EMPIRICAL ANALYSIS OF TAX REVENUE AND GOVERNMENT SPENDING

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ABSTRACT

The purpose of this study was to use modern time-series data and sophisticated econometric methods to examine the connection between tax income and government spending in Nigeria, both in the short- and long-term. According to the research, there is a long-term connection between tax collection and government spending in Nigeria. Government expenditure, tax income, debt, and population all exhibited positive correlations at the 5% level of statistical significance in the results of the Vector Error Correction Model (VECM). The study recommends that the Nigerian government should prioritize increasing tax revenue to finance government spending and reduce the reliance on debt to avoid increasing the debt burden. Additionally, the study recommends that the Nigerian government should implement policies that encourage economic growth and population control to avoid unsustainable government spending.
Keywords: Econometric methods, government spending, tax revenue,

INTRODUCTION

Nigeria's tax revenue-to-GDP ratio is among the lowest in the world, standing at 6.1% in 2019, far below the sub-Saharan Africa average of 16.5% and the global average of 15.3% (World Bank, 2021). The low tax revenue collection is due to the country's over-reliance on oil revenue, weak tax administration, and low tax compliance rate. On the other hand, Nigeria's government spending is high and rising, reflecting government's ambitious development agenda. The government's spending priorities include social infrastructure, education, healthcare, and security. In 2021, the federal government budgeted ₦13.6 trillion for recurrent and capital expenditures, with a deficit of ₦5.6 trillion (National Assembly, 2021). To finance the deficit, the government intends to borrow from domestic and foreign sources, including the issuance of bonds and loans from multilateral institutions.

There is a clear causality between tax income and governmental expenditures. Revenue collection, especially tax money, is essential to government's capacity to fund programmes and projects. Government is primarily funded through tax revenue. In Nigeria, tax revenue accounts for over 60% of the federal government's total revenue (Okafor, 2020). When the government collects more tax revenue, it has more funds to spend on development projects, social welfare programs, and other priorities. Conversely, when tax revenue falls short, the government may have to cut spending, borrow more, or both. The purpose of this study was investigate the relationship between tax revenue and government expenditure in Nigeria, both in the short and long terms. The study was guided by the following hypotheses:
HA$_1$. There is significant relationship between tax revenue and government spending in Nigeria, with tax revenue having a positive impact on government spending in both the short-run and long-run.

LITERATURE REVIEW

Concept of Tax Revenue

According to the International Monetary Fund (IMF), tax revenue is "the sum of all taxes and net of refunds on goods and services, income, and profits" (IMF, 2021). This definition implies that tax revenue is the total amount of money collected by the government from all types of taxes imposed on goods and services, income, and profits, after accounting for refunds. The Organisation for Economic Co-operation and Development (OECD, 2021) defines tax revenue as "the sum of taxes and social contributions levied on all types of income, profits, and capital gains, as well as on the production, sale, transfer, or use of goods and services". This definition is similar to the IMF's definition but includes social contributions, which are payments made by individuals or employers to finance social security programmes.

Taxes are a major way that the government of Nigeria brings in money to pay for public works and other critical services and programs. The Central Bank of Nigeria (CBN, 2018) reports that the federal government's tax collection grew by 20.4% in 2017, from 3.3 trillion in 2016 to 4.0 trillion in 2017. The launch of the Voluntary Assets and Income Disclosure Scheme (VAIDS) in the middle of 2017 encouraged taxpayers to disclose their assets and income and pay any back taxes they owed willingly.

Nigeria has a complex tax structure that includes federal, state, and local levies. The federal government collects a wide variety of taxes, including personal and corporate income taxes, sales taxes, value-added taxes, customs and excise duties, and royalties on petroleum profits. The state governments collect taxes on personal income, consumption, and property, while the local governments collect taxes on market stalls, shops, and other small businesses (Nigeria Law, 2021).

The implementation of tax reforms and the expansion of the tax base are crucial for increasing tax revenue in Nigeria. Electronic tax payment systems, a tax appeals court, and a review of tax laws and norms have all been implemented by the federal government in recent years to enhance tax administration and compliance (PwC Nigeria, 2021). Nigeria has several opportunities to increase its tax revenue collection, thereby providing more funds for government spending (Anyanwu & Erhijakpor, 2014). These opportunities include**s** expanding the tax base, reforming tax laws and leveraging technology.

Firstly, just approximately 6% of Nigerians actually pay income tax, hence the country has a small tax base (World Bank, 2019). The government can raise more money from taxes if it can tax a larger percentage of the population and more types of enterprises. Increasing the attractiveness of tax compliance by means of incentives and streamlining procedures can assist improve tax administration, reduce tax evasion and avoidance, and achieve these goals.

Secondly, Nigeria's tax laws are complex and outdated, hindering tax compliance and revenue collection. To improve tax revenue, the government can reform tax laws to make them more efficient, transparent, and easier to comply with. This can include reducing tax rates, simplifying tax procedures, and eliminating tax exemptions and loopholes that favor the wealthy and powerful. And thirdly, Nigeria has a significant opportunity to leverage technology to improve tax administration and revenue collection. Technology can be used to improve taxpayer registration, filing, and payment processes, as well as detect and prevent tax fraud and evasion. The use of data analytics and artificial intelligence can also help identify tax compliance risks and opportunities.

Despite these opportunities for increasing tax revenue, Nigeria faces several challenges in tax collection. These challenges include weak tax administration, High Level of Informality and resistance to tax payment. Nigeria's tax administration is weak, characterized by inefficiencies, corruption, and a lack of capacity. The tax authorities are understaffed and lack the necessary skills and tools to carry out their mandate effectively. This leads to poor tax collection, low compliance rates, and revenue leakages.

Also, The Nigerian economy is predominantly informal, with a large proportion of economic activities taking place outside the formal sector. This makes it difficult for the government to track and tax these activities, leading to a significant revenue gap. In addition, Many Nigerians are resistant to paying taxes, partly due to a lack of trust in government's ability to utilize the funds effectively. Perceived low quality of public services, corruption and mismanagement of public funds have eroded taxpayers' confidence in the government, making it difficult to convince them to pay taxes willingly.

Concept of Government Spending

IMF (2020) defines government spending as "the sum of government consumption expenditures and gross investment, which includes government purchases of goods and services, payments made to government employees, and investments in infrastructure and other assets." When the government uses tax revenue to fund initiatives designed to improve the lives of its residents, this is known as "government expenditure." Nigerians have discussed and analyzed government spending amid widespread concerns about corruption, poor management, and inefficiency. Nigerian government's total spending was 10.5% of GDP in 2020. This is less than what obtain in neighboring nations (World Bank, 2021).

Major areas of government spending in Nigeria is infrastructural (roads, rails, housing, power, etc.). Another area of government spending in Nigeria is social welfare programmes intended to reduce poverty and improve the standard of living of its citizens. For example, the National Social Investment Program (NSIP) was launched in 2016 to provide financial support to vulnerable groups, including the elderly, the disabled, and the unemployed (Federal Ministry of Humanitarian Affairs, Disaster Management and Social Development, 2021). For low-income families, the government has also established the Conditional Cash Transfer (CCT) programme, which distributes monthly cash payments.

However, there have been concerns about the efficiency and effectiveness of government spending in Nigeria. Corruption and mismanagement have been major obstacles to achieving the desired outcomes of government programmes and projects. For instance, in 2020, the Auditor-General of the Federation reported that several government agencies and ministries failed to account for public funds (Premium Times, 2021). Such inefficiencies in government spending have hindered development and eroded citizens' trust in the government.

Theoretical Review

This study is grounded in classical theory of public finance which assumes that individuals and firms are rational and self-interested, and the market operates efficiently. According to this theory, the government's role is limited to providing public goods, such as national defense and law enforcement. The government should finance these goods through taxes, and the tax revenue should be used efficiently. The classical theory emphasizes the importance of a balanced budget, where government spending does not exceed tax revenue (Musgrave & Musgrave, 1989).

According to the traditional conception, excessive taxes retard economic development by dampening the motivation to labor, save, and invest. As a result, government should reduce tax rates to boost the economy. According to this argument, tax receipts have a chilling effect on government outlays. In order to prevent budget deficits, government expenditure should be constrained to the amount of money it takes in through taxes. The supply-side economics, sometimes called the "trickle-down" hypothesis, is a school of thought that holds that reducing taxes would result in higher economic growth and tax revenue (Laffer, 2012).

The Keynesian view of public finance suggests that stimulus expenditure by government prevent or mitigate economic downturns. Hence, government is required to use fiscal policies like increasing spending or cutting taxes, to stimulate the economy when private investment is low. The theory suggests that government should run a budget deficit during a recession to stimulate aggregate demand and create jobs (Musgrave & Musgrave, 1989). This view holds that increase in tax revenue leads to more government spending. As tax collections increase, government accumulates more money to spend on public service and

works; and increased government investment stimulate the economy by giving rise to new enterprises and leading to increased consumer spending (Blanchard, 2018).

Tax Revenue and Government Expenditure
Studies have been conducted to determine or examine the relationship between tax revenue and government expenditure. Some of these studies includes that of Adeola and Evans (2019) which used yearly time series data from 1986 to 2016 to analyze the connection between tax income and government spending in Nigeria. The study discovered that a rise in tax collection results in increased government expenditure, suggesting a positive long-run link between the variables. That is, tax income influence government expenditure.

The study of Akinlo and Akinlo (2017) investigated how government expenditure compares to tax revenue in Nigeria. The study analyzed time series data collected annually between 1980 and 2015. The study reported that tax revenue has significant impact on government expenditure in Nigeria. The study also demonstrates that tax income and government expenditure are intertwined in the short run; that is, government expenditure rises in tandem with tax collections.

In, Ibrahim and Adebisi (2017), the correlation between tax income and government spending in Nigeria was studied using time series data from 1981 to 2015. The study found a correlation between tax income and governmental spending in Nigeria, suggesting that more money coming in via taxes leads to more money being spent. Changes in one variable lead to shifts in the other, as shown by the discovery of bidirectional causation between tax income and government expenditure.

The financial resources of the Nigerian government are dissected by Nwant and Ogunleye (2016). Using time series data from 1981 to 2014, the study uses econometric techniques to assess the long- and short-term effects of tax revenue on governmental spending. The study suggests that tax revenue and government spending in Nigeria are positively correlated both in the long and short terms. The research also reveals that the connection between tax collection and expenditures in Nigeria is not linear, since other factors, such as debt payments, foreign reserves, and currency rates, impact government expenditure.

Udeagwu and Eze (2020) use yearly time-series data from 1981 to 2017 to examine the effect of tax collection on government spending in Nigeria. The study found that tax collection significantly boosted government spending in Nigeria. The study also found that increase of 1% in tax income results to increase of 0.78% in government spending. The research also shows that there is a two-way causal link between tax revenue and government spending, with more spending leading to more tax revenue.

In line with the forgoing reports, Ogunmuyiwa and Olanrewaju (2019) states that tax revenue appears to be a significant predictor of government expenditure in Nigeria due to its long-term correlation with tax receipts. This also shows that government spending in Nigeria is a direct result of tax revenue, and demonstrates that higher tax revenues would lead to increased government spending, though this is not always the case.

METHODOLOGY

This quantitative study is to examine the relative sizes of government expenditures and tax revenues in Nigeria. Advanced econometric approaches are used to examine short-run and long-run correlations between tax revenue and government spending using data from the Nigeria National Bureau of Statistics covering a 10-year time frame. The accuracy and precision of the data collected are crucial to the credibility of the study's results. Some of the more advanced econometric tools that may be used to investigate the link between taxes and spending are unit root tests, cointegration analysis, and vector error correction models.

Avoiding erroneous inferences about the relationships between variables is facilitated by the unit root test's verification of stationarity. Co-integration study helps clarify whether or not tax revenue and government

spending are indeed co-integrated. The short-term dynamics of the variables, including the impact of shocks on the system, may be investigated with the use of the vector error correction model. Statistical tools like E-Views will be used to conduct the econometric analysis, increasing faith in the study's results.

The study models Government Spending as_t = γ + δ1 Tax Revenue_t-1 + δ2 Debt_t + δ3 Population_t + ε2t

Where:
Tax Revenue_t represents tax revenue in year
Government Spending_t represents government spending in year t
Debt_t represents government debt in year t
Population_t represents population in year t
α, β1-4, γ, δ1-3 are coefficients to be estimated
ε1t, ε2t are error terms.

RESULTS AND DISCUSSION

Table 1: Augmented Dickey-Fuller (ADF) test results for original variables

Unit Root Tests

Variable	ADF Statistic	Critical Value	Critical Value	Critical Value	Result
Government Spending	-1.82	-3.44	-2.86	-2.57	Non-stationary
Tax Revenue	-3.49	-3.44	-2.86	-2.57	Stationary
Debt	-1.78	-3.44	-2.86	-2.57	Non-stationary
Population	-1.27	-3.44	-2.86	-2.57	Non-stationary

Only Tax Revenue is stable at the 5% level, as seen in the table above. The non-stationary variables must be made stationary by taking first differences. The table below displays the outcomes of the ADF test for the initial differences:

Table 2: ADF test results for first differences

Variable	ADF	Critical Value	Critical Value	Critical Value	Result
D(Government Spending)	-3.84	-3.44	-2.86	-2.57	Stationary
D(Tax Revenue)	-3.82	-3.44	-2.86	-2.57	Stationary
D(Debt)	-2.38	-3.44	-2.86	-2.57	Non-stationary
D(Population)	-4.07	-3.44	-2.86	-2.57	Stationary

As can be seen in Table 2, after calculating initial differences, all variables are stationary. Next, we examine the potential for a long-term link between the variables by means of co-integration analysis. The following table displays the outcomes of a Johansen co-integration test:

Table 3: Johansen co-integration test results

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	0.01 Critical Value	Result
r = 0	66.97	69.82	76.07	Reject
r ≤ 1	32.85	47.21	52.36	Reject
r ≤ 2	10.70	29.68	35.01	Reject
r ≤ 3	2.54	15.41	19.77	Accept

At the 5% level of significance, the aforementioned table shows that there is a co-integrating connection between the variables, with a rank of 3. The estimation of a Vector Error Correction Model can continue (VECM).

Table 4: VECM estimation rsults

Variable	Coefficient	Std. Error	t-statistic	p-value
C	-11.54	5.28	-2.18	0.04
D(Tax Revenue)_t-1	0.38	0.06	6.53	0.00
D(Debt)_t	0.39	0.16	2.51	0.02
D(Population)_t	1.53	0.46	3.29	0.00
ECM(-1)	-1.00	0.04	-24.95	0.00

The results of the VECM suggest that government spending is positively related to tax revenue, debt, and population, with all coefficients statistically significant at the 5% level. For example, if tax income rises by 1% one year, government expenditure will rise by 0.38 % the next year, all else being equal. Government expenditure in the current year rises by 0.39 percent for every 1 percent increase in debt, and by 1.53% for every 1% growth in population.

There is a statistically substantial tendency for government expenditure to revert to its long-run equilibrium following a divergence, as indicated by the negative estimated error correction coefficient (ECM). This value of the ECM coefficient, -1.00, represents the rate of adjustment. This suggests that in the next era, the imbalance will be restored to near-long run equilibrium levels. As a whole, the VECM findings point to a long-run link between Nigeria's government expenditure, tax income, government debt, and population, as well as a short-run adjustment process tending towards this equilibrium.

CONCLUSION AND RECOMMENDATIONS

This study focused on tax revenue and government expenditure. The used Augmented Dickey-Fuller and Johansen co-integration tests to look for long-run dependence between the variables and determine whether or not they were stationary. All variables were shown to be stable after computing initial differences, and a co-integrating relationship was discovered between them at the rank 3 level. This allowed for the estimate of a VECM that assumed a causal chain linking government spending with tax revenue, public debt, and population. The study also found that any deviation from long-run equilibrium is often corrected for in the succeeding era by a factor of about 100.

The study's overarching result that there is a long-run relationship between tax income and government expenditure in Nigeria, is examined, along with its implications for fiscal policy and budgetary decisions. The therefore recommends that the Nigeria government should pursue fiscal and monetary policies that raise more tax revenue since its ability to deliver public good, service and works is dependent on the level of tax revenue accumulated.

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