

Article

Causal Effects of Tax Revenue and Budget Implementation in Nigeria

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Abstract: This study examines the causal relationship between taxation and budget implementation in Nigeria from 2000 to 2022, addressing the persistent challenge of aligning tax revenues with fiscal policy outcomes. Despite Nigeria's reliance on tax revenue, its impact on budget execution remains unclear, creating a knowledge gap in fiscal management. The research aims to assess the Granger causality between company income tax (CIT), value-added tax (VAT), and budget implementation, measured by capital expenditure. Time series data from the CBN Statistical Bulletin and World Development Indicators were analyzed. The findings revealed no Granger causality between CIT and budget implementation, while a significant Granger causality exists between VAT and capital expenditure, indicating that VAT revenue influences budget execution. The study recommends improved fiscal and monetary policy coordination to ensure VAT revenues are effectively channeled toward capital expenditure, fostering economic development.

Keywords: Tax revenue, Budget implementation, Capital expenditure, Company income tax, Value added tax

1. Introduction

The fundamental objective of governance worldwide is to ensure the provision of security and welfare services to the general population. The matter of generating, allocating, and utilising public funds is a significant challenge faced by all nations, regardless of their level of development. The effective utilisation of these funds plays a crucial role in determining the extent to which public policy objectives are accomplished (Olaoye & Olugbamiye, 2019). The welfare services encompass a range of essential provisions, including education, housing, health care, food, and social amenities. Hence, an essential criterion for evaluating the efficacy or inefficacy of a government lies in the extent to which it effectively delivers these services (Olurankise & Oloruntobe, 2017).

The budget, as identified by Olurankise and Oloruntobe (2017), serves as the instrumental mechanism through which the government is able to effectively fulfil its obligation. According to Ogboru (2016), the concept of budget can be likened to a navigational tool that guides a government towards its intended objectives. Without a budget, a government may find itself lacking direction and clarity, unsure of its destination or the path it should take to get there. According to Ahmad, Ali, and Khan (2020), the utilisation of annual budgets within a medium-term plan and a medium-term expenditure framework plays a crucial role in driving economic progress.

According to Ayodeji and Oluwole (2018), the national budget holds significant importance as an economic policy instrument for a government. It serves as a reflection of the government's priorities in terms of social and economic policies, surpassing the significance of any other official documents. Furthermore, it is worth noting that the aforementioned instrument serves the purpose of converting policies, campaign promises,

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political commitments, and goals into determinations pertaining to the allocation of financial resources and the methods employed for revenue generation (Obamuyi & Faloye, 2018). In recent years, there has been a notable increase in the significance placed on the budget, which can be attributed to the growing democratisation, heightened involvement of civil society, and the imperative to address the developmental issue of poverty (Dakasku, Jelilov, Isik & Akyuz 2020). The allocation of funds within the national budget can be broadly categorised into two main components: recurrent budget and capital budget. The capital budget is a component of the national budget that delineates the allocation of national revenue specifically for the implementation of projects with a useful lifespan exceeding one year.

According to Andabai, Ikeora, and Anah (2019), the volatility in global oil prices and interruptions in crude oil production have endangered the country's foreign revenues. A 2016 analysis conducted by the World Bank supported this claim, cautioning that economies heavily dependent on a single product, especially crude oil, will be highly susceptible to fluctuations in crude oil prices. Empirical evidence since the 1980s has shown a correlation between taxation and economic expansion or activity in the Nigerian economy. An analysis of multiple empirical studies conducted between 2010 and 2023 across various continents revealed diverse findings regarding the factors influencing budget implementation. In addition, the review also found that the majority of previous studies were conducted in Asia, particularly in Malaysia, Laos, and India. In Africa, the studies were carried out in Tunisia, Zambia, Ghana, and Nigeria. However, all the studies conducted in Africa, and specifically in Nigeria, only used petroleum profit tax and capital gain tax as proxies for taxation.

However, only the studies conducted by Bashir and Sam-Siso Davies, Siedschlag (2020), and Studnicka (2018); Dibia and Onwuchekwa (2019); Ahmad, Ali, and Khan (2020); and Babatunde, Ibukun, and Oyeyemi (2017) utilised the measure of company income tax as a proxy for determining the factors influencing economic growth. Previous studies have assessed economic growth by measuring Gross Domestic Product (GDP) (Dakasku, Jelilov, Isik & Akyuz 2020; Andabai, Ikeora, & Anah 2019; Ayodeji and Oluwole 2018; Ufoeze, Odimgbe, Ezeabalisi & Alajekwu, 2018; Sharma, Kautish, & Kumar 2018; Srithilat & Sun, 2017; and Akinjare, Babajide, & Okafor 2016), as well as Real Gross Domestic Product (RGDP) (Bashir & Sam-Siso 2020; Inam & Ime, 2017; and Ilugbusi, 2017).

None of the studies analyse the macroeconomic indicators in relation to budget implementation. Upon reviewing the literature, we have identified a gap in the scope of the studies conducted by Bashir & Sam-Siso (2020), Dakasku, Jelilov, Isik & Akyuz (2020), Andabai, Ikeora, & Anah (2019), and Ufoeze, Odimgbe, Ezeabalisi & Alajekwu (2018). These studies utilised data ranging from 1981 to 2018, 1986 to 2018, 1990 to 2017, and 1986 to 2016, respectively. It is evident that none of these studies incorporated recent data up to the year 2022. This study aims to address these research problems by incorporating variables such as value added tax and company income tax. Furthermore, we utilised the variable of capital expenditure as a metric to assess budget performance.

Literature Review

Conceptual Clarification

Budget Implementation

The layman's interpretation of the concept of budget pertains to a projected assessment of the financial inflows and outflows of a governing body over a specified duration. The statement in question may also be interpreted as a conventional approximation of financial outlays proposed by a government official holding the position of finance minister. The perspective presented appears to possess a limited scope when it comes to elucidating the intricacies of government budgeting. According to the scholarly

work of Oloto, Nnamani, and Nnamani (2019), the concept of a budget can be defined as a comprehensive document that serves to delineate the economic and non-economic activities that a government intends to pursue. This document places particular emphasis on the formulation of policies, establishment of objectives, and development of strategies necessary for the successful execution of these activities. Moreover, the budget is supported by revenue and expenditure projections, which further substantiate the proposed plans and actions.

According to the provided definition, it is posited that government budgeting encompasses a wide range of both economic and non-economic expenditures undertaken by the government. According to Omolehinwa (1989), an individual who holds a plan-dominant position within an organisation can be defined as someone who possesses a significant influence over the organization's operations, typically measured in monetary terms. This influence is subject to various constraints imposed by both the participants involved and the external environments in which the organisation operates. The plan-dominant individual is responsible for determining how the available resources can be effectively utilised to accomplish the organization's agreed-upon priorities. The noteworthy aspect of this definition lies in its acknowledgement of the budgetary constraint imposed by various factors, which are aimed at guaranteeing the realisation of the objectives and targets outlined in the budget.

Capital Expenditure Budget

Capital expenditures, commonly referred to as CapEx, are financial resources allocated by a corporation for the purpose of procuring, enhancing, and upholding tangible assets, including but not limited to real estate, facilities, infrastructure, technological systems, and machinery. This definition, as provided by Investopedia, elucidates the nature and scope of CapEx as a crucial component of a company's financial activities. Capital expenditure (CapEx) is a commonly employed financial term within the corporate realm, typically employed to facilitate the initiation of novel projects or investments by an organisation. Capital expenditure refers to the financial outlay incurred in the process of creating or acquiring fixed assets, as well as the acquisition of land, buildings, and intangible assets.

The annual allocation of funding for cultural activities may be subject to fluctuations due to significant levels of non-recurring capital expenditure, as indicated by the Australian Bureau of Statistics in 2010. According to Obamuyi and Faloye (2018), capital expenditure refers to the financial outlays made to acquire fixed capital assets, stock, land, or intangible assets. An exemplary illustration can be observed in the construction of educational institutions, medical facilities, or transportation infrastructure. It is crucial to acknowledge that a significant portion of donor-funded "capital" expenditure, as indicated by Government Spending Watch (2017), encompasses disbursements that are not strictly categorised as capital payments, despite being allocated towards project-related activities.

Tax Revenue

In the context of Nigeria, tax revenue refers to the income collected by the Nigerian government through various taxation mechanisms (Oyediran, 2022). Taxation serves as a crucial source of revenue for the government, funding public services, infrastructure development, and social programs (Adegbe & Fagbemi, 2023). Nigeria's tax system comprises direct and indirect taxes, including personal income tax, corporate tax, value-added tax (VAT), customs duties, and excise duties (Ayuba, 2021). The significance of tax revenue in Nigeria cannot be overstated, particularly in light of the country's economic challenges. With a growing population and increasing demand for public services, the government relies on tax revenue to finance its expenditures and bridge budget deficits (Obi, 2023). However, tax collection in Nigeria faces various challenges, including widespread tax evasion, inadequate tax administration capacity, and a large informal economy (Anyanwu, 2022).

Efforts to improve tax revenue collection and compliance in Nigeria have been ongoing. The government has implemented tax reforms aimed at simplifying the tax system, broadening the tax base, and enhancing enforcement mechanisms (Iheanacho & Oshodi, 2023). Additionally, initiatives such as the Voluntary Assets and Income Declaration Scheme (VAIDS) have been introduced to encourage tax compliance among individuals and businesses (Oyelami, 2024). In recent years, there has been a greater emphasis on leveraging technology to enhance tax administration and improve revenue collection in Nigeria. The adoption of digital platforms for tax filing and payment, as well as the use of data analytics for risk assessment and compliance monitoring, has shown promising results (Adeyemi, 2023). Such initiatives are essential for strengthening Nigeria's fiscal position and promoting sustainable economic development (Ojo, 2023).

Company Income Tax Revenue

Company income tax (CIT) in Nigeria is a significant component of the country's tax revenue system, playing a crucial role in financing government activities and driving economic development (Adesina & Ajide, 2022). CIT is imposed on the profits of incorporated entities, including companies, partnerships, and corporations, operating within Nigeria (Oyediran, 2021). The CIT rate in Nigeria is currently 30% for large companies and 20% for small and medium-sized enterprises (SMEs), with certain incentives and exemptions available to specific sectors and industries (Ojo & Adegbe, 2023). Recent developments in CIT administration in Nigeria include efforts to enhance compliance and streamline tax processes. The Federal Inland Revenue Service (FIRS), Nigeria's primary tax authority, has implemented measures such as electronic tax filing and payment systems to improve efficiency and transparency (Oyediran & Ayuba, 2023).

Furthermore, the government has introduced reforms aimed at addressing tax evasion and avoidance through stricter enforcement mechanisms and the implementation of transfer pricing regulations (Ayuba & Anyanwu, 2022). These measures are intended to ensure that companies operating in Nigeria fulfill their tax obligations and contribute to the country's fiscal sustainability. In addition to traditional CIT, recent discussions have also focused on the introduction of digital service taxes (DST) targeting multinational technology companies operating in Nigeria. These taxes aim to capture revenue generated from digital transactions and services provided within the country (Adegbe & Iheanacho, 2023). Overall, CIT remains a critical source of revenue for the Nigerian government, and ongoing efforts to improve its administration and effectiveness are essential for promoting economic growth and development (Obi & Adeyemi, 2024).

Value Added Tax Revenue

The Value Added Tax (VAT) was implemented in Nigeria in 1993 with VAT Decree 102, effective from December 1, 1993, with actual invoicing commencing on January 1, 1994. This Decree promptly rescinded the state-administered Sales Tax Decree No. 7 of 1986. By this decree, States will discontinue the collection of Sales Tax, which will be transformed into VAT, with its collection transferred to the Federal Government via the FIRS. Value Added Tax (VAT) is levied on individuals, sole corporations, and organisations that purchase or consume taxable goods or services in Nigeria. This tax is not directly paid by the user; instead, it is collected by the seller upon the sale of any taxable item or service. The vendor thereafter deducts the VAT and remits it to FIRS via an authorised bank. The bank promptly generates an e-ticket as proof of payment, and upon presentation of this e-ticket to the Integrated Tax Office (ITO), an e-receipt is subsequently produced. Michael and Ben (2007) examine the origins and effects of the proliferation of value added tax (VAT). The findings indicate that VAT exerts a considerable yet varied influence. This indicates that certain countries would have benefited financially from the implementation of VAT, while others would not.

Theoretical Review

Many theories discussed the relationship between taxation revenue and budget implementation. However, this study adopts the Wagner's theory of ever-increasing state activities.

Theory of Increasing State Activities

The principle known as Wagner's law is named after the German economist Adolph Wagner (1835-1917). Wagner expanded upon his "law of increasing public expenditures" by examining patterns in the expansion of public spending and the scale of the public sector. Wagner's law states that as the functions of the government expand, there will be a corresponding increase in public spending on administration and regulation of the economy. This is because the development of modern industrial society creates a demand for social progress and necessitates greater consideration for social factors in the management of industry. As a result, public spending will increase at a rate higher than the overall growth of national income, leading to a relative expansion of the public sector.

Musgrave and Musgrave (1988) argued that as advanced nations undergo industrialization, the proportion of the public sector in the national economy consistently increases, supporting Wagner's law. Ezirim (2006) acknowledges that reducing the growth of the public sector would necessitate a deceleration of economic growth, and it is anticipated that there would be an ongoing increase in the size and spending of the government sector. Tsauni (2007) argues that public expenditure can be considered both as a result and a factor influenced by the growth of the economy. Additionally, Tsauni contrasts this perspective with Keynes' belief that public expenditure is an external factor that can be used as a tool to stimulate economic growth.

The Wagner theory posits that government spending rises in response to industrial and economic expansion within a nation. This theory posited that there is a simultaneous increase in both the absolute and relative size of the public sector, which comes at the expense of the growth in the private sector. It is assumed that as a country undergoes industrialization, there is an expected increase in both the real income per capita and the share of public expenditure. This implies that the growth of the industrial sector in a country will be accompanied by a rise in government spending.

Thus, government spending is increased, whether it is for ongoing expenses or for investments, in order to sustain the growth process. Bird (1991) supports this claim by presenting three pieces of evidence: the government's administrative and protective functions necessitate significant capital expenditure; the growing industrial sector demands increased provision of social and cultural goods and services; and government expenditure is required to regulate and finance natural monopolies and maintain the efficient functioning of market forces. This study utilises Wagner's theory of ever-increasing state activities as a theoretical framework to elucidate the correlation between budget implementation and economic development.

Empirical Review

Ngwoke (2019) assessed the impact of taxation on economic growth during the period of 2007-2017. The primary aims were to assess the influence of petroleum profit tax on Nigeria's real gross domestic product, analyse the effect of company income tax on Nigeria's real gross domestic product (RGDP), and ascertain the impact of custom and excise duty on the RGDP. The hypotheses were examined using the unit root test and regression analysis, which are statistical tools. For this study, it was determined that the petroleum profit tax has a substantial impact on the GDP of Nigeria. The company income tax and customs and excise duties have a substantial impact on Nigeria's GDP.

The study conducted by Babatunde, Ibukun, and Oyeyemi (2017) examined the influence of taxation on the economic growth of Africa during the period of 2004 to 2013. The study employed the Hausman-Test to ascertain the suitable estimator choice between

Fixed and Random Effect. In order to verify the strength and accuracy of the regression model, certain post-estimation tests are performed, including the Omitted Variable Test and the Heteroscedasticity test. The findings suggest a positive correlation between tax revenue and GDP, indicating that tax revenue plays a role in promoting economic growth in Africa. The result was statistically significant at a significance level of 5%. Thus, according to Ibn Khaldun's theory on taxation, both high and weak levels of taxation are beneficial for economic growth. This theory supports the notion that lower tax rates have a positive influence on labour, production, and overall economic performance.

In their study, Ahmad, Ali, and Khan (2020) examine the influence of taxation on the economic growth of Pakistan. They analyse time series data spanning from 1980 to 2015. This study examines the immediate and long-term impacts of taxation on the economic growth of Pakistan. The study's findings indicate that both taxes and exchange rates have a negative yet significant impact on economic growth, both in the short term and the long term.

In their study, Dibia and Onwuchekwa (2019) investigated the correlation between taxation and the economic expansion of Nigeria. The study specifically examined the connections between company income tax, petroleum profit tax, and the economic growth of Nigeria, represented by Real Gross Domestic Product. It utilised time series data from 1981 to 2016. The study utilised an Ex Post-Facto research design. The results suggest that both the petroleum profit tax (PPT) and company income tax (CIT) have a positive and significant impact on the real gross domestic product (RGDP) in Nigeria.

Onyiah, Ezeamama, Ugwu, and Mgbodile (2016) undertook a study to assess the impacts of budget implementation and control changes introduced by the Federal Government of Nigeria. The study sought to evaluate their influence on resource management, productivity, efficiency, and personnel and overhead expenses in Nigeria. The research employed an ex-post facto descriptive design. The participants comprised Accountants and Economists working in the federal civil service in Enugu State. Data were collected with structured questionnaires featuring a 5-point Likert scale. Secondary data were obtained from academic journals and other scholarly publications.

This research encompassed the development and evaluation of three hypotheses. Questionnaires were administered to a sample of 308 persons from a population of 1,338, utilising the Taro Yamane (1967) formula. The Analysis of Variance (ANOVA) was employed to evaluate the hypotheses. The findings revealed that insufficient project conceptualisation, design, or planning by Ministries, Departments, and Agencies (MDAs) resulted in ineffective resource management. Participants indicated that there has been no significant reduction in the budgets designated for personnel and overhead expenses within the public service.

Nwala and Ogboji (2020) investigated the correlation between budget implementation and economic growth in Nigeria. This study employed an ex-post facto research design. The research used secondary data from the Federal Ministry of Finance and the Central Bank of Nigeria Statistical Bulletin covering the period from 1981 to 2018. The dependent variable was Gross Domestic Product, and the independent variables were Capital expenditure, Recurrent spending, and Debt. Utilising E-Views 10, it was established that capital spending exhibits a positive and statistically significant link with Nigeria's Gross Domestic Product. There exists a positive and significant association between recurrent expenditure and gross domestic product, whereas a negative and significant correlation is observed between government debt and gross domestic product.

Ojong, Owui, and Effiong (2013) analyse the effects of government budget deficit financing on Nigeria's economic development. The study established six research hypotheses to evaluate the relationship between government budget deficit financing, unemployment, inflation, balance of payments (BOP), government financing, and government revenue as independent variables, and gross domestic product (GDP) as the

dependent variable. Secondary data was obtained from the CBN statistical bulletin. The research employed the Ordinary Least Squares regression method to estimate the derived equations. The results demonstrate a significant relationship between budget deficit financing and economic growth in Nigeria.

Omotayo (2015) investigated the relationship between human capital, assessed through education and quality healthcare services, and economic growth in Nigeria. The research employed annual time series data from 1980 to 2012. The research employed Ordinary Least Squares (OLS) methodology. The results demonstrate that a 1% rise in GDP correlates with a 22% growth in human capital, when accounting for the magnitude. This theory asserts that increasing investment in education and health will lead to a proportional rise in GDP. The R² score, indicating the goodness of fit, is assessed at 0.80 or 80%. This signifies that the independent variables explain around 80% of the variation in the dependent variable.

Ezeji and Michael (2013) analysed the policy determinants that substantially impacted the rate of economic growth in Nigeria. The statistics were sourced from the CBN statistical bulletin, covering a period of 21 years. The econometric approaches utilised for data estimation were unit root testing, co-integration analysis, VAR modelling, and graphical analysis. The Phillip-Perron test statistic demonstrated that the variables' time series properties attained first-order stationarity. The variables demonstrated a maximum of one co-integration and a minimum of two co-integrating equations. The variables of Minimum Rediscount Rate (LNMRR), Interest Rate (LNIR), Liquidity Rate (LNLR), Corporate Income Tax (CIT), and Federal budget exhibited no statistically significant effect on Gross Domestic Product (LNGDP) in both the preceding and current year.

Nonetheless, the GDP is negatively impacted by both the interest rate and liquidity rate, whereas it is positively influenced by the minimum rediscount rate, corporate income tax, and government budget. The synergistic impacts of monetary and fiscal policies exert a statistically significant influence on the economic growth level in Nigeria. The research indicated that the influence of monetary and fiscal policies on Nigeria's economic growth has been variable throughout time, implying a lack of a long-term relationship. Nevertheless, the analysis revealed that fiscal policy interventions exert a more significant influence on promoting economic growth in Nigeria.

In their study, Adawo (2011) employed an econometric model to analyse the impact of primary education, secondary education, and tertiary education on the economic growth of Nigeria. The variables were represented by school enrollments at different levels. Additional variables encompassed physical capital accumulation and health, as indicated by total health expenditure. Physical capital formation and health were identified as contributing factors to growth in all primary school data. The presence of secondary school enrollment and higher education institutions was found to hinder economic growth.

Gaps in the Literature

The studies outlined offer valuable insights into the relationship between taxation and budget, yet several gaps persist that warrant further investigation. While Ngwoke (2019) and Dibia and Onwuchekwa (2019) delve into the impact of specific taxes like petroleum profit tax and company income tax on Nigeria's economic growth, there's a lack of exploration into the broader spectrum of taxation policies and their nuanced effects. Ahmad, Ali, and Khan (2020) highlight the negative impact of taxes on economic growth in Pakistan, but similar longitudinal analyses are scarce for Nigeria. Additionally, the studies often overlook non-tax factors such as institutional quality and trade policies, which can significantly influence economic outcomes (Besley & Persson, 2014). Methodological diversity remains limited, with an overreliance on econometric techniques.

While these methods are valuable, incorporating qualitative analyses and case studies could provide complementary insights (Yin, 2018). Furthermore, the studies predominantly focus on short-term effects, neglecting potential long-term dynamics and lagged effects of taxation policies on budget implementation trajectories. Longitudinal studies spanning extended periods would offer a more comprehensive understanding of these dynamics (Ayyagari et al., 2014). Moreover, there's a lack of policy implications in many studies, hindering their practical relevance for policymakers.

2. Materials and Methods

This study employs a longitudinal research strategy. Longitudinal studies utilise continuous or repeated measurements to track specific individuals over extended durations, frequently spanning years or decades. The studies are predominantly observational, collecting quantitative and/or qualitative data on various combinations of exposures and outcomes, devoid of any external influences. This study utilised a secondary data source. The data were primarily sourced from the Central Bank of Nigeria Statistical Bulletin 2022. The data were deemed sufficient and suitable for the study as the Central Bank of Nigeria (CBN), the principal banking authority, compiled the data and possesses regulatory and supervisory authority in Nigeria. All financial institutions in the country submit annual operational reports to the CBN. This study's explanatory variables consist of annual data on corporate income tax revenue and value-added tax revenue, whereas the dependent variable is capital spending, serving as a proxy for budget execution. This study adopts and changes the econometric model proposed by Nwala and Ogboji (2020). The econometric specification of the current study's model, incorporating the effects of structural breaks, is mathematically expressed as:

The short-run estimate from the error correction process, based on the long-run relationship, is provided below:

Location:

CAPEX = Capital Expenditure

CITX = Corporate Income Tax Revenue

VATX = Value Added Tax Revenue = First Difference Operator = White Noise
Disruption Error Term = Time = Represents the lag(s) under consideration; = Parameter Coefficients

ECT = Error Correction Term = ECT coefficient, which must be negative, smaller than zero, and statistically significant for long-run causality to be established.

3. Results and Discussion

In this study, we investigate the influence of taxation on budget implementation in Nigeria from 2000 to 2022. In using ARDL approach, there is the need to determine the optimal lag length using Akaike Information Criterion (AIC). Succinctly, the optimal lag length suggested for the stochastic equation based on Akaike Information Criterion (AIC) is 4. Hence, the optimal Lag for this study is 4.

Unit Root Test

In testing the time series properties of the variables in the model, we performed a univariate regression analysis using conventional Dickey Fuller Unit Root Tests in order to ascertain whether each of these variables has unit root (non-stationary) or does not have unit root (stationary series). The results are presented below:

Table 1. Dickey Fuller (DF) Test for Unit Root

H0: There is no Stationarity					
At Levels- $I(0)$			Interpolated Dickey-Fuller Critical Values		
Variables	DF t- statistics	MacKinnon p-value	1%	5%	Decision
CAPEX	-2.082	0.2517	-3.750	-3.000	Accept H0
CITX	-1.227	0.6621	-3.750	-3.000	Accept H0
VATX	-1.304	0.6273	-3.750	-3.000	Accept H0
At 1st difference - $I(1)$					
CAPEX	-5.105	0.0000	-3.750	-3.000	Reject H0
CITX	-3.310	0.0144	-3.750	-3.000	Reject H0
VATX	-5.060	0.0000	-3.750	-3.000	Reject H0

Source: Researchers Computation (2023) from STATA'16 Output

Following the summary results of the unit root tests presented in Table 4.1 above, it is clearly shown that the variables considered are non-stationary at difference $\{I(1)\}$ series. Therefore, given this scenario, there is need to test for the presence of long-run relationship among the variables in the model, which the ARDL technique is capable of capturing.

Bound Test

To determine the existence of long-run relationship or trend among the variables, a co-integration analysis is performed using ARDL bounds test. In this case, the null hypothesis of no co-integration ($H_0: \beta_0 = \beta_1 = \beta_2 = 0$) is tested. The results obtained is presented below:

Table 2. Pesaran, Shin, & Smith (2001) Bound Test for Cointegration

H0: There is no relationship					
	Pesaran, Shin, & Smith (2001) Critical Values				
	5%		1%		
Bounds	I0	I1	I0	I1	Decision
F-Statistics	3.79	4.85	5.15	6.36	Accept H0
t-Statistics	-2.86	-3.53	-3.43	-4.10	Accept H0
F = 2.993					
t = -2.927					

Source: Researchers Computation (2023) from STATA'16 Output

In the model of CAPEX, the results in Table 2 above depict that the Wald F-statistic of 2.993 is less than the lower critical values or bounds of 3.79 at 5% level of significance as established by Pesaran, Shin, & Smith (2001). Similarly, in absolute terms, we find that the t-statistics of -2.927 is less than the lower critical bounds of -2.86 at 5% level of significance. Based on this, we accept the null hypothesis of no relationship and conclude that there is no long-run relationship between the series in the model for the period between 2000 and 2022.

Granger Causality Test

Granger causality analysis provides a methodological framework for examining causality between two variables within a time series dataset. Named after the Nobel laureate economist Clive Granger, this approach offers a probabilistic understanding of causality by analyzing empirical data sets to identify patterns of correlation and infer causal relationships between variables. In essence, Granger causality analysis seeks to determine whether the past values of one variable can predict the future values of another variable beyond the information contained in the past values of the latter variable alone. This concept is grounded in the notion that if variable X "Granger-causes" variable Y, then the past values of X contain additional predictive information about the future values of Y, beyond what can be predicted by considering only the past values of Y itself. The result from the granger causality is presented and discussed below:

Granger causality Wald tests				
Equation	Excluded	chi2	df	Prob > chi2
capex	citx	.00093	1	0.976
capex	vatx	4.3483	1	0.037
capex	ALL	4.3498	2	0.114
citx	capex	.12806	1	0.720
citx	vatx	.48768	1	0.485
citx	ALL	2.3619	2	0.307
vatx	capex	2.6562	1	0.103
vatx	citx	.35268	1	0.553
vatx	ALL	2.7103	2	0.258

Figure 1. Granger causality wald tests

Discussion of Findings

A p-value of 0.976 obtained from the Granger causality test between capital expenditure (CAPEX) and company income tax (CITX) suggests that there is no statistically significant evidence to reject the null hypothesis that company income tax does not granger cause budget implementation. Interpreted in this context, it indicates that there is no Granger causality between company income tax and budget implementation when measured in terms of capital expenditure during the period under study. In other words, changes in company income tax do not cause or predict changes in budget implementation when measured using capital expenditure, and vice versa during the period under study. Therefore, we fail to reject the null hypothesis, implying that there is no evidence to suggest a causal relationship between the two variables in either direction.

The present study aligns with the findings of previous research conducted by Wahab and Diji (2017), Ordu (2016), George and Bariyima (2015), Gumo (2013), Fernando (2009), Coleman (2008), and Yakassi (2001). However, it is important to note that our perspective differs from the findings of Agostini and Tulayasathien (2003) as well as Abdioglu et al.

(2016). These studies suggest that company income tax has a positive impact on capital expenditure, potentially influenced by the expectations of foreign investors regarding the relatively low labour rates in Nigeria and the promising market opportunities presented by its large population, which could ultimately lead to higher profits.

However, a p-value of 0.037 obtained from the Granger causality test between value-added tax (VATX) and capital expenditure (CAPEX) suggests that there is statistically significant evidence to reject the null hypothesis that value added tax does not granger cause budget implementation. In this context, it indicates that there is Granger causality between value-added tax and budget implementation when measured in terms of capital expenditure during the period under study. The significance of the p-value implies that changes in value-added tax may cause or predict changes in capital expenditure, or vice versa during the period under study. Therefore, we reject the null hypothesis, indicating that there is evidence to suggest a causal relationship between the two variables. This is contrary to the studies of Ugochukwu and Azuibike (2016), Okoli and Matthew (2015), Njoku (2015), Onwuchekwa and Aruwa (2014), Izedonmi and Okunbor (2014), and Chigbu (2014) have suggested that VAT may not be a significant determinant of capital expenditure when considering budget implementation.

4. Conclusion

This study concludes that taxation revenue plays a crucial yet uneven role in budget implementation in Nigeria, as evidenced by the mixed empirical findings. While no Granger causality was found between company income tax and capital expenditure, a significant causality exists between value-added tax (VAT) and capital expenditure, indicating that VAT revenue substantially influences budget execution. These findings imply that Nigeria's fiscal policy should shift from excessive reliance on oil revenue to a more diversified revenue structure that maximizes non-oil tax sources like VAT. To enhance budget implementation, the government should strengthen fiscal-monetary policy coordination, prioritize infrastructure investments with high economic returns, and improve capital expenditure efficiency through transparency and reduced bureaucratic delays. Future research should explore co-integration dynamics involving broader tax categories under structural changes or economic shocks, offering deeper insights into sustainable fiscal policy design.

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