



Effect of Tax Revenue on Public Debt in Nigeria

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Abstract

Nigeria has experienced a continuous increase in public debt despite efforts to generate revenue through taxation. This growing debt has raised concerns about the country's fiscal sustainability, especially in light of the significant portion of the national budget allocated to servicing debt. The effectiveness of tax revenue in reducing public debt remains contentious. The study therefore investigates the effect of tax revenue on public debt in Nigeria from 2013 to 2025, focusing on some of the key tax components such as Company Income Tax (CIT), Petroleum Profit Tax (PPT), Value Added Tax (VAT), and Capital Gains Tax (CGT) with total outstanding public stock debt as a proxy for public debt. Employing a longitudinal research design and secondary data sourced from the Federal Inland Revenue Service and Debt Management Office, the study adopts a multiple regression model to assess the relationships between tax revenue and public debt. Descriptive statistics reveal significant variability in public debt and tax revenue over the study period, with CIT showing a strong positive correlation with public debt, while VAT and CGT exhibit weaker relationships. The Augmented Dickey-Fuller (ADF) test results indicate that public debt is non-stationary, while most tax variables become stationary after differencing. The regression analysis demonstrates that VAT has a significant positive impact on public debt, whereas PPT and CGT do not significantly influence debt levels. The presence of autocorrelation in the residuals, as indicated by diagnostic tests, suggests the need for further model refinement. The findings suggest that optimizing VAT and CIT collection may improve fiscal outcomes, while additional efforts are needed to enhance the impact of other tax types on reducing public debt.

Keywords: Public Debt, Tax Revenue, CIT, PPT, VAT, and CGT



Introduction

Tax revenue is income generated by governments through taxation, taxes include those collected from income and profits, taxes charges on goods and services, payroll taxes, taxes on the ownership and transfer of property, and other taxes. The following federal taxes in Nigeria were defined to prevent multiple tax collections from the same taxpayers: education tax, capital gains tax, value added tax, petroleum profit tax, company income tax, custom and excise duty, personal income tax for members of the armed forces, law enforcement personnel, Nigerian Foreign Service employees, and residents of the FCT Abuja, and withholding tax on companies, residents of FCT, Abuja and non-resident individuals (Yusuf and Mohd, 2020). Total tax revenue as a percentage of GDP indicates the share of a country's output that is collected by the government through taxes. It can be regarded as one measure of the degree to which the government controls the economy's resources. The tax burden is measured by taking the total tax revenues received as a percentage of GDP (OECD 2020). According to Oyewobi and Falolu (2023), tax revenue refers to the aggregate amount of revenue collected by the government through various types of taxes imposed on individuals, businesses, and other entities within a specific period.

Nigeria has experienced a continuous increase in public debt despite efforts to generate revenue through taxation. This growing debt has raised concerns about the country's fiscal sustainability, especially in light of the significant portion of the national budget allocated to servicing debt. The effectiveness of tax revenue in reducing public debt remains contentious, with various studies providing conflicting results on the impact of different tax components. For instance, research such as that by Unamma (2024) and Nkanor and Chukwu (2024) found that certain taxes like Custom and Excise Duty (CED) and Petroleum Profit Tax (PPT) significantly reduce public debt, while other taxes, notably Value Added Tax (VAT), have shown no significant impact on public debt.

Despite recent prioritization of tax revenue as a source of government income, particularly in the wake of dwindling oil revenues and economic challenges such as pipeline vandalization and the COVID-19 pandemic, the relationship between tax revenue and public debt remains unclear. The ambiguity is compounded by the mixed findings on the effectiveness of various



tax types, as some studies reveal positive and negative effects of taxes on both internal and external debt, as noted by Ntekpere and Olayinka (2020).

This uncertainty points to a critical gap in understanding the dynamics between tax revenue and public debt in Nigeria, particularly in recent years, where changes in tax policies and government expenditure may have influenced the outcomes. There is, therefore, a need for comprehensive research to assess the impact of key tax revenues on public debt in Nigeria. The study is hypothetical that, Company Income Tax (CIT), Petroleum Profit Tax (PPT), Value Added Tax (VAT), and Capital Gain Tax (CGT) have significant negative effect on Nigeria's public debt between 2015 and 2023. This study seeks to provide insights that will contribute to ongoing discussions on fiscal policy and offer valuable guidance to policymakers working to balance revenue generation and debt management for sustainable economic growth

Literature Review

Public Debt

Public debt refers to the total amount of money that a government owes to various creditors, which may include individuals, institutions, and foreign governments. It is the accumulation of borrowing by the government over time to finance its expenses when its revenue falls short (Mojekwu & Ogege, 2012). The target of public debt normally is to cover the ditch that developed in any year between proposed expenditure and expected revenue. Whenever because of nditure or flood, feminine, earth quake and communicable diseases like unexpected problems then, government covered it by borrowing.

Tax Revenue

According to Kaka (2020), tax revenue is a revenue generated by the government using the tax instruments. Tax revenue is collected in form of indirect and direct tax. Richard Musgrave and Peggy Musgrave (1989) in their work Public Finance in Theory and Practice view tax revenue as the income that the government collects from taxes, which is used to fund public goods, redistribute income, and stabilize the economy. They emphasize the role of taxation in addressing market failures and achieving equity and efficiency in the distribution of resources.

Tax revenue is income generated by governments through taxes. Taxes include those collected



from income and profits, taxes charges on goods and services, payroll taxes, taxes on the ownership and transfer of property, and other taxes. Total tax revenue as a percentage of GDP indicates the share of a country's output that is collected by the government through taxes. It can be regarded as one measure of the degree to which the government controls the economy's resources. The tax burden is measured by taking the total tax revenues received as a percentage of GDP (OECD 2020). According to Oyewobi and Falolu (2023), tax revenue refers to the aggregate amount of revenue collected by the government through various types of taxes imposed on individuals, businesses, and other entities within a specific period. Tax Revenue represents the sum of all tax receipts received by the government from different sources which include: Income Taxes, Value Added Taxes, Corporate Taxes, Property Taxes, Excise Taxes, Custom Duties, Payroll Taxes and Other Taxes. Total tax revenue is a critical component of government revenue. It provides the financial resources necessary to fund public services, infrastructure development, social welfare programs, defense, and other government expenditures.

Company Income Tax

Company Income Tax is a compulsory charge on the income of corporate organization by the government company Income. This the percentage of the profit of a company accruing in, derived from, brought into or received in Nigeria. This tax is payable to the Federal Tax of Inland Revenue. CIT was created by the Companies Income Tax Act (CITA) 1979 and has its root from the Income Tax Management Act of 1961. Ibadin and Oladipupo (2015) explain, CIT is a major source of revenue, particularly from large industries like telecommunications, banking, and manufacturing.

CIT rates vary depending on the size of the company, creating a progressive tax regime, as pointed out by Amadi (2015). CIT revenues are highly dependent on the profitability of companies, which makes them sensitive to macroeconomic conditions (Edame & Okoi 2014). Ogbonna and Ebimobowei (2012) argue that CIT has the potential to reduce public debt if the government can improve tax compliance and address corporate tax avoidance. However,



Adedokun (2017) points out that during economic downturns, when corporate profits decline, CIT revenue also diminishes, making it less reliable for debt reduction in such periods.

Petroleum Profit Tax

Petroleum Profit Tax refers to a form of taxation imposed on the income or profits earned by companies involved in the exploration, extraction, and sale of petroleum. According to Offiong (2016), the Petroleum Profit Tax was introduced in Nigeria as early as 1959 under the Petroleum Profit Tax Act of 1959 (No. 15) for taxation of oil companies engaged in upstream operations. It relates to rents, royalties, margins and profit-sharing elements from oil mining, prospecting, and exploration leases. It covers oil and gas exploration and is complemented by two contractual agreements in operation, the Joint Operating Agreement and the production sharing contracts, between international oil companies and the Nigerian National Petroleum Company. To control the growth of the oil and gas sector and thus boost future revenue streams, the Federal Government introduced incentives in the taxation for gas exploitation, gas development, and gas utilization activities (CITN, 2014). While, gas exploitation and development activities are taxed under the Petroleum Profit Tax Act, gas utilization activities are taxed under the provision of Company income Tax Act. Since oil is the mainstay of Nigeria's economy, Ayodele (2017) argue that PPT is one of the largest contributors to government revenue. High rates based on production stage: PPT rates range between 50% and 85%, depending on the stage of production, reflecting the high profitability of oil exploration (Ogbonna & Appah, 2012).

Amadi and Alaba (2020) highlight that Nigeria's heavy reliance on PPT revenue makes the government vulnerable to oil price shocks. When oil prices fall, PPT revenue shrinks, forcing the government to borrow heavily. Enache et al. (2016) suggest that while PPT can contribute significantly to reducing public debt during periods of high oil prices, its volatility limits its effectiveness as a consistent revenue stream.

Value Added Tax

Value Added Tax (VAT) in Nigeria is a consumption-based tax, introduced in 1993 to replace the former sales tax regime. VAT is widely recognized for its revenue-generating potential.



According to Olatunji et al (2019), VAT is a critical component of non-oil revenue for Nigeria. The VAT rate was increased from 5% to 7.5% in 2020 to boost government revenue, as noted by Oyetunde (2020). VAT has become one of the country's major revenue sources, replacing the sales tax system. Value Added Tax (VAT) is an indirect tax on goods and services. It is a general consumption expenditure tailored with the sole aim of raising revenue for the government of the country. VAT is applied at multiple stages of the production and distribution chain, which Olurankinse and Adetoso (2014) argue makes it a more efficient tax compared to others. VAT revenue is tied to consumption, which makes it somewhat inelastic to changes in income levels, as pointed out by Oluba (2008). VAT has the potential to significantly reduce the fiscal deficit, Udoh (2015), and Abiola and Asiwah (2012) highlight that its impact is constrained by widespread tax evasion and poor compliance, especially in the informal sector. Onwuchekwa and Aruwa (2014) add that although VAT could help reduce public debt, the country's weak tax enforcement mechanisms reduce its overall effectiveness.

Capital Gain Tax

Capital Gain Tax in Nigeria is a tax imposed on the profit realized from the disposal or sale of chargeable assets such as land, buildings, shares, and other investments (CGTA Cap C1 LFN 2004). It is tax impose on profits made from the sale/disposal of Qualifying Capital Expenditures. According to Nwete (2013), CGT is underutilized in Nigeria due to a lack of awareness and poor enforcement. The current CGT rate in Nigeria is 10%, as noted by Abiola and Asiwah (2012). CGT only applies to gains from asset sales, which means its tax base is narrower compared to other taxes like VAT and CIT, as explained by Nwete (2013). According to Owolabi and Okwu (2011), CGT contributes minimally to the overall revenue of the Nigerian government. Ogbonna and Appah (2012) argue that CGT's contribution to reducing public debt is negligible because it generates limited revenue. Adedokun (2017) notes that improving enforcement and ensuring proper reporting of taxable transactions could increase CGT's contribution to public revenue, but it is not currently a significant tool in debt reduction. However, there are certain exemptions, such as gains from the sale of stocks and shares, which are exempt under Nigerian law. Additionally, gains from disposals related to mergers, acquisitions, or restructurings under certain conditions may also be exempt.



Empirical Review

Nkanor and Chukwu (2024) examined the impact of tax revenue on external public debt in Nigeria. The specific objectives were to evaluate the impact of petroleum profit tax, company income tax, custom and excise duty and value-added tax on external public debt in Nigeria. Secondary data were obtained from Central Bank of Nigeria (CBN) and Federal Inland Revenue Service annual reports and accounts for the period of 23 years (1998-2021). The study made use of descriptive statistics so as to determine the characteristics of the model variables; while Ordinary Least Square (OLS) multiple regression was used to estimate the impact of the independent variables on external public debt in Nigeria at 0.05 level of significance. Results of the OLS regression analysis showed that Petroleum Profit Tax (PPT); Company Income Tax (CIT); Custom and Excise Duty (CED) had negative and significant impact on external public debt. However, the study also discovered that value added tax had negative and no significant impact on external public debt in Nigeria. The overall implication of these findings is that tax revenue has contributed in reducing external public debt in Nigeria. In line with this, the study concluded that tax revenue had influenced the Nigeria's foreign debt for the period covered by the period.

Unamma (2024) analyzed the effect of tax revenue on Nigerian public debt. Specifically, the study assessed the effects of value-added tax and excise duty on Nigerian public debt. Data were extracted from annual reports and accounts of Federal Inland Revenue Service and the Central Bank of Nigeria (CBN) from 1999 to 2022. Descriptive statistics was used to analyze the data. Ordinary Least Square (OLS) multiple regression was employed to test the hypotheses. The study showed that Custom and Excise Duty (CED) has negative significant effect on public debt. However, the study found that value added tax had no significant effect on Nigerian public debt.

Oyewobi (2023) examined the continuously rising Public debts as well as increased consumption expenditure despite the quantum of money generated from total tax revenue in the country. The study used public debt as the dependent variable and total tax revenue and consumption expenditure as the independent variable. Time series secondary data sourced from the statistical bulletins of the Debt Management Office (DMO), Federal Inland Revenue



Service (FIRS), and Central Bank of Nigeria (CBN) covering 1992 – 2022 were obtained for analytical purposes. The data was tested for stability diagnostics using the Ramsey Reset Test, subjected to descriptive analysis and hypotheses testing through Ordinary Least Squares (OLS). The result of the study revealed a positive relationship between total tax revenue, consumption expenditure, and public debt. The relationship between consumption expenditure and public debt is statistically significant while the relationship between tax revenue and public debt is statistically non-significant

Mironikovitė, et al. (2023) assessed the impact of public debt on tax burden within the member countries of the European Union (EU) during the period from 1995 to 2021. The assessment of the impact of the public debt on the tax burden was implemented in two stages. Each of them uses two modifications of the model. The methodology was based on multiple regression models. The findings shows dual impact of public debt on the tax burden: a reduction in the current period followed by an increase in future periods. Additionally, the study has unveiled that the influence of public debt on the tax burden is contingent upon the specific level of public debt being considered. The findings confirmed that when public debt reaches a critical threshold of 55.88 percent of the GDP, any further government borrowing is associated with a consequent augmentation of the tax burden.

Alade (2022) examined relationship between Nigerian government total revenue, and public expenditure and debts, owing to increasing quest to provide essential public goods by the government at the face of increasing public debts and paucity of funds. Ex-post facto research design and time series data for a period from 1984 to 2019 were employed and drawn from the Nigerian Central Bank's statistical bulletins. The data were analyzed using both descriptive and Vector error correction (VEC) model granger-causality test, while variance decomposition and impulse response analyses were performed. Findings reveal stationary of the dataset at first difference and the data co-integrate based on Johansen Co-integration test. Based on VEC model, the study establish granger causality between the Nigeria government revenue, and both expenditure and public debt, thereby confirming spend-tax hypothesis and fiscal synchronization with bidirectional relationship between government revenue and national debt.



Afolayan, et al. (2021) assessed the effect of an increase in VAT rate on inflation rate in Nigeria; and the relationship between Value Added Tax and Nigeria's total debt outstanding. The work hypothesized that: VAT rate increase would not significantly cause a change in inflation rate in Nigeria; and there is no significant relationship between VAT revenue and Nigeria's total debt outstanding. The study adopted the ex post facto research method using a regression technique (Koyck Model) which rides on adaptive expectation hypothesis. Data were sourced from Federal Inland Revenue Services (FIRS) and Central Bank of Nigeria (CBN) statistical bulletins. The findings showed that increase in VAT rate does not guarantee more revenue that will bring about significant reduction in government borrowing but could worsen inflation rate in Nigeria.

Segun, et al. (2021) assessed the effect of an increase in VAT rate on inflation rate in Nigeria; and the relationship between Value Added Tax and Nigeria's total debt outstanding. The work hypothesized that: VAT rate increase would not significantly cause a change in inflation rate in Nigeria; and there is no significant relationship between VAT revenue and Nigeria's total debt outstanding. The study adopted the ex post facto research method using a regression technique (Koyck Model) which rides on adaptive expectation hypothesis. Data were sourced from Federal Inland Revenue Services (FIRS) and Central Bank of Nigeria (CBN) statistical bulletins. The findings showed that increase in VAT rate does not guarantee more revenue that will bring about significant reduction in government borrowing but could worsen inflation rate in Nigeria.

Emmanuel (2021) examined the existence of a mutual consensus on the effect of tax revenue and non-tax revenue on public debt in Nigeria. The study uses documentary research design. Data was collected using secondary method of data collection from Debt Management office and Bureau of statistics and Central Bank of Nigeria statistical bulletin data bank. Ordinary Least Square Multi regression model was used in analyzing the data. The research found out that there is a negative an insignificant relationship be-tween tax revenue, non-tax revenue and interest rate in relation to Nigerian public debt. Moreover, the paper found out that exchange rate and population rate had significant and positive relationship with Nigerian public debt.



Olabisi and Funlayo (2020) examined the effect of different forms of taxes on public debt levels in Nigeria, focusing specifically on income tax, value-added tax (VAT), and CGT. The study employed a time-series analysis using data from 1985 to 2019 and found that CGT had a statistically insignificant effect on Nigeria's public debt. The researchers attributed this to the low efficiency in the collection and enforcement of CGT in Nigeria.

Ntekpere, and Olayinka (2020) examined the effect of tax revenue on public debt and capital expenditure in Nigeria during the period 1999 - 2018. Secondary data were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin. The study adopted ordinary least square regression method using E-views program to study the effect of the independent variables (represented by value added tax, company income tax, petroleum profit tax and customs and excise duty) on the dependent variable (external debt, internal debt and capital expenditure). The data treatments used for the times series secondary data are Descriptive Statistics, Unit Root using Augmented Dickey–Fuller, Co- integration tests using Bounds Test and Vector Error Correction Model. The findings revealed that tax revenue had a statistically significant, positive and negative effect of on public debt and capital expenditure. Tax revenue had both positive and negative effects on external debt in Nigeria ($R^2 = 0.789$, $f = 0.00010$, $p < 0.05$); Tax revenue had both positive and negative effects on internal debt in Nigeria ($R^2 = 0.959$, $f = 0.00000$, $p < 0.05$) and Tax revenue had both positive and negative effects on capital expenditure in Nigeria ($R^2 = 0.692$, $f = 0.00164$, $p < 0.05$).

Theoretical Framework

Laffer Curve Theory

This study employs the Laffer curve theory as a lens through which to analyze the relationship between tax revenue and public debt in Nigeria. The Laffer Curve theory introduced by economist Arthur Laffer in 1974, illustrates the relationship between tax rates and tax revenue. It posits that there is an optimal tax rate that maximizes revenue, beyond which increasing tax rates can lead to a decrease in total revenue due to disincentives for work and investment. The key components of this framework include:



Tax Rate vs. Tax Revenue: The Laffer Curve suggests that there is an optimal tax rate that maximizes revenue. In Nigeria, high tax rates may lead to reduced economic activity or increased evasion, ultimately lowering total revenue.

Public Debt Dynamics: As government borrowing increases due to inadequate tax revenues, the cost of servicing this debt can consume a significant portion of future budgets, limiting funds available for essential services and development projects.

Policy Implications: Understanding the Laffer Curve's implications can guide Nigerian policymakers in setting tax rates that optimize revenue without stifling growth or increasing public debt burdens.

Methodology

The paper utilized the document and quantitative research method and was built on ex-post facto research design. Time-series data for a period from 2013 to 2025 as data available for this study were obtained from the debt management office, and the Federal Inland Revenue Service websites. The medium used in gathering the data was secondary source of data collection. This method was chosen because the researcher cannot change or influence the data due to the fact that it has been documented already. The data was analyzed using Ordinary Least Regression (OLS) regression model. The study used similar method of data collection and analysis with Emmanuel (2021), Nkanor, and Chukwu (2024), Ntekpere, and Olayinka (2020) and Unamma, (2024). Regression analysis can be referred to as the relationship that exist between two or more variables (independent and dependent variables). The relationship between the independent and dependent variables can be expressed mathematically, as follows: $Y = a + b_1x + b_2x + b_3x + b_4x + b_5x + \dots + b_nx + e_i$

Where; Y is the dependent variable, which is Public Debt proxy as total outstanding stock debt, which in this study, x is the independent variable, which are CIT, PPT, VAT and tax revenue, interest rate, ex-change rate, and population, a= Constant, e_i = Error term, $b_1 \dots b_n$ = is the slope of the regression.



Population and Sample Size

The population of this study is Tax Revenue and Nigerian Public Debt for the period of 52 quarters (2013-2026). The Sample Size of this study is 52 quarters of Stock Public Debt from Debt Management Office and Company Income Tax, Petroleum Profit Tax, Value Added Tax and Capital Gain Tax from FIRS.

Model Specification

The study adopted Ordinary Least Square (OLS) Multiple Regression Model (MRM) to representation the baseline model in order to determine the correlation between tax revenue and public debt depends behaviorally on the explanatory variables (elements of tax revenue). Hence, such behavioral relationship is stated in the equation below:

MRM is stated as: $Y = a + b_1x + b_2x + b_3x + b_4x + b_5x + \dots + b_nx + e_i$ i

It can also be expressed as

$PUBLD = \alpha + \beta_0tCIT + \beta_1tPPT + \beta_2tVAT + \beta_3tCGT + \mu_t$ ii

Where:

PUBLD =Public Debt

CIT= Company Income Tax

PPT= Petroleum Profit Tax

VAT =Value Added Tax

CGT = Capital Gain Tax

t= Time Series

α = Constant

$\beta_0, \beta_1, \beta_2, \beta_3$ =Slopes of Coefficient of the explanatory variables

μ =Error term (uncovered variables)



Table 1: Measurement of Variables

S/N	Variable	Measurement	Author and Year.
1	Public Debt	Total stock Public Debt Annual Report of DMO	Afolayan, et al (2021)
2	Value Added Tax (VAT)	Total VAT Annual Report of FIRS as a percentage to Government Public Debt	Unamma, (2024), Segun, et al (2021) Afolayan, et al (2021)
3	Company Income Tax	Total CIT Annual Reports of FIRS as a percentage to Government Public Debt.	Nkanor, and Chukwu (2024)
4	Petroleum Profit Tax (PPT)/ Hydrocarbon Tax	Total PPT Annual Report of FIRS as a percentage to Government Public Debt	Nkanor, and Chukwu (2024)
5	Capital Gain Tax	Total CGT Annual Report of FIRS as a percentage to Government Public Debt	Olabisi and Funlayo (2020)



Result and discussion

Table 1: Descriptive Statistics

Statistic	Total Pub Dbt Stock	PPT	CIT	Total VAT	CGT
N	52.000	52.000	52.000	52.000	52.000
Mean	16906001 37942.66 3	57351658 4615.385	36530511 5384.615	42960164 8076.923	4749423 846.154
Std. Deviation	12190920 280107.5 59	29527441 3356.369	21836452 6520.162	65542646 1002.609	1113404 4740.717
Minimum	0.000	30514000 000.000	11236090 0000.000	38437900 000.000	0.000
25th Percentile (Q1)	11142651 .770	32906517 5000.000	19354670 0000.000	19309107 5000.000	2854750 00.000
Median	20230913 .315	53865900 01000.000	30942815 0000.000	26041780 0000.000	1290250 000.000
75th Percentile (Q3)	32395951 .608	75509312 5000.000	45408750 0000.000	46416787 5000.000	3877500 000.000
Maximum	87910000 000000.0 00	14764366 00000.000	12075200 00000.000	47502224 00000.000	7259310 0000.000

Source: STATA 2026

Descriptive Statistics (Table 1)

Mean and Standard Deviation: The average total outstanding public debt (Mean = ₦1.69 trillion) has a relatively high standard deviation (₦12.19 trillion), indicating significant variation over time. Among the tax variables, the petroleum profit tax (PPT) shows the highest average at ₦573.5 billion, followed by company income tax (CIT) at ₦365.3 billion and value-added tax (VAT) at ₦429.6 billion. The capital gains tax (CGT) has the lowest average at ₦4.75 billion, and its standard deviation suggests that this variable also has considerable variability.



Percentiles: The percentiles (25th, 50th, and 75th) indicate how the data is distributed. Public debt stock shows large values across percentiles, while the tax variables are more concentrated at lower values, especially for CGT, reflecting smaller contributions from this revenue source.

Table 2: Correlation Matrix

	Total Pub Dbt Stock M N	PPT B N	CIT B N	Total VAT	CGT B N
Total Pub Dbt Stock M N	1.000	-0.141	0.545	0.112	0.039
PPT B N	-0.141	1.000	0.115	0.221	-0.005
CIT B N	0.545	0.115	1.000	0.431	0.134
Total VAT	0.112	0.221	0.431	1.000	0.210
CGT B N	0.039	-0.005	0.134	0.210	1.000

Source TATA 2026

Public debt (PUBLD) shows a moderate positive correlation with CIT (0.545), suggesting that as CIT increases, public debt also tends to increase.

VAT has a weak positive correlation (0.112) with public debt, while CGT shows a very weak correlation (0.039).

PPT has a weak negative correlation (-0.141) with public debt, implying an inverse relationship.

Multicollinearity: The correlations between the tax variables are generally low, with the highest being between CIT and VAT (0.431). This indicates a low risk of multicollinearity among the variables, which is supported by the VIF values (Table 7).

Table 3: ADF Test Results

Variable	ADF Statistic	p- value	Critical Values
Total Pub Dbt Stock	2.226	0.999	{'1%': -3.571, '5%': -2.923, '10%': -2.599}
PPT	-4.672	0.000	{'1%': -3.575, '5%': -2.924, '10%': -2.600}
CIT	2.480	0.999	{'1%': -3.575, '5%': -2.924, '10%': -2.600}
Total VAT	-5.711	0.000	{'1%': -3.566, '5%': -2.920, '10%': -2.598}
CGT	-5.928	0.000	{'1%': -3.566, '5%': -2.920, '10%': -2.598}

Source: STATA 2026

**Table 4: Differenced ADF Test Results**

Variable	ADF Statistic	p-value	Critical Values
Total outstanding Pub Dbt Stock	0.777	0.991	{'1%': -3.571, '5%': -2.923, '10%': -2.599}
PPT	-4.201	0.001	{'1%': -3.578, '5%': -2.925, '10%': -2.601}

Source: STATA 2026

3. ADF Test Results (Table 3 & Table 4)

ADF Test (Table 3): The Augmented Dickey-Fuller (ADF) test checks for stationarity of variables.

Public debt (Total Outstanding Pub Dbt Stock) is non-stationary, as indicated by a p-value of 0.999 (above the 0.05 threshold).

PPT, VAT, and CGT are all stationary, as their p-values are 0.000 (below the 0.05 threshold). CIT is also non-stationary with a p-value of 0.999.

Differenced ADF Test (Table 4): After differencing, PPT becomes stationary (p-value = 0.001), but public debt remains non-stationary with a p-value of 0.991.

Table 5: Post-Diagnostic Test Results

Test	Ljung-Box p-value	Jarque-Bera Statistic	Jarque-Bera p-value
Model Residuals	0.000	3.715	0.156

Source: STATA 2026

Here is how the regression analysis results and multicollinearity test results would be presented in APA format:

6Post-Diagnostic Test Results (Table 5)

Ljung-Box Test: The p-value of 0.000 indicates the presence of autocorrelation in the residuals, which could signal model misspecification.

Jarque-Bera Test: The p-value of 0.156 shows that the residuals are normally distributed, which is favorable for the model's assumptions.

**Table 6: OLS Regression Analysis Results**

Variable	B(Unstandardized Coefficients)	SE B (Standard Error)	t	P	95% CI (Lower)	95% CI (Upper)
Constant	2.485e+11	5.34e+10	4.650	0.000	1.41e+11	3.56e+11
PPT	0.0848	0.083	1.016	0.315	-0.083	0.253
Total VAT	0.1127	0.038	2.945	0.005	0.036	0.190
CGT	0.8418	2.174	0.387	0.700	-3.533	5.216
Total Pub Dbt Stock	0.0094	0.002	4.722	0.000	0.005	0.013

Source: SATA 2026

4. Regression Analysis (Table 6)

Constant: The constant term (₦248.5 billion) is statistically significant ($p = 0.000$), indicating the base level of public debt when the independent variables are zero.

PPT: The coefficient for PPT ($B = 0.0848$) is not significant ($p = 0.315$), suggesting no strong direct impact of PPT on public debt.

VAT: The VAT coefficient ($B = 0.1127$) is significant ($p = 0.005$), implying that a 1-unit increase in VAT revenue will decrease public debt by ₦0.1127 units, controlling for other factors.

CGT: CGT has a positive coefficient ($B = 0.8418$), but it is not statistically significant ($p = 0.700$), indicating an insignificant relationship with public debt.

Total Public Debt Stock: The public debt coefficient ($B = 0.0094$) is highly significant ($p = 0.000$), showing that as total public debt increases by ₦1, public debt stock increases by ₦0.0094.



Table 7

Multicollinearity (VIF) Test Results

Variable	VIF
Constant	5.211
PPT	1.086
Total VAT	1.126
CGT	1.049
Total Pub Dbt Stock	1.043

Source: STATA 2026

5. Multicollinearity (Table 7)

The VIF values for all variables are below 10 (ranging from 1.043 to 5.211), suggesting no multicollinearity issues among the variables, confirming the stability of the regression model.

Conclusion

The study explores the effect of tax revenue components on Nigeria's public debt, highlighting the relationships between Company Income Tax (CIT), Petroleum Profit Tax (PPT), Value Added Tax (VAT), and Capital Gains Tax (CGT) with public debt levels. Findings reveal that CIT shows a moderate positive correlation with public debt, suggesting that as CIT revenue rises, public debt also tends to increase. VAT has a significant positive impact on public debt, while PPT and CGT exhibit weaker relationships. Diagnostic tests indicate the presence of autocorrelation, signaling potential model refinement needs. Overall, VAT and CIT demonstrate the most substantial impact on public debt, implying that maintaining the tax rate and effective management of these tax types may positively influence fiscal stability. However, the non-stationarity of public debt and certain tax variables suggest that the effectiveness of these taxes in reducing public debt may be limited, necessitating additional strategies. Additionally, no multicollinearity issues were identified, indicating that the model is stable.



Recommendation

Base on the above conclusion, the following recommendations were made:

- i. Since VAT's has significant impact on public debt, policymaker should prioritize optimizing VAT collection through measures such as enhanced monitoring, automation, and stricter compliance enforcement. Similarly, strengthening CIT processes, and addressing tax evasion in this sector could improve revenue streams and help mitigate need for additional public debt.
- ii. Efforts to expand the tax base, especially for PPT and CGT, could help reduce dependence on VAT and CIT alone, providing a more diversified revenue source for debt reduction.
- iii. Given the non-stationarity of public debt, Nigeria's debt management policies should incorporate long-term measures to stabilize debt levels. Effective fiscal discipline and debt refinancing can also help reduce volatility in debt levels.
- iv. Future studies should focus on improving the econometric models used in this analysis. Addressing autocorrelation through the inclusion of lagged variables or error-correction models can lead to more accurate predictions. Additionally, transforming non-stationary variables like public debt will enhance the reliability of conclusions drawn.

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