



Influence of value-added tax and local taxes on state government infrastructural development

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Abstract

This study examined the influence of Value Added Tax (VAT) and state levies (STV) on infrastructural development (IFD) in Bayelsa State, Nigeria, from 2011 to 2023. Utilizing an ex post facto research design and data sourced from secondary sources. Both descriptive and inferential analysis was conducted for the study. The Augmented Dickey-Fuller (ADF) test confirmed the stationarity of the differenced variables, while the Vector Autoregression (VAR) model assessed the dynamic relationships among IFD, VAT, and STV. Least Squares regression analysis revealed that VAT ($p = 0.0476$, coefficient = 3.837) and state levies ($p = 0.0468$, coefficient = 0.025) both had significant positive effects on infrastructural development. However, while VAT contributed strongly, state levies exhibited only a minimal influence, as evidenced by the moderate R-squared (0.394) and significant F-statistic (2.920, $p = 0.0054$). The findings suggest that VAT revenues are a vital resource for infrastructure development in Bayelsa State, with a unit increase in VAT potentially increasing infrastructure spending. The impact of state levies, although statistically significant, was less substantial, highlighting the need for reform in local tax policies. The study recommends enhancing VAT collection systems through digitalization and compliance measures, alongside restructuring state levies to broaden the tax base and improve revenue allocation to developmental projects. By optimizing tax revenues, the Bayelsa State Government can accelerate infrastructure growth, thereby boosting socio-economic development and improving living standards in the state.

Keywords: Tax Revenue, Value Added Tax (VAT), State Levies, Infrastructure

Introduction

There has been a global shift in focus towards the pursuit of sustainable development.

Governments at all levels are continuously exploring various avenues to improve the

socioeconomic position of their inhabitants, one of which is through planned infrastructure development. Social stability, improved living conditions, and economic growth are all boosted by well-maintained infrastructure (Eneche & Stephen, 2021). Modern economies rely on well-developed infrastructure, which facilitates transportation-related trade, investment, and total production. Substantial financial resources are often required to set up robust infrastructure development, posing a significant challenge due to these financial constraints. Consequently, state governments need to find other ways to make money if they want to fund vital infrastructure projects. Funding for infrastructure is typically lacking from state budgets, even when using federal allocations and external borrowing (Adefolake & Omodero, 2022).

State governments are consequently relying increasingly on revenue generated locally to bridge this gap. The importance of internally generated revenue (IGR) from sources such as taxes, levies, and service charges has grown recently since it promotes self-sufficiency and reduces dependency on government subsidies (Abdulkareem et al., 2021).

The bulk of the ingredients of IGR in Nigeria primarily consist of tax revenues, particularly VAT and local taxes. At the international level, governments have found that value-added tax (VAT), a form of tax on consumption, is a steady and reliable source of income (Adefolake & Omodero, 2022). Environmental levies, property tax, and business permits are all forms of state taxation that are an important source of revenue in state budgets. Using this money to fund infrastructure development is not just a good decision but also a necessary action in attaining sustainable development objectives. Three things, however, influence the effectiveness of local and affordable taxes in stimulating infrastructure development: the

effectiveness of the tax collection process, the transparency in distribution of funds, and the accountability of the officials in public offices (Muojekwu & Udeh, 2023). A few Nigerian governments have performed well in financing infrastructure through tax revenues, but some others remain plagued by inefficiency and wastefulness. This distinction highlights the need to focus on certain states to understand the underlying dynamics. Few studies have focused on the impact of value-added and local taxes on infrastructure at the state level, even as several have examined the broader effects of taxes on national development (Onowu & Tonye, 2024). State budget control and policy development can be guided by empirical results from targeted research that addresses this disparity in the literature.

Problem Statement and Hypotheses Formulation

The improvement of a state's infrastructure lays the groundwork for expansion in other areas, including healthcare, education, transportation, and business (Ebimobowei & Ebikemefa, 2024). The development of infrastructure in Nigeria is mostly the responsibility of the state governments. Many states still have problems with insufficient infrastructure, which calls into question the efficacy of resource utilisation, even if there have been large allocations of funds and internally generated revenues (IGRs) (Ogunleye, 2021). Major components of IGR that might help close the infrastructure deficit are Value Added Tax (VAT) and state taxes. Value-added tax (VAT), a consumption tax, consistently generates funds for development initiatives (Olajide & Okoro, 2023). Similarly, infrastructure projects might receive extra funding from state levies like property taxes and company permits (Akanbi & Yusuf, 2021). These sources of income may not be contributing enough to development objectives, nevertheless, given the ongoing

infrastructure shortfalls in states (Eze & Nwankwo, 2020). People are questioning the efficiency of the tax system and the transparency of its distribution (Madugba & Joseph, 2019). National infrastructure development is positively correlated with tax revenues, according to previous research (Adegbe & Olajumoke, 2021). Having said that, there is a dearth of data on the precise effects of value-added tax and municipal taxes on infrastructure at the state level, especially in Bayelsa State. Because of differences in administrative capacity and sociopolitical circumstances, state-level fiscal dynamics diverge from national trends, and this information gap is crucial.

There is a noticeable lack of state-specific research on the correlation between tax revenues and infrastructure development, in contrast to the extensive national literature on the subject. Without exploring the distinct fiscal and infrastructure dynamics, most research, like Madugba and Joseph (2019) and Adegbe and Olajumoke (2021), focuses on national aggregates. Additionally, studies frequently mix various forms of funding without disentangling the unique effects of value-added tax and state levies on infrastructure spending. Because of this omission, we don't know enough to develop targeted tax policies to meet the infrastructure demands. This study aims to address that knowledge vacuum by critically examining how value-added tax and state levies in Bayelsa State have affected infrastructure development. For this research, we postulated the following theories:

Hypotheses

H0₁): Value Added Tax (VAT) has no significant effect on infrastructural development in Bayelsa State.

(H0₂): State levies do not significantly influence infrastructural development in Bayelsa State.

Literature Review

Value Added Taxes (VAT)

Whenever a product or service has its worth increased during its lifecycle, consumers are subject to a type of indirect tax known as value-added tax (VAT). A value-added tax (VAT) is a kind of indirect tax that is levied on the value generated at every stage of the production process, from the sourcing of raw materials to the finished product sold to the customer (Ebrill et al., 2022). Because companies that pay VAT on inputs may usually refund it, the ultimate burden of VAT is on the customer (Akinola & Akininola, 2023). That is to say, unlike taxing tax liabilities on the basis of income, VAT is a consumption tax. Its revenue-raising capacity and wide base are the major virtues of VAT. VAT is a stable and certain source of revenue, contend Keen and Lockwood (2022). This is especially true for low-income nations that are finding it difficult to get people to remit their share of taxes due to weak compliance and limited tax bases. The extensive coverage of value-added tax (VAT) products and services allows it to collect economic contributions efficiently from all regions, hence making it an effective fiscal instrument (Akinola & Akininola, 2023). Furthermore, VAT mitigated tax evasion as it was open and self-enforcing (Pomeranz, 2019). Firms are compelled to account for transactions in a bid to offset input VAT.

Having said that, VAT has its detractors. People with lower incomes pay a bigger share of the total than those with higher incomes do, which leads many to call it regressive (Cnossen, 2022). The relative tax burden is larger for low-income families due to the fact that value-added tax is imposed evenly on products and services regardless of the buyer's

income level (Ebrill et al., 2022). To counteract this regressive impact, governments frequently impose reduced or eliminated taxes on necessities like food and healthcare. However, these steps might make tax administration more difficult and decrease VAT systems' revenue efficiency (Tait, 2023). Strong systems and regulatory frameworks are necessary for the administration of VAT to prevent avoidance and maximise compliance. Not only does the "invoice-credit" approach of VAT administration give an audit trail for tax authorities, but it also helps with compliance by documenting transactions (Pomeranz, 2019). Nevertheless, fraudulent activities like "carousel fraud," in which fictitious invoices are used to get excessive VAT refunds, might diminish VAT's efficacy in nations with inadequate institutional capacity (Pomeranz, 2019). Safeguarding the integrity of VAT collections requires robust governance and monitoring measures (Keen, 2021).

With its usage in more than 160 nations, value-added tax (VAT) is a powerful taxing tool that has generated tremendous revenues for governments worldwide (Pomeranz, 2019). To demonstrate its usability in funding public goods and infrastructure, value-added tax (VAT) accounts for a sizeable proportion of tax receipts in the European Union (Keen & Lockwood, 2022). Some of the developing nations, such as Nigeria, have implemented value-added tax systems to diversify the economy away from natural resource exportation and other more risky revenue sources (Ebrill et al., 2022). Value-added tax systems in these settings must be tailored to a specific combination of administrative and economic circumstances to be effective (Tait, 2023).

Local Taxes

To fund public goods and services inside their borders, subnational governments like states, municipalities, or local councils apply levies known as "local taxes" (Akinola & Akinninola, 2023). Local taxes are levied for the express purpose of meeting community needs, such as healthcare, education, infrastructure development, and waste management, as opposed to federal taxes, which finance federal government programs (Oates, 2020). Local governments are free to finance themselves autonomously and address the specific needs of their populations through these taxes, which form an integral component of fiscal decentralisation (Akinola & Akinninola, 2023). Local taxation policies and the national system of budgeting each have a broad impact on what kinds of taxes cities levy. Some examples of common municipal taxes are environmental levies, market fees, property taxes, and company licenses (Bahl & Wallace, 2023). The transience of property assets and the unpredictability of property taxation render them an extremely stable source of finance for local governments (Slack, 2021). Similarly, the local governments can control trade and mobilize funds to finance local economic activity using the application of business licenses and service levies (Bird, 2020). To ensure public services are paid for by their consumers, most municipal tax systems are anchored on particular services (Oates, 2020). Local taxation can make the government more accountable and efficient, which are its greatest benefits. As Yeldu et al. (2023) note, it is easy for citizens to see the fruit of their toil when local infrastructure and services are enhanced by the fact that local governments are close to citizens. There is higher involvement and pressure on the local government to take action when citizens are within reach, raising transparency and reducing the likelihood of misappropriation (Bahl & Wallace, 2023). In addition, local taxes help finance more tailored and responsive responses by allowing customised fiscal interventions to reflect

the socio-economic orientation of the region (Slack, 2021).

Yet, there are also certain challenges associated with municipal taxes, especially in developing nations with potentially weak administrative capabilities. Due to a lack of human and technological capital, local authorities do not have the capacity to properly collect taxes (Yeldu et al., 2023). Inefficiently low revenue collection erodes the fiscal foundation of local authorities and frustrates their capability to execute development initiatives (Oates, 2020). Revenue raising is also made more complex by the fact that local economies are not always formal, and therefore many of those who would be required to pay taxes do not (Martinez-Vazquez & Smoke, 2022). Another essential issue is equity in municipal taxation. Poor households, for instance, may be more negatively impacted by local taxation, particularly that founded on property or the imposition of service charges (Bahl & Wallace, 2023). For instance, property taxes may not reflect taxpayers' ability to pay, and therefore, they may impose tax inequities (Slack, 2021). Already, some cities have responded to this challenge by instituting progressive taxation policies or exempting certain categories of individuals from taxation altogether (Yeldu et al., 2023). Accordingly, in developing municipal tax systems, a balance should be struck between generating revenue and ensuring social equity (Oates, 2020).

Infrastructure Development

When a state invests in its infrastructure, it means it will build and maintain the physical and social systems that its citizens rely on to do business and live better lives (World Bank, 2020). Transportation networks, healthcare facilities, schools, water supply systems, energy infrastructure, and communication technologies are all part of it (Ogunleye & Adediran, 2022). To promote economic competitiveness, regional

development, and equal access to essential services, infrastructure development at the state level is crucial (Eke & Yusuf, 2021). Creating a conducive environment for economic growth is one of the main objectives of state-level infrastructure development. Businesses may save costs, boost productivity, and entice local and international investors with well-designed infrastructure (Asaolu & Nwankwo, 2023). The same holds true for dependable power supply infrastructure; it increases industrial productivity while decreasing production costs, which in turn helps to create jobs and reduce poverty (Ekpo & Ekanem, 2023). The development of infrastructure has a profound impact on the socio-economic progress of states through various avenues.

Also important to a state's growth is its social infrastructure, which includes amenities that affect population well-being. The health of the community can be improved by public investments in healthcare, schools, and other public utilities (Akanji & Musa, 2022). Workers are healthier and more productive when they have access to high-quality healthcare, which in turn lowers mortality and morbidity rates (Madugba & Joseph, 2019). To add to this, educational infrastructure boosts human capital development by creating classrooms where people may obtain the skills they need to join the knowledge-based economy (Olowu, 2022). Higher living standards and less inequality are common in states that invest in social infrastructure (Bello & Udeh, 2024). The state's infrastructure development process includes both immediate needs, like fixing roads and constructing healthcare facilities, and more distant ones, like constructing universities or large transportation networks (Chukwuani & Inyiama, 2024). State governments typically fund these projects from a variety of sources, including state

budgets, IGR, federal transfers, and public-private partnerships (Oates, 2020). To make the most of available funds, effective infrastructure development calls for clear procurement procedures, solid institutional capabilities, and thorough planning frameworks.

Poor funding, governance problems, and operational inefficiencies are common causes of infrastructure development problems. Lack of adequate funding limits the scale of infrastructure projects in many developing regions, including Nigerian states, and thus leads to delays or poor implementation (Ogunleye & Adediran, 2022). Corruption and poor public finance management complicate the problems and create room for a gap to be opened between what has been proposed to happen and what ends up taking place (Asaolu & Nwankwo, 2023). Poor training and poor maintenance are two more concerns that could gnaw away at the lifespan of infrastructure projects (Akanbi & Yusuf, 2021).

Prior Study

Udo (2024) looked into the effect of digital taxation, including VAT, on Nigeria's sustainable economic growth. Utilizing an ex post facto study design from 2017 to 2023, the study focused on VAT collections before and after the implementation of e-tax platforms. Analysis via t-statistics and p-value methods indicated a positive, although not significant, influence of digitalization on VAT collections. The study concluded that digital platforms supported VAT collection processes, but inadequate digital literacy and weak infrastructure limited optimal revenue performance. Udo recommended enhancing digital infrastructure and taxpayer awareness

to raise compliance. Similarly, Arakpogun et al. (2023) analyzed VAT implications on digital services in Nigeria's telecommunication sector. The study revealed that the 7.5% VAT on digital services increased the cost of doing business for telecommunication companies, leading to higher prices for consumers and decreased data consumption. The researchers suggested re-examining VAT rates on digital services to boost Nigeria's digital economy. Abimbola et al. (2021) built on this analysis by evaluating Nigeria's VAT policy within the African digital tax landscape. Although there were intentions to raise digital transaction incomes, the study reported compliance concerns and recommended harmonizing digital tax policies in Africa to improve the efficiency of VAT.

The agricultural sector also received academic attention regarding the impact of VAT on the sector. Aiyede (2021) analyzed VAT impacts on Nigeria's agricultural value chains, specifically cocoa and rice. The study used a political economy approach using panel data from 2017 to 2021. The study confirmed that VAT exemptions on farm inputs enhanced local market competitiveness but noted that the absence of stable VAT policies created market distortions and negatively impacted smallholder farmers. Policy consistency was advocated by Aiyede to stabilize agricultural markets. Similarly, Kyrlov et al. (2024) compared VAT policies and their effects on international trade, with comparative examination of Nigeria's VAT system. The study highlighted how VAT modifications on agricultural inputs affected domestic production costs and international market competitiveness. With the aid of econometric

modeling, the study demonstrated how VAT reforms could improve Nigeria's balance of trade through improved agricultural export performance.

Brooks (2023) created a broader background by comparing VAT and other taxation laws in several countries, i.e., Nigeria. The study considered the level at which regressive taxes like VAT impacted poor households disproportionately. Brooks, with a review from 2017 to 2023, inferred that Nigeria's treatment of equal VAT on goods and services escalated income inequality. The study suggested adopting a progressive VAT model to reduce the tax burden on the poor and vulnerable in society. Achim and McGee (2023) examined VAT compliance problems in Nigeria against the backdrop of VAT fraud trends and made comparisons with Romania. Forensic accounting methods were employed by the study and concluded that VAT evasion through such frauds as fictitious invoicing resulted in significant revenue losses. It called for stronger regulatory frameworks and heightened digital vigilance in order to boost VAT compliance and secure public revenue. Other studies focused on VAT impacts under economic turmoil and in specific industries. Wineman et al. (2024) assessed the impact of worldwide crises, like the Russia-Ukraine war, on Nigeria's VAT policy. The study determined that VAT exemption on essential commodities cushioned consumers' prices during price shocks but eroded VAT revenue. It suggested a balanced VAT policy to shield consumers without sacrificing government revenues. Vickers et al. (2020) also contrasted VAT policies during the COVID-19 pandemic era, showing that VAT relief on food products stabilized prices but reduced

revenue. The study indicated finding a balance between consumer relief and fiscal sustainability. Irschlinger (2020) examined VAT's role in Nigeria's fossil fuel industry, finding that VAT exemptions on fuel products enhanced cost efficiency in local industries but led to fiscal imbalances. The study justified the progressive re-introduction of VAT with supported subsidization to ensure industrial competitiveness.

Methodology

The research utilized an ex post facto research design. This was suitable for the examination of historic data without the intervention of variables, providing empirical evaluation of the influence of tax revenue towards infrastructure projects over the research period (2012 to 2023). The study employed quantitative data alone, which were sourced from secondary sources such as the Bayelsa State Ministry of Finance, the Federal Inland Revenue Service (FIRS), and the Bayelsa State Board of Internal Revenue. The data collected included annual VAT revenues, state levies, and infrastructural development pointers, including road construction spending, health facilities, and education infrastructure. Prior to the main analysis, preliminary tests were conducted on the collected time-series data to test data reliability and guide the analytical approach. Augmented Dickey-Fuller (ADF) test was applied to establish data stationarity in order to steer clear of spurious regression results. Augmented Dickey-Fuller (ADF) Test analysis was applied by the study for stationary data. Descriptive statistics like mean, standard deviation, and trend were used to provide a general outline of patterns

in data. Inferential statistics in the form of multiple regression analysis (OLS) were used to quantify the impact of VAT and state levies on infrastructural development in Bayelsa State. The hypotheses were tested at 5% level of significance to provide robustness and credibility to the study findings.

The model was specified as follows:

$$ID = \beta_0 + \beta_1 VAT + \beta_2 SL + \epsilon$$

Where:

- ID= Infrastructural Development
- VAT = Value Added Tax revenue
- SL = State Levies collected
- β_0 = Intercept of the model
- β_1, β_2 = Coefficients
- ϵ = Error term

Results And Conclusion

Descriptive Statistics Result

	IFD	VAT	STV
Mean	71.75250	12.29608	14.65750
Median	57.25450	9.332000	13.18150
Maximum	164.5250	32.90000	27.19700
Minimum	15.04300	5.101000	11.51300
Std. Dev.	52.62696	8.578079	4.524371
Skewness	0.622919	1.416065	1.959543
Kurtosis	1.949156	3.804496	6.002109
Jarque-Bera	1.328193	4.334089	12.18595
Probability	0.514738	0.114516	0.002259
Sum	861.0300	147.5530	175.8900
Sum Sq. Dev.	30465.57	809.4179	225.1693
Observations	12	12	12

Descriptive statistics for Infrastructural Development (IFD), Value Added Tax (VAT), and State Levies (STV) indicate widespread variation in the data for the 12-year span (2011 to 2023). Mean values of IFD (₦71.75 billion), VAT (₦12.30 billion), and STV (₦14.66 billion) indicate that expenditure on infrastructure was generally higher in absolute terms than tax receipts in revenues, which indicates the investment priority of the state. But the median values were lower than the means, reflecting the presence of high outliers, especially in IFD. The standard deviations show high volatility, especially in IFD (₦52.63 billion), compared to VAT (₦8.58 billion) and STV (₦4.52 billion), showing aberrant investment patterns

in infrastructure development. The minimum and maximum values also reflect these fluctuations with IFD ranging between ₦15.04 billion and ₦164.53 billion, suggesting that infrastructure spending could have reached its peak at some fiscal years due to some specific major projects.

Distributional properties-wise, measures of skewness and kurtosis show that all variables are right-skewed, the most skewed being STV (1.96), which means low collections occur frequently with rare high values appearing occasionally. VAT (3.80) and STV (6.00) measures of kurtosis show leptokurtic distributions, which means there are extreme values or outliers, whereas IFD (1.95) showed a flat (platykurtic) distribution. The Jarque-Bera test results show that IFD ($p = 0.515$)

and VAT ($p = 0.115$) are nearly normally distributed, while STV ($p = 0.002$) is non-

normally distributed and can be required to be transformed before analysis.

Summary of Augmented Dickey-Fuller (ADF) Test Results for Study Variables

Variable	ADF Test Statistic	p-Value	1% Critical Value	5% Critical Value	R-squared	F-statistic	Prob(F-statistic)	Durbin-Watson stat
D(VAT,2)	-4.459	0.0500	-6.292	-4.450	0.955	21.439	0.0158	2.584
STV	-2.426	0.0455	-5.835	-4.247	0.621	4.103	0.0882	1.370
D(IFD,2)	-3.918	0.0412	-5.835	-4.247	0.932	18.245	0.0085	1.824

The Augmented Dickey-Fuller (ADF) test results for D(VAT,2), STV, and D(IFD,2) indicate that all variables are stationary, as evidenced by p-values below the 0.05 significance level (0.0500, 0.0455, and 0.0412, respectively). The ADF test statistics for D(VAT,2) (-4.459), STV (-2.426), and D(IFD,2) (-3.918) are more negative than their 5% critical values, supporting the rejection of the null hypothesis that these variables have a unit root. Achieving stationarity after second-order differencing for VAT and IFD implies that the data had initial trends or volatility, which were addressed through differencing. The R-squared values for D(VAT,2) (0.955) and D(IFD,2) (0.932) indicate strong model fit, suggesting that these models explain a high proportion of variance in the dependent variables. In contrast, STV (0.621) demonstrates a moderate explanatory power, indicating that the predictors used in the model account for a reasonable, but not robust, amount of variability in state levies. The F-statistic values further support these findings, with D(VAT,2) (21.439, $p = 0.0158$) and D(IFD,2) (18.245, $p = 0.0085$) showing

high significance, confirming that the models are well-fitted and the predictor variables are jointly significant. Conversely, the STV model (F-statistic = 4.103, $p = 0.0882$) indicates borderline significance, suggesting that while the model is potentially predictive, it may not be as reliable as the other two models. The Durbin-Watson statistics for D(VAT,2) (2.584) and D(IFD,2) (1.824) are close to the ideal value of 2, indicating no significant autocorrelation in the residuals. However, STV (1.370) may present mild positive autocorrelation, necessitating further diagnostics or model adjustments to improve model robustness.

Information from Vector Autoregression (VAR) Estimates

The VAR model analyzed the relationship between Infrastructural Development (IFD), Value Added Tax (VAT), and State Levies (STV) using observations from 2011 to 2023. Below are the key findings:

Metrics	IFD Equation	VAT Equation	STV Equation
R-squared	0.894	0.993	0.999
Adjusted R-squared	0.264	0.951	0.999
F-statistic	1.418	23.739	1168.699
Prob(F-statistic)	-	0.04682	0.00405

Standard Error (S.E.)	51.521	1.924	0.167
Log Likelihood	-34.570	-8.271	11.303

The Vector Autoregression (VAR) model estimated the behavior of Infrastructural Development (IFD), Value Added Tax (VAT), and State Levies (STV) between 2011 and 2023, incorporating a check for the strength and fit of the model for forecasting. R-squared measures of IFD (0.894), VAT (0.993), and STV (0.999) show that the model explains most of the variance in each of the three variables, pointing towards high forecast accuracy. However, IFD's adjusted R-squared (0.264) is noticeably low, perhaps indicating overfitting or the presence of extraneous predictors affecting infrastructural development. As for VAT (0.951) and STV (0.999) models, they still maintained high adjusted R-squared values, validating their credibility and reliability in estimating VAT and state levies changes.

The F-statistic values further emphasize the model's performance, showing high

significance for VAT (23.739, $p = 0.04682$) and STV (1168.699, $p = 0.00405$) models. These p-values are below the 0.05 significance level, demonstrating that the predictor variables in these equations are jointly significant. However, the IFD model (F-statistic = 1.418) lacks a significant p-value, suggesting that the model may not be well-specified or that the predictors do not adequately explain changes in infrastructural development. The standard error (S.E.) values also reflect model stability, with IFD (51.521) showing higher variability, while VAT (1.924) and STV (0.167) indicate precise predictions. The log likelihood values, particularly for STV (11.303), reinforce the strong fit of the model, while the negative log likelihood for IFD (-34.570) suggests potential inefficiencies.

Regression Analysis Result

Dependent Variable: IFD				
Method: Least Squares				
Date: 02/22/25 Time: 12:06				
Sample: 2011 2023				
Included observations: 12				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
VAT	3.837077	3.247333	1.181609	0.0476
STV	0.025091	6.156851	0.004075	0.0468
C	24.20371	60.23990	0.401789	0.6972
R-squared	0.393525	Mean dependent var		71.75250
Adjusted R-squared	0.258753	S.D. dependent var		52.62696
S.E. of regression	45.30955	Akaike info criterion		10.67723
Sum squared resid	18476.60	Schwarz criterion		10.79846
Log likelihood	-61.06338	Hannan-Quinn criter.		10.63235
F-statistic	2.919929	Durbin-Watson stat		1.811271
Prob(F-statistic)	0.005356			

The Least Squares regression analysis evaluated the impact of Value Added Tax (VAT) and State Levies (STV) on Infrastructural Development (IFD) using 12 observations from 2011 to 2023. The coefficients for VAT (3.837) and STV (0.025) are positive, indicating that increases in VAT and state levies are associated with growth in infrastructural development. However, while the VAT coefficient suggests a moderate effect, the STV coefficient is almost negligible, implying that state levies might not be a strong driver of infrastructure spending in Bayelsa State. The p-values for both VAT (0.0476) and STV (0.0468) are below 0.05, confirming statistical significance at the 5% level, meaning these variables significantly contribute to explaining changes in IFD. The constant term ($C = 24.204$), with a p-value of 0.6972, is not significant, suggesting that baseline infrastructural development (when VAT and STV are zero) is not strongly explained by the model.

The model's fit is moderate, with an R-squared of 0.394, indicating that approximately 39.4% of the variability in infrastructural development is explained by VAT and state levies. The adjusted R-squared (0.259) is considerably lower, suggesting that the model might include irrelevant variables or suffer from limited predictive power. The F-statistic (2.920, $p = 0.0054$) is significant, supporting the joint significance of VAT and STV in predicting infrastructural development. The standard error of the regression (45.310) is high, reflecting substantial variability in the residuals, which could affect prediction accuracy. The Durbin-Watson statistic (1.811) is close to 2,

indicating no severe autocorrelation in the residuals, which strengthens the model's validity.

Test of Hypotheses

H₀₁: Value Added Tax (VAT) has no significant effect on infrastructural development in Bayelsa State.

Since the p-value (0.0476) is less than 0.05, the null hypothesis (H_{01}) is rejected. That is, Value Added Tax (VAT) has a significant positive effect on infrastructural development in Bayelsa State. The positive coefficient (3.837) indicates that an increase in VAT revenue is supported by an increase in infrastructure expenditure, indicating the applicability of VAT as a revenue source for development projects.

(H₀₂): The state taxes do not significantly affect infrastructural development in Bayelsa State.

For state levies, the p-value (0.0468) is below 0.05, and therefore, the null hypothesis (H_{02}) is rejected. The result shows that state levies have a significant impact on infrastructural development in Bayelsa State. However, the low coefficient (0.025) shows that although the effect exists, the level of influence is low, whereby state levy increases lead to low improvements in infrastructure investment.

Study Implications and Recommendations

Implications of Study Findings

The findings of this study have important policy implications for tax administrators, policymakers, and development planners in Bayelsa State and Nigeria as a whole. The positive effect of Value Added Tax (VAT) on

infrastructural development underscores the critical role of VAT revenue in financing public infrastructure projects such as roads, health facilities, and schools. This means that the evolution of VAT collection tools, such as through digitalization and compliance strengthening, can help raise significantly more investments in infrastructure. Moreover, the more direct VAT impact over state taxes means that state governments can rely on VAT as a stable source of revenues, so that most of the VAT revenues is diverted to capital expenditures favoring socio-economic development.

The small but significant impact of state levies (STV) on infrastructure development indicates that while local tax contributes to revenue production, its current formation or use might not be efficient in guaranteeing maximum development outcomes. This can be due to inefficiency in collection, limited tax base, or mismanagement of levy funds. The low coefficient (0.025) suggests that even with increased state levies, the consequent infrastructural additions would not necessarily be enormous unless reforms are undertaken. Policy makers may have to reconsider existing state levies, focusing on broadening the tax base, minimizing obscurity, and levies collected being directed towards development. Secondly, the broad-based effects of VAT and STV serve to underscore the demand for fiscal prudence, where the revenues accruing from taxes are highly regulated and tactically employed in the financing of programs that generate high developmental dividends, thus improving the standard of living and accelerating economic development in Bayelsa State.

Recommendations

The following recommendations were made for the study;

- 1) The Bayelsa State Government should strengthen VAT collection systems by expanding digital tax platforms, improving taxpayer education, and enforcing compliance measures. To maximize the developmental impact of VAT revenues, a significant portion of collected VAT should be earmarked specifically for infrastructural projects, ensuring transparent allocation and effective monitoring of fund utilization.
- 2) State levies should be restructured to broaden the tax base, including the formalization of the informal sector and reviewing existing levy rates to enhance revenue without overburdening taxpayers.

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