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**CAN WE TAX OURSELVES OUT OF POVERTY? THE INTERACTION OF GOVERNANCE ON
THE LINK BETWEEN TAX REVENUE AND SUSTAINABLE DEVELOPMENT IN NIGERIA**

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Abstract

Tax revenue provides a potent tool for governance and economic emancipation of nations irrespective of region and level of development because of its non-vulnerability to external shocks like other natural resources income flows. This study explored the moderating effect governance on the nexus between tax revenue and sustainable development of Nigeria from 1996 to 2024. Anchoring on fiscal social contract and institutional theories, explanatory research design was deployed and secondary data was collected to effectively operationalize the research variables. The autoregressive distributed lag method was utilized as the appropriate estimation method after the pre-estimation tests. The empirical results indicated that tax revenue only exhibited significant influence on sustainable development at the introduction of governance indices. However, both tax revenue and governance has significant and negative effects on sustainable development of Nigeria. The study also found that governance significantly and negatively moderates the effect of tax revenue on sustainable development of Nigeria in the short run. Thus, the study called for urgent government action on the basic elements of governance indicators identified by the World Governance Indicator (WGI), as a necessity for Nigeria's fiscal revenue to effectively and positively contribute towards sustainable development.

Keywords: Governance, Tax Revenue, Sustainable Development, Tax-To-GDP Ratio, Economic Development, World Governance Indicator.

Introduction

The achievement of sustainable development is predicated on certain factors of which government revenue is very crucial among them (O'Hare & Hall, 2022). The strength of every government lies, to a reasonable extent, on its wealth and disposition to protect as well as provide for its people. So, the concept of government revenue especially through consistent sources such as taxation remains a potent economic driver to the realization of development goals. According to Degirmenci (2024), sustainable development is a more desirable and

strategic approach to global progress because it balances all the important aspects of growth which includes; the environment, society and economy. The Sustainable Development Goals (SDGs) by United Nations provides a clear picture of the global advancement possibilities through a total of seventeen actionable goals (Hall & O'Hare, 2023). These SDGs are to be harped on by various countries' governments through provision of access to food, clean water, health care, sanitized environment, education and gender neutral opportunities. However, these goals require funding first, after which strategic plans and dedicated implementation must be provided to successfully realize them.

Government revenue is the totality of income that accrues to the administrative arm of a country, state or local government. It is a very important contributor to growth because it determines how potent and relevant the government is perceived by its people and foreigners. Hence the provision of general goods majorly underscored by the SDGs requires effective mobilization of funding through taxation. Ubali et al (2024) submits that countries should attain a minimum tax to GDP ratio of 15% to realize the SDGs efficiently. In Nigeria, government revenue sourcing is distributed among the three tiers of government, with the central government holding the greater part of the wealth's sources, thereby making the central government the most powerful tier of government effortlessly. As a result, the central government administration of Nigeria is significantly tasked with the realization of the national goals on sustainable development as it controls a greater percentage of the country's resources.

The principle of resource control which is needed to direct financial resources towards achievement of set goals highlights the importance of effective and efficient government administration. One of the lessons that resonates from the Nigerian oil boom period and current economic fix, is that of criticality of governance to control wealth, align them to set goals to ensure sustainability. In line with the resource curse theory, Nigeria as a country blessed with various natural resources of which oil is in commercial quantities, still struggles with inadequate funding for developmental courses due to inadequate strategy in governance (Johnson & Omodero, 2021). So, the sufficiency of financial resources available and its successful applicability to achieve national objectives may depend to a reasonable extent on the quality of governance it can offer. Governance deals with the administrative aspect of national leadership where government is saddled with the task of proper utilization of available scarce resources to provide for increasing expenditure paths (Hall & O'Hare, 2023). According to Johnson and Omodero (2021), the quality of governance can influence its revenue mobilization ability. This underscores the role of leadership style and performance of the government in drawing the peoples' support and eliciting compliance to taxation. Sustainable development requires predictable public finance. In resource-rich Nigeria where tax revenue is structurally low and volatile relative to needs. Increased tax revenues may not often translate into sustainable development, depending critically on governance quality (Besley & Persson, 2009); credibility, efficiency, and accountability. This study therefore aims to assess the influence of tax revenue on the actualization of sustainable development in Nigeria, while considering the moderating effect of governance on the relationship.

The study seeks answers to the following questions; how does tax revenue affect sustainable development of Nigeria? And what is the moderating effect of governance on the link between tax revenue and sustainable development in Nigeria?

The study explores the practicability of tax administration as a tool for fostering sustainable development. It educates tax scholars on the role of governance, and aids policy makers to better align governance actions to achieve sustainable development. The debate on whether taxation can serve as a sustainable pathway out of poverty and underdevelopment remains inconclusive for example Ayana et al (2024) submitted that tax revenue can be inimical to growth of Sub-Saharan African countries. While extant literature acknowledges the role of tax revenue in financing development (Onyekachi & Anaeme, 2021), evidence is inconclusive on whether higher taxation translates directly into sustainable outcomes, particularly in resource-dependent economies such as Nigeria (Adefolake & Omodero, 2022). This gap is largely due to the omission of governance quality as a moderating variable (Khaltar, 2023; Appiah et al, 2025). By analyzing the interactive effect of governance on tax revenue, this study contributes to the fiscal sociology and public finance literature, offering deeper insights into how governance quality moderates the effectiveness of taxation in driving sustainable development.

Literature Review

Tax Revenue and Sustainable Development in Nigeria

Taxation is a compulsory transfer of economic resources from individuals and corporate entities to the government with the aim of funding the provision of general goods and other objectives of the government. The process of taxation is part of the fiscal policy of a country which is intended to generate revenue for the government. Ubali et al (2024) opined that revenues from taxation is a basic source of government income from which it can fund the SDGs. It provides a solid avenue to fund sustainable development and achieve economic growth (Ajeigbe et al, 2024) but the case is not exactly the same for Nigeria. According to Jung (2023), Nigeria's persistent low revenue stems from its undue dependence on oil revenue which is vulnerable to shocks from the volatile international oil market. This is perhaps, also responsible for the low tax to GDP ratio as the focus for national revenue mobilization has been on the scramble for oil resources. Nonetheless, tax revenue continues to provide a veritable means for the Nigerian government to support the dwindling oil revenue in recent times. According to Onyekachi et al (2018), tax revenue influences Nigerian infrastructural development positively and significantly. The findings imply that even for a developing nation leaning unduly on oil resources, tax revenue is still relevant for enhancing developmental progress. Empirical studies on Nigerian fiscal policy have submitted evidences to prove that tax revenue improves economic growth in Nigeria (Ogbonna & Odoemelam, 2015; Duru, 2017; Abomaye-Nimenibo et al, 2018; Bamidele & Olowookere, 2019; Ayeni & Omodero, 2022) but Ofoegbu et al (2016) opined that gross development product (GDP) may not be a perfect indicator for measuring the impact of taxation as it presents a bloated picture of economic development, the study maintained that tax revenue should be pitched against indicators of sustainable development which present a more persistent economic performance for Nigeria.

This stance was further supported by the results of Halim and Rahman (2022) which suggests that multidimensional sustainable development outcomes respond to tax policy. Also, O'Hare and Hall (2022) submitted positive correlations between tax revenue and SDG indicators thereby supporting that taxation is closely linked to sustainable development outcomes beyond growth alone. Linking tax revenue to sustainable development in Nigeria has become essential in fiscal policy research thrusts because government wealth may not always translate to human development for some African developing countries (Aizenman et al, 2021; Ofoegbu et al, 2016,

Halim & Rahman, 2022; Onyekachi & Anaeme, 2021). In addition, Jung (2023) opined that as Nigeria’s fiscal revenue continues to decline, the economy relies on oil revenue, thereby making it vulnerable to external shocks. So, there is need to empirically link fiscal revenue to concrete economic indicators of sustainable development.

Ubali et al (2024) strongly argued that increased government revenue should enable it drive towards the SDGs. This is because government expenditures on public services will boost economic activities (Hall & O’Hare, 2023) by financially empowering the private sector. There is also a boomerang effect as the improved activities in the economy yields more revenue to the government through taxation. Hence the relationship between tax revenue and sustainable development can be described as mutually reinforcing provided that there is a strong political will to put the nation’s realization of its sustainable economic progress above self-interests. In other words, the quality of governance prevalent may be critical to the continuous successful transformation of government revenue and public expenditure to sustainable development.

Interacting Influence of Governance on the Nexus Between Tax Revenue and Sustainable Development

The quest for sustainable development was solidified by the articulation of the SDGs in 2015. The 2030 agenda for sustainable development is a universal action plan for all people, planet, prosperity, peace and partnership. It was adopted by the United Nations General Assembly, setting out 17 goals and 169 targets to be pursued by all countries. The SDGs emphasize that the pursuit of economic growth alone is not sufficient for lasting development thus, it should be supported by social inclusion and environmental protection (UN General Assembly, 2015). Obviously, the plan also covered the funding aspect and domestic resource mobilization is one the major pillars of the SDGs financing strategies. However, Nigeria have not been able to meet the least tax to GDP target for adequate domestic revenue mobilization, this precarious situation requires critical steps to address it holistically.

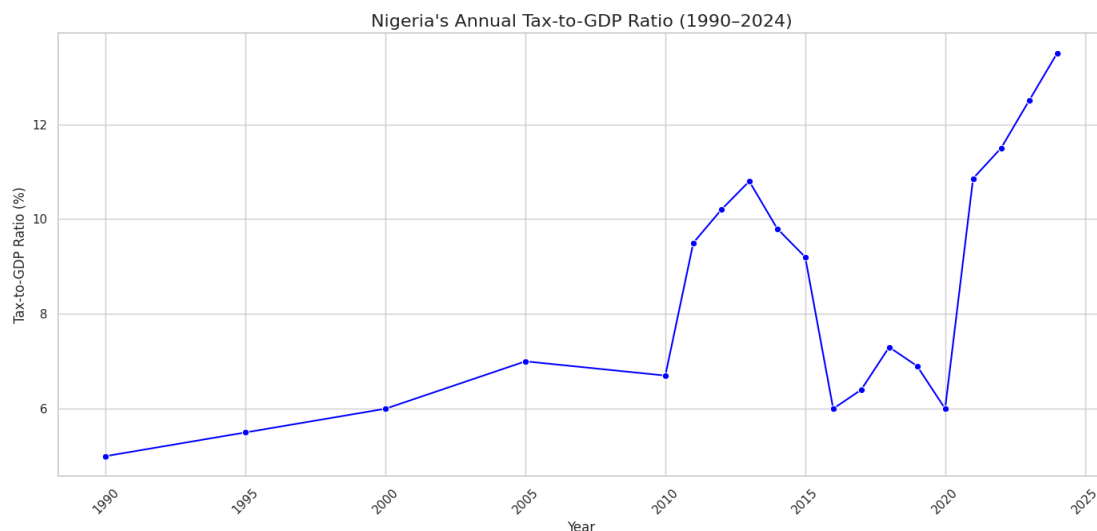


Fig. 1: Tax-to-GDP ratio chart from 1990 to 2024

Fig. 1 shows the tax to GDP ratio of Nigeria from 1990 to 2024 mirroring its volatility over the years. For past three decades, Nigeria’s tax-to-GDP ratio has remained lower than the regional and global benchmarks reflecting persistent structural challenges. Between 1990 and

2010, the ratio fluctuated between 5–7%, largely due to overreliance on oil revenues and consequent limited tax compliance (Oladejo, 2024). There was a brief improvement between 2010 and 2013 which coincides with high oil prices and early tax reforms as submitted by the National Bureau of Statistics (2023). But the fall in oil prices in 2014 and also the 2020 pandemic led to a sharp decline, with the ratio falling to 6.0% in 2016 and again in 2020 (International Monetary Fund IMF, 2023). In 2021, the Federal Government revised its methodology to include previously excluded revenue sources such as Customs and various States Internal Revenue Services, raising the ratio to 10.86% (National Bureau of Statistics, 2023). The ratio reached a record high of 13.5% in 2024, driven by reforms in tax administration, digital systems, and policy incentives aimed at broadening the tax base and reducing exemptions (KSBC Journal, 2025). Despite this progress, Nigeria still lags behind the African average of 18.8% and the OECD average of 34.2%, underscoring the need for sustained fiscal policy reforms in Nigeria (IMF, 2023). The implication of the tax to GDP ratio historical analyses in Fig. 1 is that the Nigerian state has been performing poorly in domestic resource mobilization, creating a room for sourcing more revenue using the better approaches to attain sustainable development.

Various scholarly outputs have emphasized that revenues from taxation can sustain the financing need of countries, for every aspect of development if it can be effectively harnessed. For example, Ayana et al (2024) found that tax revenue of Sub-Saharan African countries of which Nigeria is a unit, has significant negative influence on their economic growth. Interestingly, the study also revealed that institutional quality improves the link between tax revenue and economic growth of these countries. The study therefore suggests that the quality of governance in a country is relevant to the relationship that may subsist between tax revenue and sustainable development of such country. Degirmenci (2024) found that tax revenue has significant influence on the sustainable development of Turkey. Hall and O’Hare (2023) generalized the secondary data collection on all countries of the world and used a sample of 217 countries to analyze the effect of tax revenue on quality of governance. The study posited based on its findings that, increases in tax revenue improves the quality of governance, and then quality governance significantly and positively influences sustainable development of the sampled countries. Evidence from Organization for Economic Co-operation and Development (OECD) countries indicates that tax revenue indicators have significant and positive influence on sustainable development (Rahman, 2023).

A cross-country study of both African and non-African countries by Ajeigbe et al (2024) found that tax revenue has significant positive influence on economic growth and opposite effect on poverty and unemployment rate. This result affirms the idea that economic growth does not necessarily translate to sustainable development; and both variables may not respond the same way to variations in tax revenue. Khaltar (2024) found that quality governance effectively reduces tax evasion in sampled 112 developing countries covered by the study. However, Olaleye et al (2024) while studying a sample of 36 Sub-Saharan African countries submitted that governance negatively moderates the effect of tax revenue on the sustainable economic welfare of the region. So, the study argued that the link connecting the variables is complex and maintains that the countries should consider governance as a factor while making tax policies. Ayana et al (2024) had similar results and therefore concluded that institutional quality is a critical factor in determining the direction of tax revenue’s influence on economic

growth of Sub-Saharan African countries. This outcome is worrisome and demands answers to unravel the efficacy of tax revenue to providing solutions to financial needs of the region. Is tax revenue really sufficient for sustainable development in Nigeria?

Akanbi (2019) concluded that tax capacity and quality governance mutually reinforces each other based on the data of 110 resource-rich countries. The study found that both variables has higher bi-directional causal effects for developing countries. Ubali et al (2024) did a case study of Nigeria and found that while tax revenue has negative effect on sustainable development, government expenditure influences it positively. This result implies that domestic revenue mobilization in Nigeria may not be accountable for its expenditure because both variables elicit conflicting responses from sustainable development. Johnson and Omodero (2021) submitted that quality governance could be instrumental to effective domestic revenue mobilization. Sampling 20 years data from Nigeria, the study concluded that bad governance has no significant effect on tax revenue mobilization. Adekanmbi et al (2022) concluded that major tax revenue components in Nigeria only have positive and significant short run effect on sustainable development. But the study measured sustainable development with GDP.

There is need for a Nigerian case study on the relevance of tax revenue to sustainable development including the assessment of interaction effect of governance on this nexus. The framework of this concept is captured in the Fig. 2;

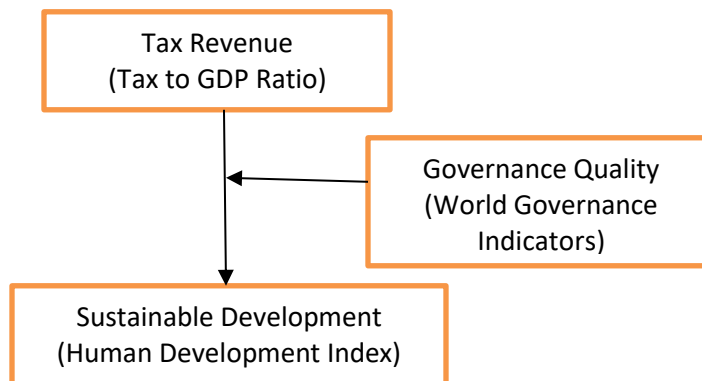


Fig. 2: Framework of the moderating effect of governance quality on the link between tax revenue and sustainable development.

Theoretical Framework and Hypotheses Formulation

Fiscal Social Contract Theory

Taxation often implies that a social contract subsists between the citizens who pay taxes with the expectation to partake of public goods and services and the government who is saddled with the responsibility of this provision, thus promoting sustainable development. When this social contract is honored, voluntary compliance can be easily attained (Umar et al, 2017) and development becomes inclusive and sustainable. The fiscal social contract theory is an offshoot of the social contract theory developed by scholars like Thomas Hobbes, John Locke, and Jean-Jacques Rousseau in the 17th–18th centuries. However, the fiscal aspects of the theory was proposed by Joseph Schumpeter in 1918. According to Moore (2008), taxation connotes an implicit contract between the citizens and the government hence it provides a platform for both parties to bargain and subsequently demand for accountability. The fiscal social contract theory aligns with the concept of taxation when it over-reaches the bounds of

revenue mobilization and extends to investment in lasting and inclusive development to the benefit of the masses. The theory recognizes that the process of taxation can be harmonious through compliance and strategic via investment into collective development (Obayuwana, 2020). The process of taxation can be applied to lift the people out of under-development when the government simply upholds their own part of the social contract. So, this study hypothesizes that;

Hypothesis I: Tax revenue has no significant effect on sustainable development of Nigeria.

Institutional Theory

Institutional theory describes how accepted societal norms and settings guide people's behavior and strength of character. The government administrators as custodians of laws and societal norms legitimizes any disposition they portray in their duties hence the need to uphold strong and good governance mechanisms in Nigeria. A weak institutional setting where resources are mismanaged, revenues leak through corruption and public services suffer even when tax revenue increases; is bound to demoralize altruistic behaviours and promote tax evasion (Onyekachi & Anaeme, 2021). Kifordu et al (2020) held that good governance enhances effective application of taxation to achieve societal welfare whereas weak institutional settings foster inefficiencies in revenue mobilization. The concept of good governance as a moderator of the tax revenue and sustainable development link, is built on the efficacy of institutional influence on the dispositions that constitutes acceptable norm in Nigeria. This study therefore proposes a reinforcing link of where increased tax revenues are guaranteed by enhanced tax morale and voluntary compliance legitimized by evident public goods and services delivered through good governance. Hence the second null hypothesis states;

Hypothesis II: Good governance does not interact significantly on the relationship between tax revenue and sustainable development in Nigeria.

Methodology

This study sets out to analyze the moderating effect of governance on the relationship between tax revenue and sustainable development; thus it is built on explanatory research design. Secondary data were collected from Central Bank of Nigeria statistical bulletin, and websites of World Bank Group United Nations Development Programme to form a time series from 1996 – 2024. The focuses on the case of Nigeria as one of the Sub-Saharan African countries, located on the western region of Africa. The country is resource-rich, has a large population that stood at 237 million as at June 2025 according to Worldometer (2025). Nigeria is categorized as a developing nation and has undertaken tax reforms in recent times which are aimed at harnessing its tax potentials and mitigating the tax losses through its large underground economy. The data collected were analyzed using autoregressive distributed lag (ARDL) method after checking the appropriateness through series of pre-estimation tests. Moderated regression equation was adjusted for, in the ARDL model to test whether governance amplifies or diminishes the effect of tax revenue on sustainable development. According to Onabote et al (2023), ARDL model is a more effective estimation technique for time series of less than 50 years, allows for different stationarity order in the variables and can handle short-run and long-run cases in a single model. These analyses were conducted with the aid of Eviews version 13 analytical software.

Model Specification

The empirical assessment of the two hypotheses were captured as follows;
Model 1 for the first hypothesis is specified as follows:

$$SD_t = \alpha + \beta_1 TR_t + \beta_2 GOV_t + \gamma' X_t + \varepsilon_t \quad (1)$$

Where: SD is sustainable development captured as human development index

TR is tax revenue measured as annual tax to GDP ratios

GOV is governance index, summation of the six worldwide governance index

t for time, α is the constant of the regression, β is beta or slope of the equation, $\gamma'X$ is gamma prime for summation of all the control variables and ε is the error term.

Control variables included in the equation are inflation rate and GDP growth rate.

The ARDL model is the specified as;

$$SD_t = \alpha_0 + \sum_{i=1}^p \phi_i SD_{t-i} + \sum_{j=0}^{q1} \beta_j TAX_GDP_{t-j} + \sum_{j=0}^{q2} \gamma_j GOV_{t-j} + \sum_{j=0}^{q3} \delta_j INF_{t-j} + \sum_{j=0}^{q4} \eta_j GDP_gr_{t-j} + \varepsilon_t \quad (2)$$

Conditional ECM form (for bounds test and short-run/long-run)

$$\Delta SD_t = \psi_0 + \sum_{i=1}^{p-1} \psi_i \Delta SD_{t-i} + \sum_{j=0}^{q1-1} \pi_j \Delta TAX_GDP_{t-j} + \sum_{j=0}^{q2-1} \rho_j \Delta GOV_{t-j} + \sum_{j=0}^{q3-1} \chi_j \Delta INF_{t-j} + \sum_{j=0}^{q4-1} \omega_j \Delta GDP_gr_{t-j} + \lambda (SD_{t-1} - \theta_1 TAX_GDP_{t-1} - \theta_2 GOV_{t-1} - \theta_3 INF_{t-1} - \theta_4 GDP_gr_{t-1}) + \varepsilon_t \quad (3)$$

Where Δ denotes first differences or short-run changes.

$\lambda < 0$ is the error-correction speed describing how fast deviations from the long run are corrected.

The bracketed term is the error-correction term (ECT), i.e., the long-run equilibrium relationship.

θ_k are long-run coefficients; $\psi_i, \pi_j, \rho_j, \omega_j, \chi_j, \eta_j, \kappa_j, \zeta_j$ are short-run coefficients.

Model 2 for the second hypothesis is specified thus:

$$SD_t = \alpha + \beta_1 TR_t + \beta_2 GOV_t + \beta_3 INTERACTION + \gamma' X_t + \varepsilon_t \quad (4)$$

Where INTERACTION or $(TAX_GDP_t * GOV_t)$ represents the interaction term included in the second model for moderated regression. The moderation term was included in the ARDL model and specified as follows;

$$SD_t = \alpha_0 + \sum_{i=1}^p \phi_i SD_{t-i} + \sum_{j=0}^{q1} \beta_j TAX_GDP_{t-j} + \sum_{j=0}^{q2} \gamma_j GOV_{t-j} + \sum_{j=0}^{q3} \theta_j INTERACTION_{t-j} + \sum_{j=0}^{q4} \delta_j INF_{t-j} + \sum_{j=0}^{q5} \eta_j GDP_gr_{t-j} + \varepsilon_t \quad (5)$$

The conditional ECM form (for bounds test and short-run/long-run)

$$\Delta SD_t = \psi_0 + \sum_{i=1}^{p-1} \psi_i \Delta SD_{t-i} + \sum_{j=0}^{q1-1} \pi_j \Delta TAX_GDP_{t-j} + \sum_{j=0}^{q2-1} \rho_j \Delta GOV_{t-j} + \sum_{j=0}^{q3-1} \omega_j \Delta INTERACTION_{t-j} + \sum_{j=0}^{q4-1} \chi_j \Delta INF_{t-j} + \sum_{j=0}^{q5-1} \eta_j \Delta GDP_gr_{t-j} + \lambda (SD_{t-1} - \theta_0 - \theta_1 TAX_GDP_{t-1} - \theta_2 GOV_{t-1} - \theta_3 INTERACTION_{t-1} - \theta_4 INF_{t-1} - \theta_5 GDP_gr_{t-1}) + \varepsilon_t \quad (6)$$

Table 1: Specification of research variables

<i>Variable</i>	<i>Source</i>	<i>Description</i>
Sustainable development	Official website of World Bank Group United Nations Development Programme	Annual raw scores of Human Development Indexes for Nigeria contained in the online publication. Data was transformed to its logit form
Tax revenue	International Center for Tax and Development dataset publication (https://www.ictd.ac/dataset/) and World Bank development indicators dataset (https://databank.worldbank.org/)	Annual values for tax-to-GDP ratios and computations based percentage of tax revenue to GDP value in local currency units. Data was transformed to its natural log form.
Governance	World Governance Indicators published by the World Bank (https://www.worldbank.org/en/publication/worldwide-governance-indicators)	Total of six annual WGI for Nigeria. Transformed to its inverse hyperbolic sine form.
Interaction term	Researcher's computations	Product of transformed values of Tax-to-GDP ratio and total WGI of each year
Inflation rate	World Bank development indicators dataset (https://databank.worldbank.org/)	Annual values for inflation rate. Data was transformed to its natural log form
GDP growth rate	World Bank development indicators dataset (https://databank.worldbank.org/)	Annual values for GDP growth rate. Data was transformed to its linear form

Source: Research review 2024

Empirical Results

The data analyses included a pre-estimation tests to determine the right procedure for hypotheses testing after which the variables were analyzed using the autoregressive distributed lag method.

Descriptive and Unit Root Analyses

The descriptive and unit root tests of variables were taken and the results are shown on table 2.

Table 2: Descriptive analyses of variables

	LOGIT_HDI	LN_TAX_GDP	IHS_GOV	GDP_GR	LN_INF
Mean	0.021841	-2.373357	-2.656898	0.046517	-2.067585
Median	0.024001	-2.383795	-2.658165	0.042000	-2.079442
Maximum	0.180488	-1.610438	-2.613313	0.153000	-1.102620
Minimum	-0.140229	-2.905892	-2.692443	-0.018000	-2.918771
Std. Dev.	0.098453	0.346623	0.015488	0.034414	0.431886
Skewness	-0.054386	0.171850	0.404521	0.657894	0.245893
Kurtosis	1.756586	2.363134	3.923051	4.641980	2.798279
Jarque-Bera	1.882475	0.632838	1.820443	5.349773	0.341409
Probability	0.390145	0.728754	0.402435	0.068915	0.843071
Stationarity order	I(1)	I(1)	I(0)	I(1)	I(1)
Observations	29	29	29	29	29

Source: Eviews 13 output

The results on table 2 shows the variables in their transformed forms. While HDI was transformed to its logit form, the inverse hyperbolic sine transformation was utilized for the totaled six governance indicators because they comprised of both positive and negative values in various ranges. Tax to GDP ratio and inflation rate were transformed to their natural log forms whereas GDP growth rate was transformed to linear form.

The outcome of the descriptive analyses showed that the variables are normally distributed because the Jarque-Bera probabilities are all greater than the 5% benchmark which informs the acceptance of null hypothesis for normal distribution. The variables are also fairly dispersed around their mean scores as inferred from comparing their mean, median and ranges.

On the other hand, the unit root tests show that all the variables are not stationary in the same order. Good governance indicator was stationary at level while the other variables became stationary at first differencing thus the study concluded that the variables are stationary at mixed order.

Test of Hypotheses

Restatement of Hypothesis I: Tax revenue has no significant effect on sustainable development of Nigeria.

Table 3: ARDL Short-Run and Long-Run Estimates for LOGIT_HDI Model

Variable	Coefficient	Std. Error	t-Statistic	p-Value
Panel A: Short-Run Dynamics				
LOGIT_HDI(-1)	19.90196	4.228401	4.706734	0.002
LOGIT_HDI(-2)	-10.81782	3.454316	-3.131682	0.017
LOGIT_HDI(-3)	-8.168511	3.115192	-2.622153	0.034
ΔLN_TAX_GDP	0.004050	0.007482	0.541	0.605
ΔLN_TAX_GDP(-3)	-0.013440	0.006847	-1.963	0.090
ΔIHS_GOV	-0.672468	0.141233	-4.761	0.002
ΔIHS_GOV(-1)	-0.728997	0.179580	-4.059	0.005
ΔIHS_GOV(-2)	-0.815956	0.180517	-4.520	0.003
ΔIHS_GOV(-3)	-0.464023	0.214165	-2.167	0.067
ΔLN_INF	-0.017962	0.005533	-3.247	0.014
ΔGDP_GR	-0.045740	0.075335	-0.607	0.563
Constant	-7.524549	1.444820	-5.208	0.001
Error Correction Term (ECM(-1))	-0.084371	0.008130	-10.378	0.000
R-squared	0.8883			
F-statistic	227.93			
Prob(F-statistic)	0.000			
Durbin-Watson statistic	2.14			
Panel B: Long-Run Relationship				
Bound Test F-statistics	10.470			
Critical upper bounds (1%)	I(0)4.28	I(1)5.84		
LN_TAX_GDP	-0.072270	0.131179	-0.550929	0.587
IHS_GOV	-31.78142	17.71588	-1.793951	0.087
LN_INF	-0.510683	0.318004	-1.605902	0.123
GDP_GR	-3.969396	1.244210	-3.190294	0.004
Constant	-89.18355	49.42244	-1.804515	0.025

Source: Eviews 13 output

The ARDL model estimation was automatically selected using the Schwarz Criterion and presented on Table 3. The bounds test and error correction model (ECM) also included on Table 3 suggest that long-run relationship exist between the explanatory variables and HDI which captures sustainable development of Nigeria in this study. The bounds test confirmed the existence of a long-run relationship among the variables as the F-statistics of 10.47 is higher than the upper bounds of 5.84, thus the result validates co-integration assumption in the model. The long-run coefficients on the second panel in Table 3 shows that only GDP growth which is a control variable, has significant long-run influence on HDI. The good governance indicators continue to have negative impact on the HDI on the long-run though the significance level is weak. This implies that both tax revenue and governance indicators have negative effects on HDI of Nigeria on both short and long-run periods. The error correction term is negative and significant ($ECT = -0.08$, $p < 0.05$), indicating only 8% annual speed of adjustment to equilibrium. This outcome implies that deviations from the long-run path are corrected over time, demonstrating the dynamic stability of the model. However, the long-run outcome shows that both tax revenue and good governance indicators have negative and non-significant effects on sustainable development.

The short-run results according to the ARDL outcome revealed that inflation rate (LN_INF) has a significant and negative short-run effect on HDI ($p = 0.014$), while good governance (IHS_GOV) consistently exhibits a strong and negative association across all the lags ($p < 0.01$) except for lag of the third year. Tax revenue (LN_TAX_GDP) does not exhibit a statistically significant short-run impact. GDP growth (GDP_GR) yielded a negative and significant effect only at the third year lag ($p = 0.028$), but the lagged dependent variables are significant which indicates persistence in HDI over time. The model is strongly fitted ($R^2 = 0.89$, $Adj. R^2 = 0.88$) and its Durbin–Watson statistics of 2.14 indicates stability in the model as reflects near absence of autocorrelation.

Considering the reliability and stability of the model, the diagnostic tests confirms that the model has a normal distribution based on the Jarque-Bera probability of 0.57. The Breusch Godfrey serial correlation (0.78, 0.13) and heteroskedasticity (0.62, 0.45, 0.21) tests returned probability values of greater than 0.05 which suggest that absence of autocorrelation and stability of the study parameters for the period of the study. Additionally, the RAMSEY RESET ($p = 0.2269$, 0.1475, 0.0901) tests confirmed the model's validity and specification since the null hypothesis which holds that the model is correctly specified cannot be rejected based on the outcomes.

Based on the results, the study failed to reject the null hypothesis as restated thereby positing that tax revenue does not significantly influence sustainable development in Nigeria. It supports the positions of Ubali et al (2024), Okere et al (2022) for Nigeria. However the findings did not align with that of Degirmenci (2024), Saragih (2018) and Ofoegbu et al (2016) for Turkey, Indonesia and Nigeria respectively. The results for tax revenue and sustainable development continue to vary overtime, Onyekachi and Anaeme (2021) found that while direct tax had positive effect on HDI, indirect taxes have negative and insignificant effect on HDI. The timing, model and control variables adopted for the studies can influence variations in results particularly for Nigeria where it is evident that studies with contrary positions were carried out couple of years back.

Restatement of Hypothesis II: good governance does not interact significantly on the relationship between tax revenue and sustainable development in Nigeria.

Hypothesis II was analyzed by incorporating the interaction term into the ARDL model in order to assess the moderating effect of good governance on the sustainable development of Nigeria. The findings are summarized of table 4.

Table 4: ARDL Short-Run and Long-Run Estimates for Moderating Effect of Governance

Variable	Coefficient	Std. Error	t-Statistic	p-Value
Panel A: Short-Run Dynamics				
ΔLOGIT_HDI(-1)	0.999921	0.031867	31.37780	0.000
ΔLN_TAX_GDP	-5.294709	2.208425	-2.397505	0.031
ΔLN_TAX_GDP(-1)	-3.561088	1.566243	-2.273650	0.039
ΔLN_TAX_GDP(-2)	-1.901512	1.481967	-1.283100	0.220
ΔIHS_GOV	-5.101211	1.867261	-2.731921	0.016
ΔIHS_GOV(-1)	-3.189710	1.391270	-2.292660	0.038
ΔIHS_GOV(-2)	-2.046183	1.359492	-1.505109	0.155
ΔINTERACTION	-1.988311	0.829587	-2.396748	0.031
ΔINTERACTION(-1)	-1.338723	0.588881	-2.273336	0.039
ΔINTERACTION(-2)	-0.718465	0.556301	-1.291505	0.217
ΔLN_INF	-0.000987	0.007741	-0.127491	0.900
ΔGDP_GR	0.060308	0.072192	0.835375	0.417
Constant	-27.47750	6.413546	-4.284291	0.001
Error Correction Term (ECM(-1))	-7.93E-05	8.15E-06	-9.722381	0.000
R-squared	0.894			
F-statistic	252.65			
Prob(F-statistic)	0.000			
Durbin-Watson statistic	1.97			
Panel B: Long-Run Relationship				
Bound Test F-statistics	9.452			
Critical upper bounds (1%)	I(0)4.13	I(1)5.76		
LN_TAX_GDP(-1)	-441.6610	566.1098	-0.780169	0.4440
IHS_GOV(-1)	-423.0900	541.6516	-0.781111	0.4435
INTERACTION(-1)	-166.1553	212.8990	-0.780442	0.4438
LN_INF	0.043155	0.263960	0.163493	0.8717
GDP_GR(-1)	-0.718880	2.576361	-0.279029	0.7830
Constant	112.5911	144.1777	2.780919	0.0436

source: Eviews 13 output

The results on Table 4 indicate absence of specific long-run relationship between the variables when interaction of governance with tax revenue was introduced. This is because all the variables returned higher probabilities than the 5% threshold (p-values > 5%) except for the constant of the equation, though the bounds tests revealed possibility of long-run co-integration. Thus, the study failed to reject the null hypothesis for the long-run effect, thereby concluding that good governance does not significantly moderate the effect of tax revenue on sustainable development of Nigeria in the long run. Robustness checks on the model revealed that Jarque-Bera probability of the histogram is above 5% (p-value = 0.88) indicating that the model is from a normally distributed quantities. Furthermore, Breusch-Godfrey serial correlation (F-statistics=0.19, P-values=0.83 and 0.66) and heteroscedasticity (F-statistics=1.84,

p-values=0.23, 0.11 and 0.79) tests yielded probability values of above 5% which suggest that the null hypotheses in each of the cases should be accepted thus the study concludes that the model is consistent. The Ramsey RESET test yielded probability values of 0.32, 0.30 and 0.14 for the t-statistic, F-statistic and Likelihood ratio respectively. The estimation results was therefore deemed appropriate for inference on the basis of these robustness checks.

The short-run dynamics on the other hand revealed that both tax revenue and good governance interaction may have critical implications for sustainable development in Nigeria. The ARDL model was well specified as evidenced by its r-squared of 89% and the F-statistics of 252.65 (p-value < 5%). There is no significant issue of autocorrelation as revealed by the Durbin-Watson statistic of 1.97 hence the model was adopted for explaining the moderating effect of good governance in the short-run. The lagged value of HDI showed a significant association which attests to the persistence of the variable. The explanatory variables; tax revenue, good governance indicator and interaction effects are negatively and significantly associated with HDI as presented in Table 4 but the control variables; inflation rate and GDP growth rate do not significantly elicit responses from the HDI. Considering the direction of the effects, Table 4 shows that interaction term elicits negative effect on the HDI implying that governance indicator of Nigeria weakens the effectiveness of taxation to sustainable in the short-run. Though, this outcome appears not to confirm theoretical stances, the consideration of Nigeria's performance on governance as captured in the World Governance Indicators (WGIs) and descriptively presented on Table 2 shows that the Nigeria's governance indicators are negative values. This condition raises questions on the credibility of governance in Nigeria and its capacity to impact positively on any macroeconomic indices.

In the light of these findings, the study rejects the second null hypothesis as restated and thus conclude that governance indicators significantly moderate the link between tax revenue and sustainable development in Nigeria. This conclusion aligns with the positions of Akanbi (2019), Kifordu et al (2020), Johnson and Omodero (2021), Adekanmbi et al (2022), Khaltar (2024), Ayana et al (2024) and Olaleye et al (2024). But it is important to note that even though only Ayana et al (2024) and Olaleye et al (2024) employed a moderated regression model to conclude that governance factor is critical to the relevance of tax revenue to development, both studies used a panel data of Sub-Saharan African countries, thus this study submits evidential premise for the case of Nigeria particularly.

Conclusion and Policy Implication for Good Governance

Tax revenue remains a very important tool for governance and economic emancipation of nations irrespective of region and level of development. This is because of its consistency and non-vulnerability to external shocks like natural resources income flows. In the case of Nigeria, findings in this study reveal that tax revenue only elicited significant response from sustainable development in the second model where governance interaction was included. However, the response was only on the short-run basis and negative. This outcome implies that Nigeria can only tax itself out of poverty if the government takes drastic steps towards strengthening its effectiveness, accountability, regulatory quality, rule of law, control of corrupt practices and reduction of petty political tussles that unnecessarily heat up the polity. The study therefore concluded that while governance significantly highlights the relationship between taxation and sustainable development in Nigeria, the relationship is negative thereby implying that there is urgent need to deploy governance strategies that promote or attract positive responses from sustainable development.

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