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EFFECTS OF DISAGGREGATED TAX REVENUES ON ECONOMIC GROWTH IN NIGERIA (1995-2023): ARDL BOUND TEST APPROACH

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Abstract:
Tax revenue has been a great tool of fiscal policy harnessed toward the economic development of a nation. Its different components have collective effects on the economic growth of a nation. This study examined the effects of disaggregated tax revenue on Nigeria's economic growth from 1995 to 2023. The data was sourced from the Central Bank of Nigeria and the Federal Inland Revenue Service databases. This study examined the effects of disaggregated tax revenue on Nigeria's economic growth from 1995 to 2023. The data was sourced from the Central Bank of Nigeria and the Federal Inland Revenue Service databases. Employing multiple regression analysis within an Autoregressive Distributed Lag (ARDL) model, the study assessed the impact of Value Added Tax (VAT), Companies Income Tax (CIT), Petroleum Profit Tax (PPT) and Personal Income Tax (PIT) on economic growth. The diagnostic tests confirmed the model's validity, with unit root tests showing that all variables, except PIT, achieved stationarity after differencing. The findings revealed that each tax revenue component positively influences economic growth. Based on these results, the study recommends enhancing the legal and regulatory frameworks for businesses, including regular evaluations and updates of tax laws and stronger enforcement mechanisms. It also underscores the need to strengthen anti-corruption efforts, promote property rights, uphold the rule of law,

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and prioritise good governance to foster public confidence and ensure the effective use of tax revenues for economic development.

JEL: C32, H20, H24, H25

Keywords: VAT, PIT, PPT, Economic Growth, ARDL

1. Introduction

All over the world, the basic responsibility or duty of any government is to render essential services to their citizens. Some of the responsibilities or commitments which the government may owe its citizens include but are not limited to adjustment and stabilisation of the economy, income redistribution and provision of essential services in the form of public goods or utilities (Abiola & Asiweh, 2012). Among the significant tools that are sources of global government revenue is taxation. Governments generate revenue through this means and, in turn, use such revenue to carry out their respective duties, which include: the provision of public goods such as good road transportation system, healthcare, education, maintenance of peace, and prevention of external aggression, among several others (Appah & Eze, 2013)

Taxation is, therefore, considered to be the oldest and most stable source of government revenue, through which the individuals living in a given geographical territory are granted support by the basic expenditures on goods and services. This makes tax the best instrument to support the requirements for public sector performance and liquidation of public debt (Okoye & Ezejio, 2014). Taxation is a process employed by all governments the world over to bring or exert control over public expenditure (Abomaye, Samuel, Eyo, & Friday, 2018).

While tax refers to funds realised from carrying out tax administration, taxation is the process of collecting taxes, while the payment of tax has no quid pro quo as it is seen as a civic responsibility due to the state by all taxable citizens of a country. Thus, according to Edewusi and Ajayi (2019), taxes are always imposed to limit the production of certain products or services, to protect infant industries, to keep inflation at bay and to redistribute income in society. In view of the relative importance of tax, which provides a stable source of income to governments for purposes of providing government expenditure or public goods and services, influences the consumption patterns which leads to economic growth in an economy, impacts on the consumption pattern as well as exerting influence on relevant economic variables; governments all over the world always make great efforts to maximise revenues derived from taxation.

As a nation, Nigeria currently over-relies on oil as a major source of revenue due to the utter neglect of taxation. However, oil prices are subject to the vagaries and vicissitudes of an unpredictable world market, which is not only perilous but also detrimental to Nigeria's economic growth (Adesina & Ibadin, 2015). The effect of this could be seen in April 2020 when the world price of Nigerian crude oil dropped

abysmally to $38 per barrel, which was exacerbated by the COVID-19 pandemic (Ayeni & Omodero, 2022). The tax system in Nigeria has several loopholes and, as a result, is confronted with many challenges and the country has not advanced a tax system that can be adjudged as effective and efficient. These include challenges such as multiplicity of taxes, poor tax administration, non-availability of the database, tax touting, complex nature of the Nigerian tax laws, minimum tax, commencement, change of accounting date and cessation, and non-payment of tax refunds, among others (Edori, 2017). While some of the issues have been dealt with, especially by the recent reforms that brought about the Finance Act 2020 (PWC, 2020), many issues still remain unclear and unresolved.

However, from the review of the literature conducted, few studies have been conducted on the impact of disaggregated tax revenue on economic growth in Nigeria. It is against this backdrop that this study focuses on the effects of disaggregated tax revenue precisely, companies' income tax, petroleum profit tax, personal income tax and value-added tax on Nigeria's economic growth from 1995 to 2023.

This study intends to seek answers to the following questions:

1) What is the impact of Petroleum Profit Tax (PPT) on economic growth in Nigeria?
2) What is the impact of Companies Income Tax (CIT) on economic growth in Nigeria?
3) What is the impact of Value Added Tax (VAT) on economic growth in Nigeria?
4) What is the impact of Personal Income Tax (PIT) on economic growth in Nigeria?

The rest of the study is structured as follows: section two discusses theoretical issues and a review of the empirical literature; section three covers methodology and data issues; section four entails analysis of data; and section five discusses the conclusion and policy recommendations.

2. Review of Literature

2.1 Conceptual Review

2.1.1 Taxation

The National Tax Policy defines tax as "*any compulsory payment to government imposed by law without direct benefit or return of value or a service, whether it is called a tax or not"* (Federal Ministry of Finance, 2017; p. 1). It went on to further define tax as "*a monetary charge levied by the Government on persons, entities, transactions or properties to generate revenue*" or "*the enforced proportional contributions from persons and property, levied by the State by virtue of its sovereignty for the support of Government and for all public needs*".

According to Onakoya, Afintinni and Ogundajo (2017), tax is defined simply as a compulsory levy imposed by the government of a state in order to enhance the effective and efficient management of various activities of government. Abomaye, *et al.* (2018) describe the tax as a liability from the viewpoint of the taxpayer as a contribution in some quantum measure to the funds available for use by the government to provide basic infrastructure for her citizens. However, the efficiency and effectiveness of tax administration, which should ordinarily lead to increased tax revenue generation for

government to provide necessary public goods and services, is being bedeviled by the fraudulent practices of some tax officials through the diversion of the collected tax revenue into their private pockets (Ashaolu, 2018).

Osamor, Omoregbe, Ajasa-Adeoye and Olumuyiwa-Loko (2023) noted that taxation plays a crucial role in the economic growth of nations, adding that this benefit of taxes is yet to be fully harnessed among many developing countries. Tax is thus a mandatory contribution paid by individuals and corporate organisations to governments based on predetermined conditions in which there is no quid pro quo. Through tax imposition, governments are able to influence or restrict the production and utilisation of certain goods and services, protect infant industries from the danger of dumping by advanced countries, and put inflation at bay. Tax can, therefore, be regarded as a compulsory payment that is supported by laws and paid at a predetermined rate.

The provision of basic and essential infrastructural facilities to the citizens is largely funded by government revenue, of which a very reasonable proportion comes from taxes. It is argued that when citizens are provided with necessary social amenities, voluntary tax compliance is encouraged, and business activities are further stimulated, which in turn stabilises payment of taxes, leading to more tax revenue being generated by the government.

2.1.2 Economic Growth

Economic growth on the other hand can be defined as the increase in the inflation-adjusted market value of goods and services produced in an economy over a given period (Roser, 2021). It can also be regarded as the annual rate of increase in the total output or income in a particular economy (Dladla & Khobai, 2018). It is the increase in the capacity of an economy to produce goods and services when compared from one period to another. Edewusi & Ajayi (2019) are of the opinion that economic growth is "*the stable process which lead to the expansion of the productive capacity of the economy after some time in order to realise rising degrees of national output and income*".

Accordingly, economic growth can be defined as a constant increase in the production capacity of a country by comparing the current year's Gross National Product (GNP) with previous years as well as an increase in Per Capita National Output measured by an outward shift of the production possibility curve of the country (Ibidun, Ogundana, Ogundana, & Ibidunni, 2017). The role of government in achieving economic growth for both developed and developing countries is germane, and taxation is an instrument of fiscal policy that can be used by the government to positively impact the economy (Edewusi & Ajayi, 2019).

According to Ibadin and Oladipupo (2015), economic growth can be due to a sustained increase in Per Capita National output or Net National Product over a long period of time. It is also argued that economic growth also occurs when there is an outward shift in the Production Possibility Frontier (PPF). Edewusi & Ajayi (2019) explained that one other measure of economic growth is that the national product should be a combination of goods and services that meet the yearning of a reasonable number of

people in a nation. It is also argued that economic growth can be determined by four important indicators: national resources, human resources, capital formation and technological development. As a measure of economic growth, economists usually investigate the rate of increase in Real Gross Domestic Product (RGDP) from one year to the other year.

There are, however, other economic indicators which can be used as a proxy for economic growth. These include Gross Domestic Product (GDP), Gross National Product (GNP), Market Capitalisation and Per Capital Income (PCI). It should be noted, however, that the Real Gross Domestic Product (RGDP) is an inflation-adjusted measure which reflects the value of all goods and services produced in an economy in a given period of time, which is usually a year, expressed in base year prices.

2.2 Theoretical Review

2.2.1 Exogenous (Neoclassical) Growth Theory

The Exogenous Growth Theory, often referred to as the Neoclassical Growth Model, can be considered to be a breakthrough in the theory of economic growth and has been attributed to the seminal works of Solow (1956) and Swan (1956). The Neoclassical school of thought believes that long-run economic growth is a function of exogenous or external factors such as capital accumulation, labour, population growth and increase in productivity, commonly referred to as technological progress. Central to this theory is a Neoclassical (aggregate) production function, which is interpreted to be of the Cobb–Douglas type of production function, which allows the model "to make contact with microeconomics":

$$Y(L,K) = AL^{\beta} K^{\alpha}$$

where:
Y is Output,
L is Labour,
K is Capital,
β is output elasticity with respect to labour,
α is output elasticity with respect to capital,
A is the efficiency parameter or total factor productivity.

Solow (1956), therefore, submitted that fiscal policy did not have any impact on the determination of long-run economic growth. Rather, it assumes that economic growth was caused by the main factors of production, such as labour and technological progress, which are exogenously determined in the model (Peru-Ovidiu, 2015)

2.2.2 Endogenous Growth Theory

According to endogenous growth theory, economic growth is largely driven by factors within the system rather than external factors (Liberto, n.d.). The theory suggests that investments in human capital, innovation, and knowledge are germane to economic

growth. It also sheds a searchlight on the positive externalities and spillover effects of a knowledge-based economy, which is a necessary condition for economic growth and development in general. The endogenous growth theory is of the view that the long-run growth rate of an economy is a function of policy measures.

For example, subsidies for research and development or education will increase the growth rate in some endogenous growth models by increasing the incentive for innovation. The endogenous growth theory submitted that financing through taxes could have an impact on welfare and/or on growth. Tax policy can, however, have a negative impact on economic growth in the sense that it can discourage new investment and incentives by entrepreneurial or by distorting investment decisions.

In addition, the endogenous growth model postulates that government spending and tax policies can have long-run or permanent growth effects. The theory further argues that economic growth is generated by three production factors: labour, capital, and technological progress, which are linked to one another through a production function. Taxes, in this case, could alter the economic decisions of these factors of production and can affect economic growth (Hakim, 2020).

2.2.3 The Tax Smoothing Hypothesis

The Tax Smoothing Hypothesis (TSH) is an effort made by the government to minimise tax distortions and not necessarily vary tax rates directly with changes in government expenditures. Rather, government expenditure is financed by debt in order to maintain a constant tax stream or rate. The hypothesis was first suggested by Barro (1979) in a partial equilibrium context and is regarded as one of the most important concepts in fiscal policy literature. It is argued that in a deterministic context, optimal tax rates are constant, but in the case of a stochastic economy with incomplete financial markets, tax rates follow a more random pattern generated by a martingale or a static process.

In this respect, the tax smoothing hypothesis requires tax rates to be altered only when unpredicted shocks occur in a system, which means that there should be no predictable changes in tax rates in ordinary times. Tax smoothing has important policy implications in the sense that tax distortions or excess tax burdens increase more than proportionally with tax rates. It is expected that the government can minimise the tax distortions by keeping tax rates relatively smooth or constant instead of raising them in some periods and reducing them in another period.

2.2.4 Laffer Curve Theory

The Laffer curve is a theory developed by the supply-side American economist Arthur Laffer in 1974 to show the relationship between tax rates and the amount of tax revenue collectable by governments in relationship to economic activity (Canto, Douglas, & Laffer, 1982). The curve is used to illustrate Laffer's argument that sometimes cutting tax rates can increase total tax revenue. The Laffer curve describes the relationship between tax rates and total tax revenue, with an optimal tax rate that maximises total government tax revenue. If taxes are too high along the Laffer curve, then they will discourage the

taxed activities, such as work and investment, enough to actually reduce total tax revenue. In this case, cutting tax rates will both stimulate economic incentives and increase tax revenue. The Laffer curve states that there is a parabolic relationship between tax rates and tax revenue.

According to the theory, tax revenue can increase by increasing tax rates up to a certain point, which is referred to as the revenue maximising point, beyond which increasing tax rates cause tax revenue to fall (Austin, Robert, & Lawrence, 1999). A theoretical model of a Laffer curve to prove that there is a tax rate that maximises government revenue has been provided by Canto, Douglas and Laffer (2011). The range is regarded as a "*normal range*" if an increase in either tax rate leads to an increase in total tax revenue collected. If an increase in the tax rate, however, leads to a reduction in total tax revenue collected, the range is referred to as the "*prohibitive range*". The upward-sloping portion of the Laffer curve is called the normal range, while the downward-sloping segment is the prohibitive range. The prohibitive range is said to exist because high tax rates stifle economic activity and force agents to barter and encourage leisure pursuits (Ballard, Fullerton, Shoven, & Whalley, 1985).

2.3 Empirical Review

Dackehag and Hansson (2012) studied how tax rates on corporate income and personal income affect economic growth. They made use of panel data from 1975 to 2010 on 25 developed countries of the Organisation for Economic Cooperation and Development (OECD). The results revealed that taxation of corporate income and personal income has a negative impact on economic growth. There is, however, a very strong correlation between tax on corporate earnings and economic growth.

Atems (2015) investigated the effects of taxation on economic growth both in the long-and short-run in 48 states in the United States covering the years 1967 to 2008, making use of the partial Durbin model. The results revealed a short and long-run correlation between taxation and economic growth, which indicates that a 1% increase in tax will decrease economic growth by 0.33%.

McGowans and Billings (1997) studied the growth pattern of VAT in European Union (EU) countries to ascertain whether the implementation of VAT has led to an increase in the overall tax burden. Using Ordinary Least Square (OLS) and Seemingly Unrelated Regression (SUR). They found that VAT has often been disapproved of as it is said to be a money machine for the government and a regressive tax. The results, however, show that VAT can be put into practice without becoming money machines for the government. They submit that EU countries used VAT to substitute a number of indirect taxes and not to boost the overall tax burden.

Iriqat and Anabtawi (2016) analysed the causality relationship between Gross Domestic Product and its components with tax revenues in developing countries, using Palestine as a case study. They based the study on an empirical approach using secondary data from the Palestine Monetary Authority covering the period 1999-2014. The result of the research revealed that tax revenues do not Granger Cause each of the Palestinian

Gross Domestic Product, Government spending, Consumption, Investment and Balance of trade.

Babatunde, Ibukun and Oyeyemi (2017) conducted a study on the impact of taxation on economic growth in Africa from 2004 to 2013. Various preliminary tests were carried out, some of which included descriptive statistics and stationary tests, using the Augmented Dickey-Fuller (ADF) test, Im, Pesaran & Shin W-stat tests, Levin *et al.* test, etc. The results of the investigation revealed that tax revenue is positively related to GDP and promotes Economic Growth in Africa as it was significant at a 5% level. The study, therefore resolved that tax revenue has a significant positive relationship with Gross Domestic Product.

Research carried out by Onakoya and Afintinni (2016) empirically investigated the cointegration relationship between tax revenue and economic growth in Nigeria, covering the period from 1980 to 2013. The study employed various preliminary tests, which include descriptive statistics, trend analysis, and stationarity tests using the Augmented Dickey-Fuller (ADF) test. The study also made use of the Engle-Granger Cointegration test to determine whether a long-run relationship existed between tax revenue and economic growth. The Vector Error correction model was used equally to confirm the long-run relationship and determine the short-run dynamics between the variables. Their findings from the study revealed that a long-run relationship existed between tax revenue and economic growth in Nigeria. Their results also showed a positive and significant relationship at a 5% level of significance between Petroleum Profit Tax (PPT), Companies Income Tax (CIT) and economic growth.

Emmanuel and Onyedikachi (2020) conducted a study on the impact of income tax revenue on Nigeria's economic growth, as proxied by gross domestic product (GDP). The ordinary least square (OLS) regression analysis was adopted to explore the relationship between the GDP (the dependent variable) and a set of federal government income tax revenue heads over the period 1981-2007. The result of the study indicated a very positive and significant relationship between federally collected tax revenue and the GDP in Nigeria, even though the actual tax revenue generated in most years fell below the level expected. The author attributed the anomaly to dysfunctionalities in the income tax system, loopholes in tax laws and inefficient tax administration. However, the author proffered suggestions as to strategies to be adopted to improve the system of tax administration in order to increase tax revenue generation.

Ogbonna and Amah (2021) conducted research on the relationship between taxation and economic growth in Nigeria, and a time series of data was applied to this research work. Multiple Linear Regression analysis was further used to analyse the data by making use of the Vector Error Correction Model. The findings of the study established that PPT and CIT showed a positive impact on Nigeria's economic growth, while customs and excise duties (CED) indicated that a negative and significant relationship exists between tax revenue and Nigerian economic growth.

In addition to the above works, other empirical studies discussed below evaluated the impact of disaggregated tax revenue on economic growth and mostly focused on

selected categories of taxes such as Companies Income Tax (CIT), Petroleum Profit Tax (PPT), Value Added Tax (VAT), as well as Customs and Excise Duties (CED). For instance, Adereti, Sanni and Adesina (2011) studied the contribution of VAT to GDP in Nigeria. Their findings show that VAT revenue to total tax revenue averaged 12.4%, which they considered low compared to other African countries such as Ivory Coast, Kenya and Senegal, which had an average of 30%. The study also observed a positive and significant correlation between VAT and GDP.

Adereti, Sanni and Adesina (2011) empirically evaluated the contribution of value-added tax (VAT) to economic growth in Nigeria between 1994 and 2008. From their time series data of GDP and VAT revenue, it was observed that VAT revenue to Total Tax Revenue averaged 12.4%, which was considered very low when compared to other countries in Africa. The study also observed that there is no causality between VAT revenue and Nigeria Gross Domestic Product.

Umeora (2013) investigated the effects of value-added tax (VAT) on economic growth and total tax revenue in Nigeria. The result of his findings shows that VAT has a significant effect or impact on economic growth (GDP) and total tax revenue. In pursuit of this, two hypotheses were proposed, namely: First Ho, that VAT does not have a significant effect on GDP. Secondly, we have Ho VAT, which does not have a significant effect on Total Tax Revenue. The simple linear regression method was used to analyze time series data relating to VAT, GDP, and total revenue for the period 1994 – 2010, and the computation was done with the assistance of SPSS. The results of the regression analysis show that VAT has a significant effect on GDP and total tax revenue. That means that both Null Hypotheses (Ho) are accepted. The government is encouraged to sensitise the people to enable it to increase the tax rate to enlarge its annual revenue for economic development.

Akogo and Akadakpo (2022) examined the effect of direct tax as a tool for income redistribution in Nigeria. The population and sample of this study focused mainly on direct taxes, which include petroleum profit tax (PPT), personal income tax (PIT), companies income tax (CIT) and education tax (ED), which are domiciled in Nigeria. Utilising a timeframe that spanned 1990-2020, they employed the longitudinal design as their research design. The result from the inferential statistic employed revealed that companies' income tax and education tax had no significant effect on income redistribution, while personal income tax and petroleum profit tax had a significant effect on income redistribution. Furthermore, personal income tax had a positive effect on income redistribution, while petroleum profit tax had a negative effect on income redistribution. The study recommended that there should be an introduction and proper implementation of a luxury tax system where the rich will be made to pay tax for consuming more luxury goods than the poor.

Ojong, Ogar and Arikpo (2016) examined the impact of tax revenue on the Nigerian economy. They used the ordinary least square of the multiple regression model to establish the relationship between dependent and independent variables. The finding revealed that there is a significant relationship between petroleum profit tax and the

growth of Nigeria's economy. It showed further that there is a significant relationship between non-oil revenue and the growth of Nigeria's economy. The finding also revealed that there is no significant relationship between companies' income tax and the growth of the Nigerian economy. It was recommended that the government should endeavour to provide social amenities to all nooks and crannies of the country. Also, the government should engage in a complete re-organisation of the tax administrative machinery in order to reduce tolerable problems of tax evasion and avoidance and, finally, to enhance the tax base of government, employment opportunities should be created and a good environment for entrepreneurship and innovation to thrive by using tax proceeds.

Adegbite and Fasina (2011) studied the effects of taxation on revenue generation in Nigeria. It also analysed the direction of causality between taxation and revenue generation utilising the method of Johansen co-integration and the Granger causality tests using secondary data spanning the period 1970 to 2017. Results showed that PPT has a positive and significant effect on REV. VAT and CORPT. All the components of taxation showed bidirectional causality with government revenue in Nigeria because PPT, VAT and CORPT, jointly, Granger-cause REV. It is concluded that taxation had a positive significant impact on revenue generation of government both in the short run and in the long run. It is now recommended that the regulatory authorities charged with the responsibility and accountability of collecting tax should further be supported and empowered by the government to impose compliance on taxpayers and bring tax evasion and avoidance into the tax net so as to generate more revenue for the government to implement its fiscal responsibilities.

The conflicting conclusions from the above-disaggregated studies indicate that the impact of disaggregated tax revenue on economic growth is not yet resolved. The gap in terms of the period covered is also a contributory factor to the gaps in the outcomes of relationships between disaggregated tax revenue and the economic growth of Nigeria. Following the aforementioned lacuna created by the earlier researchers in the light of mixed views in results and conclusions arrived at by these different researchers, this study endeavoured to fill the gap in terms of the variables and analysis on the disaggregated impact of tax revenue on economic growth in Nigeria. Also, the present study improves on the previous studies by updating the data to 2023 and by using a more robust statistical tool.

3. Methodology

3.1 Research Design

This study used a causal research design to capture the effect of disaggregated tax revenue on economic growth in Nigeria. Causal research design is a type of research design in which there is a dependent variable and independent variables, whereby the dependent variable responds to the changes in independent variables (Khanday & Khanam, 2019). This research work is fundamentally analytical, and it embraces the use of secondary data to examine the impact of taxation on economic growth in Nigeria.

Autoregressive Distributed Lag Model (ARDL) was used as the technique of model estimation because it is valid if the variables of interest have a vague order of integration i.e. purely I(0), purely I(1) or a combination of I(0) and I(1) which is not acceptable in previous approaches. Also, as maintained by Haug (2002), the ARDL bounds testing approach is more appropriate and gives better results for small sample sizes while the short and long-run parameters can be estimated simultaneously.

3.2 Model Specification

To examine the impact of disaggregated tax revenue on Nigeria's economic growth, this study adapts the model of Onoja and Ibrahim (2020), who examined the impact of tax revenue on Nigeria's economic growth. They specified their model as:

$$GDP = f(CIT, VAT, PPT) \quad (3.1)$$

where:
GDP = Gross Domestic Product (it is used as a proxy for economic growth),
CIT = Companies Income Tax,
VAT = Value Added Tax,
PPT = Petroleum Profit Tax.

To achieve the objective of this study, the above model was modified by including personal income tax in the model, and GDPGR is used to replace GDP. The model for this study was then specified as:

$$RGDPGR = \beta o + \beta_1 VAT + \beta_2 CIT + \beta_3 PPT + \beta_4 PIT + \mu \quad (3.2)$$

where:
RGDP = Real Gross Domestic Product Growth Rate,
VAT = Value Added Tax,
CIT = Companies Income Tax,
PPT = Petroleum Profit Tax,
PIT = Personal Income Tax,
βo = Constant Term,
β_1 - β_4 = Coefficient parameters,
μ = Error Term.

However, the ARDL representation of equation 3.2 can be presented as thus;

$$\Delta GDPGR_t = \beta_0 + \beta_1 GDPGR_{t-1} + \beta_2 VAT_{t-1} + \beta_3 CIT_{t-1} + \beta_4 PPT + \beta_5 PIT + \beta_6 \Delta GDPGR + \beta_7 \Delta VAT_{t-i} + \beta_8 \Delta CIT_{t-i} + \beta_9 \Delta PPT_{t-i} + \beta_{10} \Delta PIT_{t-i} + \mu_t \quad (3.3)$$

where:
Δ is the first-difference operator, and
β's shows the long-run coefficients and short-run coefficients.

Hence, the null hypothesis (H_0) of no cointegration states that, H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = 0$ and the alternative hypothesis of existence of cointegration state that; $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq \beta_8 \neq \beta_9 \neq \beta_{10} \neq 0$

3.3 Nature and Sources of Data

The study utilised secondary data for the variables identified in the model. In an attempt to establish the impact of disaggregated tax revenue on the economic growth of Nigeria, the data covered the period 1995 to 2023, a period of 29 years, to assess whether this relationship indeed exists. In order to obtain sufficient data, the data was obtained on a yearly basis, as per published GDP data for the years under consideration and the tax data for the same period.

4. Analysis of Results

4.1 Descriptive Analysis

Table 4.1: Descriptive Analysis Result

Statistics	GDPGR	PIT	CIT	PPT	VAT
Mean	4.714649	7.174825	885.0836	3751.856	211.8149
Median	5.015935	4.680000	599.7689	3830.096	144.3728
Maximum	15.32916	20.70560	1791.409	8878.970	564.4489
Minimum	-1.814924	2.890000	501.4589	160.1924	5.026000
Std. Dev.	3.635721	5.298709	485.6073	2651.955	189.7670
Skewness	0.484231	1.418893	0.981960	0.169319	0.451488
Kurtosis	4.128391	3.795105	2.200136	1.845704	1.741231
Jarque-Bera	2.487582	9.770879	5.058859	1.627960	2.699850
Probability	0.288289	0.007556	0.079704	0.443091	0.259260
Sum	127.2955	193.7203	23897.26	101300.1	5719.002
Sum Sq. Dev.	343.6802	729.9843	6131175.	1.83E+08	936299.4
Observations	29	29	29	29	29

Source: Authors' computation using E-views, version 11.0.

Table 4.1 shows the descriptive statistics of GDPGR, PIT, CIT, PPT and VAT. It is shown that all the variables under consideration contained 29 observations. It can be observed from the table that Petroleum Profit Tax, Companies Income Tax and Value Added Tax have the highest mean value while Personal Income Tax and GDP growth rate have the lowest mean value. In terms of standard deviation, the most volatile series are Petroleum Profit Tax, Companies income tax and Value Added Tax whereas the least volatile series are Personal income tax and GDP growth rate. Also, in terms of Jarque-Bera statistic, only Personal Income Tax does not follow normal distribution, while other variables are normally distributed because of their high probability value.

4.2 The Unit Root Test Result

Table 4.2: Unit Root Stationarity Result

Variables	ADF Statistics	Critical Value	Stationary Status	Interpretation
GDPGR	-2.994912	-3.711457 (1%) -2.981098 (5%) -2.629906(10%)	I(0)	Stationary at level
PIT	-5.444092	-3.724070 (1%) -2.986225 (5%) -2.632604 (10%)	I(1)	Stationary at 1st difference
CIT	-3.257748	-3.724070 (1%) -2.986225 (5%) -2.632604 (10%)	I(1)	Stationary at 1st difference
PPT	-5.146740	-3.724070 (1%) -2.986225 (5%) -2.632604 (10%)	I(1)	Stationary at 1st difference
VAT	-3.451187	-3.752946 (1%) -2.998064 (5%) -2.638752 (10%)	I(1)	Stationary at 1st difference

Source: Authors' computation using E-views 11.0.

Table 4.2 presents the result of the Augmented Dickey-Fuller unit root test. It can be observed that all the variables were stationary at the 1st difference except GDPGR, which was stationary at level. Hence, they are said to be integrated of order zero and one, that is, I(0) and I(1). Theoretically, when all variables are integrated of order zero, we are expected to conduct a cointegration test. However, given the ARDL approach adopted by this study, the validity of this theoretical expectation is validated by conducting a cointegration test in what follows.

4.3 ARDL Bounds Test Approach to Cointegration

Table 4.3: Result of Bounds Cointegration Test

F-statistic	4.754777	
Critical Values		
Significance levels	**I0 Bound**	**I1 Bound**
10%	2.22	3.09
5%	2.56	3.49
2.5%	2.88	3.87
1%	3.29	4.37

Source: Authors' Computation using E-views 11.0.

The result of the Bounds Cointegration Test is reported in Table 4.3. Since the F-statistic is greater than the I0 and I1 critical bound at 1%, 2.5%, 5% and 10% levels of significance, the null hypothesis of no cointegration is rejected. The conclusion can, therefore, be made that there is a long-run relationship between all the variables.

4.4. Lag Selection Criteria

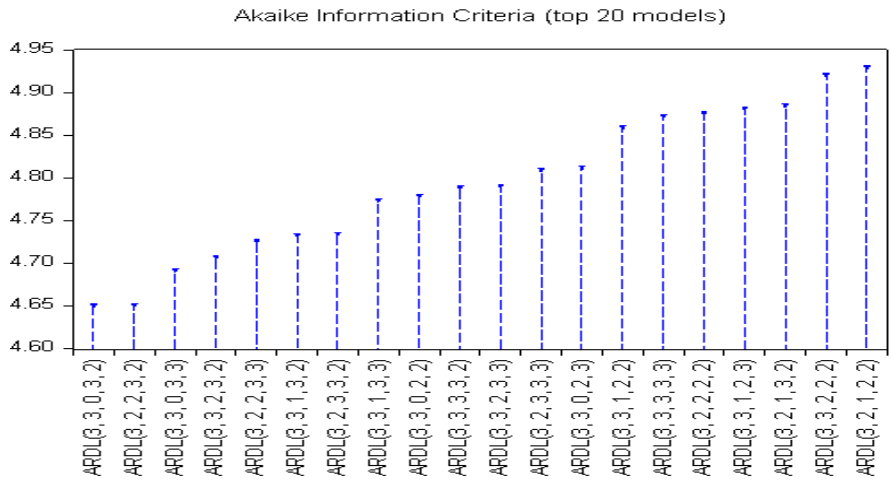

Figure 4.1: Lag Selection Criteria.

The information criterion presented in figure 4.1 showed that ARDL (3, 3, 0, 3, 2) is appropriate for the model in this study. This explains the advantage of ARDL methodology, as it is not necessary for all the variables to have the same lag(s).

4.5: CUSUM and CUSUMSQ Stability Test

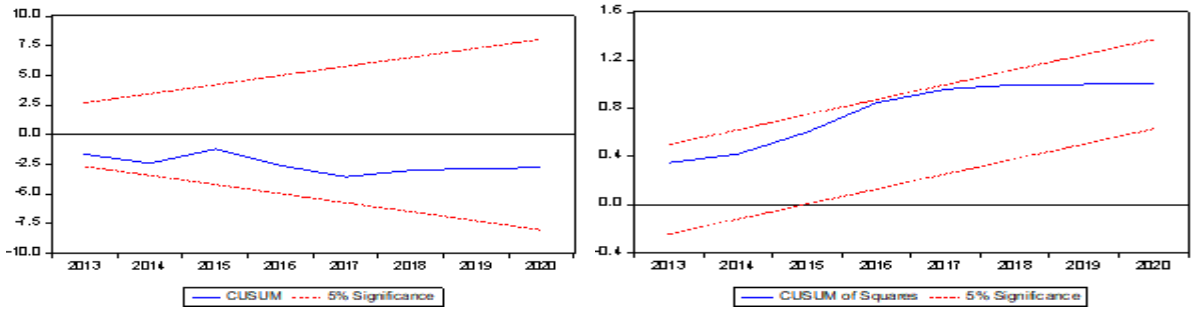

Figure 4.2: CUSUM and CUSUMSQ Stability test graphs

Figure 4.2 indicates the cusum and the cusumq test graph that helps in tracing out the stability of the error and its square during the period under study. The null hypothesis is that the regression model fits the data well versus its alternative hypothesis of an invalid regression model. The smooth blue lines show the cumulative sum of recursive residual errors and the cumulative sum of the square of recursive residual errors, and the dotted lines indicate 5% Bartlett standard error bound.

4.6 Estimated ARDL Long Run and Short Run Model

The ARDL long-run and short-run estimation of the impact of taxation on economic growth is presented in Table 4.4 using the ARDL (3, 3, 0, 3, 2) Selected based on the Akaike info criterion (AIC).

Table 4.4: Error Correction and Short-Run Analysis

Dependent variable: GDPGR				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(GDPGR(-1))	0.883744	0.225962	3.911029	0.0045
D(GDPGR(-2))	1.146792	0.190914	6.006853	0.0003
D(PIT)	0.841216	0.210851	3.989615	0.0040
D(PIT(-2))	0.711478	0.208052	3.419718	0.0091
D(PPT)	0.001238	0.000365	3.391404	0.0095
D(PPT(-1))	-0.000892	0.000331	-2.692196	0.0274
D(PPT(-2))	0.000788	0.000346	2.276182	0.0524
D(VAT)	0.108360	0.024029	4.509518	0.0020
D(VAT(-1))	0.185516	0.029588	6.270042	0.0002
CointEq(-1)*	-1.875814	0.275500	-6.808750	0.0001

Source: Authors' Computation using E-views 11.0.

From Table 4.4 shows the short-run relationship among the variables and the error correction mechanism. The result indicates that the Error Correction parameter is negative and significant, indicating that short-run disequilibrium in the previous period is corrected to restore equilibrium in the subsequent period. The value of -1.875814 implies that about 187% of the disequilibria in GDPGR of the previous year's shocks adjust back to the long-run equilibrium in the current period.

Table 4.5: Long-Run Analysis

Estimated Long Run Coefficients Using the ARDL Approach ARDL (3,3,0,3,2) Selected based on Akaike info criterion (AIC)				
Dependent variable is GDPGR				
Regressor	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
GDPGR(-1)	0.007930	0.208614	0.038014	0.9706
GDPGR(-2)	0.263048	0.208987	1.258682	0.2436
GDPGR(-3)	-1.146792	0.284422	-4.032013	0.0038
PIT	0.685500	0.270651	2.532780	0.0351
PIT(-1)	0.841216	0.384472	2.187976	0.0601
PIT(-2)	1.187445	0.495452	2.396688	0.0434
CIT	-0.025515	0.008253	-3.091568	0.0149
PPT	0.001680	0.000619	2.715635	0.0264
PPT(-1)	0.000468	0.000529	0.884221	0.4024
PPT(-2)	0.001238	0.000653	1.894770	0.0947
PPT(-3)	-0.000788	0.000575	-1.372075	0.2073
VAT	0.108360	0.041979	2.581321	0.0325
VAT(-1)	0.280598	0.071300	3.935468	0.0043
VAT(-2)	-0.185516	0.065230	-2.844018	0.0217
C	8.883075	4.167457	2.131534	0.0656
R Squared = 0.857454 Adjusted R-Squared = 0.790182 S.E. of Regression = 2.201571 F-Statistics = 10.08162 Prob (F-Statistics) = 0.001039				
Diagnostic Tests DW = 1.682623				
Test Statistics LM Version				
A. Serial Correlation X^2_{auto} = 1.734815 (0.2244) B. Functional Form (Ramsey Reset) X^2_{RESET} = 1.557481 (0.1633)				

C. Normality X^2_{Norm} = 1.374034 (0.503075) D. Heteroscedasticity X^2_{Het} = 0. 947743 (0.5590)	

Source: Authors' computation obtained from E-views 11.

Table 4.5 displays the estimated long-run impact of taxation on economic growth. The results reveal that all the variables, except CIT, have a positive and significant impact on economic growth.

4.7 Discussion of Results

Tables 4.4 and 4.5 present the short-run and long-run autoregressive distributed lag (ARDL) estimates of the impact of taxation on economic growth in Nigeria.

Table 4.4 presents the estimated short-run relationship among the Gross Domestic Product Growth Rate (GDPGR), Petroleum Profit Tax (PPT), Personal Income Tax (PIT), Value Added Tax (VAT), and Companies Income Tax (CIT). The results reveal that all variables positively and significantly impact GDP growth at conventional levels. Specifically, GDP growth rate, Petroleum Profit Tax, Personal Income Tax, and Value Added Tax are significant at their first lag (lag 1). Moreover, GDP growth rate, Petroleum Profit Tax, and Personal Income Tax are also significant at their second lag (lag 2).

The Error Correction parameter is negative and statistically significant at the 1% confidence level, indicating that short-run disequilibrium from the previous period is corrected to restore equilibrium in the subsequent period. The value of -1.875814 implies that approximately 187% of the disequilibrium in GDPGR caused by the previous year's shocks is adjusted back to the long-run equilibrium in the current period.

Similarly, the results in Table 4.5 reveal that Petroleum Profit Tax (PPT), Personal Income Tax (PIT), and Value Added Tax (VAT) have a positive and significant impact on economic growth at conventional levels. Conversely, the coefficient of Companies Income Tax (CIT) is negative and significantly related to economic growth. This implies that unfavorable variations in Companies Income Tax are detrimental to economic growth. Although Companies Income Tax (CIT) is significant at the 5% critical level, it shows an inverse relationship, which is contrary to the a priori expectation of a direct relationship, reflecting the situation in Nigeria over the past years.

The GDP Growth Rate is negative and significant at its third lag, while PIT is positive and significant at its second lag, and VAT is significant at its first lag. The high adjusted R-squared value (0.857454) indicates the strong explanatory power and overall significance of the estimated model.

Additionally, post-estimation tests, including the Breusch-Godfrey Serial Correlation LM Test and the Normality Test, were conducted. The results of these tests, as presented in Table 4.5, confirm that the model passes all diagnostic tests.

5. Conclusion and Recommendations

5.1 Conclusion

This study examined the impact of disaggregated tax revenue on the economic growth of Nigeria from 1995 to 2023. The major findings highlight the positive and statistically significant impact of Personal Income Tax (PIT) on economic growth, confirming its crucial function as a catalyst in the nation's economic growth. Furthermore, although Companies Income Tax (CIT) and Value Added Tax (VAT) showed beneficial effects on economic growth, their impacts did not reach statistical significance. However, the study highlights the crucial role they play in promoting economic growth and urges the need for thoughtful policy considerations.

5.2 Recommendations

The findings of this research have important implications for economic policymaking in Nigeria, emphasising the need to improve taxation policies, namely by harnessing the significant impact of Personal Income Tax (PIT). Policymakers are advised to maximise the potential influence of CIT and VAT while also considering modifications in policy frameworks. According to these findings, the study suggests that the Federal Government should significantly reduce or completely eliminate the widespread inefficiencies in tax administration in Nigeria. Additionally, the government should transparently and responsibly allocate the revenue generated from taxes towards improving infrastructure and providing high-quality public goods and services throughout the country. This will result in a substantial increase in government revenue. The Federal Government can increase tax revenue by efficiently and adequately utilising the revenue from taxes to support growth, employment opportunities, and wealth creation. This will encourage taxpayers to fulfil their tax commitments, resulting in higher tax revenue for the government.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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