



REVIEW ARTICLE

THE EFFECT OF TAX REVENUE ON PUBLIC BUDGET DEFICIT: EVIDENCE FROM NIGERIA

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ABSTRACT

This research was driven by Nigeria's continuing fiscal deficits, a low tax-to-GDP ratio, and volatile petroleum-dependent revenues, all of which weakened public infrastructure financing and macroeconomic stability. Accordingly, the study assessed how tax revenue affects public budget deficits in Nigeria by using time-series data covering 1981 to 2024. It adopted a quantitative longitudinal research design. The Autoregressive Distributed Lag (ARDL) model was used to examine both short-run and long-run relationships after unit root tests (Augmented Dickey-Fuller and Philip-Perron) established that the variables were a mixture of stationary series. The empirical findings showed that total tax revenue has a statistically significant positive impact on public budget outcomes in both the long and the short run, thereby confirming its essential contribution to fiscal stabilization. Disaggregated results indicated that indirect taxes consistently enhanced the budget balance, while direct taxes and higher public expenditure initially created short-term fiscal strain, attributable to compliance costs and spending pressures. Even so, highly significant negative error-correction terms indicated a swift adjustment back to long-run equilibrium after temporary shocks. The study concluded that tax revenue mobilization significantly reduces public budget deficits. It recommended that fiscal authorities prioritize full tax administration digitalisation, broaden the tax net, and rigorously enforce the Fiscal Responsibility Act in tandem with spending controls.

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INTRODUCTION

Budget performance determines how public revenues are managed to fund critical infrastructure and services, making it a key foundation for financial management and macroeconomic stability (Olaoye & Akinola, 2019). Sound revenue mobilization supports sustainable public finances (Olaoye & Alabadan, 2024); nevertheless, Nigeria has repeatedly experienced severe budget imbalances in which spending exceeds revenues (Michael *et al.*, 2024). These recurring shortfalls signal an ongoing deficit in government finances across the specified fiscal periods (Momodu & Monogbe, 2017). The Nigeria's federal budget deficits reached 3.88% of the anticipated Gross Domestic Product (GDP) in 2025, which indicates a non-compliant margin compared with the 3% statutory ceiling required under the Fiscal Responsibility Act of 2007 (Olusegun *et al.*, 2024). The main contributors to this higher deficit-to-GDP outcome included insufficient revenue collection, low levels of compliance, and a limited tax base (Felix & Elisha, 2023). Globally, Nigeria ranked 191 out of 193 countries, with a general revenue-to-GDP ratio of 7.3% in 2023—well below half the Economic Community of West African States (ECOWAS) average and only one-third of the Sub-Saharan African average (Jung, 2023). To mitigate this vulnerability, government efforts sought to increase the ratio to 15% by 2027 (Kolawole, 2021). Historically, actual revenues have been consistently below 70% of budgeted amounts, which has kept average expenditure execution under 85% (Amade & Oyigebe, 2024). Except for fiscal surpluses in 1995 and 1996, which were driven by structured deregulation and austerity measures (Adebisi & Oyeleke, 2020), government spending has continued to exceed revenues. Although tax revenue remains the most sustainable means of financing public spending (Bright, 2023), the empirical evidence on its effectiveness is inconsistent. For example, Waleed (2020) found no statistically significant effect of direct and indirect taxes on Jordan's budget deficit, while Anojan (2023) reported a substantial effect in Sri Lanka. Consequently, this study examined the impact of tax revenue on Nigeria's public budget deficit.

Conceptual Review

Public Budget Deficit: Budgets were defined as financial plans detailing projected revenue and expenditure (Central Bank of Nigeria, 2017). Budget performance denoted how entities fulfilled aims regarding revenue, expenditure, and debt sustainability through economy, efficiency, and effectiveness (Akano & Salawu, 2024; Laili & Sari, 2022; Osadola *et al.*, 2023). It served as a metric for a government's capacity to execute strategies and optimize resource allocation (Hadi Al Ghozali *et al.*, 2024; Liu, 2024; Olaoye & Alabadan, 2024). A public budget deficit can be understood as a fiscal situation in which a government's total spending surpasses the revenue it generates during a given fiscal period, with borrowing excluded (Musgrave & Musgrave, 1989). It signaled a shortfall in financial resources that compelled the state to close the gap by accumulating public debt, issuing currency, or liquidating assets (Stiglitz & Rosengard, 2015).

While deficits resulted from excessive spending or suboptimal collection (Balan, 2020), reforms like the Treasury Single Account were introduced to enhance transparency (Udoikah *et al.*, 2024; Uwaleke *et al.*, 2024). IPSAS 24 required juxtaposing budgeted and actual figures to enhance accountability (Dominic & Ubong, 2018; Ibrahim *et al.*, 2021). While some studies used GDP or capital expenditure as proxies, this study utilized budget balances as a percentage of GDP to reflect fiscal discipline (Adeyemi *et al.*, 2022; Arif & Arif, 2023; Okoye *et al.*, 2021). OECD metrics categorized performance via GDP ratios or expenditure growth (Ehizuelen & Bassey, 2025). This research assessed budget deficits using the budget balance-to-GDP ratio to evaluate national efficacy and debt viability (Hancer, 2024; Ogiji & Ajayi, 2020; Okwuokei, 2014; Olayide & Ikpi, 2010).

Tax Revenue: Tax revenue was conceptualized as a mandatory fiscal charge administered by government authorities to eligible individuals and legal entities, intended to finance public spending and support macroeconomic stabilization (Muhammad, 2025). As a key tool of public finance, it produces public resources without providing taxpayers with direct, reciprocal benefits (Kaka, 2020). Dakhil *et al.* (2025) described tax revenue generation as a structured mechanism in which administrative authorities apply tax provisions to enhance fiscal capacity. In Nigeria, tax revenues refer to revenue streams generated outside the crude oil sector, including major components of both direct and indirect taxation (Ajagun *et al.*, 2025; Ibitoye *et al.*, 2025). Direct taxes, including petroleum profit tax (PPT) and company income tax (CIT), were characterized as non-transferable levies borne directly by the profit-making entity (CBN, 2017). Under the Nigeria Tax Act of 2025, CIT operated within a two-tier statutory arrangement determined by corporate revenue thresholds. By contrast, indirect taxes, such as value added tax (VAT) and customs and excise duties, were defined as consumption-based charges incorporated into product pricing and passed on to final consumers (Folorunsho, 2023; George-Anokwuru, 2023).

Empirical Review: In Nigeria, Duyile *et al.* (2024) reported no Granger causality between the Corporate Income Tax (CIT) and budget execution, while the Value Added Tax (VAT) significantly Granger-caused capital expenditure. In line with this, Adeyemi *et al.* (2022) found that VAT had a positive effect on capital expenditure, whereas CIT had a significant negative effect. By contrast, Olaoye *et al.* (2024) observed that CIT and customs duties significantly improved budget implementation, whereas VAT exhibited a non-significant positive effect. Likewise, Olaoye and Akinola (2019) showed that CIT and Petroleum Profit Tax (PPT) enhanced capital execution, while customs duties improved recurrent budget performance.

Concerning revenue generation, Musa *et al.* (2023) and Adegbite and Fasina (2019) confirmed that direct and indirect taxes positively affected government revenues, although Amadi and Amadi (2023) reported that CIT and customs duties had no positive long-term effects on per capita income. Tax administrative challenges were also documented: Edori and Ogaluzor (2023) identified persistent shortfalls in targets by the Federal Inland Revenue Service (FIRS), and Owenvbiugie and Owenvbiugie (2020) attributed poor performance to evasion, corruption, and systemic non-compliance. Internationally, inconsistent results pointed to context-dependent dynamics. Anojan (2023) found that direct and indirect taxes explained 85% of the variance in Sri Lanka's budget deficit, whereas Waleed (2020) reported no significant effect in Jordan, attributing this to rising debt servicing and expenditure.

Theoretical Framework

Institutional Theory: Institutional Theory, introduced by Meyer and Rowan (1977), established the core framework for examining how organizational structures, regulatory settings, and governance mechanisms influence fiscal conduct and outcomes. The theory argued that organizations adopt standardized practices and structures to secure social legitimacy and to comply with rules in their environments (Andriele *et al.*, 2017; Lammers & Garcia, 2017). In public finance, budgetary institutions that include codified rules and procedural directives substantially shaped fiscal discipline and the achievement of budgetary balance (Alesina & Perotti, 1996).

Within the Nigerian context, the theory accounted for how institutional arrangements—such as tax laws, the Fiscal Responsibility Act of 2007, and public financial management regulations, structured the collection of tax revenues and the execution of budgets (Diamond, 2006). Ongoing budget deficits and limited revenue performance were linked to institutional shortcomings, weak regulatory enforcement, and corruption (Emelogu & Ozughalu, 2010; Kilishi, 2020). As a result, institutional quality was recognized as a key determinant of tax compliance and fiscal stability (Emmanuel *et al.*, 2024). Accordingly, Institutional Theory indicated that strengthened institutional capabilities improve the efficiency of both direct and indirect tax mobilisation, thereby enhancing budget execution and reducing fiscal deficits in Nigeria directly.

METHODOLOGY

The study employed a quantitative research method via a longitudinal research design to analyze time-series data (1981 – 2024), following the precedents set by Muhammad (2025), Okoroigwe *et al.* (2023), and Waleed (2020). Utilizing the approach of Oladejo (2024), the research utilized the entire population of Nigeria's fiscal metrics from 1981 to 2024. Secondary data were sourced from the Central Bank of Nigeria, Federal Inland Revenue Service. Inferential analysis was conducted using EViews 12, employing Principal Component Analysis for tax revenue indices and the Autoregressive Distributed Lag (ARDL) approach to estimate short- and long-run relationships.

Model Specifications

The research used the ARDL multiple regression model to investigate how tax revenue relates to budget deficit. The ARDL approach yields valid estimates regardless of a mixed order of integration up to I(1) (Umaru *et al.*, 2021) and makes it possible to assess temporal effects through a modern analytical framework (Aboudi *et al.*, 2023).

The study employed the ARDL multiple regression model to analyze the relationship between petroleum revenue and budget performance. ARDL provides valid estimation irrespective of mixed integration order up to I(1) and allows for examining temporal effects using a contemporary framework. The generalized ARDL (p, q) model is specified as:

$$Y_t = \gamma_{0i} + \sum_{i=1}^p d_i Y_{t-i} + \sum_{i=1}^q b_i X_{t-i} + \varepsilon_t \quad (1)$$

Where Y_t is a vector and the variable in (X_t) are allowed to be purely I(0) or I(1) or cointegrated; d and b are the coefficients; γ is the constant; $i = 1..k$; p, q are optimal lag orders; ε_t is a vector of the error terms – unobserved zero mean white noise vector process (serial uncorrelated or independent. More precisely, the researcher delineates models based on objectives of the study and formed as aggregated and disaggregated, all specify using ARDL as employed by Muhammad (2025).

Model 1: The effect of tax revenue on budget performance in Nigeria

$$BD_t = \beta_0 + \beta_1 TRI_t + \beta_2 \ln GE_t + \beta_3 \ln PDR_t + \varepsilon_t \quad (2)$$

Where: BP= Budget deficits proxied as Budget balances (% GDP)

β_0 = The constant term represents the expected value of the budget deficit when independent variables is zero.

TRI = Tax revenue index

$\ln GE$ = Log of government expenditure growth

$\ln PDR$ = Natural logarithm of public debt ratio

β_{1-3} , = The coefficients of direct relationship that represent the impact of each tax revenue and control variable on the budget performance
 ε_t =Error term.

The ARDL model is specified as follows:

$$\Delta BD_t = \beta_0 + \sum_{i=1}^p \phi_i \Delta BD_{t-i} + \sum_{i=1}^q \alpha_1 \Delta TRI_{t-i} + \sum_{i=1}^q \alpha_2 \Delta \ln GE_{t-i} + \sum_{i=1}^q \alpha_3 \Delta \ln PDR_{t-i} + \beta_1 BD_{t-1} + \beta_2 TRI_{t-1} + \beta_3 \ln GE_{t-1} + \beta_4 \ln PDR_{t-1} + \varepsilon_t \quad (3)$$

The Error Correction Model (ECM) model for BP_t is specified as follows:

$$\Delta BD_t = \beta_0 + \sum_{i=1}^p \phi_i \Delta BD_{t-i} + \sum_{i=1}^q \alpha_1 \Delta TRI_{t-i} + \sum_{i=1}^q \alpha_2 \Delta \ln GE_{t-i} + \sum_{i=1}^q \alpha_3 \Delta \ln PDR_{t-i} + \lambda ECT_{t-1} + \varepsilon_t \quad (4)$$

Where: All variables are as previously defined except:

$t=1$ =are the optimal lag orders.

$t-1$ =are the lag values.

ϕ, α =short term dynamics.

β =long term dynamics.

p =the maximum number of lags for independent variable in the study. It represents fiscal inertia. The parameter p tells us how many previous periods of Budget deficit ($BD_{t-1}, BD_{t-2}, \dots$) affect the current budget performance.

q =The lag of the independent and control variables (TRI, GE and PDR). It represents the transmission delay (or time lag). The parameter q tells us how many previous periods of the tax revenue, expenditure growth and public debt ratio affect the current budget. The lag length for p, q , may not necessarily be the same.

ε_t =Error term.

Δ =is the difference operator (compute the difference between consecutive observations). Useful to transform non-stationary data into stationary data. Long run models do not have a difference operator, only the short run model. $\lambda = (1 - \sum_{i=1}^p d_i)$, speed of adjustment (speed limit of the recovery) parameter back to equilibrium, with a negative sign and statistically significant. Tells us how resilient the Nigerian fiscal system is in returning to normal after a crisis. $ECT_{t-1} = (BD_{t-1} - \theta X_t)$, the error correction term which is the extracted residuals from the regressions of the long-

run equation. This is the most critical part of the model. It represents the gap or error from the previous period. The ECT calculates how much of that gap needs to be closed $\theta = \frac{\sum_{i=1}^q b_i}{\sum_{i=1}^q b_i + 1}$, is the long-run parameters

To analyze particular items of tax revenue (TRI), the TRI in equation 2 is further broken down and disaggregated into a linear form as set out in equation 5:

$$BD_t = \beta_0 + \beta_1 DTI_t + \beta_2 IDTI_t + \beta_3 \ln GE_t + \varepsilon_t \quad (5)$$

Where: All variables are as previously defined except

DTI = Direct taxes index.

IDTI = Indirect taxes index.

The ARDL model is specified as follows:

$$\Delta BD_t = \beta_0 + \sum_{i=1}^p \phi_i \Delta BD_{t-i} + \sum_{i=1}^q \alpha_1 \Delta DTI_{t-i} + \sum_{i=1}^q \alpha_2 \Delta IDTI_{t-i} + \sum_{i=1}^q \alpha_3 \Delta \ln GE_{t-i} + \beta_1 BD_{t-1} + \beta_2 DTI_{t-1} + \beta_3 IDTI_{t-1} + \beta_4 \ln GE_{t-1} + \varepsilon_t \quad (6)$$

Where: All variables are as previously defined.

The ARDL (Short run model) specification is stated due to absence of cointegration:

$$\Delta BD_t = \beta_0 + \sum_{i=1}^p \phi_i \Delta BD_{t-i} + \sum_{i=1}^q \alpha_1 \Delta DTI_{t-i} + \sum_{i=1}^q \alpha_2 \Delta IDTI_{t-i} + \sum_{i=1}^q \alpha_3 \Delta \ln GE_{t-i} + \varepsilon_t \quad (7)$$

Where: All variables are as previously defined.

RESULTS AND DISCUSSION

Descriptive Statistics: Raw data were used for descriptive statistics to ensure accuracy, detect outliers, and create a rigorous basis for modeling (Asuquo, 2021).

Table 1.2. Descriptive Statistics

Variable	Mean	Median	Max	Min	Std. D	Skew	Kurtosis	Jarque - B	Prob.	Obs.
BD	2.7098	2.6136	8.5696	0.0322	1.8733	0.7844	3.7576	5.5646	0.0618	44
TR	2931.9	1062.3	17184	6.2924	3842.7	1.6886	5.9844	37.241	0.0000	44
DT	2010.0	753.08	10462	4.3084	2455.2	1.2903	4.4163	15.888	0.0000	44
IDT	921.83	322.60	6721.3	1.6160	1496.7	2.4861	9.1182	113.95	0.0000	44
GE	8.3114	8.0117	17.286	5.0893	2.4816	1.5935	6.1894	37.273	0.0000	44
PDR	31.346	24.249	79.713	7.1170	22.343	0.8065	2.3410	5.5665	0.0618	44

Source: Researcher Computation Using Eviews12 Output, 2026

Nigeria's average budget deficit (measured using the budget balance as a percentage of GDP) of 2.71% remained within the 3% statutory ceiling, notwithstanding periods of serious non-compliance, with a maximum value of 8.5%. Tax revenue showed pronounced positive skewness, particularly for indirect taxes (2.4861), suggesting that receipts frequently fell below their averages. Together with rising expenditures and fluctuating debt, these unstable dynamics created substantial obstacles for sustainable fiscal planning.

Principal Component Analysis: Principal Component Analysis (PCA) was used to build composite indices for tax revenue, mitigating multicollinearity and inconsistencies in proxies (Adedokun & Ukafor, 2024; Otekunrin et al., 2023). By converting related variables into orthogonal components, the study retained the maximum amount of variance while lowering dimensionality (Ramesh et al., 2025). The findings showed strong commonality: the first components for total tax, direct tax, and indirect tax accounted for 83.29%, 83.34%, and 91.33% of the variance, respectively. These leading components reflected substantial co-movement across revenue categories, yielding a more dependable and concise characterization of overall performance than relying on individual variables in isolation.

Table 1.3. Principal Component Analysis of Tax Revenue

Component	Eigenvalues	Difference	Proportion	Cumulative Value	Cumul. Prop
Tax Revenue					
PPTR	3.332727	2.867447	0.8329	3.332727	0.8329
CIT	0.464280	0.273710	0.1161	3.796007	0.9490
CED	0.190570	0.177147	0.0476	3.986577	0.9966
VAT	0.013423	-----	0.0034	4.000000	1.0000
Direct Tax Revenue					
PPTR	1.666789	1.333578	0.8334	1.666789	0.8334
CIT	0.333211	-----	0.1666	2.000000	1.0000
Indirect Tax Revenue					
CED	1.826656	1.653311	0.9133	1.826656	0.9133
VAT	0.174433	-----	0.0867	2.000000	1.0000

Source: Researcher Computation Using Eviews12 Output, 2026.

Correlation Analysis: The pairwise correlation matrix verified that multicollinearity was absent, thereby strengthening the model's reliability (Kyriazos & Poga, 2023). A robust positive relationship between the public debt ratio and budget deficit ($r=0.527$) indicated substantial dependence on borrowing, whereas the association between expenditure and BD ($r=0.400$) lent support to the spend-and-revenue hypothesis (Efuntade, 2020; Kaka, 2020). By contrast, tax revenue demonstrated only a weak connection to the budget deficit ($r=0.150$). These results were consistent with evidence concerning infrastructural constraints and institutional difficulties (Central Bank of Nigeria, 2017; Umaru et al., 2021). Multicollinearity was therefore not a concern because highly correlated revenue components were assessed in separate models (Usman et al., 2016).

Table 1.4. Correlation Analysis of Government Revenue Components and Budget Performance in Nigeria

Variable	BD	TRI	DTI	IDTI	lnGE	lnPDR
BD	1.000					
TRI	0.150	1.000				
DTI	0.053	0.979	1.000			
IDTI	0.262	0.969	0.901	1.000		
lnGE	0.400	-0.470	-0.490	-0.420	1.000	
lnPDR	0.527	-0.310	-0.400	-0.200	0.688	1.000

Source: Researcher Computation Using Eviews12 Output, 2026.

Pre-test Analysis of the Data: In analysis involving time series data, it is imperative to examine this property of series. The assumption such as stationarity, nonstationary, optimal lag length selection, and cointegration are often tested to ensure unbiased regression analysis. The following subsections discuss the application of these tests in this study.

Stationarity Test: Stationarity in table 1.5 was assessed using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests to mitigate the limitations of single-testing procedures (Adedokun & Ukafor, 2024). The ADF findings showed that the budget deficit was stationary at level $I(0)$, whereas tax revenue and government expenditure became stationary at first difference $I(1)$. Although the ADF test did not reject the null for indirect tax, the PP test verified that it is $I(1)$. The series displayed a mixed order of integration comprising $I(0)$ and $I(1)$, with no variables integrated of order $I(2)$. This met the conditions required for the ARDL bounds testing approach, enabling the investigation of short-run and long-run fiscal dynamics.

Table 1.5. Stationarity test using Augmented Dickey-Fuller (ADF) and Philip Perron (PP) Unit Root Test:

Augmented Dickey-Fuller (ADF)						
Variables	Level			First Difference		
	t-statistic	Critical Value	I(d)	t-statistic	Critical Value	I(d)
BP	-3.285 ^a	-2.931 ^{**}	$I(0)$	-----	-----	-----
TRI	-----	-----	-----	-4.693 ^b	-4.262 ^{***}	$I(1)$
DTI	-----	-----	-----	-4.527 ^b	-4.262 ^{***}	$I(1)$
IDTI	-----	-----	-----	-----	-----	-----
lnGE	-----	-----	-----	-9.375 ^b	-4.192 ^{***}	$I(1)$
lnPDR	-----	-----	-----	-4.000 ^b	-3.520 ^{**}	$I(1)$
Philip Perron (PP)						
BP	-3.273 ^a	-2.931 ^{**}	$I(0)$	-----	-----	-----
TRI	-----	-----	-----	-----	-----	-----
DTI	-----	-----	-----	-5.510 ^b	-4.192 ^{***}	$I(1)$
IDTI	-----	-----	-----	-6.215 ^b	-4.192 ^{***}	$I(1)$
lnGE	-----	-----	-----	-9.367 ^b	-4.192 ^{***}	$I(1)$
lnPDR	-----	-----	-----	-3.964 ^b	-3.520 ^{**}	$I(1)$

Note: The ^a indicates constant without deterministic trend; ^b is the model with constant and deterministic trend as exogenous lags are selected based on Schwarz info criteria. *, **, *** imply that the series is stationary at 10%, 5%, and 1% respectively. ADF and PP denote Augmented Dickey-Fuller and Phillip-Perron Unit Root tests. Source: Researcher Computation Using Eviews12 Output, 2026.

Optimal Lag Length Selection: Lag values were incorporated to reflect how prior revenue affected current budget balances, thereby addressing autocorrelation to support accurate functional representations. An unrestricted Vector Autoregression (VAR) was applied, with the assumption that the variables were not cointegrated. The Akaike Information Criterion (AIC) was used to select the optimal lag structure by assessing goodness of fit while imposing a penalty for excessive inclusion of parameters. Following the rule of choosing the minimal values, an automatic selection procedure identified a lag length of 1 for disaggregated models and a lag length of zero for aggregated models. This strategy secured the best model fit, maintained consistency, and produced robust statistical results while preventing bias in the lag selection process.

Table 1.6. Optimal Lag Length Selection Criteria using Standard Vector Autoregression (VAR) estimates

Models	Model 1	
	Agg	Disagg
Inf. Criteria	AIC	AIC
Lag length	0	1

Sourced: Researcher Computation Using Eviews12 Output, 2026.

ARDL Bounds Test: The Auto-Regressive Distributed Lag (ARDL) bounds testing approach was used to determine long-run relationships among the variables (Oladipupo, 2023; Pesaran et al., 2001). Cointegration results showed that the variables moved toward equilibrium even though short-term discrepancies persisted. For the aggregated models, the findings exceeded the I(1) critical threshold at the 5% level, which verifies a long-run relationship. In contrast, the disaggregated models produced values below the I(0) critical bounds, implying that no long-run linkage exists. Accordingly, the study estimated both short-run and long-run dynamics for the aggregated models using the Error Correction Model (ECM), whereas the disaggregated models were limited to short-run analysis using ARDL.

Table 1.7. ARDL Bounds Cointegration Test Results

Aggregated Models				Disaggregated Models						
Model 1	F-Stat.	Lower Bound I(0) at 5%	Upper Bound I(1) at 5%	Cointegration	Remark	F-Stat.	Lower Bound I(0) at 5%	Upper Bound I(1) at 5%	Cointegration	Remark
1	6.29	4.69***	4.69***	Yes	ECM	2.87	2.37*	3.2*	No	ARDL

Note: *, ** and *** imply cointegration at 10%, 5% and 1* level of significance, respectively.

Data analysis

Effect of Tax Revenue on Public Budget Deficit in Nigeria: Long-run estimates derived from the aggregated ARDL model showed that total tax revenue exerted a statistically significant positive effect on budget deficits (0.498), indicating that improved collection strengthened fiscal conditions (Ogiji & Ajayi, 2020; Umaru et al., 2021). Highly significant negative error-correction terms further corroborated the existence of a stable equilibrium, and the aggregated specifications demonstrated relatively quicker adjustment speeds (Adeyemi et al., 2022; Ebieri, 2022). Disaggregated findings revealed that direct tax had a negative effect (-1.457), whereas indirect tax had a positive effect (0.690); meanwhile, increases in expenditure significantly worsened fiscal imbalances (Alade, 2025; Uzor, 2025). Diagnostic tests, including the Durbin–Watson statistic and F-statistics, verified the lack of serial correlation and heteroskedasticity. Adjusted R-squared values pointed to a moderate level of model fit, suggesting that unobserved institutional factors explained the remaining variance. Because variance inflation factor scores were below 10, multicollinearity was absent. The ARDL Eviews syntax $Z = Z(-1) + D(Z)$ reported in table 1.8 denotes a dynamic specification in which current values are estimated by jointly using lagged levels and contemporaneous changes, thereby distinguishing short-term effects from long-run trends. Accordingly, the null hypothesis was rejected, confirming that tax revenue significantly influences Nigeria's budget deficits.

Table 1.8. Regression analysis: Estimated ARDL long run and short run results for Model 1: $BP=F(TRI, \ln GE, \ln PDR)$ – (1,0,0,0) and $BP=F(\ln DT, \ln IDT, \ln GE,)$ – (1,1,0,1).

Aggregated Model 2						Disaggregated Model 2					
ARDL Long Run Results						ARDL Long Run Results					
Variable	Coeff. (β)	Std. Error	t-Stat	P-v		Coeff. (β)	Std. Error	t-Stat.	P-v		
TRI	0.498	0.188	2.650	0.011		-----	-----	-----	-----		
lnGE	3.286	2.130	1.542	0.131		-----	-----	-----	-----		
lnPDR	0.839	0.686	1.223	0.228		-----	-----	-----	-----		
Short Run Results						Short Run Results					
Variable	Coeff. (β)	Std. Error	t-Stat	P-v	VIF	Coeff. (β)	Std. Error	t-Stat	P-v	VIF	
Constant	-4.824	1.920	-2.511	0.016	NA	-2.865	2.094	-1.368	0.179	NA	
BD(-1)*	-0.706	0.178	-3.955	0.000	2.36	-0.412	0.133	-3.093	0.003	1.87	
TRI**	0.352	0.146	2.406	0.021	1.59	-----	-----	-----	-----	-----	
DTI(-1)	-----	-----	-----	-----	-----	-0.193	0.429	-0.450	0.654	9.43	
IDTI**	-----	-----	-----	-----	-----	0.690	0.350	1.972	0.056	7.12	
lnGE**	2.322	1.241	1.870	0.069	2.43	-----	-----	-----	-----	-----	
lnGE(-1)	-----	-----	-----	-----	-----	2.002	1.066	1.876	0.068	3.01	
lnPDR**	0.593	0.579	1.024	0.312	3.96	-----	-----	-----	-----	-----	
D(DTI)	-----	-----	-----	-----	-----	-1.457	0.430	-3.388	0.001	9.75	
D(lnGE)	-----	-----	-----	-----	-----	5.231	1.047	4.993	0.000	2.45	
CointEq(-1)	-0.706711	0.135	-5.214	0.000	NA	-----	-----	-----	-----	-----	
Mean VIF					3.66					6.35	
R-squared		0.492					0.660				
Adjusted R-squared		0.438					0.604				
Durbin Watson Stat		1.678					2.154				
F-Statistic		9.206					11.68				
Prob(F-statistic)		0.000					0.000				
Diagnostics tests						Diagnostics tests					
Tests	F-Stat.	P-value	Decision (H ₀)			F-Stat.	P-value	Decision (H ₀)			
B-G LM test	1.318	0.258	Accept			1.404	0.244	Accept			
B.P.G Test	2.018	0.111	Accept			1.279	0.291	Accept			
ARCH test	0.688	0.411	Accept			1.082	0.304	Accept			
J-B test	0.487	0.783	Accept			0.222	0.894	Accept			
RESET test	0.699	0.408	Accept			1.444	0.237	Accept			
CUSUMSQ	-----	-----	Stable			-----	-----	Stable			

Note: The test includes only constant are at 5% level of significance. * p-value incompatible with t-bounds distribution. ** variables interpret as $Z = Z(-1) + D(Z)$ – this indicates a dynamic regressor with an optimal lag of zero, as such Eviews does not include lags and difference of such variables but estimates them contemporaneously. Source: Researcher Computation Using Eviews12 Output, 2026.

Discussion on the Effect of Tax Revenue and Public Budget Deficit in Nigeria: Tax revenue significantly improved budget deficits in both the long and short run (Anojan, 2023; Joseph & Omodero, 2020). While government expenditure and debt showed insignificant long-run effects, short-run analysis revealed that increased expenditure significantly worsened budget performance (Mose et al., 2024). Furthermore, direct taxes negatively impacted performance initially, as compliance costs and reduced disposable income constrained private investment. However, the highly significant error correction term confirmed a stable long-run equilibrium. These findings indicated that while total tax revenue remained a vital fiscal tool, controlled spending was essential alongside revenue mobilization to ensure improved budget performance.

CONCLUSION

This study established that total tax revenue has a statistically significant positive impact on reducing Nigeria's public budget deficit in both the short and the long run. In disaggregated analyses, it showed that indirect taxes help promote fiscal stabilization, whereas direct taxes and higher public spending intensify short-term deficits. Even so, highly significant error-correction terms indicate a swift adjustment toward the long-run equilibrium after short-term shocks. Although the study offered important empirical support, it did not include strong measures of institutional quality or key macroeconomic variables, making further research necessary.

Recommendations: The study recommended that the Nigerian government should prioritize the full digitalisation of tax administration to enhance collection efficiency for both direct and indirect taxes. The Federal Inland Revenue Service and state tax authorities should broaden the tax base while sealing administrative loopholes to limit tax evasion and lower compliance costs. In addition, fiscal authorities ought to enforce tight expenditure controls alongside revenue-raising strategies to restrain unbudgeted public spending. Lastly, legal frameworks such as the Fiscal Responsibility Act should be strictly enforced to ensure that generated tax revenues translate directly into sustained reductions in budget deficits.

Contributions to Knowledge: This study advanced knowledge by empirically identifying the separate long-run and short-run dynamics of direct and indirect taxes on Nigeria's budget performance using a dynamic ARDL framework. It strengthened the public finance literature by showing that, although indirect taxes reliably improved the budget balance, direct taxes initially created short-term fiscal friction attributable to compliance costs.

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