoiu et al. [19] on 28 EU countries, Tanchev [40] on Bulgaria, Tendengu [42] on South Africa, Basha [5] on Jordan, Annyaduba & Otulugbu [4] and George-Anokwuru [37] on Nigeria.

However, the findings contradict the studies of Ekong et al. [21], Pere-Ere et al. [22] on Nigeria and Neog & Gaur [35] on India. Together, these results suggest that while additional tax resources can boost growth in the near term, the efficiency and targeting of those funds determine whether they translate into sustainable, broad-based development.

Hypothesis *H02*, which suggests that income inequality affects inclusive growth, is strongly supported. The short-run relationship is positive, possibly reflecting elite-driven investment that temporarily boosts growth.

However, the long-run impact is negative and significant, corroborating the views of Alves & Afonso [28] on OECD countries, Anyaduba & Otulugbu [4] on Nigeria as well as Topuz [43] on 143 countries, which align with the notion that sudden spikes in inequality disenfranchise large segments of the population and dampen aggregate demand. However, it negates the findings of Danso & Boateng [45], 52. Mbara [52] in Kenya and Ibekwe & Ibekwe [10] on Nigeria. Thus, inequality may accompany growth in the short run; it is likely reflecting exclusionary or elite-driven growth, which may not be sustainable or socially desirable. Therefore, redistributive policies, including progressive taxation, social safety nets, and inclusive human capital investments, are essential to ensure that growth is not only strong but also broad-based and equitable.

While the study presents important policy-relevant insights, it is not without limitations. First, the use of macro-level time series data may mask important subnational variations in tax structure, inequality, and growth outcomes across Nigeria's diverse regions. Secondly, while the ARDL approach is robust for analyzing dynamic relationships, it does not establish causality.

Future research could employ structural models or instrumental variable techniques to better identify causal pathways. Additionally, the measure of inclusive growth, GDP per person employed captures income-related inclusivity but does not fully reflect non-income dimensions such as access to health, education, or gender equality. Broader indicators could provide a more holistic assessment. Despite these limitations, the findings provide a strong empirical foundation for rethinking

Nigeria's fiscal policy strategy. They underscore the importance of not only raising revenue but also ensuring that such revenue is equitably and efficiently spent to achieve inclusive and sustainable development.

6. Conclusion

This study investigated the relationship between tax structure and inclusive growth in Nigeria, with particular attention to the mediating role of income inequality, using annual time series data from 1993 to 2023. Employing the Autoregressive Distributed Lag (ARDL) model within the framework of an augmented endogenous growth theory, the study reveals that tax structure and income inequality negatively affect inclusive growth in Nigeria within the study period.

Theoretically, the study contributes to existing literature by reinforcing the relevance of endogenous growth theory in explaining how fiscal policy, particularly the structure of taxation can influence long-term development outcomes. It extends conventional models by empirically demonstrating that income inequality acts not only as an outcome of fiscal dynamics but also as a channel through which tax policy affects inclusive growth. The findings also support the evolving theoretical understanding that inequality may have mixed effects, potentially boosting growth in the short run due to elite-driven investment, but undermining it in the long run through reduced access to opportunities and weakened social cohesion.

Practically, the study highlights critical implications for policy reform in Nigeria. The results reveal that while increased tax revenue can positively influence inclusive growth in the short term, its long-term effectiveness depends heavily on the efficiency and equity of public expenditure. This underscores the need for fiscal reforms that not only enhance revenue mobilization but also improve transparency, accountability, and pro-poor spending. Moreover, the significant long-run negative effect of income inequality on inclusive growth calls for targeted redistributive policies, such as progressive taxation, inclusive education, social protection programs, and investments in human capital.

The study therefore recommends the need to improve the efficiency of tax utilization, particularly by channeling revenues into inclusive social investments, as well as fiscal reforms that emphasize transparency, accountability, and developmental expenditures, which should be implemented to enhance inclusive growth.

Furthermore, re-distributive policies, including progressive taxation, welfare programs and inclusive human capital investments, are crucial for ensuring that growth is robust, broad-based and equitable.

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FOR CITATION

Olaniyi, O.A. (2025). Tax Structure and Inclusive Growth in Nigeria: The Mediating Role of Income Inequality. *Journal of Applied Economic Research,* Vol. 24, No. 4, 1165–1187. https://doi.org/10.15826/vestnik.2025.24.4.038

ARTICLE INFO

Received May 25, 2025; Revised July 22, 2025; Accepted August 12, 2025.

УДК 336.2

Налоговая структура и инклюзивный рост в Нигерии: посредническая роль неравенства доходов

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Аннотация. Несмотря на десятилетия экономического роста, в Нигерии сохраняется неравенство доходов и широко распространенная бедность, что вызывает обеспокоенность по поводу инклюзивности траектории развития страны. Налоговая система Нигерии по-прежнему в значительной степени зависит от косвенных налогов, которые непропорционально сильно влияют на бедные слои населения, в то время как прямые налоги, имеющие решающее значение для перераспределительной справедливости, используются в недостаточной степени. В этом исследовании изучается, как налоговая структура влияет на инклюзивный рост с особым акцентом на посредническую роль неравенства доходов в Нигерии. Используя данные годовых временных рядов с 1993 по 2023 г., в исследовании используется модель дополненного эндогенного роста Барро-Сала-и-Мартина (1992) и метод оценки авторегрессионного распределенного лага (ARDL). Модель учитывает краткосрочную динамику и долгосрочные равновесные взаимосвязи, при этом проверяется с помощью надежных диагностических тестов, включая тест Брейша — Пагана — Годфри на гетероскедастичность, тест Рамсея RESET, тест Брейша — Годфри LM на серийную корреляцию и тест нормальности Жака — Бера. Результаты показывают, что налоговая структура положительно и существенно влияет на инклюзивный рост в краткосрочной перспективе, но оказывает негативное и статистически незначимое влияние в долгосрочной перспективе. Неравенство доходов имеет краткосрочное положительное влияние, но значительное негативное влияние в долгосрочной перспективе. Это говорит о том, что сохранение неравенства доходов подрывает устойчивое развитие. Участие в рабочей силе и накоплении капитала демонстрируют зависящие от времени эффекты, которые в долгосрочной перспективе приносят выгоды для инклюзивного роста. Инфляция была признана незначительной в обоих периодах. Эти выводы подчеркивают необходимость проведения налогово-бюджетных реформ, в которых приоритет отдается эффективному использованию налогов, прогрессивному перераспределению и инклюзивным государственным инвестициям. Укрепление основ налогово-бюджетной политики Нигерии и повышение справедливости в сборе налогов и расходовании средств могут способствовать устойчивому развитию на широкой основе.

Ключевые слова: налоговая структура; инклюзивный рост; неравенство доходов; метод оценки авторегрессионного распределенного лага; Нигерия.

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ДЛЯ ЦИТИРОВАНИЯ

Оланийи О. А. Налоговая структура и инклюзивный рост в Нигерии: посредническая роль неравенства доходов // Journal of Applied Economic Research. 2025. Т. 24, № 4. С. 1165–1187. https://doi.org/10.15826/vestnik.2025.24.4.038

ИНФОРМАЦИЯ О СТАТЬЕ

Дата поступления 25 мая 2025 г.; дата поступления после рецензирования 22 июля 2025 г.; дата принятия к печати 12 августа 2025 г.