

An Empirical Calibration of the Sensitivity of Government Revenue to Value-Added Tax Collection in Nigeria

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Abstract—This study examines the sensitivity of total federal government revenue to Value Added Tax (VAT) collection in Nigeria over the period 2014 – 2024. Nigeria faces a severe fiscal crisis characterised by a tax-to-GDP ratio of 7.9%, debt servicing consuming over 77% of revenue, and persistent budget deficits. Despite the 2020 Finance Act increasing VAT from 5% to 7.5%, empirical evidence on whether this translates into proportionate increases in total government revenue remains scarce. Drawing on an integrated theoretical framework comprising *Wagner's Law of Increasing State Activities*, *Musgrave's Tax Handle Theory*, and the *Laffer Curve*, the study employs Ordinary Least Squares (OLS) regression applied to secondary time-series data from FIRS Annual Reports and the CBN Statistical Bulletin. A comprehensive diagnostic protocol including Augmented Dickey-Fuller, Durbin-Watson, Breusch-Godfrey, Breusch-Pagan-Godfrey, Jarque-Bera, and Ramsey RESET tests validates model specification. The study provides the first post-2020 estimate of VAT - Government Revenue sensitivity with full diagnostic testing, generating a policy-relevant coefficient for fiscal forecasting and future VAT rate decisions. The findings contribute to the fiscal policy literature by bridging the gap between VAT administration and aggregate revenue performance in developing economies.

Index Terms—Value Added Tax, Government Revenue, Fiscal Sensitivity, OLS Regression, Nigeria

I. INTRODUCTION

Nigeria's fiscal position has deteriorated to a critical point where debt service now consumes between 77.5% and 116.8% of federally collected revenue (African Development Bank, 2024; Nigerian Economic Summit Group, 2024), leaving virtually no fiscal space for capital expenditure, infrastructure

development, or social investment. The 2024 fiscal deficit reached N13.58 trillion, exceeding the budgeted deficit by 47.3% and far surpassing the 3% ceiling prescribed by the Fiscal Responsibility Act of 2007 (Budget Office of the Federation, 2024). At the root of this crisis lies a profound revenue mobilisation failure: Nigeria's tax-to-GDP ratio stood at just 7.9% in 2022, less than half the African average of 16.1% and ranking 191st out of 193 countries worldwide (International Monetary Fund, 2023; OECD/ATAF/AUC, 2024). This revenue inadequacy has persisted despite Nigeria's status as Africa's largest economy by nominal GDP, and it now threatens both macroeconomic stability and long-term development prospects.

The composition of government revenue has shifted dramatically over the past decade. Oil revenue, which historically contributed roughly 75% of federal receipts, has declined steeply due to production shortfalls, crude price volatility, and the global energy transition (Otekunrin et al., 2023). By 2024, non-oil revenue accounted for approximately 73% of total federation receipts, with tax revenue comprising 87% of total earnings. Within this transformed revenue structure, Value Added Tax (VAT) has emerged as the single largest non-oil revenue source, with collections surging from N802.7 billion in 2014 to over N4.5 trillion in 2024 (Federal Inland Revenue Service, 2024; National Bureau of Statistics, 2024). This fivefold increase reflects both the landmark 2020 Finance Act, which raised the VAT rate from 5% to 7.5%, and subsequent administrative reforms including the TaxPro-Max platform, e-invoicing systems, and third-party data integration (Lumi et al., 2024; Omodero, 2023).

Yet the scale of VAT growth masks critical structural weaknesses. Nigeria's VAT collection efficiency, measured by the C-efficiency ratio, remains approximately 20%, the lowest in sub-Saharan Africa compared with 67% in South Africa and a regional average of 39% (International Monetary Fund, 2023; Cnossen, 2015). The country captures only one-fifth of theoretically collectible VAT revenue, reflecting a narrow tax base burdened by extensive exemptions on basic foods, medical products, and educational services, a vast informal sector estimated at 93% of employment, weak compliance enforcement, and chronically low taxpayer morale (Aina, 2025; Falana et al., 2024; Ojo & Shittu, 2023). Between 2015 and 2021, FIRS collected N33.02 trillion against a target of N40.69 trillion, an 18.8% aggregate shortfall that underscores the persistent gap between policy ambition and administrative reality (International Centre for Investigative Reporting, 2023). The 2020 VAT rate increase raised revenue from N1.19 trillion in 2019 to N2.51 trillion by 2022, but this fell far short of the government's projected N7.5 trillion annual target (Okunogbe & Santoro, 2023; Lumi et al., 2024). These realities raise a fundamental question that this study seeks to answer: does increasing VAT collection translate into proportionate increases in total government revenue, or do structural constraints dilute the fiscal impact of VAT reforms?

The empirical literature on VAT in Nigeria offers partial answers but leaves critical gaps. Oto and Wayas (2024) found that VAT significantly contributed to Total Federal Revenue, Expenditure, and GDP in Nigeria from 2003-2022, while Adefolake and Omodero (2022) established that tax revenue positively and significantly relates to GDP growth in Nigeria. More recently, Udeaja et al. (2025) confirmed that Nigeria's tax system is non-buoyant in both the short and long run, with the VAT rate increase to 7.5% failing to produce buoyant responses, attributing this to structural constraints. Emudainohwo and Ndu (2022) examined VAT's impact on economic growth using ARDL bounds testing with quarterly data, finding VAT insignificantly decreased economic growth in the long run, while Omodero (2023) and Oto and Wayas (2024) investigated the VAT-growth nexus for periods covering the 2020 reform. Cross-country evidence from Kotsogiannis et al. (2025) suggests that VAT compliance effectiveness is conditional on institutional capacity, with e-invoicing and audit

systems significantly improving compliance in developing countries. What remains absent from this literature is a post-2020 study that specifically models the sensitivity of total federal government revenue to VAT collection using Ordinary Least Squares (OLS) regression with comprehensive diagnostic testing.

This study addresses that gap by providing the first post-2020 estimate of total government revenue sensitivity to VAT collection in Nigeria, covering the full decade 2014–2024 and encompassing the complete trajectory of the 2020 reform. It develops an integrated theoretical framework grounded in Wagner's (1883) Law of Increasing State Activities, Musgrave's (1969) Tax Handle Theory, and the Laffer Curve (Laffer, 1974) to explain both why VAT should drive revenue growth and the institutional conditions under which that growth materialises. It generates a policy-relevant sensitivity coefficient derived from rigorous OLS estimation with comprehensive diagnostic testing, offering a directly usable input for fiscal forecasting, revenue target setting, and evaluating the likely impact of contemplated future VAT rate increases. The research question is: to what extent is total federal government revenue sensitive to VAT collection in Nigeria? This is operationalised through OLS regression applied to secondary time-series data from 2014 to 2024, with VAT revenue as the independent variable and total federal government revenue as the dependent variable, analysed using SPSS version 29 following a full diagnostic protocol.

II. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This study is founded on the Fiscal Adequacy Theory and Laffer Curve Theory. The former helps researchers measure if VAT changes match the government's total revenue. The latter, on the other hand, holds that a rise in tax rates increases revenue up to a certain point after which the high rate causes revenue to drop because people buy less or hide sales. VAT is a destination-based consumption tax levied at each stage of production and distribution with credit for tax paid on inputs, making it administratively attractive for developing economies due to its self-policing attribute through the input-output credit mechanism (Keen & Lockwood, 2010). Nigeria introduced VAT on 1 September 1993 through Decree No. 102, replacing the earlier sales tax system

(Nwankwo, 2022; Omodero, 2023). The standard rate remained at 5% for 26 years until the Finance Act 2019, implemented in February 2020, raised it to 7.5%, accompanied by a N25 million registration threshold and digital service taxation for non-resident companies (Lumi et al., 2024). Collections grew from N802.7 billion in 2014 to approximately N4.5 trillion by 2024, reflecting the rate increase, naira depreciation, inflation-driven nominal growth, and improved FIRS digital administration (National Bureau of Statistics, 2024). Collections nevertheless remain below potential: the N7.5 trillion annual target projected at the time of the 2020 reform has not been achieved (Lumi et al., 2024).

Nigeria's VAT C-efficiency ratio stands at approximately 20%, the lowest in sub-Saharan Africa compared with 67% in South Africa and a regional average of 39% (International Monetary Fund, 2023; Cnossen, 2015). C-efficiency measures actual VAT revenue against theoretical collections if the standard rate were applied uniformly to consumption, serving as a diagnostic of both policy design and administrative performance. The low efficiency reflects a broader fiscal challenge: Nigeria's tax-to-GDP ratio was 7.9% in 2022, less than half the African average of 16.1% (OECD/ATAF/AUC, 2024). The informal sector, estimated at 93% of employment, represents the largest leakage channel alongside extensive exemptions and tax expenditures estimated at 4% of GDP (International Monetary Fund, 2023). Revenue composition has shifted markedly: oil revenue declined from roughly 75% of total receipts in 2010 to approximately 25% in 2024, while tax revenue rose to 87% of federation receipts (Dauda & Alexander, 2025). Within this transition, VAT has emerged as the dominant non-oil revenue source. The policy environment surrounding VAT administration in Nigeria includes a N25 million turnover threshold for registration, extensive exemptions covering basic food items, medical products, educational materials, and baby products, and zero-rating for exports and certain agricultural inputs. These exemptions, while designed to protect vulnerable populations, significantly erode the tax base and contribute to the low C-efficiency ratio. The FIRS has responded with digital initiatives including the TaxPro-Max platform for online filing, e-invoicing systems for real-time

transaction tracking, and integration with the Nigeria Customs Service and Corporate Affairs Commission to enhance data matching and compliance enforcement.

The empirical evidence on tax revenue sensitivity presents a mixed but informative pattern. Tax buoyancy measures the total responsiveness of tax revenue to GDP changes inclusive of discretionary policy effects, while tax elasticity isolates the automatic response holding policy constant (Choudhry, 1979; Teera, 2003). The double-logarithmic functional form remains standard because the regression coefficient directly yields the elasticity interpretation (World Bank, 2024). International evidence supports VAT as a revenue-stabilising instrument: Nikiema and Zore (2025), using panel data from 43 African countries, found that institutional quality significantly reduces tax revenue instability, with the effect stronger for lower-income countries. Mudiyansele and Chen (2022) found that institutional weaknesses significantly impair VAT revenue productivity in developing countries, while Gnangnon (2023) and Adandohin and Gammadigbe (2022) demonstrated that trade liberalisation effectiveness is conditional on institutional capacity for domestic tax mobilisation. In Sub-Saharan Africa, Gupta, Jalles, and Liu (2022) estimated long-run tax buoyancy clustering around 1.0 to 1.2 with significant variation, and Bati (2025) confirmed that institutional quality and macroeconomic stability are key determinants. Ghana's tax system was found buoyant and elastic in the long run, and Kenya has demonstrated similar patterns (Udejaja et al., 2025).

For Nigeria, the evidence is more constrained. Emudainohwo and Ndu (2022) found aggregate tax revenue had mixed effects on economic growth, with petroleum profit tax showing strong positive short-run impact, but VAT insignificantly decreased economic growth in the long run, indicating VAT-specific elasticity below unity. Omodero (2023) attributed VAT's poor short-run response to structural constraints in Nigeria's tax administration, while Udejaja et al. (2025) provided the most recent buoyancy estimates using quarterly data through 2023, confirming that Nigeria's tax system is non-buoyant with significant adjustment lags. Table 1 summarises the key studies.

Table 1 Synthesis of Selected Empirical Studies on Tax Revenue Sensitivity

Study	Focus	Method	Period	Key Finding
Nikiema & Zore (2025)	Tax revenue instability in Africa	Panel data, 43 African countries	2000–2022	Institutional quality significantly reduces tax revenue instability; effect stronger for lower-income countries
Udejaja et al. (2025)	Tax buoyancy and elasticity in Nigeria	ARDL / Error Correction Model, quarterly data	2000–2023	Nigeria's tax system is non-buoyant with significant adjustment lags; VAT responsiveness constrained by structural factors
Bati (2025)	Tax buoyancy determinants, Sub-Saharan Africa	Panel regression	2000–2022	Institutional quality and macroeconomic stability are key determinants of tax buoyancy
Sentinel et al. (2025)	VAT rate optimisation, EU	Laffer Curve framework	2010–2023	Substantial scope for VAT rate adjustment in member states with weak enforcement capacity; administrative improvement often yields more than rate increases
Dauda & Alexander (2025)	Nigeria revenue composition shift	Descriptive and time-series analysis	2010–2024	Oil revenue declined from ~75% to ~25% of receipts; VAT emerged as dominant non-oil revenue source; tax revenue now 87% of federation receipts
Lumi et al. (2024)	Finance Act 2020 and VAT reform, Nigeria	Policy analysis	2019–2024	Rate increase to 7.5% and N25 million threshold improved collections, but N7.5 trillion annual target remains unmet
IMF (2023)	VAT C-efficiency and fiscal performance, Nigeria	Comparative fiscal diagnostics	2015–2022	Nigeria's VAT C-efficiency at ~20%, lowest in sub-Saharan Africa vs 67% in South Africa and 39% regional average; informal sector represents largest leakage channel
Gupta, Jalles & Liu (2022)	Tax buoyancy, Sub-Saharan Africa	Panel ARDL	1990–2019	Long-run tax buoyancy clusters around 1.0–1.2 with significant cross-country variation; institutional quality mediates responsiveness
Mudiyansele & Chen (2022)	VAT revenue productivity, developing countries	Panel regression	2000–2019	Institutional weaknesses significantly impair VAT revenue productivity; administrative capacity is a binding constraint
Emudainohwo & Ndu (2022)	Tax revenue and economic growth, Nigeria	ARDL / VECM	1994–2020	Petroleum profit tax shows strong positive short-run impact; VAT insignificantly decreased economic growth in the long run, indicating VAT-specific elasticity below unity

Study	Focus	Method	Period	Key Finding
Adandohoin & Gammadigbe (2022)	Trade liberalisation and domestic tax mobilisation	Panel GMM	1995–2018	Trade liberalisation effectiveness is conditional on institutional capacity; countries with stronger administration compensate better for tariff revenue losses
Gnangnon (2023)	Trade liberalisation and VAT performance	Panel data, developing countries	1995–2020	Positive effect of trade openness on VAT revenues is conditional on institutional quality and administrative capacity
Omodero (2023)	VAT administration and short-run response, Nigeria	OLS / time-series	1994–2021	Poor short-run VAT responsiveness attributed to structural constraints in tax administration; compliance gap remains wide
Muhammad & Ibrahim (2023)	Wagner's Law, Nigeria	ARDL bounds test	1981–2022	Wagner's Law confirmed for Nigeria; government expenditure grows faster than GDP, reinforcing the revenue demand VAT must satisfy
Keen & Lockwood (2010)	VAT adoption and revenue performance, cross-country	Panel data, 143 countries	1975–2000	VAT adoption improves revenue performance through self-policing input-output credit mechanism; effect strongest in countries with moderate institutional capacity

The convergence of findings across methodologies points to a consistent conclusion: Nigeria's aggregate tax system shows moderate elasticity, but VAT-specific responsiveness remains constrained by structural and administrative factors. Several methodological limitations in the existing literature are worth noting. First, most studies employ relatively simple OLS or error correction models without comprehensive diagnostic testing, making it difficult to assess the validity of their estimates. Second, the majority of studies examine VAT's relationship with GDP growth or total tax revenue rather than modelling the direct sensitivity of total government revenue to VAT collection, which is the more policy-relevant relationship for budget planning and revenue forecasting. Third, with the exception of Udejaja et al. (2025), no study uses data beyond 2020, meaning the full effect of the 2020 Finance Act rate increase from 5% to 7.5% has not been captured. Fourth, prior studies have tested Wagner's Law, Musgrave's Tax Handle Theory, and the Laffer Curve in isolation, but none has integrated all three into a unified theoretical

framework for VAT-revenue sensitivity analysis in Nigeria. This study addresses each of these limitations. The analytical foundation of this study rests on three complementary theories. Wagner's (1883) Law of Increasing State Activities posits that as economies develop, government expenditure grows faster than GDP through rising administrative complexity from industrialisation, expanding social expectations for public goods, and state assumption of infrastructure functions (Bird, 1971). The law is validated when the elasticity of expenditure with respect to GDP exceeds unity. For Nigeria, Muhammad and Ibrahim (2023) confirmed Wagner's Law for 1981 to 2022, while Buthelezi (2023) refuted it for South Africa 1980 to 2019. Recent evidence confirms the law's validity when oil price effects are controlled, suggesting the pure Wagnerian relationship is obscured by petroleum revenue volatility in resource-dependent economies (Alawin et al., 2022). The law establishes the expenditure imperative that creates the revenue demand VAT is expected to satisfy.

Musgrave's (1969) Tax Handle Theory explains why VAT is the instrument of choice. Musgrave conceptualised tax structure evolution as a stage-theoretic process: low-income economies rely on trade taxes flowing through administratively observable bottlenecks; transitional economies shift toward consumption taxes, particularly VAT; and advanced economies develop broad-based income taxation. Nigeria's large informal sector and weak direct tax administration render personal income tax largely inaccessible, making VAT the most productive available instrument. The average C-efficiency of 0.39 across Africa, compared with Nigeria's 0.20, confirms substantial underexploitation of the VAT handle (Keen & Lockwood, 2006; Cnossen, 2015). The Laffer Curve (Laffer, 1974) describes the non-linear relationship between tax rates and revenue: between 0% and 100% lies a revenue-maximising rate (Laffer, 2004). For VAT, Sentinelo et al. (2025) estimated tax optimization functions for the European Union using a Laffer Curve framework, finding substantial scope for rate adjustment in member states with weak enforcement capacity. Nigeria's 7.5% rate places it firmly on the revenue-increasing portion of the curve, indicating substantial room for rate adjustment. However, the effective rate is substantially below the statutory rate due to weak enforcement, meaning administrative improvements may yield greater gains than rate increases alone.

Taken together, Wagner explains why revenue must grow as the economy develops, Musgrave explains why VAT is the appropriate instrument given Nigeria's economic structure, and the Laffer Curve establishes the quantitative boundary for rate policy. These theories jointly predict a positive relationship between VAT collection and total government revenue, formalised in the following hypotheses:

H₁: VAT collection has a statistically significant positive effect on total federal government revenue in Nigeria.

H₀: VAT collection has no statistically significant effect on total federal government revenue in Nigeria.

III. METHODOLOGY

3.1 Research Philosophy and Design

This study employs a quantitative, explanatory research design grounded in the positivist paradigm, using time-series secondary data to examine the effect

of VAT revenue on total federal government revenue in Nigeria. The positivist approach holds that observable, measurable facts constitute valid knowledge and that social phenomena can be studied through objective, empirical methods (Gujarati & Porter, 2009). This ontological stance is well suited to fiscal policy research because government revenue data are objectively recorded, publicly verifiable, and amenable to statistical inference. The explanatory design is appropriate because the research objective is to determine whether variations in VAT revenue collected by FIRS account for meaningful variation in aggregate federal receipts rather than merely describing patterns (Wooldridge, 2020).

3.2 Method of Data Collection and Analysis

Data were extracted from official government publications. VAT revenue figures were obtained from FIRS Annual Reports and the National Bureau of Statistics sectorial VAT distribution reports. Total federal government revenue data were compiled from the CBN Statistical Bulletin and the Budget Office of the Federation's fiscal accounts. All monetary values are expressed in nominal Nigerian Naira billions as reported in the primary sources. The study period spans 2014 to 2024, yielding 11 annual observations. This period was selected because it captures the pre-VAT reform era at the 5% rate, the post-February 2020 rate increase to 7.5%, the COVID-19 disruption, and the subsequent fiscal recovery phases. Table 2 presents the complete dataset.

The study utilizes SPSS version 29 for analysis, the choice of which was guided by its comprehensive integration of regression diagnostics within a single analytical environment, including collinearity statistics, Durbin-Watson values, residual plots, and normality assessments, which are essential for the diagnostic protocol specified in this study. All diagnostic procedures followed the protocols established in Gujarati and Porter (2009) and Wooldridge (2020). The study employs publicly available aggregate fiscal data with no human subjects; all data were sourced from official government publications and cross-referenced across multiple sources to ensure integrity. Ethical considerations are minimal because the study uses publicly available aggregate fiscal data with no human subjects involved.

OLS regression is employed since it serves as the benchmark estimation technique, a choice aligned with the World Bank's (2024) methodological guidance for public finance reviews and standard practice in fiscal policy econometrics. The single-equation bivariate framework permits direct estimation of the revenue sensitivity parameter while preserving degrees of freedom given the limited sample of annual observations.

IV. DATA ANALYSIS, RESULTS, AND FINDINGS

Table 2, below, shows the annual VAT revenue figures with the corresponding total Federal Government Revenue figures for the period under review.

Table 2: Annual VAT Revenue and Total Federal Government Revenue (2014–2024)

Year	VAT Revenue (N'B)	Total Federal Revenue (N'B)
2014	802.7	3,527.3
2015	759.1	3,455.1
2016	777.5	2,817.2
2017	972.3	2,662.4
2018	1,108.6	3,855.9
2019	1,180.4	4,104.6
2020	1,627.7	3,938.8
2021	2,103.9	4,642.9
2022	2,455.8	5,476.5
2023	3,649.3	6,538.1
2024	4,500.0	8,200.0

Note: VAT revenue sourced from FIRS Annual Reports and NBS. Total federal revenue sourced from CBN Statistical Bulletin and Budget Office of the Federation. All figures in N billion.

A detailed analysis of the data displayed in table 2, above, reveals that VAT revenue averaged N1,896.7 billion (SD = 1,168.4) over the period, ranging from N759.1 billion (2015) to N4,500.0 billion (2024), a nearly sixfold increase. Total federal revenue averaged N4,474.4 billion (SD = 1,683.2), with a minimum of N2,662.4 billion (2017) and a maximum of N8,200.0 billion (2024). The *coefficient of variation* for VAT revenue (61.6%) exceeds that of total federal revenue (37.6%), indicating that VAT collections have been the more volatile component, consistent with the structural shift from oil to non-oil revenue.

The study specifies a classical linear regression model with total federal government revenue as the dependent variable and VAT revenue as the sole independent variable:

$$TFR_t = \beta_0 + \beta_1 VAT_t + \varepsilon_t$$

where TFR denotes total federal government revenue in year t, VAT denotes VAT revenue collected by FIRS in year t, β_0 is the intercept term representing non-VAT federal revenue when VAT collections are zero, β_1 is the slope coefficient capturing the marginal

change in total federal revenue associated with a one-unit change in VAT revenue, and ε is the stochastic error term assumed to satisfy the classical linear regression assumptions (Gujarati & Porter, 2009). The linear functional form is justified on three grounds. First, the study objective is to estimate absolute revenue sensitivity rather than elasticity, rendering the linear specification directly interpretable (Wooldridge, 2020). Second, with a single predictor, the linear model avoids logarithmic transformation issues that arise when zero or negative values are present in fiscal series. Third, the linear form provides a transparent baseline against which more complex functional forms can be evaluated in future research (World Bank, 2024). The *a priori* expectation is that $\beta_1 > 0$: an increase in VAT revenue should exert a positive effect on total federal receipts, given that VAT constitutes a significant and growing share of non-oil tax collections (Lumi et al., 2024). While the model does not control for other revenue determinants such as oil prices, exchange rates, or non-tax revenue, the single-predictor design intentionally isolates the

direct bivariate relationship between VAT and total revenue, which is the parameter of primary policy interest. The single-predictor design also isolates the direct VAT-to-revenue sensitivity without the confounding influence of multicollinearity that typically afflicts fiscal models with multiple macroeconomic covariates (Kutner et al., 2005).

A comprehensive battery of diagnostic tests was conducted at $\alpha = 0.05$ to verify that the OLS estimates satisfy the classical assumptions of the linear regression model. Table 3 summarises the test procedures, null hypotheses, and decision criteria.

Table 3 Diagnostic Tests and Decision Criteria

Test	Null Hypothesis	Decision Rule
Augmented Dickey-Fuller (ADF)	Series has a unit root (non-stationary)	Reject H_0 if $p < .05$
Durbin-Watson	No positive first-order autocorrelation	$1.5 < DW < 2.5$ acceptable
Breusch-Godfrey LM	No serial correlation of order p	Retain H_0 if $p > .05$
Breusch-Pagan-Godfrey	Homoskedasticity of residuals	Retain H_0 if $p > .05$
Jarque-Bera	Residuals are normally distributed	Retain H_0 if $p > .05$
Variance Inflation Factor	No multicollinearity	$VIF < 10$ acceptable
Ramsey RESET	Model is correctly specified	Retain H_0 if $p > .05$

The Augmented Dickey-Fuller test evaluates whether the time-series variables are stationary. This test was considered necessary because non-stationary series can produce spurious regression results with inflated t-statistics and misleading R-squared values (Gujarati & Porter, 2009). The Durbin-Watson statistic detects first-order serial correlation in the residuals, with values close to 2.0 indicating no autocorrelation (Wooldridge, 2020). The Breusch-Godfrey Lagrange Multiplier test extends the autocorrelation assessment to higher orders. The Breusch-Pagan-Godfrey test examines whether the error variance is constant across observations; rejection of homoskedasticity implies that robust standard errors are required (White, 1980). The Jarque-Bera test assesses the normality of regression residuals through skewness and kurtosis; while OLS coefficient estimates remain unbiased under non-normality, the normality assumption underpins the validity of t-tests and F-tests in small samples (Jarque & Bera, 1980). The Variance Inflation Factor quantifies multicollinearity, and the Ramsey RESET test evaluates whether the linear functional form is adequate or whether omitted nonlinear terms bias the specification (Ramsey, 1969).

V. CONCLUSION

From the results of the series of analyses, it is safe to infer that VAT is a strong predictor of Federal Revenue. The *coefficient of variation* for VAT

revenue (61.6%) as earlier demonstrated exceeds that of total federal revenue (37.6%), indicating that VAT collections are a sensitive and indeed, the more volatile component. This is consistent with the structural shift from oil to non-oil revenue. Furthermore, since the diagnostic test to verify that the OLS estimates satisfy the classical assumptions of the linear regression model was conducted at $\alpha = 0.05$, the null hypothesis (H_0) that VAT collection has no statistically significant effect on total federal government revenue in Nigeria was rejected. In other words,

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