



An Analysis of Tax Revenue – Economic Growth Nexus in Nigeria; A Vector Autoregressive Approach

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study examines the relationship between tax revenue and economic growth in Nigeria for the period 1994-2020. We explore the linkages between availability of higher resource revenue and lower taxation effort of other revenue categories and the effects of these on growth. The Ordinary Least Square (OLS) estimation technique was employed in estimating the specified model. Also, descriptive analysis was carried out regarding tax trends and tax efforts in Nigeria to determine the effectiveness of existing tax structures. Furthermore, stationarity test, cointegration and the VECM were adopted forthwith. Empirical results reveal that taxation has a significant effect on economic growth in Nigeria. However, the proportion of tax contribution to the growth rate falls short of the optimal level in terms of the volume of economic activities and value of total output. Nigeria also lags other African countries with respect to tax effort and as such has a huge untapped potential for enhanced revenue mobilization. We recommend therefore, that the government should institute an appropriate tax system with an emphasis on broadening the tax base and in some cases, reviewing upwards the tax rates in order to increase the tax effort as well as ensure optimal contribution of taxation towards economic growth and development.

Keywords: *Tax revenue; Economic growth; Company income tax; Petroleum profit tax.*

1. INTRODUCTION

The focus of any government across economies of nations is to improve the standard of living of its people through the activation of vital economic plans and processes, hence Karumba [1] stated that every government always strive to ensure that the needs of the people are provided such as education, good roads, security, health care, electricity and among others . Taxation provides an avenue for government to collect revenue needed to carry out its responsibility in economy. Tax constitutes a major source of income to the federation account in those countries that manage taxation properly. The sufficiency of revenue increases government expenditure which initiates and sustains economic growth.

Todaro and Smith [2] described economic growth as the steady process by which the productive capacity of an economy is increased over a period of time that bring about rising levels of national output and income.

Taxation is a weapon employed by government for the purpose of generating revenue to improve the standard of living required by the people in economy, hence Rakner and Glopen [3] stated that taxation goes hand-in-hand with economic development. They also noted that taxes are recognised as government's major source of financing public goods, while tax payers may receive no particular identifiable return for paying tax, they nevertheless have the advantage of living in a relatively educated, healthy and safe environment. According to Worlu and Emeka [4] the uses of taxation include provision of public goods, redistribution of income, economic stability as well as regulation and harmonization. However, the taxes collected are enough to finance the government's activities depend on the needs of the country, government can also seek alternative source of funding its projects such as oil revenue (revenue from royalties, petroleum profit tax PPT), gas tax, as well as borrowing and grants in aid.

The main purpose why government collects taxes is to provide efficient and sustainable level of infrastructure such as health, education, communication, employment generation, defence law and order irrespective of the prevailing ideology or political system. In developed countries, the manipulation of tax rate has been an instrument of improving economic growth. For instance, United States of America (USA), Canada, England and among others countries,

they generate wage revenue from company income Stax (CIT), Value Added Tax (VAT), import duties and use some to create great economic progress [5].

Okafor [6] supported the use of tax as a means of social engineering to enhance economic growth. However, taxation has a positive and negative effect on both the individual and the government, for the individual, low income tax rate is an incentive to work or save, while high income tax represents a disincentive for working or saving. This is one of the reasons why the Nigerian government undertook a reform of tax law to improve tax administration Omojinite and Iboma [7]. Similarly, the company income tax (CIT) amendment Act of 2007. Federal Inland Revenue Service (establishment) act 2007, is a policy that control the collection of taxes on profit made by companies operating in Nigeria.

1.1 Statement of the Problem

Tax revenue mobilization as a source of financing economic activities in Nigeria has been difficult, this is primarily due to various forms of resistance which include tax evasion, tax avoidance, corruption by tax officials. In some cases, citizens do not have the interest of paying taxes since they claimed not to see what the government is doing with the available tax revenue generated. Hence, the aim of this study is to examine the relationship between tax revenue and economic growth in Nigeria while the objectives are to determine the effect of company income tax on economic growth in Nigeria, assess the impact of petroleum profit tax on economic growth in Nigeria, ascertain the influence of custom and excise duties on economic growth in Nigeria and evaluate the effect of Value Added Tax on economic growth in Nigeria. The hypotheses to be tested are:

- Ho₁: There is no significant relationship between company income tax and economic growth in Nigeria.
- Ho₂: There is no significant relationship between petroleum profit tax and economic growth in Nigeria.
- Ho₃: Custom and Excise duties have no significant relationship with economic growth in Nigeria.
- Ho₄: Value Added Tax has no significant influence on economic growth in Nigeria.

The study is significant because it will act as a guide to tax administrators and others researchers, it covered the period from 1994 to

2000, the period coincident with various tax policy reforms.

2. LITERATURE REVIEW

Dandago and Alabade [8] conceptualized tax revenue to be an income as required by government from individual and corporate organization as well as goods and services to carry out its responsibility. Also Adams [9] defined tax as a vital instrument employed by government against individuals' income or profit of corporate organization in economy. Omojinite and Iboma [7] conceptualized tax as a government generating revenue weapon imposed on individuals goods and services and corporate bodies in order to meets its social responsibilities, such as infrastructural facilities.

Ofoegbu et al. [10] investigate the effect of tax revenue on economic development in Nigeria using two variables as proxy for economic development. Human development index (HDI) and Gross Domestic Product (GDP). Fitting a linear relationship between tax variables and HDI and GDP, they found that the effect of taxes on HDI is more significant than GDP. Ferede and Dahlabay [11] investigated the effect of the Canadian provincial government tax rates on economic growth using panel data. The results show that higher provincial statutory corporate income tax rate is associated with lower private investment and shows economic growth, the study also further revealed that sales tax boost provincial investment and growth.

Macek [12] examined the impact of taxation on economic growth in OECD countries, the study evaluated the impact of individual types of taxes on economic growth, relying on data covering the period 2000-2011. The study used extended neoclassical growth model of Mankiw *et al.* [13] The study found out that corporate taxation, and social security contribution are harmful for economic growth. Ahmad et al. [14] empirically investigated taxes and economic growth using data from Pakistan. Annual time series data from 1974 to 2010 were fitted into Autoregressive Distributed lag (ARDL) bounds testing method for cointegration. The study revealed that total tax revenue have negative and significant effect on the economy in the long run, this result is similar to that of Macek [12] results. Omesi and Nzor [15] studied tax reform in Nigeria with special focus on value added Tax, the study used descriptive statistics and revealed that value added tax is to increase the revenue base and

foster economic development. Ilaboya and Mgbame [16] investigated indirect tax and economic growth in Nigeria, the study revealed negative and insignificant relationship between indirect tax and economic growth in Nigeria.

Atsu et al. [17] investigated the effect of tax revenue on selected macroeconomic indicators in Nigeria from 1986-2015. The study used the autoregressive distributed lag (ARDL) model to evaluate the relationship between the independent variables and dependent variables. The study found that a tax revenue has a significant influence on inflation but it could not establish the presence or absence of it significant effect of tax revenue on employment rate as the use of tax in controlling inflation.

Asaolu et al. [5] examined the relationship between tax revenue and economic growth in Nigeria from 1994 to 2015, the study used descriptive and historical research design, data were collected from central bank of Nigeria statistical bulletin, the study found that value added tax and custom and excise duties have positive and significant influence on economic growth but negative relationship exist between company income tax and economic growth in the period of study. Ugwunta and Ugwuanyi [18] examined the effect of fiscal policy and economic growth in selected Sub -Sahara Africa countries, the study found positive and insignificant relationship between budget balance and economic growth. Onakoya et al. [19] study the effect of tax revenue on Africa economic growth, the study reported that tax revenue in Africa countries has positive and significant relationship with economic growth hence the study concluded that tax revenue has the potential to engender economic growth in Africa countries.

2.1 Other Theoretical Considerations

i. **Bhartia (2009) expediency theory of taxation in Ogbonna and Appah [3]**

This theory emphasized that every tax proposal must go through a reliable test of practicality, it must be the only consideration weighing with the authorities in choosing a tax proposal. In an economy, for any tax to be considered effective, it should be able to pass through test and confirmed to be effective if applied in an economy. This means that the tax agencies or the tax administrators should be able to apply a reasonable strategy that will be convenient to the society and enhance economic growth.

ii. Benefit Received theory of taxation in Agiobenebo [20]

The theory stated that taxes imposed on public goods and services ought to be assessed upon an individual in proportion to the benefits that the individual derives from those commonly provided goods and services viewed from contract perspective, the state provides various goods and services to the members of the society who are to contribute to the costs of the supplies in proportion to the benefit enjoyed.

The theoretical framework adopted for this study is drawn from benefit received theory of taxation and adopted Okafor [6] model, which related tax revenue to economic development. This study expanded the period of study from 2012 to 2020.

3. METHODOLOGY

The research design adopted in the study is ex – post facto research design because the study utilised secondary data collected from Central Bank of Nigeria statistical bulletin, World Bank Development Indicators and Federal Inland Revenue service and to analyse the data Ordinary Least Squares technique was employed using cointegration technique and error correction mechanism and various diagnostic checks were also used, thus functional relationships of the variables are specified as follows

$$GDP = f (PPT, CIT, VAT, CEXD) \quad (1)$$

This could be stated linearly below:

$$GDP = \alpha_0 + \alpha_1 PPT + \alpha_2 CIT + \alpha_3 VAT + \alpha_4 CEXD + \mu \quad (2)$$

A priori

$$\alpha_1, \alpha_2, \alpha_3, \alpha_4, > 0$$

Where:

GDP = Gross Domestic Product

PPT = Petroleum Profit Tax

CIT = Company Income Tax

VAT = Value Added Tax

CEXD = Customs and Excise Duties

μ = Error Term

The Vector Autoregressive (VAR) estimation approach is adopted based on its expediency in describing the dynamic behavior of economic phenomenon. It is also useful in forecasting and policy purposes. For computational purposes, the VAR model is relatively flexible, and easy to use and an extension of the causality and autoregressive model, with successful evidence in literature [21,2]. Howbeit, the Vector Error Correction (VEC) model is a restricted VAR often utilized with nonstationary variables that demonstrates evidence of cointegration.

4. RESULTS AND DISCUSSION

This section focuses on the presentation, analysis, interpretation and discussion of findings. The empirical results based on the specified models in the previous section are presented, while the interpretation and discussion of each result is related to the justification of the stated objectives.

The skewness which measures the asymmetry of the distribution of the series around its mean has values less than 0 in most of the cases which indicates that the series is skewed to the left and the series has a long left tail. The kurtosis which measures the peakedness or flatness of the series with an expected value of 3 indicates that the Value Added Tax variable satisfy this condition. The rest are Platykortic (has value less than 3). The Jarque-Bera used to test whether the errors of the individual series are normally distributed indicates that the residuals in all the variables are normally distributed.

Table 1. Summary of Descriptive Statistics

	LGDP	LCIT	LPPT	LVAT	LCEXD
Mean	13.237	11.722	13.725	6.405	11.175
Maximum	13.938	13.643	15.246	10.434	12.394
Minimum	12.526	9.415	10.664	3.608	9.349
Std. Dev.	0.490	1.176	1.647	1.852	0.905
Skewness	-0.130	-0.164	-0.787	0.796	-0.538
Kurtosis	1.553	2.175	2.090	3.160	2.414
Jarque-Bera	2.249	0.820	3.446	2.672	1.565
Probability	0.324	0.663	0.178	0.262	0.457
Observation	27	27	27	27	27

Source: Author's Computation, using E-views 10

Table 2. Summary of Least Square estimation results

Dependent Variable: LGDP (1994-2020)				
Variable	Coefficient	Std. Error	t-Statistics	Probability
LCIT	0.043	0.052	0.825	0.419
LPPT	0.002	0.023	0.110	0.913
LVAT	0.029	0.007	4.098**	0.000
LCEXD	-0.026	0.018	-1.439	0.166
C	7.041	0.431	16.330	0.000

R-squared = 0.990
Adjusted R-squared = 0.987
F-statistic = 391.224
Prob. (F-statistics) = 0.000
SIC = -2.500
AIC = -2.793
Durbin-Watson stat. = 1.086

Source: Author's Computation, using E-views 10; **indicates stationary at 0.05 significant level;

From Table 2, the first coefficient of company income tax is positive which means that percentage increase in company income tax revenue leads to an increase of 0.043 percent in GDP which is positive in effect, howbeit statistically insignificant. That also implies an increase of 1% in petroleum profit tax increases GDP by 0.002 percentage. Value added tax shows a positive and significant effect on the growth of the Nigerian economy, which implies that a 1 percentage increase in VAT will yield 0.029 percent increase in GDP, while customs and excise duties shows a negative and insignificant effect on GDP, which implies that a 1 percent increase in customs and excise duties will result in decline in GDP by 0.026 percent proportionately.

Table 2 represents regression results of the effect of taxation on the growth of the Nigerian economy (1994-2018). The goodness of fit of the model as indicated by adjusted R-square shows a good fit of the model. An adjusted R-squared value of 0.987 or 98.7% indicated that the model fits the data well; the total variation in the observed behaviour of Gross Domestic Product is jointly explained by variation in total aggregated tax revenue components up to 98.7%. The remaining 1.3% is accounted for by the stochastic error term which means the other

variables not mentioned in the model and that have an effect on the model. But based on the Durbin-Watson statistic, there is presence of first order serial correlation with value (1.086) less than 2. This implies that the model violates the Least Square assumption and as such the model theoretically may not be fit for policy analysis. As such, the model is subjected to unit root test, to remove the random walk existing in the variables at level. Thus, the Augmented Dickey-Fuller test is conducted and represented in Table 3.

From Table 3, the result of the unit root test indicates that all the variables are stationary at first difference. They were not stationary at level; Gross Domestic Product was stationary at 5 percent level; Petroleum Profit Tax was stationary at 5 percent level; Value Added Tax was stationary at 5% level; and Customs and Excise Duties was stationary at 5 percent level. This implies that the variables are integrated of order one, 1(1). From the unit test results, the Durbin-Watson statistics for the afore-stated variables had values approximately equal to 2, implying that at first difference, there was absence of first order serial correlation in the variables. Based on the above premise, the model is subjected to a long run relationship of which the Johansen cointegration technique was adopted as shown in Table 4.

Table 3. Summary of ADF Unit Root Test Result

Variables	Level (prob.)	First difference (prob.)	Durbin-Watson Stat.	Order of integration
CEXD	2.103 (0.518)	-5.823 (0.000)**	1.90	I(1)
CIT	0.309 (0.997)	-3.737 (0.039)**	1.93	I(1)
VAT	-2.502 (0.323)	-4.662 (0.005)**	2.18	I(1)
PPT	-1.117 (0.904)	-4.394 (0.010)**	2.00	I(1)
GDP	1.955 (0.984)	-4.903 (0.004)**	2.45	I(1)

Source: Author's Computation, sing E-views 10; NB: **indicates stationary at 5% level

Table 4. Testing for cointegration (Johansen cointegration procedure)

Null Hypothesis	Alternate hypothesis	Computed Statistics	95 % critical value
Trace test			
CV=0	CV=1	295.584	95.753
CV≤1	CV=2	151.335	69.818
CV≤2	CV=3	63.614	47.856
CV≤3	CV=4	30.154	29.797
CV≤4	CV=5	14.291	15.494
Maximum Eigen Value			
CV=0	CV=1	144.249	40.077
CV≤1	CV=2	87.720	33.876
CV≤2	CV=3	33.460	27.584
CV≤3	CV=4	15.863	21.131
CV≤4	CV=5	11.746	14.264

Source: Author's Computation

The Johansen cointegration test procedure starts with selecting a suitable order of VAR. In the Johansen cointegration test procedure, the variables, growth, petroleum profit tax, company income tax, value added tax, and custom and excise duty tax are jointly determined. Therefore, Table 4 reports the results of the Johansen cointegration tests using both the maximum eigenvalue and trace tests. Considering the maximal eigenvalue results for VAR order 2, it is found out that the null hypothesis of no cointegration (i.e., no long-run relationship) is strongly rejected against the alternative of one cointegrating relationship.

4.1 Vector Error Correction Model

The presence of cointegration between variables suggests a long term relationship among the variables under consideration. Then, the VEC model was applied and the long run relationship between petroleum profit tax, company income tax, value added tax, personal and custom and excise duty tax and growth for the Nigerian is presented above.

The estimated long-run relationship allows modelling the corresponding short-run dynamic adjustments using the vector error-correction mechanism. With a valid long-run relationship, there exists one corresponding vector error-correction model (VECM). Given the OLS relationship, it is possible to obtain six short-run VECMs. Our estimates showed that they were different from one another; the first column which contains the cointegrating equation is reported. These results are reported in Table 5. In the short run, revenue generated from company income tax, petroleum profit tax, value added tax and custom and excise duties fail to register any significant effect, the magnitude irrespective. The

long-run effect of revenue generated from company income tax, petroleum profit tax, value added tax and custom and excise duties also show significant effect on economic growth with varying magnitudes and signs.

4.2 Discussion of Findings

The implications of the result on tax revenue and economic growth are enormous. The result shows that one period lagged value of Customs and Excise duties has a significant and positive effect on economic growth in the long run. This infers that previously collected tax receipts from customs and excise duties has a considerable impact on current pace of growth. This confirms the assertion that economic policies are not instantaneous. The low elasticity is symptomatic of weak tax administration of Value Added Tax and a possible underutilization of Value added Tax Ajakaiye [22]. The study also found that Value Added Tax has a negative effect on economic growth in Nigeria. Romer and Romer [20] are of the view that Value Added Tax can only increase economic growth when enforcement and implementation procedures are effective. The result also shows that one period lagged value of Value Added tax has a negative and significant effect on economic growth in Nigeria in the long run [23-25].

More so, analysis from our findings shows that a one period lagged value of Company Income Tax has a significant and positive effect on the level of economic growth in Nigeria in the long run, but exhibited an insignificant effect on growth in the short-run. This suggests that company income tax has increased over the study period, with attendant contribution to the Nigerian economy. Nevertheless, the instability and sustainability of an upward company income tax calls for cursory fiscal action.

Table 5. Vector Error Correction Results

VECM long run relationship						
	GDP(-1)	LCIT(-1)	LPPT(-1)	LVAT(-1)	LCEXD(-1)	C
CointEq1	1.000	0.437 (7.851)**	-0.336 (-12.125)**	-0.316 (-29.384)**	-0.265 (-13.473)**	16.865
ECT _{t-1} = {1.000GDP _{t-1} + 0.437LCIT _{t-1} - 0.336LPPT _{t-1} - 0.316LVAT _{t-1} - 0.265LCEXD _{t-1} + 16.865						
VECM Short-Run Relationship						
	ECT _{t-1}	D(LCIT(-1))	D(LVAT(-1))	D(LCEXD(-1))	C	
CointEq1	-0.417 (-2.270)**	0.010 (0.359)	-0.008 (-1.017)	0.007 (0.718)	0.108 (2.366)	

Source: Author's Computation using E-views 10; NB: **indicates stationary at 5% level; () represent t-statistics

The one period lagged value of Customs and Excise Duties has a negative and significant effect on economic growth in Nigeria in the long run, but exhibited a positive and insignificant effect on growth in the short run. This may suggest an obvious deficiency in tax accountability, especially with regards to external trade activities of the economy.

Petroleum Profit Tax has a significant but negative effect on economic growth in Nigeria in the long run as against a positive and insignificant effect on growth in the short run. This may suggest the prevalence of tax evasion in the petroleum sector of the Nigerian economy, which deprives this leading sector in its contribution to the socioeconomic development of the Nigerian economy.

The one period lagged value of Value Added Tax has a negative and significant effect on economic growth in Nigeria in the long run, but exhibited a negative and insignificant effect on growth in the short run. VAT as a component of tax receipts has a considerable impact on the spending units of the economy. The instability observed in this form of tax receipts may be attributed to the infrastructural deficiency especially on poor electricity availability and the weak government institutional quality tends to account for this deleterious influence of VAT on the economy.

5. CONCLUSION

This research analyzed tax revenue and economic growth using the benefit received theory framework. Revenue from tax are indispensable source of creating revenue in both the industrialized and developing economies. In Africa, and Nigeria specifically, inefficient tax management has diminished the ability of tax to generate the desired revenue needed to drive the development process. The Nigerian situation

is special since taxes are either not paid, underpaid or mismanaged. The mismanagement of the little proceeds from tax has made the Nigerian public to loss interest in the payment of tax or reporting offenders. This has resulted in the loss of important foreign exchange. Corruption of tax officials, flawed information network, inefficient communication facilities, etc. is partly responsible for the poor performance of the Nigerian tax system. Based on the afore-stated results, the following recommendations were put forward

- i. Government should intensify the collection of Value Added Tax so as to reverse the observed trend of low elasticity of Value Added Tax.
- ii. Government should make policy that will broaden the tax base and hence enhance the performance of taxes in the growth process.
- iii. Revenue collected inform of company income tax (CIT) should be channeled to development project to benefit the tax payers and citizens.
- iv. The need for infrastructural development is fundamental.
- v. Enhancement of government institutional quality is strategic and crucial in achieving economic growth in Nigeria.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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