
Federal Tax Revenue and Government Expenditure on Roads and Power in Nigeria

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Abstract

Government spending on infrastructural development is a key driver for the growth and development of any economy. Evidence from literature has shown that Nigeria was lagging behind on spending for infrastructural development as every sector of the Nigerian economy is challenged with huge infrastructure deficit and decay. The extent of government spending on roads and power in Nigeria, funded from federal tax revenue had remain uncertain. Studies have shown that while many developed and developing countries have fully diversified to income from taxes to fund infrastructure for development, Nigeria was yet to fully integrate income from taxes into its development programmes. Therefore, this study examined the effect of federal tax revenue (companies income tax, petroleum profit tax, customs and excise duties, value added tax and tertiary education tax) on government expenditure on roads and power in Nigeria. The study adopted an expo facto research design. The study evaluated the effect of federal tax revenue on government expenditure on roads and power in Nigeria from 1994-2021. A purposive sampling technique was adopted. Data were extracted from the Central Bank of Nigeria Statistics Bulletin, Office of Budget and Fiscal Policy, Nigerian Exchange Group and the Federal Inland Revenue Services. The validity and reliability of data were premised on the statutory audit of the financial statements of the government agencies by the office of the Auditor General of the Federation. Descriptive and inferential (multiple regression) statistics were used to analyze the data at 0.05 level of significance. The study revealed that government expenditure on roads ($Adj.R^2 = 0.806$, $F(5, 21) = 25.097$, $p < 0.000$) and government expenditure on power ($Adj.R^2 = 0.742$; $F(5, 21) = 17.63$; $p < 0.05$) were significantly affected by federal tax revenue. The study concluded that federal tax revenue influenced government expenditure on roads and power in Nigeria. Hence, the study recommended that as a priority, the Federal Inland Revenue Service and other relevant tax authorities should device and implement strategies that will ensure effective collection of tax revenue from taxpayers. The federal government should strengthen tax administration in the country through capacity development programmes for staff of the Federal

Inland Revenue Service and other revenue collecting agencies in order to enhance their skills to grow tax revenue. The federal Government should allocate more funds for infrastructural development in order to achieve tax justice which will help to grow tax revenue.

Keywords: Company income tax, Expenditure on roads, Expenditure on power, Federal tax revenue, Government expenditure, Infrastructural development, Tertiary education tax, Tax justice, Value-added tax

1. Introduction

Government expenditure is a key driver for the growth and development of any economy, as most of the activities and functions that support growth and development of a nation cannot be efficiently provided by individuals and corporate organizations. Government expenditure is the money applied by government to finance its activities and various functions. This will cover spending on administration, infrastructural development and public services, defense and social security, debt servicing, grants and aids, and the various forms of transfers.

Danladi, et al. (2015) categorized government expenditure as: government consumption, which is government purchases of goods and services for current use; government investment, which is government purchases of goods and services intended to create future benefits such as government expenditure and research spending; and transfer payments, which are government expenditures that are not directly related to purchases of goods or services. Government expenditure on infrastructural development is widely known as an economic catalyst and key pillar that stimulates economic development strategies and the growth of a nation. Anyaduba and Aronmwan (2015) argued that government expenditure on infrastructure may cover all public services meant to serve the people and these will include the provision of law and order, education, health care, transportation, telecommunication, power and energy, drainage, amongst others.

According to Xuehui et al. (2020), government expenditure facilitates and propels economic activities to such an extent that where there is a lack of adequate infrastructure, economic activities, and business opportunities will become near impossible to achieve. Globally, studies have agreed that economic and business opportunities will always be stagnated in the absence of thriving and adequate investments in infrastructural development (Guillermo & Deyve, 2019; Kouadio & Gakpa, 2020). Studies have advanced that the economic significance of infrastructural investments is essentially important at both the projects and macro levels of nations (Karpushkina et al. 2020; Kira, 2017; Wahdan & Leithy, 2017).

Infrastructure development is conventionally viewed as a vital factor that fosters economic advancement since productive activities will remain impossible without good roads, power and energy, telecommunication, and transportation (Aggarwal, 2018). Infrastructural development brings about the growth of national productivity and also stimulates private and corporate investments, effective business opportunities, and facilitates domestic and international trade, economic growth, sustainable, and the physical and organizational structure required for economic development (Yun & Liu, 2019). In pursuance of sustainable economic realities for

citizens and corporate bodies, infrastructural development situates beyond building assets but includes investments decisions that will take care of full externality effects of projects for long terms benefits, ensure sustainable development strategies and consistent mobilization of human resources that will improve the capital formation, human skills and standard of living of the citizens (McIntosh et al. 2018; Fay et al. 2019).

The adequacy of infrastructure like good roads and power may determine a country's success or failure in diversifying production, coping with population growth, reducing poverty and improving welfare of citizens (Mobolaji, & Wale 2012). Thus, every country strives for infrastructural development and to achieve this, they need revenue, and thus engage in revenue mobilization which may be domestic or foreign (Anyaduba & Aronmwan, 2015).

Indeed, nearly all sectors in Nigeria: transportation, power, provision of law and order, telecommunications, education, health care, amongst others have recorded absence of critical and needed infrastructures and this has affected deliverables. The overall effect is that the citizenry have not enjoyed a strong system that could deliver the best of services to the people.

Allwell et al. (2022) noted that there are clear signs of infrastructure inadequacy and inefficiencies in Nigeria, with the most challenging of the infrastructural gap being on road networks, power, transportation, telecommunication and distribution networks .

According to Mpofu (2021), neglect and governments' passive attitude to spending on infrastructural development had deepened infrastructural deficits and loss of huge opportunities to put the country on the part of economic growth among the progressive nations of the world.

The World Bank, in its 2022 Nigeria Public Finance Review report described the level and quality of infrastructure in Nigeria as low, with the country ranked 132 out of 137 countries for infrastructure in the 2018 Global Competitive Index. According to the referenced World Bank report, the Nigerian physical infrastructure gap is estimated to reach about US\$3 trillion by 2050 and this will require annual investments of about US\$100 billion. The World Bank report further stated that with the current levels of public infrastructural investment by government, it would take some 300 years to close Nigeria's current infrastructure gap. Furthermore, the report noted that the infrastructure gap was estimated to cost Nigeria up to 4 percent of GDP annually, reduces and discourages private investment through the lack of reliable power supply, and gaps in transportation, irrigation, water and sanitation, amongst others.

Inadequate infrastructure promotes poor living standard, economic deficit, productivity decline, and free trade barriers that have negative impact on a country's economic development (Gaal & Afrah, 2017).

According to Wekesa et al. (2017), there is evidence that quality infrastructure reduces the cost of doing business and hence attracts foreign direct investment (FDI) to a country as infrastructural development in the national space provides the enabling environment for FDI and to a great extent contributes to the safety of such investment. However, one of the major causes

of Nigeria's low level of FDI attraction is low level of savings and investment in infrastructure (Wekesa et al., 2017).

Akanbi (2022), noted that the Nigeria national grid has been plagued with challenges in the transmission and distribution subsectors, which has made it difficult to evacuate the available generation capacity through the grid. According to him, the Nigeria Electricity Regulatory Commission (NERC), based on data obtained in 2021, reported that power distribution in the year, averaged 4,094.09 megawatts (MW), despite an available generation capacity of about 8,000 MW. Relatedly, average unutilized power generation increased year-on-year, to 3,008.18 MW in 2021, from 1,030.80 MW in 2013, indicating an increase of 291 per cent in the past eight years.

In Nigeria there are clear signs of infrastructure inadequacy and inefficiencies, with the most challenging of the infrastructural gap being in power, transportation, telecommunication and distribution networks (Allwell et al., 2022).

The United Nations Industrial Development Organization (UNIDO) has said that the absence of critical infrastructure such as power was contributing to the non-competitiveness of goods produced in Nigeria. The head, UNIDO Investment and Technology Promotion Office, Nigeria, Akanbi (2020) stressed this at a webinar recently in Lagos. She noted that when you lack infrastructure and people have to create infrastructure as a typical manufacturer in Nigeria does, based on the current state of things, what you manufacture will almost not be affordable because the cost of producing the product and the cost of importing that same product from other countries like China will be miles apart, concluding that such is the reality crippling the Nigerian economy.

Some of the causes of infrastructural development problems in Nigeria have been identified to include: insufficient funding (Obara and Nangih, 2017), the inability of successive governments to make adequate infrastructure investments (Ikeokwu and Micah, 2019), inability to harness and optimize federal tax revenue (Owimo, 2019), the inability of the government to harvest informal tax possibilities (Omodero and Dandago, 2019), high level of sharp practices in tax revenue collection (Onwuchekwa and Aruwa, 2016), embezzlement of tax revenues and poor tax database in Nigeria (Adegbola et al. 2018).

Evidently, studies have advanced that adequate federal tax revenue would boost government income and enhance government expenditure capabilities to improve spending on roads (Olabisi et al. 2020). Also, Omodero (2020) posited that adequacy of federal tax revenue is important as no government can deepen economic development and expenditure on roads and power infrastructure unless there are evidence of expendable revenue.

While a good number of studies have researched into government expenditures, there is a dearth of studies researching the effect of federal tax revenue on government expenditure on roads and power in Nigeria.

In filling this gap in literature and contributing to knowledge, this study examined the effect of federal tax revenue on government expenditure for roads and power in Nigeria. Therefore, in attempting to resolve the problem of government expenditure on roads and power, this study provided the following research objective, research question and hypothesized as follows:

Research Objective: To investigate the effect of federal tax revenue on government expenditure on roads and power in Nigeria.

Research Question:

- i. How does federal tax revenue affect government expenditure on roads in Nigeria?
- ii. How does federal tax revenue affect government expenditure on power in Nigeria?

Research Hypothesis:

The following hypotheses were tested in this study:

Ho1: Federal tax revenue has no significant effect on expenditure on roads in Nigeria

Ho2: There is no significant effect of federal tax revenue on expenditure on power in Nigeria.

The rest of the study was considered in this way: In section 2, the study considered a literature review and theoretical framework. In section 3, the methodology of the study was presented. In section 4, the study considered data analysis, results and the discussion of findings. In section 5, the conclusion, recommendations, limitations and suggestions for future studies were provided.

2. Literature Review and Theoretical Framework 2.1. Conceptual Review

2.1 Federal Tax Revenue

Taxation: Tax is a levy imposed by government on qualified persons (individual and corporate), properties and certain activities primarily to generate revenues to fund government expenditures.

Ogbonna and Appaih, (2016); Odoemelam, (2018), defined tax as a compulsory financial charge imposed by the government on all taxable persons, private and corporate bodies, on incomes of individuals or profit of corporate bodies in order to generate money to fund government expenses. In Nigeria, while some taxes are collected by the federal government, others are collected by either the States or local government area councils. Taxes are collected for several reasons, and the rates and structure of tax collection and administration are different from one country to another and are based on each country's tax laws and policies (Olatunji & Ayeni, 2018; Idowu et al., 2022).

Federal tax revenues are taxes paid to the federal government of Nigeria. The following are some of the federal tax revenues in Nigeria: companies' income tax, value added taxes, stamp duties paid by corporate bodies, petroleum profit taxes, capital gains tax paid by corporate bodies, tertiary education trust fund and personal income tax paid by members of the armed forces, the Nigeria police force, staff of the ministry of foreign affairs and non-resident individuals earning incomes in Nigeria (Olaoye & Agugom, 2018).

Company Income Tax: Companies Income Tax (CIT) is a tax on the profits of registered companies in Nigeria. It also includes the tax on the profits of foreign companies carrying on any business in Nigeria. Resident companies are liable to CIT on their worldwide income while non-residents are subject to CIT on their Nigeria-sourced income. Yaru and Awodun, (2019), defined company income tax as the process of ascertaining the appropriate tax obligation due to every eligible corporate taxpayers taxable profits within a given tax jurisdiction.

Company income tax is concerned with the issues of ensuring an accurate and timely filing, the assessment of the appropriate amount of tax due and the communication of tax liability to the taxpayer in good time. The Company Income Tax Act (CITA) is the principal law that regulates the taxation of companies in Nigeria. The Federal Inland Revenue Service (FIRS) administers the company income tax in Nigeria.

Petroleum Profit Tax: Petroleum Profits Tax is imposed on the income of companies in petroleum operations in Nigeria. Yahaya and Bakare (2018), noted that oil is a major source of government revenue in Nigeria, accounting for about 90 per cent of total exports, while tax revenue derived from petroleum profits contributes largely to the total tax revenue available to the Nigerian Government.

The petroleum profit tax was first introduced in 1959 in Nigeria as the Petroleum Profits Tax Ordinance 1959 with a retrospective effect from 1st January 1958 (Oyeleke et al. 2016). The petroleum profit tax in Nigeria is governed by the Petroleum Profits Tax Act, Cap P13 LFN 2004 (as amended). The petroleum profit tax Act provides for the imposition of Petroleum Profits Tax on the chargeable profits of companies involved in the upstream activities of exploration, drilling, extraction and transportation of crude oil. Companies liable to petroleum profit tax are not liable to Companies Income Tax (CIT) on the same income.

The Nigeria's Petroleum Industry Act (PIA) 2021, was a major attempt by government to refit the petroleum sector. The PIA seeks amongst others to provide legal, governance, regulatory and fiscal framework for the Nigerian Petroleum Industry.

Custom and Excise Duties: Custom and excise duties are one of the taxes collected by the federal government. According to Babatunde (2018); Chinwendu et al. (2021), custom and excise duties are the type of taxes charged on goods produced within the country and goods brought from outside the country respectively. While excise duties are the tax charged on goods produced in Nigeria, custom duties are ones charged on goods brought into the country as import duties. Dada et al. (2017) posited that custom and excise duties had a positive significant influence on tax revenue and increment to the federation account in Nigeria.

Value-Added Tax: The Value Added Tax (VAT) in Nigeria is a consumption tax paid when goods are purchased and services rendered. VAT is borne by the final consumer. VAT was introduced in Nigeria through the Value Added Tax (VAT) Decree 102 of 1993, which became effective in the year 1994. The introduction of VAT in Nigeria requires manufacturing companies, wholesalers, importers and suppliers of vatiable goods and services to register with

the Federal Inland Revenue Service for the VAT operation within six months of commencement of business operations in Nigeria (Inyiama & Ubesie, 2019).

Under the VAT law in Nigeria, all goods and services (produced within or imported into the country) are subject to the VAT, except those goods and services were specifically exempted by the VAT law. Also, VAT is charged at a flat rate of 7.5% on the vatable goods and services in Nigeria. Ikeokwu and Micah (2019) stated that companies registered for VAT operation were required by the VAT law to charge and collect VAT on behalf of the government and remit same to the designated government accounts.

Tertiary Education Trust Fund: The tertiary education trust fund was established in the year 2011 under the TETFund Act 2011 with the purpose and responsibility of managing, disbursing and monitoring education, for the benefit of tertiary education in Nigeria. The TETFund replaced the earlier Education tax Act Cap E4, FFN 2004. According to Okolo et al. (2018), the tertiary education trust fund was charged as 2 % of assessable profits of companies listed and operating in Nigeria. However, recent amendments to the law through the Nigeria Finance Act 2023, increased the tertiary education trust fund tax rate to 3% of assessable profits of eligible companies. The collection of the tertiary education trust fund tax is the sole responsibility of the Federal Inland Revenue Services. The fund caters for the federal and state universities, polytechnics and colleges of education across Nigeria.

Government Expenditure

Government expenditure is the sum of money applied by government to finance its activities and various functions. This will cover spending on administration, infrastructures and public services, defense and social security, debt servicing, grants and aids, and the various forms of transfers.

Danladi, et al. (2015) categorized the Nigerian government expenditure broadly into capital and recurrent expenditure. The recurrent expenditure is government spending on administration, public services, debt servicing, transfers, and maintenance, amongst others, whereas the capital expenditure is spending to develop and improve capital projects like roads, power infrastructures, housing, airports, educational facilities, telecommunication facilities, healthcare facilities, amongst others.

This study is focused on the federal government expenditures in Nigeria on roads and power infrastructures, whether such spending were recurrent or capital in nature. This focus is necessitated by the critical role of good road networks and developed power infrastructures on economic growth and the advancement of the welfare of the citizenry.

Government Expenditure on Roads: This is the total government spending on roads development in Nigeria. The quality of road infrastructure is an important factor that stimulates economic development and competitiveness of a country. Poorly maintained road infrastructure has a negative impact on productivity and safety of lives.

Wasike, (2000), observed that road networks have not kept pace with growth demand in Nigeria as Kilometer lengths are limited and construction standard are often low and national roads networks are not coordinated effectively.

Expenditure on roads in the context of this study covers the federal government's spending on provision of roads towards improving infrastructural development in the country both in the urban centers and rural areas (Gangl et al., 2015).

Babatunde,(2018) posited that adequate expenditure on roads has a significant effect on infrastructural development and since infrastructural development and investment in the sector require adequate budgetary allocation, when government do not have sufficient funds, it hinders the ability of the government to achieve this desire.

Government Expenditure on Power: Efficient electricity infrastructure plays a major role in the growth of every economy. Power and Energy drives development, but from verifiable records, the available energy supply in Nigeria hardly can meet the needs of household, which means the energy capacity of Nigeria is not enough to sustain industrial and commercial needs.

Ajadi (2015), defined expenditure on power as government spending on the generation of electricity for the populace.

Theoretical Framework

The theoretical framework and the bedrock of this study is underpinned on the social contract theory. The social contract theory was propounded by Lucke, Hobbes and Rousseau in the year 1690 (Marire & Sunde, 2009) in relation to the moral obligation that depends on written, verbal or implied agreements among parties in society. Clearly, the social contract is the unspoken agreement between individuals to give up certain natural rights in order to enjoy the benefits of society. The social contract theory suggested that the society in any given community has the understanding and mutual consent to the existing morals and political set of behaviors, where each owed to the other some level of reciprocity and a reflection of a symbiotic relationship between each other. According to Marire and Sunde (2009), the social contract theory posited that people are in social morality and mutuality by choice and not by compulsion.

By extension, the social contract theory supports the choice of a group of individuals to offer themselves for the service of society with the understanding that they will protect the society in line with social morality and utilize the general resources of society for the general good of all within the society being represented (Castro & Camarillo, 2014). The theory of the social contract further posited that there is a social contract subsisting between the agents of the state and the masses, that those who offer to be elected by morality accept to act in the interest of the masses, in terms of social justice, upholding the social-cultural beliefs, use of the state and common resources optimally to provide infrastructural facilities, protect the citizens and collect taxes or levies so as to provide the common social need of the citizens to perform their civic duties.

Some assumptions of social contract theory have been advanced in the literature. For instance, the theory assumes the principles of political tolerance as people should not assume power by force but by the choice of the people. The consent of the people is supreme and the power or authority obtained without consent or voluntary selection is a violation of morality (Getachew, 2019). The theory further posited that once political power is obtained, laws resulting from such power must be obeyed. It is assumed that power and legislative decisions must be tailored to better the welfare of the masses (Margareta & Hansson, 2015). Nebo and Chigbo (2015) submitted that power attracts legitimacy when it is obtained through collective choice and selection, however, even if power was obtained with the consent of the masses because it is the law, it must be obeyed for peace and order to prevail in the society, hence laws are moral agents to guide and control the conduct and moral behaviors of the leaders and the led collectively.

Empirical Review

Federal tax revenue and Expenditure on Roads

Adegbite and Shehu (2022) appraised the effect of indirect taxes of customs and excise duty (CED), and value-added tax (VAT) on road construction in Nigeria. The study which covered the period 1985 to 2020 used data sourced from the National Bureau of Statistics (NBS), the CBN statistical bulletin, and the Federal Inland Revenue Service (FIRS) records and adopted the regressions model to determine the effect of indirect taxes on road construction. The study concluded that the indirect taxes of VAT and CED displayed a long and short-run positive and significant impact on road construction in Nigeria. Therefore, it recommended that government needs to increase the coverage of VAT so that more tax revenues can be obtained from this indirect tax source. It also recommended the judicious use of tax revenues from this source for the development of needed road infrastructures. However, for future studies on this subject, the measures of indirect taxes and government expenditure need to be expanded beyond VAT, CED and road construction respectively.

Adelusi (2022) examined the effect of internally generated revenue on government expenditure in the Oyo state of Nigeria. The study employed a survey research design, using structured questionnaires administered to a total of 3 senatorial districts in 3 local government councils in Oyo State Nigeria out of a population of 33 local government councils in the State. Using regression analysis, the study found that internally generated revenue had a positive effect on government expenditure in the 3 senatorial districts based on the responses from the selected respondents. The study further found that local taxes improved the internally generated revenue of the 3 senatorial districts in the local government councils areas sampled in the study. The study variables were similar to some of the variables measured in the dependent variable of our study.

In addition, the study was found consistent with the study carried out by Ayeni and Afolabi (2020) who equally found a positive effect. On the contrary, the study was found to be inconsistent with the result obtained by Huang et al. (2020) and is not in tandem with the result given by Nnabuife et al.(2020), which found a negative effect on Nigeria's federal tax revenue and government expenditure support.

Akpokhio and Ekperiware (2022) examined the impact of company income tax, petroleum profit tax and value-added tax on the economic growth of Nigeria. The study measured economic growth by gross domestic product. The study adopted the ex-post facto research method and data for analysis covering 1981 to 2021 were sourced from the CBN statistical bulletin and the Federal Inland Revenue Service Reports. The study concluded that petroleum profit tax affects positively the growth of the Nigerian economy, while company income tax only influences the growth of the economy in the short run. Also, the study revealed that VAT has no significant contribution to the economic growth of Nigeria. However, for a more encompassing result, the individual components of gross domestic product need to be considered in future studies.

Chinwendu et al. (2021) studied the influence of federal tax revenue on public infrastructure in Anambra State. The study employed a survey research design, using questionnaires administered to selected respondents in the State. Descriptive and regression analyses were conducted based on the data collected. The result of the analysis revealed that there was a positive relationship between and among the variables. It also revealed that federal tax revenue had a positive significant effect on public infrastructure in Anambra State, Nigeria. Chinwendu et al. (2021) report is consistent with the result obtained by Karpushkina et al. (2021) which exhibited that federal tax revenue contribution had a positive significant effect on employment enhancement among the countries investigated. The result obtained from Chinwendu et al. (2021) study is not consistent with Resnick and Sivasubamian (2020) whose result revealed that social contract negotiation had a negative and insignificant influence on federal tax revenue compliance among the food and petty traders in Ghana. Mpofo (2021) studied the effect of federal tax revenue on infrastructural enforcement in African countries. The study employed a survey research design, using primary obtained from selected African tax experts in some countries. The study employed questionnaires administered to selected tax administrators and tax experts. The retrieved questionnaires were analyzed using descriptive statistics and multiple regression analysis. The result of the analysis revealed that federal tax revenue had a positive effect on infrastructural enforcement in Africa. The study advised that African countries should prioritize investment in federal tax revenue development to enhance and improve tax revenues. The study of Mpofo (2021) is in consonance with the study done by Chinwendu et al. (2021) whose result showed that the federal tax revenue had a positive significant effect on public infrastructure in Anambra State. On the contrary, the study done by Madumere and Ubani (2020) is not in consonance with it as their study revealed that federal tax revenue had a negative effect on tax compliance among the federal tax revenue taxpayers in Nigeria.

Huang et al. (2020) studied the empirical implication of economic development on federal tax revenue from the perspectives of urban cities in China. An Ex-post facto research design was employed and secondary data were sourced from the databases of federal tax revenue investments in China. Analyses were conducted and the result of the analyses revealed that a rich investment has been put in the federal tax revenue development. The study found that federal tax revenue had contributed positively and significantly to government expenditure in China. The result given by

Huang et al. (2020) is in tandem with the report obtained from Otusanya et al. (2019) who posited that fiscal exchange interaction and government accountability had a positive effect on voluntary tax compliance. On the other hand, the result from Huang et al. (2020) is not in tandem with the result given by Nnabuife et al. (2020) which found a negative effect on Nigeria's federal tax revenue and government expenditure support.

Madumere and Ubani (2020) investigated the influence of tax administration on federal tax revenue increase and compliance towards infrastructural investment. In carrying out the study, a survey research design was adopted using primary data from structured questionnaire from selected respondents. Descriptive statistics and multiple regression analysis were conducted and the results were mixed. First, the tax administration had a positive effect in creating positive awareness of federal tax revenue. Secondly, federal tax revenue had a negative effect on tax compliance among the federal tax revenue taxpayers in Nigeria. The result of Madumere and Ubani (2020) is similar to the result obtained by Etim and Daramola (2020) who posited that some extraneous factors of poor corruption control, inflation challenges and lack of social protection have negative effects on impressive responses from informal taxpayers' compliance. On the contrary, the study from Kouadio and Gakpa (2020) found that the federal tax revenue had a positive and significant contribution to employment in Cote d'Ivoire and showing non-similarity with the study of (Madumere & Ubani, 2020).

Federal tax revenue and Expenditure on Power

Maccarthy and Charles (2023) investigated the effect of petroleum revenue comprising of petroleum profit tax and other petroleum revenue sources on capital expenditure in Nigeria, by using electricity and road construction as proxies for capital expenditure. The study utilized the ex-post facto research design, while data for the study covering the periods 2005 – 2020 were obtained from the Federal Government annual budget, the Federal Inland Revenue Service (FIRS), Central Bank of Nigeria (CBN) Statistical Bulletin and the Nigeria Extractive Industries Transparency Initiative (NEITI). The study revealed amongst others that Petroleum Profit tax has a negative insignificant effect on capital spending in Nigeria. The study recommended that to receive the expected value for capital spending in the Nigeria economy, government needs to ensure transparency in the fight against corrupt practices such as the diversion of funds embarked for capital projects. The study done by Maccarthy and Charles (2023) showed result which is consistent with the result obtained by Akeju (2018) who posited that the federal tax revenue had a positive effect on the tax revenue that contributes to the government expenditure in Nigeria.

Otekunrin, et al. (2023) studied the impact of oil and non-oil tax revenues on economic growth in Nigeria. Economic growth was measured using real Gross Domestic Product (rGDP), while oil revenue tax revenue was proxied by petroleum profit tax. Similarly, non-oil tax revenue was proxied by company income tax (CIT), value Added Tax (VAT) , and Custom and excise duty (CED). The study adopted ex- post facto research design and used time series data sourced from Central Bank of Nigeria (CBN) Statistical Bulletins for the period 1980-2019. The study revealed a significant positive relationship between economic growth and petroleum profit tax and custom and excise duty. It also revealed a significant negative relationship between

economic growth, value added tax and companies' income tax. Future studies may need to examine the tax revenue impact on the individual components of the GDP.

Adeyemi, et al. (2021), examined the impact of federal tax revenues on budget performance in Nigeria. Tax revenue was proxied by company income tax (CIT) and value added tax (VAT), while budget performance was measured by government capital expenditure. Data for the study covering 1985-2018 were obtained from the Central Bank of Nigeria statistical bulletins and reports from the National Bureau of Statistics. The study revealed that CIT has a significant negative effect on government capital expenditure while VAT has a significant positive effect on government capital expenditure. The reliance on CIT and VAT only as measures of federal tax revenue in the study was a limitation. The study of Adeyemi et al. (2021) was similar when compared with the study of Munjeyi (2017), who revealed that federal tax revenue had a positive effect on infrastructures.

Karpushkina et al. (2021) investigated the effect of the federal tax revenue contribution on employment enhancement in the labour market. The study employed the use of survey research, where questionnaires and interviews were employed for the study. The respondents' view and perceptual opinions were analyzed using simple regression analysis and descriptive statistics. The analysis of the sourced data was found to be positively associated with each of the variables, while federal tax revenue contribution had a positive significant effect on employment enhancement among the countries investigated. According to the result of the study done by Karpushkina et al. (2021), there is consistency when compared with the result derived from Omodero (2020). The study found that the informal tax revenue in Nigeria had contributed to total tax revenue than other countries in Africa considered in the study. On the other hand, Karpushkina et al. (2021)'s result is not consistent with the result obtained by Etim and Daramola (2020), whose result revealed that some extraneous factors of poor corruption control, inflation challenges and lack of social protection have negative effects on impressive responses from informal taxpayers' compliance.

Ayeni and Afolabi (2020) which examined the relationship between tax revenue, government expenditure and economic growth in Nigeria, noted that the Nigerian government like other countries of the world, requires tax revenue to provide infrastructures such as power supply, good roads, healthcare facilities, schools, and security. The study utilized a vector autoregression (VAR) model to capture the interrelationship between tax revenue, government expenditure and economic growth in Nigeria. It also used annual time series data on government expenditure on infrastructure, tax revenue and economic growth covering 1981-2018, which were obtained from the Central Bank of Nigeria (CBN) statistical bulletin, and the World Development Indicator (WDI). The findings of this study showed that tax revenue positively influenced government expenditure. Hence, the need for government to ensure efficient utilizing of generated tax revenue for quality infrastructure for citizens use was recommended.

Obara and Nangih (2017) investigated the influence of the federal tax revenue on Nigerian economic development. A survey research method was adopted, while primary data using questionnaires were used in collecting responses from a set of respondents. A total of 110 questionnaires were administered within the Port Harcourt area of Nigeria. The study employed

Kruskal and Chi-square estimation method and the regression analyses carried out revealed that federal tax revenue had a positive effect on economic development among the developing economies. The study recommended that the government should endeavor to strengthen the federal tax revenue for more vibrant and responsive tax payments. The study of Obara and Nangih (2017) is similar when compared with the study of Munjeyi (2017), who result revealed that federal tax revenue had a positive effect on infrastructures. On the other hand, the result from Obara and Nangih (2017) was not similar.

Nedozi et al. (2017) studied the impact of infrastructural investment on economic growth in Nigeria. Exploring an expo facto research approach, the study gathered data from the Central Bank of Nigeria for an unspecified period. Data analysis was carried out and the result of the regression analyses revealed that infrastructural investment had a positive impact on economic growth in Nigeria. The result is in tandem with the result derived from Bakar and Mat (2017), whose report showed that infrastructural development has a positive effect on economic development in the selected States in Malaysia. On the other hand, Nedozi et al. (2017)'s result is not in tandem with the result of Nwaolisa and Kasie (2012) who revealed that poor tax implementation of tax policies had a negative effect on informal tax as well as infrastructural development of Nigeria.

Anyaduba and Aronmwan (2015) investigated the impact of federal tax revenue on infrastructural development in Nigeria by using electricity production as a proxy for infrastructural development. The study utilized the longitudinal research design, while the data analyzed in the study were sourced from the Federal Inland Revenue Service (FIRS) Guage, the Central Bank of Nigeria statistical bulletin and World fact books for various periods. The finding of the study showed that company income tax and education tax have impacted on the level of infrastructure development in Nigeria, while petroleum profit tax and value added tax have not. A major limitation of the study was the use of a single proxy for infrastructural development in Nigeria.

3. Methodology

The study examined the effect of federal tax revenue on government expenditure on roads and power in Nigeria. An ex-post facto research design was adopted, using time series data for a period of 27 years from 1994-2021. A purposive sampling technique was adopted for the selection of the period. Data were extracted from the Central Bank of Nigeria Statistics Bulleting, Office of Budget and Fiscal Policy, Nigerian Exchange Group and the Federal Inland Revenue Services. The validity and reliability of data were premised on the statutory audit of the financial statement of the government agencies by the office of the Auditor General of the Federation. Descriptive and inferential (multiple regression) statistics were used to analyze the data at a 0.05 level of significance.

Analytical model

The dependent variable of the study was government expenditure, measured using expenditure on roads (EXRDS) and expenditure on power (EXPW). The independent variable of the study was federal tax revenue and its measuring proxies are company income tax (CITAX), petroleum

profit tax (PPTAX), value added tax (VAT), custom and excise duties (CEDT), and tertiary education trust fund (TEDT).

These variables translated to the following:

$$Y_t = \beta_0 + \beta_1 X_t + \beta_2 X_{2t} + \epsilon_t \text{ equation 1}$$

Where:

$$\text{GOVEXP} = f(\text{FEDTR})$$

Y = Dependent variable: Government Expenditure (GOVEXP) X = Independent variables: Federal tax revenue (FEDTR)

Models

$$\text{EXRDS}_t = \alpha_0 + \beta_1 \text{CITAX}_t + \beta_2 \text{PPTAX}_t + \beta_3 \text{VAT}_t + \beta_4 \text{CEDT}_t + \beta_5 \text{TEDT}_t + \mu_t \text{ Model 1}$$

$$\text{EXPW}_t = \alpha_0 + \beta_1 \text{CITAX}_t + \beta_2 \text{PPTAX}_t + \beta_3 \text{VAT}_t + \beta_4 \text{CEDT}_t + \beta_5 \text{TEDT}_t + \mu_t \text{ Model 2}$$

Main Model

$$\text{FEDTR}_i = \alpha_0 + \beta_1 \text{CITAX}_t + \beta_2 \text{PPTAX}_t + \beta_3 \text{VAT}_t + \beta_4 \text{CEDT}_t + \beta_5 \text{TEDT}_t + \mu_i \text{ Model 3}$$

Where

EXRDS = Expenditure on roads EXPW = Expenditure on Power CITAX = Company income tax
PPTAX = Petroleum Profit Tax VAT = Value added tax

CEDT: Custom and Exercise Duties TEDT: Tertiary Education and Trust Fund α = Intercept (Constant).

β = Coefficient of the parameter or the slope t = Time-Series

μ = Error Terms or Disturbance Term

4. Data Analysis, Results and Discussions of Findings

In this section, the results of the empirical analyses that focused on investigating the effect of federal tax revenue on government expenditure on roads and power in Nigeria were presented and discussed.

Unit Root Test

The study performed a Unit root test to check whether the series in this study are stationary at levels and in first difference. Augmented Dickey-Fuller test (ADF) and Phillip-Perron test (PP) are employed to check whether the series in this study were stationary or not and the results are presented in Table 4.1.

Table 4.1: Unit Root Test Result

| LOG(VARIABLE) | ADF | | PP | | Order of Integration |
|---------------|------------------------------------|---------------------------------------|------------------------------------|---------------------------------------|----------------------|
| | @Level <i>t</i> -stat [sig.] | @1st Diff <i>t</i> -stat [sig.] | @Level <i>t</i> -stat [sig.] | @1st Diff <i>t</i> -stat [sig.] | |
| EXRDS | -1.183 [0.663] | -3.368** [0.023] | -1.358 [0.587] | -8.357*** [0.000] | I(1) |
| EXPW | -1.487 [0.524] | -6.233*** [0.000] | -1.188 [0.664] | -8.793*** [0.000] | I(1) |
| CITAX | -1.868 [0.341] | -3.848*** [0.008] | -1.790 [0.377] | -3.848*** [0.008] | I(1) |
| PPTAX | -3.609** [0.014] | -4.354*** [0.002] | -3.140** [0.036] | -4.354*** [0.002] | I(0) |
| VAT | -2.043 [0.268] | -3.728** [0.010] | -1.877 [0.338] | -3.786*** [0.009] | I(1) |
| CEDT | -1.262 [0.631] | -6.207*** [0.000] | -1.368 [0.5821] | -6.207*** [0.000] | I(1) |
| TEDT | -3.782** [0.009] | -11.72*** [0.000] | -5.136*** [0.002] | -11.36*** [0.000] | I(0) |

Source: Authors' Computation 2023: Note: expenditure on roads (EXRDS), Expenditure on power (EXPW), company income tax (CITAX), petroleum profit tax (PPTAX), value added tax (VAT), custom and excise duties (CEDT), and tertiary education trust fund (TEDT).***, ** and * denote 1%, 5% and 10% levels of significance respectively

Table 4.1 clearly presents the Unit Root Test results for the series in their levels and as well as in their first difference forms, in which the two tests suggest that all the variables which include : expenditure on roads (EXRDS), expenditure on power (EXPW), company income tax (CITAX), value added tax (VAT) and custom and excise duties (CEDT) are not stationary at levels. In other words, the aforementioned are integrated of order 1 (One) i.e. I(1).

However, it is obvious enough that petroleum profit tax (PPTAX) and tertiary education trust fund (TEDT) are the only variables that are stationary at levels.

In other words, the PPTAX and TEDT are integrated of order 1 (zero) i.e. I(0). Since the orders of integration are mixtures of I(0) and I(1), the study proceeds to ARDL Bound cointegration.

Inferential Statistics and Test of Hypotheses

Following the unit root tests results and in line with the objective of the study, two (2) empirical models (and each having both short-run and long-run) were estimated in this study using ARDL. First, the study investigated the effect of federal tax revenue on expenditure on roads in Nigeria. Next, the effect of federal tax revenue on expenditure on power in Nigeria was examined.

Testing of Hypothesis One

Research Objective one: To investigate the effect of federal tax revenue on expenditure on roads in Nigeria.

Research Question one: To what extent does federal tax revenue affect expenditure on roads in Nigeria?

Research Hypothesis one (Ho1): Federal tax revenue has no significant effect on expenditure on roads in Nigeria.

The results of the first estimated regression model that investigate the effect of federal tax revenue on expenditure on roads in Nigeria are offered. In this first regression model, Federal tax revenue will be measured using company income tax (CITAX), Petroleum Profit Tax (PPTAX), Value Added Tax (VAT), Custom and Excise Duties (CEDT), Tertiary education trust fund (TEDT) and lagged values of EXRDS are considered as explanatory variables while expenditure on roads (EXRDS) is considered as the dependent variable.

Bounds Cointegration Test: Federal tax Revenue on Expenditure on Roads

Resulting from the unit root test results with mixed order of integration in Table 4.1, the study adopted the ARDL bound co-integration test approach to check the existence of long-run relationships among the federal tax revenue metrics and the road infrastructure variables.

Table 4.2.1: Bounds Cointegration Test: Federal tax revenue on Expenditure on Roads

| <i>Sig. Level</i> | <i>Lower Bound [I(0)]</i> | <i>Upper Bound [I(1)]</i> |
|-------------------------------------|---------------------------|---------------------------|
| 10% | 2.08 | 3.00 |
| 5% | 2.39 | 3.38 |
| 2.5% | 2.70 | 3.73 |
| 1% | 3.06 | 4.15 |
| <i>Computed F-statistic = 6.020</i> | | |

Source: Author’s Computation (2023)

Nevertheless, the result in Table 4.2.1. suggests that the null hypothesis of no cointegration can be rejected at a 5% significance level as clearly revealed by the computed F-statistic value = 6.020 which is above the Upper Bound [I(1)] =3.38. Therefore, the study concludes that there is a long- run relationship (cointegration) among the variables

Short-run and Long-run Models: Federal tax revenue on Expenditure on Roads

The results from the estimation of the short – run and the long-run models for Federal tax revenue on Expenditure on Roads based on the estimated ARDL (2, 0, 1, 1, 0, 1) as steered by Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC) are presented in Table 4.3.

Table 4.2.2: Short-run and Long-run Models: Federal tax revenue on Expenditure on Roads

| ECM Regression | | | | |
|--|-------------|------------|-------------|---------|
| Case 2: Restricted Constant and No Trend | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | P-value |
| DLOG(EXRDS(-1)) | 0.377331 | 0.135049 | 2.794023 | 0.0143 |
| DLOG(PPTAX) | 0.133269 | 0.161051 | 0.827495 | 0.4218 |
| DLOG(VAT) | 2.508059 | 0.415674 | 6.033718 | 0.0000 |
| DLOG(TEDT) | -0.469153 | 0.095371 | -4.919226 | 0.0002 |
| CointEq(-1)* | -0.410456 | 0.052900 | -7.758843 | 0.0000 |

| Levels Equation | | | | |
|--|-------------|------------|-------------|---------|
| Case 2: Restricted Constant and No Trend | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | P-value |
| LOG(CITAX) | 0.148704 | 0.622926 | 0.238718 | 0.8148 |
| LOG(PPTAX) | 0.409057 | 0.114432 | 3.574670 | 0.0030 |
| LOG(VAT) | 0.448887 | 0.920131 | 0.487852 | 0.6332 |
| LOG(CEDT) | 0.187488 | 0.421501 | 0.444810 | 0.6633 |
| LOG(TEDT) | -0.042619 | 0.211914 | -0.201117 | 0.8435 |
| C | -2.608826 | 0.707892 | -3.685342 | 0.0024 |

EC = LOG(EXRDS) - (0.1487*LOG(CITAX) + 0.4091*LOG(PPTAX) + 0.4489*LOG(VAT) + 0.1875*LOG(CEDT) -0.0426*LOG(TEDT) -2.6088)

F-Stat. (P-value) = 25.097 (0.000); R² = 0.838; Adj. R² = 0.806; D-Watson = 1.842

Diagnostic Tests

Serial Correlation (P-value) = 0.007 (0.993); Jarque-Bera (P-value) = 1.127 (0.569); Breusch-Pagan-Godfrey Heteroskedasticity (P-value) = 1.881 (0.136)

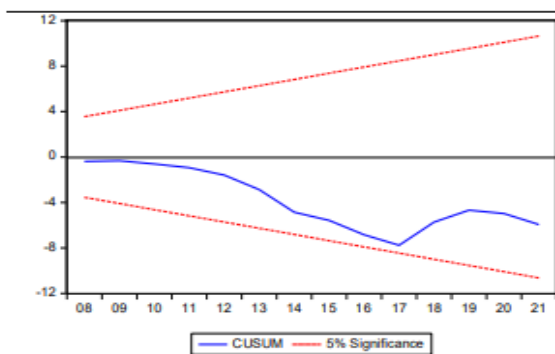


Figure 4.2.2a: CUSUM Chart

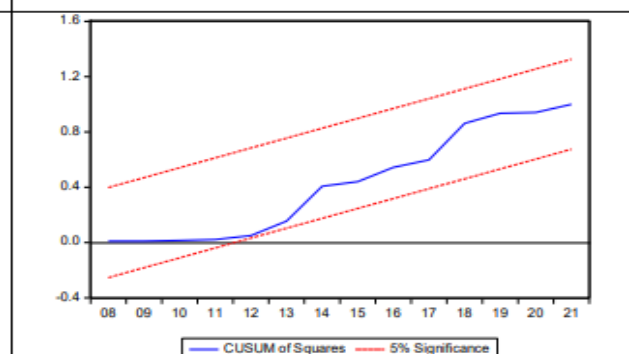


Figure 4.2.2b: CUSUM Squares Chart

Source: Author’s Computation (2023). Note: the dependent variable is Expenditure on roads (EXRDS). Independent variables are company income tax (CITAX), petroleum profit tax (PPTAX), value-added tax (VAT), customs and excise duties (CEDT), and tertiary education trust fund (TEDT).

Interpretation

As in Table 4.2.2, the outcome of the analyses for the short-run and long-run dynamic models with F-stat. (P-value) = 25.097 (0.0010) and Adjusted R-squared = 0.806. The coefficient of CointEq (-1) = -0.410 (P – VALUE = 0.000). The estimated coefficient with the expected sign (negative) is found to be statistically significant at a 1% level. This further confirms the presence of a stable long-run relationship among the selected variables.

Moving to the coefficients of explanatory variables, the result shows a positive and significant relationship exists between the past value of Expenditure on roads (EXRDS-1) and the current value of Expenditure on roads (EXRDS) [$\beta = 0.377$; p-value = 0.014] in the short run at 5% level. The company income tax (CITAX) has no implication on Expenditure on roads (EXRDS) in the short run as the variable is dropped by default in the cause of the analyses, however, its coefficient is positive but not statistically significant in the long run [$\beta = 0.149$; p-value = 0.815]. For petroleum profit tax (PPTAX), the positive but insignificant relationship is observed in the short- run [$\beta = 0.133$; p-value = 0.422]. However, the relationship becomes a statically significant relationship in the long run [$\beta = 0.409$; p-value = 0.003] at a 1% level suggesting that; petroleum profit tax (PPTAX) only has a significant effect on expenditure on roads (EXRDS) in the long run.

These further suggest that a one per cent increase in PPTAX causes about a 0.409 per cent increase in EXRDS in the long run. On the contrary, the insignificant connoted decrease in the PPTAX.

Besides, the result shows that the coefficients of value-added tax (VAT) display positive signs both in the short run and long run but only the positive coefficient in the short is statistically significant [$\beta = 2.508$; p-value = 0.000] at 1% level. This suggests that, in the short run, a 2.508 per cent increase in expenditure on roads (EXRDS) during the years is caused by a one per cent increase in VAT.

Similar to CITAX, custom and excise duties (CEDT) has no inference on Expenditure on roads (EXRDS) in the short run as the variable is thrown down by default in the cause of the analyses, nevertheless, its coefficient is positive but not statistically significant in the long-run [$\beta = 0.187$; P– value = 0.663].

The relationships that exist between the tertiary education trust fund (TEDT) and expenditure on roads (EXRDS) both in the short run and in the long run are negative. However, the negative relationship is only significant in the short run [$\beta = - 0.469$; p-value = 0.000] at a 1% level suggesting that a one per cent increase in TEDT causes about 0.469 per cent decrease in EXRDS.

Post Diagnostic Tests

In Table 4.2.2 and Figures 4.2.2a&b, all the diagnostic test results offer support for the validity of the model. From Table 4.2.2 and Figure 4.2.2a&b, all the test statistics and their corresponding probability values are statistically insignificant (p-value > 0.05).

Trend Analysis: Figures 4.2.2a and 4.2.2b showed the trend of expenditure for the years under consideration. The blue line showed the sum of squares in each case, while the orange line depicted the movement of a 5 per cent level of significance as revealed by the software used.

The trend means that the residual is normally distributed, free from serial correlation problems and has constant variance. Also, the blue lines of CUSUM and CUSUM Square tests that fall within the upper and lower bounds (red lines) confirm that the model is well-specified and stable.

Also, the Adjusted R2 from the results of the ARDL regression results in Table 4.3, the Adjusted R2 = 0.806 indicated that the percentage of variance in expenditure on roads (EXRDS), jointly explained by all the Federal tax revenue components is 80.6%, while the remaining 19.4% were other factors not captured in the model in this study. At a 5 % level of significance, and the degree of deference of (5, 20), the computed F- Statistic is 25.097 at a P-value of 0.000 which is less than

0.05 level and this indicates a highly statistically significant. Consequently, the null hypothesis one (Ho1) which states that 'Federal tax revenue has no significant effect on expenditure on roads in Nigeria' was rejected and the alternate accepted as a result, this study concluded that federal tax revenue has a significant effect on expenditure on roads in Nigeria.

Discussion of Findings

The study revealed mixed results judging from the individual parameter of the model that investigated the effect of federal tax revenue on government expenditure on roads in Nigeria. However, the joint statistics of the F-statistics of the combined explanatory variables showed that federal tax revenue positively affected government expenditure on roads in Nigeria. This result is in tandem with some previous studies that found positive effects as carried out by (Ayeni & Afolabi, 2020; Chinwendu et al. 2021; Karpushkina et al.2021; Mpofu, 2021; Huang et al.2020;

Otusanya et al.2019; Etim & Daramola, 2020; Abinotam, 2018; Akeju, 2018; Tamunomiebi & Ukachukwu, 2018; Al-Mustapha & Hamza, 2016; Okolo et al. 2018).

However, this result found in this model were not in tandem with some other studies of (Huang et al.2020; Nnabuife et al.2020; Resnick & Sivasubamian, 2020; Madumere & Ubani, 2020; Kouadio & Gakpa, 2020; Mahadea & Zogli, 2018; Ogbonnaya & Nelson, 2018; Dube, 2014), which have found an inverse effects.

Testing of Hypothesis Two

Research Objective two: To examine the effect of federal tax revenue on expenditure on power in Nigeria

Research Question two: How does federal tax revenue affect expenditure on power in Nigeria?

Research Hypothesis two (Ho2): There is no significant effect of federal tax revenue on expenditure on power in Nigeria.

The outcomes of the ARDL regression model that examines how federal tax revenue affects expenditure on power in Nigeria are presented in this subsection. In this regression model, Federal tax revenue is proxied by company income tax (CITAX), Petroleum Profit Tax (PPTAX), Value Added Tax (VAT), Custom and Excise Duties (CEDT) and Tertiary education trust fund (TEDT).

Bounds Cointegration Test: Federal tax revenue on government expenditure on power

Again, the ARDL bound co-integration test approach used to check the presence of long-run relationships among the Federal tax revenue metrics and Power Infrastructure variables produced the result as presented in Table 4.3.1.

Table 4.3.1: Bounds Cointegration Test: Federal tax revenue on government expenditure on power

| <i>Sig. Level</i> | <i>Lower Bound [I(0)]</i> | <i>Upper Bound [I(1)]</i> |
|-------------------------------------|---------------------------|---------------------------|
| 10% | 2.08 | 3.00 |
| 5% | 2.39 | 3.38 |
| 2.5% | 2.70 | 3.73 |
| 1% | 3.06 | 4.15 |
| <i>Computed F-statistic = 4.550</i> | | |

Source: Author’s Computation (2023)

From the results in Table 4.3.1, the ARDL bound co-integration test suggests that the null hypothesis of no cointegration can be rejected at 1% significance level as recommends by the computed F-statistic value = 4.550 which is higher than the Upper Bound [I(1)] = 4.15. Thus, the study concluded that there is long-run relationship (cointegration) among the variables.

Short-run and Long-run Models: Federal tax revenue on government expenditure on power

The outcomes from the estimation of the short – run and the long-run models for Federal tax revenue metrics and Power Infrastructure based on the estimated ARDL (1, 0, 2, 1, 0, 2) as led by Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC) are presented in Table 4.3.2.

Table 4.3.2: Short-run and Long-run Models: Federal tax revenue on government expenditure on power

| ECM Regression | | | | |
|--|-------------|------------|-------------|---------|
| Case 2: Restricted Constant and No Trend | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | P-value |
| DLOG(PPTAX) | 0.089451 | 0.154294 | 0.579743 | 0.5720 |
| DLOG(PPTAX(-1)) | -0.641693 | 0.174815 | -3.670697 | 0.0028 |
| DLOG(VAT) | 1.952169 | 0.419262 | 4.656203 | 0.0004 |
| DLOG(TEDT) | 0.438730 | 0.145990 | 3.005206 | 0.0101 |
| DLOG(TEDT(-1)) | 0.222709 | 0.109216 | 2.039169 | 0.0623 |
| CointEq(-1)* | -0.907394 | 0.132989 | -6.823058 | 0.0000 |
| Levels Equation | | | | |
| Case 2: Restricted Constant and No Trend | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | P-value |
| LOG(CITAX) | 0.284700 | 1.046416 | 0.272072 | 0.7898 |
| LOG(PPTAX) | 0.253904 | 0.227560 | 1.115766 | 0.2847 |
| LOG(VAT) | 0.599819 | 1.612615 | 0.371954 | 0.7159 |
| LOG(CEDT) | 0.159291 | 0.770947 | 0.206618 | 0.8395 |
| LOG(TEDT) | -0.401938 | 0.341331 | -1.177561 | 0.2601 |
| C | -1.678185 | 1.346407 | -1.246418 | 0.2346 |
| $EC = LOG(EXPW) - (0.2847*LOG(CITAX) + 0.2539*LOG(PPTAX) + 0.5998*LOG(VAT) + 0.1593*LOG(CEDT) - 0.4019*LOG(TEDT) - 1.6782)$ | | | | |
| F-Stat. (P-value) = 17.63 (0.000); R² = 0.796; Adj. R² = 0.742; D-Watson = 2.407 | | | | |

Diagnostic Tests

Serial Correlation (P-value) = 2.146 (0.163); Jarque-Bera (P-value) = 1.043 (0.594); Breusch-Pagan-Godfrey Heteroskedasticity (P-value) = 0.649 (0.761)

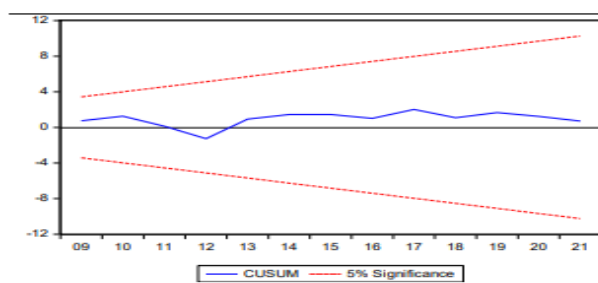


Figure 4.3.2a: CUSUM Chart

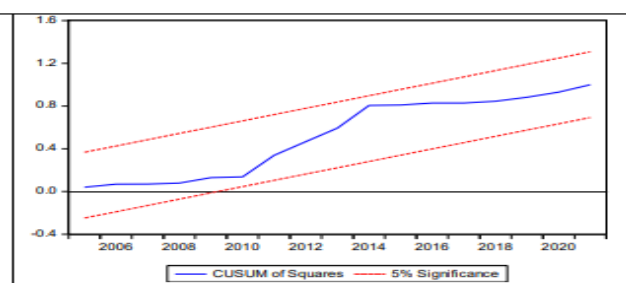


Figure 4.3.2b: CUSUM Squares Chart

Source: Author’s Computation (2023). Note: dependent variable is Expenditure on power (EXPW). Independent variables are expenditure on healthcare (EXHC), Expenditure on education (EXED), and expenditure on telecommunications (EXTC), company income tax (CITAX), petroleum profit tax (PPTAX), value added tax (VAT), custom and excise duties (CEDT), and tertiary education trust fund (TEDT).

Interpretation

From the results in Table 4.3.2, the estimated short-run and long-run dynamic models is having F- stat. (P-value) = 17.63 (0.000) and Adjusted R-squared = 0.742 with D-watson value = 2.407 suggesting that the model is free from serial correlation. The coefficient of the error correction term (CointEq(-1)) as estimated is observed to be -0.907 (P – VALUE = 0.000). This is rightly signed (negative), less than one and statistically significant at 1% level. Alternatively, it means that the speed of adjustment is about 90.7% and is relatively high. Furthermore, the result confirms the Bound cointegration test result implying presence of a stable long run relationship between the Federal tax revenue metrics and Power Infrastructure variable.

As well, it is important to note that in the short run; lag value of the dependent variable (Expenditure on power (EXPW)) and current company income tax (CITAX) are suppressed in this chosen model however, in the long run, the coefficients of company income tax (CITAX) is observed to be positive but statistically insignificant [$\beta = 0.285$; P – value = 0.790] suggesting that CITAX has no significant effect on EXPW during the period under review. The coefficient of past petroleum profit tax (PPTAX(-1)) is found to be negative and statistically significant [$\beta = -0.641$; P – value = 0.003] at 1% level while that of the current petroleum profit tax (PPTAX) appears positive but statistically insignificant [$\beta = 0.089$; P – value = 0.572]. In the long run, the coefficients of petroleum profit tax (PPTAX) is found to be positive but statistically insignificant at 0.285 [$\beta = 0.254$; P – value = 0.285].

Therefore, these suggest that only past petroleum profit tax (PPTAX(-1)) has negative and significant influence on the current Expenditure on power (EXPW) in the short run and one percent increase in PPTAX causes about 0.641 percent decrease in EXPW.

For value added tax (VAT), the estimated coefficients are positives both in the short run and long run [$\beta = 1.952$; P – value = 0.000; [$\beta = 0.600$; P – value = 0.716], however, the only statistically significant coefficient is that of the short run This is suggesting that VAT positively and significantly influence EXPW in Nigeria in the short run and one percent increase in VAT causes EXPW to increase by about 1.952 percent.

Furthermore, the coefficients of the current and past tertiary education trust fund (TEDT) are positives in the short run [$\beta = 0.439$; P – value = 0.010; $\beta = 0.223$; P – value = 0.0632], however, the current TEDT is the only positive coefficient that is statistically significant at 5% level is suggesting that CEDT positively and significantly affect EXPW in Nigeria in the short run. Nevertheless, the coefficient of TEDT is found to be negative and statistically insignificant [$\beta = -0.402$; P – value = 0.260]. What this mean is that tertiary education trust fund (TEDT) has not significant impact on Power infrastructure in the long run.

Diagnostic Tests

Also, in Table 4.3.2 and Figures 4.3.2a&b all the diagnostic test results are statistically insignificant (P-value > 0.05) meaning that the residual of the ARDL model is normally distributed, free from serial correlation problem and has constant variance.

Trend Analysis:

4.3.2a and 4.3.2b showed the trend of expenditure for the years under consideration. The blue line showed the sum of squares in each case, while the orange line depicted the movement of 5 percent level of significance as revealed from eth software used.

Also, the blue lines of CUSUM and CUSUM Square tests are all found within the upper and lower bounds (red lines) thus confirm that the model is well specified and stable.

Also the Adjusted R2 from the results of the ARDL regression results in Table 4.2.4, the result showed that the percentage of variance in expenditure on roads (EXRDS, jointly explained by Federal tax revenue metrics is about 74.2%, while the remaining 25.8 % were other factors not considered and captured in the model. At 5 % level of significant, and the degree of deference of (5, 20), the computed F- Statistic is 17.63 at a P-value of 0.000 which is less than 0.05 selected level of significance, this indicates a highly statistically significant. Therefore, the study did not accept the null hypothesis that there is no significant effect of federal tax revenue on government expenditure on power in Nigeria. But accepted the alternative hypothesis. Accordingly, this study concluded that there is significant effect of federal tax revenue on government expenditure on power in Nigeria.

5. Conclusion and Recommendations

Conclusion: From the inferential and empirical analysis points of view, the main hypotheses were tested in accordance with the objective of this study. The results based on the F-statistics/Wald Test revealed the following results:

The following Questions were answered:

Objective One

Objective one: investigate the effect of federal tax revenue on expenditure on roads in Nigeria;

Question one: To what extent does federal tax revenue affect expenditure on roads in Nigeria?

Hypothesis one: Federal tax revenue has no significant effect on expenditure on roads in Nigeria

Result: The study found that federal tax revenue had a positive significant effect on expenditure on roads in Nigeria.

Objective Two

Question two: How does federal tax revenue affect expenditure on power in Nigeria?

Objective two: examine the effect of federal tax revenue on expenditure on power in Nigeria;

Hypothesis two: There is no significant effect of federal tax revenue on expenditure on power in Nigeria.

Result: The study found that federal tax revenue had a positive significant effect on expenditure on power in Nigeria.

Recommendations: The findings from the study implied that government can fully diversify to income from taxes to fund its expenditure in Nigeria. Hence, as a priority for growing tax revenue in Nigeria, it is recommended that the relevant tax authority, particularly the Federal Inland Revenue Services (FIRS) should device and implement strategies that will ensure effective collection of tax revenue from tax payers. This way, funds would be available for government expenditures planned to be funded through federal tax revenues.

Furthermore, it is recommended that the federal government should strengthen tax administration in the country through capacity development programmes for the staff of the Federal Inland Revenue Service and the various revenue collecting agencies of government in order to enhance their skills to perform their duties efficiently and grow tax revenue. In addition, the general public should continue to hold their elected leaders accountable and ensure the social contract theory reflects the relationship between the leaders and the people, by asking questions about how the taxes they have paid were being expended. Given the mixed results of the parameter of the model that investigated the effect of federal tax revenue on government expenditure on roads and power in Nigeria, the study recommended that the federal Government should allocate more funds for infrastructural development in order to achieve tax justice which will also help to grow tax revenue.

Contribution to Future Research

Undoubtedly, there existed some related studies on federal tax revenue and government expenditure in Nigeria. However, to the best knowledge of the researcher, fewer of these studies have considered the possible effect of federal tax revenue on government expenditure from the perspective considered in this study, using the same measuring variables considered. The findings from this study would be useful to the government, policymakers, federal ministries, the budget and fiscal policy departments as well as the general public. It is the intention of the researcher that this study contributes to knowledge and brings to the fore the significance of optimal utilization of federal tax revenue on the various federal government expenditure heads.

From the foregoing, the study contributed the following to the body of knowledge:

Policymakers: This study contributed to bringing vital empirical information novel and significant for the benefit of policymakers to assist them in making useful and impactful policies that will influence the application and allocation of federal tax revenues as well as regulations on government expenditure in Nigeria. Also, the study would serve as a veritable feedback for policymakers on the effectiveness or otherwise of existing policies relating to budget implementation.

Theory: From the theory perspective, the theory reviewed contributed to the pool of existing theories in the literature, especially in the field of taxation and government expenditure in Nigeria. Tax and government expenditure related theory have been reviewed, as the developers of the theories and the theory was propounded, the assumptions, proponents and opponents were carefully highlighted and all these are adding to knowledge.

Concepts: A good number of concepts making up the study were reviewed. The concepts of federal tax revenue, and its measuring variables and that of government expenditure and its proxies were conceptually considered. The concepts reviewed added to the existing concepts, contributing to the conceptual literature in this regard. Hence, the researcher expects that these concepts would add value and content to the theoretical body of literature.

Accounting and Finance Practice: The researcher made contribution to the benefit of finance and accounting profession in relation to federal tax revenue and government expenditure in Nigeria, as both the accountants and finance professionals in practice, government, industry and those in academia will find this study useful to their various analytical works. Tax consultants and tax administrators as well as analysts will find this study useful in making useful predictive and advisory services in taxation. The models developed in this study are predictable and will aid future planning for the country.

Empirical: This study contributed to the empirical literature. An empirical review of previous studies were carried out. This was done in line with each objective of the study and the hypotheses as specified. In addition, the empirical results in this study had made an additional contribution to existing empirical studies. An empirical evidence of the effect of federal tax revenue on government expenditure on roads and power was established in this study. The study had found mixed results, while some of the results were consistent with previous studies, others were inconsistent with previous findings. Consequently, this study made additional contributions to knowledge by synthesizing these diverse findings with previous studies.

Body of Literature: This study contributed to the extant body of knowledge and an addition to the existing knowledge, as researchers who are desirous of relevant information on federal tax revenue as well as government expenditure from the perspective of expenditure on roads and power would find this study useful.

The General Populace: The study had made good contribution for the benefit of the general public. The general public is hereby provided with information on the effect of federal tax revenue on government expenditure in Nigeria and this will enable the citizen to understand how their taxes were being utilized by their elected representatives. In addition, stakeholders (labour union, employees, creditors, government) would find the outcome of this study immensely useful in making informed decision about the performance of government as it relates to how tax revenues have been utilized on planned government expenditure over the reviewed period.

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