



Examining the nexus between tax revenue and economic growth: Empirical evidence from Nigeria

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Abstract

In this paper we study the impact of tax revenue on economic growth in Nigeria for the period of 1990 to 2022. The aim of this study was to find out whether petroleum profit tax, company income tax, custom and excise duty and value-added tax have consequences for economic growth, measured using real gross domestic product (GDP). This paper investigated the relationship between tax revenue and economic growth using secondary data which was sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin and the Federal Inland Revenue Service (FIRS). The study used the autoregressive distributed lag (ARDL) estimator in estimated the multiple regression model, in addition to unit root and cointegration tests approaches used to determine the integration process of the series and possible long run relationship between the employed variables. The bounds test result revealed there is long run relationship between tax revenue and economic growth. The results revealed that petroleum profit tax and value-added tax had positive and significant impact on economic growth. Company income tax had positive and insignificant effect on economic growth, while the study showed that custom and excise duty had negative and insignificant effect on economic growth. Based on this result, the study recommends that revenue from petroleum profit tax and VAT should be used to provide growth enhancing infrastructures and the Federal Government should leverage on technology for revenue collection by automating revenue collection processes in order to reduce face-to-face contacts that breeds corruption and reduce the amount of revenue going into the government coffers.

Keywords:

Tax revenue, Economic Growth, Real Gross Domestic Product, Petroleum Profit Tax.

1. Introduction

The Nigerian State is challenge with a number of problems which include high price pressures, unstable exchange rate, rising unemployment level, weak consumer spending, high incidence of poverty, and squeezed government revenue, among others. Statistics from the National Bureau of Statistics revealed that, headline inflation which stood at 7.9% in November 2014 increased to 15.75% in December 2020. Going forward, there has been increased pressure in prices as inflation rose from 16.47% in January 2021 to 34.19% in June 2024, only declining marginally to 33.4% in July 2024 (NBS, 2024). Statistics from the Central Bank of Nigeria (CBN) revealed continuous

depreciation of the naira against the US dollar, as the naira depreciated from N180.33/\$1 in December 2014 to N306.95/\$1 in December 2019. In the succeeding periods, the naira further fell against the US dollars, as the exchange rate depreciated from N361/\$1 in April 2020 to N899.07/\$1 in December 2023. Some scholars and policy makers have attributed some of the issues challenging Nigeria, such as high inflation level and continuous free fall of the naira against the US dollars to the weak level of economic growth in Nigeria. The intuition is that, when there is higher productivity level and economic growth, supply of goods and services will expand to meet existing demand, reducing price pressures as current inflationary pressures could be linked to supply rigidities. With productivity flourishing domestically, the exchange rate pressure from import will drop and export of excess production will earn foreign exchange, propping up the value of the naira against the US dollars.

One of the macroeconomic goals is the achievement of economic growth, as it is suggested that expansion in output level will address certain developmental and societal ills. Through economic growth, the level of unemployment is expected to decline as the expansion in economic activities is expected to increase labour demand. With economic growth comes higher income level, allowing citizens to raise their standard of living. Economic growth can also be instrumental in lifting people out of poverty, reducing income gap, stabilizing prices and exchange rate, among others. In Nigeria, economic growth has remained weak and fluctuated over the years. In 2010, the Nigerian economy grew by about 8.01%, as it faltered to 5.31% in 2011 and 4.23% in 2012. The economy rebounded, as it grew by 6.67% in 2013 and 6.31% in 2014. By 2015, economic activities in Nigeria dipped to 2.65% in 2015 and the economy slipped into recession, as output grew by -1.62% in 2016 (NBS, 2016). The dwindling level of economic activities was reverse as the Nigerian economy rebounded from the dip, growing at 0.81% in 2017, 1.92% in 2018 and 2.21% in 2019. This economy recovery was halted as the Nigerian economy once again slipped into recession in 2020, as output grew by -1.79% in 2020 (NBS, 2020). The Nigerian economy existed recession and negative growth territory in 2021, as output grew by 3.65% and declined marginally to 3.25% in 2022. In the last three quarters of 2023, the Nigerian economy steadily grew by 2.51% in Q2 2023; 2.54% in Q3 2023 and 3.46% in Q4 2023, only declining to 2.98% in Q1 2024 (NBS, 2024).

With economic growth essential for the long-run prosperity and development of a country, decision makers have sought ways to raise the level of output. As traditionally suggested by the Solow growth model, a country can grow her economy or increase the level of output by either increasing labour or level of capital, or a combination of both in the right mix that guarantees the production of a desired level of output. While economic growth can be achieving through varying the level of labour and amount of capital as suggested by the Solow growth model, other theories have suggested alternate pathways to realizing economic growth. One of such theory is the tax handle theory, which emphasize that economic growth is determined by the level of national income, and income is obtainable among others from taxation. If the level of national income can be raised from taxation and the former drives economic growth, then tax revenue can be considered as one of the drivers of economic growth. This theoretical linkage between tax revenue and economic growth has been suggested to empirical analysis, with varying result found between tax revenue and economic growth (Aliyu & Mustapha, 2020; Adefolake & Omodero, 2022; Ojong, Anthony & Arikpo, 2016; Babatunde, Ibukun & Oyeyemi, 2017; Okwara & Amori, 2017; Ewa, Adesola & Essien, 2020; Egbunike, Emudainohwo & Gunardi, 2018). This opens up a gap, as this study seeks

to examine whether tax revenue has consequence for economic growth in Nigeria from 1990 to 2022.

This following section is organized as follows. Section 2 focuses on the review of related theories and empirical findings of previous studies. Section 3 discusses the methodology employed. The results of the estimation are presented in Section 4 and the study concludes and makes recommendation in Section 5.

2. Literature Review

Theoretical Literature

The nexus between tax revenue and economic growth can be explained within certain theoretical framework. One of such theory is the Solow growth model. The growth model developed by Solow (1959) and later extended by other scholars, provides insight into how to foster growth by identifying the factors that drive economic growth. The model which assumes that technology is exogenously determined, indicated that, economic growth is determined by the twin factors of labour and capital. The underpinning of the model is that, output level can be increasing by employing labour and capital. The model argues that, economic growth can be attaining by either increasing the level of labour deployed in productive activities or the capital ploughed into productive activities or varying the level of labour and capital in order to achieve a certain desired level of output. Scholars have argued that, tax revenue can impact of the domestic level of output produced. The argument of the proponents of this view is that, the imposition of tax can create deadweight loss, that is, the volume of activities lost due to taxes administered on qualified citizens. They argued that, increasing tax could cause output level to fall through the consumption and investment channels. When taxes on households increase, it reduces disposable income and given that consumption is financed through disposable income, the increase in taxes distort the consumption decisions of household, reducing aggregate demand as less is spent on consumption, causing output to drop on the strength of weak demand. Through the investment channel, an increase in company tax reduces net profit of businesses and corporation, cutting into the retained earnings and the reducing the ability of firms to reinvest earned profit into expanding operations and acquiring more sophisticated equipment. These will combine to reduce total output level. It was proposed that, taxes should be imposed in a manner that accounts for the ability of citizens to pay. This is theoretical position of the ability to pay theory. The theory argues against arbitrarily imposing or increasing taxes without considering the ability to pay of those on whom those taxes are imposed on. This is because, the lack of consideration of the ability of the taxpayers to pay will lead to tax avoidance and evasion and result in lesser economic activities and tax revenue for government. The proponents advise for a progressive tax system, as such will accommodate the ability of taxpayers to pay.

Review of Empirical Literature

Ojong, Anthony & Arikpo (2016) in their study looked at the effectiveness of tax revenue in driving economic growth in Nigeria. In their study, they examine the impact of petroleum profit tax (PPT), company income tax (CIT) and non-oil revenue on gross domestic product (GDP), the indicator of economic growth. Annualized information on the series was used and their investigation covered

the period from 1986 to 2010. The identification of the tax variables that relates to growth was done using the ordinary least square (OLS) method. From the result, non-oil revenue significant promote growth in the long run, as the effect of PPT was negative and insignificant and that of CIT positive and insignificant.

Babatunde, Ibukun & Oyeyemi (2017) examined the tax revenue-economic growth relationship for a panel of sixteen (16) African countries. The period for which their investigation covered was from 2004 to 2013. In their model setup for this investigation, gross domestic product which was the proxy for growth was specified to depend on tax revenue and other variables such as foreign direct investment and inflation, considered as control variables. The estimation procedure involved the use of panel unit root, cointegration, OLS and random estimator. The result shows tax revenue raises the level of total output in the sample of countries. On the effect of inflation, they found that higher inflation level harms economic activities, as the positive contribution of FDI to growth was insignificant.

Okwara & Amori (2017) revisited the tax revenue-growth nexus with focus on the Nigerian economy. The investigation of whether economic growth is driven or dampen by tax revenue spanned for the period 1994 to 2015. Their analysis considered the tax variants of value added tax (VAT) and non-oil revenue, and the measure of growth was gross domestic product. The modified which was specified to uncover the growth determinants were estimated using the OLS method. From the OLS result, it was shown that increase in VAT has harmful effect on the Nigerian economy, as it slows real output growth, but no significantly. In contrast, it was reported that non-tax revenue promotes economic activities during the period studied.

Egbunike, Emudainohwo & Gunardi (2018) examined the role of tax revenue in generating economic growth from 2000 to 2016. The study compared the relationship using data of Nigeria and Ghana. To examine the relationship, they applied the ordinary least square (OLS) method and Granger causality test to determine whether a causal relationship exist between tax revenue and economic growth. The authors presented strong evidence that indicates that tax revenue promote growth in Nigeria as it does in Ghana. Significance of the impact was observed in the Ghana sample, but not in Nigeria. They find evidence of no causal relationship in Ghana, but growth was reported as causes changes in tax revenue in Nigeria.

Ewa, Adesola & Essien (2020) in trying to examine the factors potent to promote economic development in Nigeria, looked at the functional effect of tax revenue. They specifically considered petroleum profit tax (PPT), value added tax (VAT) and company income tax (CIT) in a multiple regression model with these variables explaining GDP which was utilized as a measure of economic development. The estimation of the model was performed using the least square method and the outcome of the estimation is that both CIT and VAT are significant accelerators of economic development. On the other hand, PPT contribution to economic development was positive, though exerted insignificant impact.

Aliyu & Mustapha (2020) explored the Nigerian economy, questioning the role of tax revenue in the economic fortune of Nigeria. In their empirical work, they explored whether either companies income tax, custom and excise duties, petroleum profit tax, value added tax or government domestic debt potentially improve long-run economic growth. To achieve this objective, the autoregressive

distributed lag (ARDL) estimator and Granger causality test were used to estimated information collected on these variables from 1981 to 2015. It was verified from bounds testing that the variables have long-run binding forces and surprisingly, an increase in PPT and VAT significantly enhance long-run growth. Additionally, government debt significantly drives long-run growth. Consistent with theory, increase in CIT and CED significantly harm the growth of the Nigerian economy.

Adefolake & Omodero (2022) in their empirical paper assessed the nature of relationship between tax revenue and economic growth, intended to identify if tax revenue is a key factor that affects the Nigerian economy. The investigation embarked upon considered the period from 2000 to 2021 and the tax revenue variables comprised petroleum profit tax (PIT), value added tax (VAT) and company income tax (CIT). The test for cointegration based on the Johansen approach revealed that the variables employed had long-run relationship. The result from the use of the vector error correction model revealed that VAT and PPT significantly drive positive growth in output level. In contrast, they showed that real GDP declines as CIT increases.

Ezekwesili & Ezejiofor (2022) empirical study touched on the link between tax revenue and economic growth, focusing on the Nigerian economy. Their analysis which spanned from 2000 to 2019 explored the response of two macroeconomic variables, namely, inflation and interest rate, to changes in custom and excise duty and value added tax. In their analysis of inflation drivers, the found that both CED and VAT are inflationary in nature, but their positive contribution to inflation surge is insignificant. As regards interest rate, CED had increasing interest rate effect, while VAT increases reduce interest rate spike, with both tax revenue impact found to be insignificant.

Nguyen & Darsono (2022) used a balanced panel data of nine (9) ASEAN countries, namely, Brunei, Thailand, Philippines, Indonesia, Singapore, Cambodia, Vietnam, and Laos, collected from 2000 to 2020 to the role of investment and tax revenue in achieving economic growth. In the model mimicking the Cobb-Douglas function, the effect of tax revenue and domestic investment on the growth of GDP per capita alongside the control variables of foreign direct investment, trade openness and inflation were examined. From the fixed effect results, it was revealed that tax revenue significantly undermined the growth of the nine (9) ASEAN economies. They noted that growth is promoted by increased domestic investment and increased trade openness. Through the introduction of the squared term of tax revenue, the identified nonlinearity in the tax revenue-growth relationship, indicating that higher tax revenue reduces the deadweight loss of tax impact.

Maganya (2020) used annualized series data in Tanzania consisting of growth rate of real GDP per capita, income tax of firms and households (YTAX), taxes on domestic commodities (TGS), foreign direct investment, domestic investment and inflation. The multiple regression model was used in their attempt to explored the effect of tax revenue on economic growth. The relationship was investigated within the ARDL framework, with stationarity and cointegration tests conducted. As revealed from the bounds test, tax revenue was to be cointegrated with GDP over the long run. In the long run, the ARDL results indicated that, income tax increase reduces the rate of growth in real income of Tanzanians. The factors responsible for increase in the growth rate of real income per capita were taxes on commodities and direct investment.

Edewusi & Ajayi (2019) assessed the nature of relationship between tax revenue and economic growth employing annualized Nigeria data from 1995 to 2015. The analysis considered petroleum profit tax (PPT), company income tax (CIT) and value added tax (VAT), evaluated their individual marginal effect on gross domestic product (GDP). With the variables integrated of process one, cointegration was tested using the Johansen approach and the test result showed presence of co-movement among employed series. The outcome of the analysis done using the OLS method suggest that increase in PPT, CIT and VAT contribute to growing the Nigerian economy, but only CIT exerted significant impact.

Agunbiade & Idebi (2020) provided an empirical insight into how tax revenue affects overall economic activities using data from Nigeria. The timeframe for which the investigation lasted was from 1981 to 2019. The empirical investigation considered company income tax (CIT), value added tax (VAT) and petroleum profit tax (PPT) and evaluated how real gross domestic product (GDP) respond to changes in the considered regressors. The study of this relationship was undertaken within the vector autoregressive error correction framework, in addition to the use of impulse response function and variance decomposition approaches. The test to determine co-movement among the variables using the Johansen method confirmed that the series move together in the long run. The variance decomposition revealed that VAT is the first and CIT is the second variable, apart from own shock, that explain variation in GDP. They reported bidirectional causality between GDP and CIT, and unidirectional causality from GDP to VAT and PPT; as CIT granger cause PPT.

3. Data and Methodology

Data

In analysing the relationship between tax revenue and economic growth, the study utilized secondary data. The investigation covered the period from 1990 to 2022. Data were collected for the selected variables, namely, real gross domestic product (RGDP), petroleum profit tax (PPT), company income tax (CIT), custom and excise duty (CED) and value added tax (VAT). The data were sourced from the Central Bank of Nigeria (CBN) Statistical bulletin and the Federal Inland Revenue (IRS) databases. Specifically, the data for petroleum profit tax, company income tax, value added tax and custom and excise duty were sourced from the FIRS Statistics database and that of real GDP was obtained from the CBN Statistical bulletin.

Methodology

The theoretical framework for this study is the augmented Solow (1956) growth model and the ability to pay hypothesis. While the traditional Solow model is used to explain economic growth through capital and labour, the model has been augmented when examining how other factors, apart from labour and capital, affect economic growth. This process was following in this study, as the Solow model was augmented to assess how tax revenue affect economic growth in Nigeria. Also, the model for this work was based on those employed by Ewa, Adesola & Essien (2020), though modifications were made to the model used by Ewa, et al., (2020) for this study.

The relationship between tax revenue and economic growth is expressed functionally as:

$$rgdp_t = f(ppt_t, cit_t, ced_t, vat_t) \quad (1)$$

Equation (1) is specified in econometrics form as:

$$\ln rgdp_t = \delta_0 + \delta_1 \ln ppt_t + \delta_2 \ln cit_t + \delta_3 \ln ced_t + \delta_4 \ln vat_t + \varepsilon_t \quad (2)$$

Where $rgdp_t$ is real GDP, ppt_t is petroleum profit tax, cit_t denote company income tax, ced_t is custom and excise duty, vat_t is value-added tax, δ_i are parameter estimates, $\ln$ is natural logarithm notation and ε_t is error term.

In terms of how the set of regressors affect economic growth, it is expected that $\delta_1 - \delta_4 < 0$.

Estimation Method

The estimation of variables that are nonstationary usually result in regression outcomes that are spurious. In such circumstances, the relationship shown to exist between the set of regressors and outcome variables tend to be false and any inference drawn from the response of the outcome variable to changes in the nonstationary regressor(s) become misleading and might be a false representation of the nature of impact of the regressor(s) on the dependent variable. To ensure this is not the case and the appropriate method capable of addressing the stationarity properties of the series is applied, the study conducted unit root test using the approach developed by Phillip & Perron (1989). With the stationary condition of the variables of the model ascertained and the outcome suggesting that have integration process less than $I(2)$, the study conducted cointegration test, with the desire of detecting long-run relationship among the variables. This was done using the bounds test developed by Pesaran, Shin & Smith (2001).

The investigation of the tax revenue variants or sources that affected economic growth and the determination of the marginal effect of changes in the various tax revenue variants selected for this study on economic growth was performed within the autoregressive distributed lag (ARDL) framework. The ARDL estimator is suited for a set of variables that are of mixed orders of $I(0)$ and $I(1)$. In addition, the estimator addresses endogeneity problems and the estimates from small sample analysis are consistent. Therefore, equation 2 was estimated using the ARDL estimator. It has become conventional to post-test estimated results to ensure critical assumptions of the Classical Linear Regression Model (CLRM) are upheld, as only then prediction using the parameters are feasible. This study carried out five of such post-tests, namely, heteroscedasticity, serial independency, normality, linearity and stability tests. The ARCH test was used in conducting the heteroscedasticity test, Breusch-Godfrey LM for serial correlation, Jarque-Bera for normality, the Ramsey RESET for linearity, and CUSUM and CUSUM of squares for stability.

Re-specifying Equation 2 in the ARDL framework takes the form below:

$$\begin{aligned} \Delta \ln rgdp_t = & \delta_0 + \sum_{j=1}^{\rho} \gamma_1 \ln rgdp_{t-j} + \sum_{j=0}^{\omega} \gamma_2 \Delta \ln ppt_{t-j} + \sum_{j=0}^{\omega} \gamma_3 \Delta \ln cit_{t-j} + \sum_{j=0}^{\omega} \gamma_4 \Delta \ln ced_{t-j} \\ & + \sum_{j=0}^{\omega} \gamma_5 \Delta \ln vat_{t-j} + \pi_1 \ln rgdp_{t-1} + \pi_2 \ln ppt_{t-1} + \pi_3 \ln cit_{t-1} + \pi_4 \ln ced_{t-1} \\ & + \pi_5 \ln vat_{t-1} + \varepsilon_t \end{aligned} \quad (3)$$

Here $\delta_1 - \delta_4$ are the short run elasticities, $\delta_1 - \delta_4$ are long run coefficients, ρ is lag length of the regressand and ω is lag length of the regressors, which is based on the Akaike information criterion.

4. Results and Discussions

Table 1: Results of Descriptive Analysis

	RGDP	PPT	CIT	CED	VAT
Mean	44276.51	1312.034	548.7173	388.7805	560.1343
Median	40703.68	1256.500	244.9000	232.8000	401.7000
Maximum	74639.47	4209.017	2649.191	1990.021	2511.518
Minimum	21462.73	26.9100	2.9970	8.6400	7.2600
Std. Dev.	20029.25	1149.768	644.7172	442.7564	608.8099
Skewness	0.2016	0.5389	1.2996	1.8290	1.5272
Kurtosis	1.3999	2.4290	4.4805	6.5222	5.2016
Jarque-Bera	3.7437	2.0457	12.3042	35.4591	17.1303
Probability	0.1538	0.3595	0.0021	0.0000	0.0001
Observations	33	33	33	33	29

Source: Authors' computation (2024)

The result of the descriptive analysis is presented in Table 1. As reported in Table real gross domestic product averaged N44,276.51 billion and range between N21,462.73 billion and N74,639.47 billion. Average petroleum profit tax (PPT) was N1,312.034 billion and increased from N26.91 billion to N4,209.017 billion from 1990 to 2022. Tax revenue from company income tax averaged N548.7173 billion and range between N2.9970 billion and N2,649.191 billion. During the period from 1990 to 2022, custom and excise duty averaged N388.7805 billion and rose from N8.64 billion to N1,990.021 billion during the investigation period. Table 1 reveal a mean value of N560.1343 billion for value added tax and the average value fall within the range of N7.26 billion and N2,511.518 billion. The descriptive analysis revealed that the Nigerian government earned the highest in tax revenue from petroleum profit tax, followed by VAT and company income tax. The result of Table 1 revealed strong fluctuation in real GDP, petroleum profit tax, company income tax and VAT as shown by their respective standard deviation values of 20029.25, 1149.768, 644.7172 and 608.8099. The analysis revealed that all the selected variables are positively skewed, while CIT, CED and VAT are leptokurtic as their respective kurtosis statistics are above 3. The study found that RGDP and PPT are platykurtic given that their kurtosis statistics are less than 3. The analysis revealed that only RGDP and PPT follow a normal distribution.

Unit Root

Table 2: Result of unit root

Variable	Phillip-Perron (PP)			Decision I(d)
	Level	1 st Diff.	CV at 5%	
$\ln RGDP_t$	0.9134	-3.1408***	-2.9571	I(1)
$\ln PPT_t$	-1.5584	-4.7830***	-2.9571	I(1)
$\ln CIT_t$	-2.7943	-4.6844***	-2.9571	I(1)
$\ln CED_t$	-2.0057	-5.7003***	-2.9571	I(1)
$\ln VAT_t$	-3.1998**	-	-2.97185	I(0)

Note: *, ** & *** represent significance at 10, 5 and 1% respectively

Source: Authors' computation (2024)

Before estimating the regression model, the study first test for the stationarity properties of the employed variables. This is to ensure the regression estimated are not spurious as the test will provide further guideline on the method or estimator that properly accommodates the stability properties of the employed variables. To this end, the stability condition of the variables was determined through the Phillip-Perron approach. Table 2 which show the result of the unit root test revealed that real GDP, PPT, CIT and CED variables have unit root at level, implying that the level series are not stationary. However, the study discovered that their first difference are stationary, indicating that RGDP, PPT, CIT, and CED are integrated of order one, that is, I(1). As reported in Table 2, VAT is stationary in the level form. Following revelation made through unit root testing, the variables used in estimating the regression model are I(0) and I(1), and this meets the condition for using the ARDL estimator.

Table 3: Cointegration Result

Model	$F_{RGDP}(RGDP/PPT, CIT, CED, VAT)$	
ARDL Model	(1, 2, 1, 0, 2)	
F-Statistics	45.50941***	
Regressors	K = 4	
Critical Value	I(0)	I(1)
1%	3.29	4.37
2.5%	2.88	3.87
5%	2.56	3.49
10%	2.2	3.09

Note: Null hypothesis: No level relationship; *, ** and *** denote significance at 10%, 5% and 1% level, respectively.

Source: Authors' computation (2024)

In testing whether cointegration exist among the independent variables [real gross domestic product (RGDP)] and the independent variables [petroleum profit tax (PPT), company income tax (CIT), custom and excise duty (CED), value-added tax (VAT)], or the combined series have identical stochastic trend in the long run, the Pesaran, et al., (2001) bound test method was utilized and the result of the test presented in Table 5. As noticed from Table 3, the F-statistics calculated when the

bound test procedure of Pesaran, et al., (2001) was used which is 45.50941, is well above the critical value for the I(1) series at 5% level, which is 3.49. Since the F-statistics of 45.50941 is higher than 3.49, the result based on the decision rule which the study adopt for this essay is that, there is co-movement among the series which were used to investigate the tripartite link between real gross domestic product (RGDP) and the independent variables [petroleum profit tax (PPT), company income tax (CIT), custom and excise duty (CED), value-added tax (VAT) in Nigeria. The indication of this result is that, long run equilibrium relationship exists among real gross domestic product (RGDP), petroleum profit tax (PPT), company income tax (CIT), custom and excise duty (CED), value-added tax (VAT). With evidence of cointegration, the study estimated the short run and long run models to determine the short run dynamics of the interest variables and the nature of long run relationship between petroleum profit tax (PPT), company income tax (CIT), custom and excise duty (CED), value-added tax (VAT) and real gross domestic product (RGDP).

Long- and short-run Model Result

Following evidence of cointegrating relationship found existing between petroleum profit tax (PPT), company income tax (CIT), custom and excise duty (CED), value-added tax (VAT), and economic growth (as measured using gross domestic product), the study estimated the long- and short-run model to determine the static and dynamic effect of changes in petroleum profit tax (PPT), company income tax (CIT), custom and excise duty (CED), value-added tax (VAT), on economic growth (index by real gross domestic product), using the ARDL method which Pesaran, et al., (2001) developed.

Table 4: Long- and Short-run results

Dependent Variable: $\ln RGDP_t$				
Part I: Long Run				
Variable	Coefficient	Std. Error	t – Stats	Prob.
$\ln PPT_t$	0.0892***	0.0226	3.9418	0.0012
$\ln CIT_t$	0.0507	0.0522	0.9708	0.3461
$\ln CED_t$	-0.0012	0.0373	-0.0331	0.9740
$\ln VAT_t$	0.1714***	0.0721	2.3754	0.0304
<i>C</i>	8.9883	0.0832	107.9585	0.0000
Part II: Short Run				
Variable	Coefficient	Std. Error	t – Stats	Prob.
$D(\ln PPT_t)$	0.0027	0.0041	0.6725	0.5109
$D(\ln PPT_{t-1})$	-0.0262***	0.0043	-6.0187	0.0000
$D(\ln CIT_t)$	-0.0237**	0.0110	-2.1572	0.0465
$D(\ln VAT_t)$	-0.0490***	0.0122	-4.0108	0.0010
$D(\ln VAT_{t-1})$	0.0541***	0.0081	6.6623	0.0000
ECM_{t-1}	-0.3441***	0.0181	-18.9311	0.0000
$R^2 = 0.9428$			Adjusted $R^2 = 0.9292$	

Note: *, ** & *** represent significance at 10, 5 and 1% respectively

Source: Authors' computation (2024)

The result of the relationship presented in Table 4 are in two parts. Part I is the long-run model result which shows the effect of the predictor variables on the outcome variable (real gross domestic product) in the long run, with the recourse to time. In Part II, is the short run dynamic relationship which revealed the response of economic growth (as proxy by real gross domestic product) to changes in the predictor variables, taking into consideration the effect of time or the impact of lag in how the predictor variables influence the outcome variable of real gross domestic product.

The result presented in Table 4 shows that petroleum profit tax is positively related to economic growth, as measured using real gross domestic product. With a log linear model estimated, the coefficient of 0.0892 indicates that an increase in petroleum profit tax enhances economic growth in the long run. Specifically, as suggested by the coefficient of 0.0892, the regression result of the ARDL estimator is that, an increase in petroleum profit tax by 1% will lead to an increase in real gross domestic product, or economic growth, by 0.0892, under the condition of *ceteris paribus*. The finding aligns with the work of Jibrin, Blessing & Ifurueze (2012) who found that petroleum profit tax had positive and significant impact on economic growth in Nigeria.

The regression result of the ARDL estimator revealed a positive relationship between company income tax and economic growth, as measured using real gross domestic product. This positive relationship found to exist between company income tax and economic growth was suggested by the positive coefficient of company income tax, estimated to be 0.0507. As inferred by the parameter value of 0.0507, an increase in company income tax by 1% will result in economic growth, as real gross domestic product will expand by approximately 0.0507. The positive link between company income tax and economic growth implies that increase in company income tax enhances productivity in Nigeria. This positive impact of company income tax on economic growth contravenes economic theory and the result presented in Table 4 shows that the positive impact of company income tax on real gross domestic product is insignificant at 5% level of significance. This result failed to corroborate the findings of Asaolu, Olabisi, Akinbode & Alebiosu (2018).

Regarding the response of real gross domestic product or economic growth to changes in custom and excise duty, the ARDL regression result revealed that custom and excise duty had negative impact on real gross domestic product or economic growth during the period investigated. In terms of magnitude of decline in total output level due to increase in custom and excise duty, the estimated coefficient of -0.0012 for custom and excise duty, indicates that, for every 1% increase in custom and excise duty will lead to a decline in total output level of approximately 0.0012 percent. The negative relationship between custom and excise duty is in line with economic theory and reflect the Nigerian economy which is import-based. As custom taxes increase and excise duties are raised, the increases duties are transmitted into prices of goods and service, making it expensive for users in the economy. Though the negative relationship found existing with custom and excise duty and economic growth aligns with theory, it was revealed that, the negative effect of custom and excise duty on real gross domestic product (proxy for economic growth) is statistically insignificant.

Value-added tax as revealed by the estimation carried out using the ARDL method shows that value-added tax had positive impact on economic growth. As suggested by the coefficient of 0.1714 means is that, an increase in value-added tax revenue is expected to stimulate economic growth in the long run. In terms of increase in output level due to increase in value-added tax, the coefficient

of 0.1714 estimated for value-added tax indicates that, an increase in value-added tax by 1% will cause real gross domestic product to increase by 0.1714 percent. From the estimated result, it is evident that positive effect of value-added tax on economic growth is statistically significant, implying that value-added tax is a key determinant of economic growth in Nigeria. This result agrees with the findings of Nasiru, Haruna & Abdullahi (2016) and Asaolu, Olabisi, Akinbode & Alebiosu (2018).

With shocks bound to sweep through the economy and distort performance of certain variables and how they affect the outcome variable, the study estimated the speed of adjustment of the estimated model. This is depicted by the error correction term estimated to be -0.3441. As shown in Table 4, the estimated error correction term fulfilled the condition of being negative and significant at 5% level. The estimated coefficient of -0.3441 implies that the estimated ARDL model has a moderate speed of adjustment or convergence to long run equilibrium. As indicated by the error correction term, the result suggests that 34.41 percent of short run disturbances due to shocks is corrected every year to restore the model to long run equilibrium.

To ensure the prediction can be relied upon, it becomes necessary to ensure that the parameter estimates or coefficients of the predictor variables meet the assumptions of the Classical Linear Regression Model (CLRM). In order to ensure the model is fit for predictor and meets the CLRM assumptions, the estimated model is subjected to diagnostic tests or post estimation tests, which includes carrying out normality, heteroscedasticity, serial correlation, linearity and stability tests.

Table 5: Result of Diagnostic Test

Diagnostic Test	Test Statistics	Prob.
Serial Correlation	1.4602	0.4819
Heteroscedasticity	6.76E-05	0.9934
Normality	0.4035	0.8172
Linearity	0.8519	0.3706
CUSUM	Stable	
CUSUM of Square	Stable	

Source: Authors' computation (2024)

In testing for serial independence of the errors, the study employed the Breusch-Godfrey LM method and the null hypothesis tested is that the residuals are serially independent. The study estimated a Breusch-Godfrey LM Chi-square statistic of 1.4602, with an associated probability value of 0.4819. As observed, the probability value of the statistics is greater than 0.05. Hence, the null hypothesis that the errors are serially independent cannot be rejected. The test for heteroscedasticity followed the use of ARCH test, and the study estimated an ARCH test Chi-square statistic of 6.76E-05 and probability value of 0.9934. Hence, the study concludes that the errors from the estimated ARDL model have constant variance and the homoscedasticity assumption it upheld. The result of Table 5 revealed that the errors from the estimated ARDL model are normally distributed. Furthermore, the study estimated an F-statistics of 0.8519 and probability value of 0.3706, following the use the Ramsey RESET method to determine the linearity of the model estimated. The null hypothesis of the test is that, the linear form of the model that explain the relationship is correctly specified. As revealed by both figures, the plot of the CUSUM and

CUSUM of squares lie within the 5% upper and lower critical bounds, indicating that the estimates for petroleum profit tax, company income tax, custom and excise duty and value-added tax are stable over time and there is no evidence of structural break in the distribution of the series.

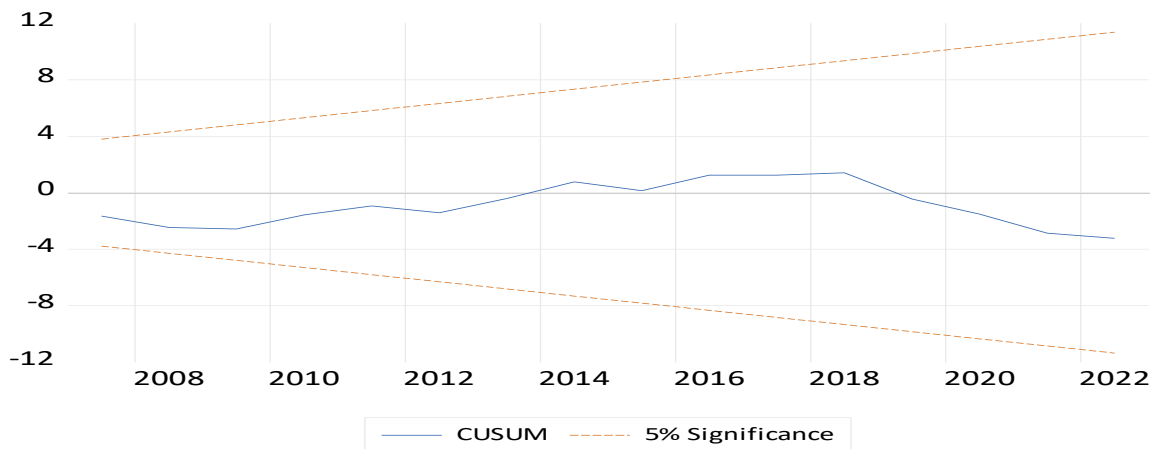


Figure 1: CUSUM Plot

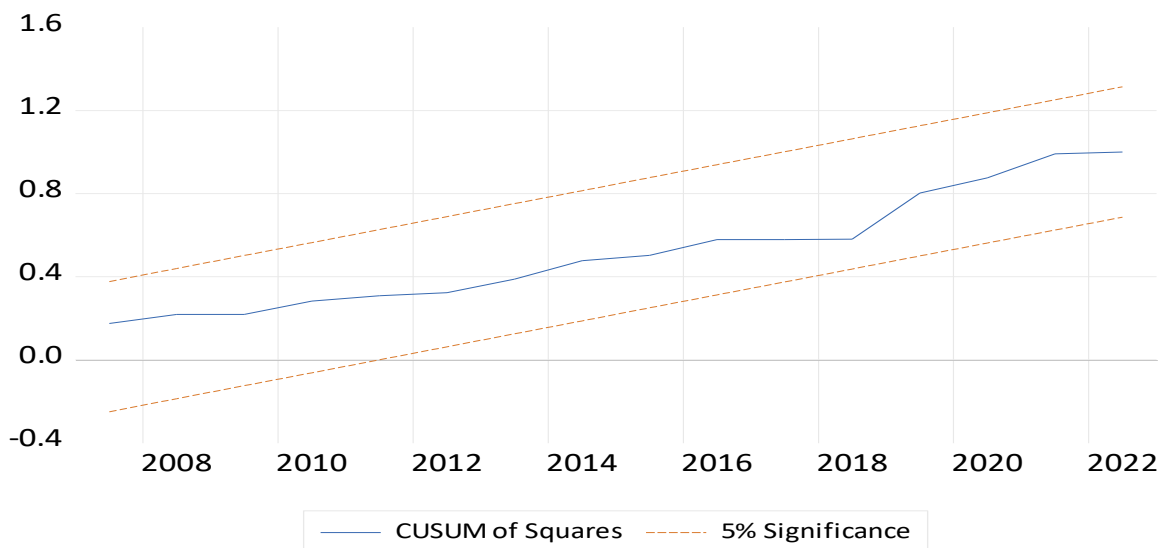


Figure 2: CUSUM of Squares Plot

5. Conclusion and Recommendations

This paper studied the nexus between tax revenue and economic growth from 1990 to 2022. The objective of the study was to examine the role of petroleum profit tax, company income tax, custom and excise duty and value-added tax on economic growth. Through the autoregressive distributed lag (ARDL) estimator, the analysis for the period shows that petroleum profit tax significantly enhances economic growth, which the study measured using real gross domestic product. Regarding the role of other tax revenue, the study found evidence suggesting that value-added tax

had positive and significant effect on economic growth. In addition, an increase in company income tax stimulates the Nigerian economy, but the positive effect of company income tax on the economic growth proxy is insignificant. The study found that an increase in custom and excise duty dampened economic growth during the period of investigation, with the impact found to be insignificant. These findings illustrate that economic growth in Nigeria is stimulated by only petroleum profit tax and value-added tax. In order to stimulate economic growth, the study recommends that revenue from petroleum profit tax and VAT should be used to provide growth enhancing infrastructures and the Federal Government should leverage on technology for revenue collection by automating revenue collection processes in order to reduce face-to-face contacts that breeds corruption and reduce the amount of revenue going into the government coffers.

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