Modelling the Effect of Taxation on Economic Performance in Nigeria: The Autoregressive Distributed Lag Model

TUANEH, Godwin Lebari, & ODUKWO, Charles Christian.

Department of Agricultural and Applied Economics Rivers State University Nkpolu-Oroworukwo, Port Harcourt. Nigeria. *Email: lebarituaneh@gmail.com:*

Abstract:
This Study examined the relationship between taxation and economic performance between 1995-2022. The specific objectives were to explore the effects of Petroleum Profits Tax, Company Income Tax, Value Added Tax, Custom Excise Duty on Real Gross Domestic Product in Nigeria. This study adopted quasi-experimental research design and relied on time series data. Pre-estimation diagnostics tests (unit-root and Cointegration tests) were adopted to check for stationarity of the data and the long run relationship to prevent spurious regression results. The method employed for analyzing the time series data was the ARDL regression method. The result showed that a unit increase in customs and excise duties brought about a 0.066719-unit increase in real GDP, a unit increase in company income tax brought about a 0.091230-unit increase in real GDP, a unit increase in petroleum profit tax brought about a -0.018427-unit decrease in real GDP and a unit increase in value added tax brought about a 0.086384-unit increase in real GDP for the period under study. The study concluded that tax revenues were significant in increasing economic performance in Nigeria and recommended that Governments at all levels should ensure taxes are paid by all citizens and companies by putting in place efficient and effective tax administrators in Nigeria, again, government should leverage on fiscal discipline to alleviate corruption and ensure that the funds allocated to key sectors of the economy are properly utilize to improve production and output in Nigeria.

Keywords: ARDL Company Income Tax, Custom Excise Duty, Petroleum Profits Tax, Real Gross Domestic Product, Taxation, Value Added Tax

Introduction

Taxation is one of the oldest methods for financing the provision of necessary services for the populace residing in any geographic region. Governments worldwide bear the obligation of supplying essential infrastructure for their inhabitants. The government's functions or obligations to its citizens encompass, but are not limited to, economic stabilization, income redistribution, and the provision of public goods (Abiola and Asiweh, 2012). Taxation constitutes a primary source of governmental revenue globally, with governments utilizing tax revenues to fulfill their fundamental functions, including the construction of infrastructure, maintenance of public order, defense against external threats, and regulation of commerce to ensure social and economic stability (Appah and Eze, 2013). The principal role of a tax system is to generate sufficient revenue to fund essential government expenditures on goods and services; furthermore, taxation is one of the most effective tools to enhance public sector performance and facilitate the repayment of public debt, as articulated by Okoye and Raymond (2014).

The history of Nigerian tax administration originates from the British model, operational since 1960, until the introduction of the self-assessment scheme in 1990, which resembles the American tax administration system (Enahoro & Olabisi, 2012).

Tax administration in Nigeria is the responsibility of the three levels of government. Federal taxes are controlled by the Federal Inland Revenue Service (FIRS), whereas state taxes are managed by the State Boards of Internal Revenue (SBIRs) across the thirty-six states of the Federation. Local governments also manage rates and taxes that are recoverable by their respective councils. A substantial amount of taxes are due by individuals conducting business in Nigeria. This encompasses corporate income tax, individual income tax, capital gains tax, value-added tax, education tax, technology tax, stamp duties, and withholding tax. Sanctions are enforced for the delinquent payment of taxes.

In the last three years, the Nigerian economy and public finances have suffered significantly due to declining oil prices and diminished foreign exchange reserves. Due to the decrease in oil revenue, attention has transitioned to taxation as a revenue source. The Federal Executive Council approved a revised national tax policy (NTP) on February 1, 2017. The NTP is a document that establishes general guidelines for taxation and related issues in Nigeria. This document articulates the principles that govern tax administration and revenue collection, offering a framework of norms, regulations, and procedures to standardize taxes in Nigeria, to which all stakeholders in the tax system can adhere (Oxford Business Group 2019).

Over the years, it has been noted that income tax revenue has been significantly underestimated due to inadequate tax administration resulting from underassessment and ineffective collection mechanisms (Adegbie & Fakile, 2011). McPherson (2004) identifies several challenges in Nigerian tax administration, including a lack of tax statistics, unethical practices (corruption), insufficient prioritization of tax initiatives, inadequate administrative processes, a proliferation of taxes, economic structural issues that impede effective tax implementation, and the existence of an underground economy.

Naiyeju (1996) asserts that the efficacy of any tax system hinges on its management and the accurate interpretation and execution of tax law.

The impact of taxation on economic growth in Nigeria is not completely appreciated, and optimal taxation necessary for fostering growth is not achieved due to inadequate administration. Despite the implementation of various tax policies by the tax authority in recent years, including the E-Payment scheme, Tax Identification Number (TIN), and AntiTax Avoidance legislation, significant tax challenges persist. These challenges encompass issues such as a lack of professionalism, inadequate accountability, insufficient public awareness regarding the importance and advantages of taxation, corruption among tax officials, tax avoidance and evasion by taxpayers, collusion between tax officials and the taxpayer population, elevated tax rates, and ineffective tax collection methods (Onakoya & Afintinni 2016).

In addition to the administrative issues outlined, the study aims to assess the impact of taxes on real gross domestic product.

Objective of the Study

The broad objective of this study is to explore the link between Taxation and economic development in Nigeria. However, the specific objectives of this study were to: determine the effects of Petroleum profit tax on Real GDP; determine the effects of company income tax on

Real GDP; determine the effects of customs and excise duties on Real GDP; and determine the effects of Value Added tax on Real GDP

Theoretical Literature The Benefit Theory of Taxation

This theory posits that taxes should be levied on individuals based on the benefits they get. A person who receives greater benefits from state activity should contribute more to the government (Cooper, 1994). Nonetheless, accurate implementation is unattainable due to the challenge of quantifying government benefits, including intangible advantages like military protection, received by each resident and non-resident taxpayer.

The Ability to Pay Theory of Taxation

This philosophy is equivalent to the principle of equity or justice in taxation. Individuals with elevated incomes ought to remit a greater tax burden than those with diminished incomes. It seems more just and rational for taxes to be imposed according to an individual's taxable ability. The primary limitation of this approach lies in the determination of an individual's capacity to pay (Pigou, 1920).

The Theory of Taxation by Ibn Khaldun (1332-1406)

This theory delineates two distinct effects: the arithmetic effect and the economic effect of tax rates on revenues. The two effects yield contrasting outcomes on revenue when rates are either increased or decreased. The arithmetic impact posits that a reduction in tax rates will result in a corresponding loss in tax receipts by the same magnitude as the rate reduction. An increase in tax rates yields the opposite effect. The economic effect acknowledges the beneficial influence of lower tax rates on labor, production, and employment, thereby expanding the tax base utilized for incentivizing these activities. Conversely, increasing tax rates produces an adverse economic effect by discouraging engagement in the taxed activities. At elevated tax rates, the adverse economic impact outweighs the positive mathematical effect, resulting in a decrease in tax collection (Islahi, 2006).

Empirical Literature

Eric and Joseph (2010) studied the effects of value added tax, as a substitute for payroll or corporate taxes, in the United States and found that VAT could be regressive, raising tax burdens proportionately more on lower income than on higher income taxpayers. Sekwati & Malema (2011) investigated the potential impact of VAT increase from 10% to 12% in Botswana on households‟ consumption expenditure behaviour, and found that the increase in VAT rate increased prices of goods and services, and that the poor households were more adversely affected owing mainly to their higher marginal propensity to consume. The impact was negligible on the middle and upper income classes because these income groups have relatively degrees of freedom to adjust their consumption patterns in response to the increase in VAT.

There are few studies on the effect of VAT on consumer retail spending behaviour or consumption pattern. Barrel and Weale (2009) employed quarterly data to investigate the impact of VAT rate reduction on retail price in Europe. They established a weak evidence of changes in consumer expenditure behaviour with the reduction in VAT rate in the European

countries. Keen and Syed (2006) studied the ways in which the tax structure affects exports and, after defining a theoretical model, estimated a panel model using 27 OECD countries over the 1967-2003 period. They addressed directly the issue of the tax mix, and estimated the relationship between net exports and both VAT and corporate taxes. The results generally confirm the view that VAT is inherently trade neutral, whereas corporate taxes affect net exports.

Haq-Padda and Akram (2011) conducted a research to examine the impact of tax policies on economic growth using data from Asian economies and discovered that tax policies adopted by developing countries have no evidence that taxes permanently affect the rate of economic growth. Even though government policies can affect per capita income in the transitory path of the steady-state growth, this seems to be inconsistent with the endogenous class of growth models. The results of their study suggest that the relationship between output and the tax rate is best described by the neo-classical growth models because a higher tax rate permanently reduces the level of output but has no permanent effect on the output growth rate. Consequently, they recommended an optimal tax rate to finance the budget, with debt instrument used in financing transitory expenditure while permanent expenditure is to be financed through taxes.

Ramot and Ichihashi (2012) used panel data from 65 countries during the period 1970 to 2006 to examine the effects of tax structure on economic growth and income inequality and discovered that company income tax (CIT) rates have a negative impact both on economic growth and income inequality. They also discovered that personal income tax rate does not significantly affect economic growth and income inequality. The authors therefore recommended the need to develop a modest design into the tax system because countries which are able to mobilize tax resources through broad-based tax structures with efficient administration and enforcement will be likely to enjoy faster growth rates than countries with lower efficiency. Also, the government should focus to reduce tax evasion, which is believed happen in the highest income group that could distort the horizontal and vertical equity in redistributing the income. Finally, very high earners or the highest income group should be subject to high and rising marginal tax rates, especially in the statutory top corporate tax rate.

Ariyo (2007) evaluated the productivity of the Nigerian tax system given the negative impact of persistent unsustainable fiscal deficits on the Nigerian economy for the period 1970-1990 to devise a reasonably accurate estimation of Nigeria's sustainable revenue profile. The results of his study showed a satisfactory level of productivity of the Nigerian tax system. The author therefore recommended an urgent need for the improvement of the tax information system to enhance the evaluation of the performance of the Nigerian tax system and facilitate adequate macroeconomic planning and implementation.

Omoruyi (2003) in his study took a comprehensive assessment of the productivity of the Nigeria tax system by evaluating the buoyancy of the tax system for the period 1960-1979. Focusing on both the indirect taxes such as import, export and excise duties, as well as direct taxes such as personal income tax and petroleum profit tax, evidence abound to support low level of productivity of the Nigerian tax system. Tuaneh and Okidim (2019) used the Autoregressive distributed lag model in their study on Agricultural Performance amidst Macroeconomic Instability in Nigeria.

Methodology Research Design

This study adopted the quasi-experimental research design. The choice of this approach emanated from its suitability in assessing the impact of the explanatory variables on the dependent variable. Real Gross Domestic Product and Taxation.

Data Collection Method and Sources

Secondary data was used in this study. Data were sourced mainly from the publications of Central Bank of Nigeria (CBN) namely; Statistical Bulletin, as well as data from Federal Inland Revenue Service (FIRS) Statistical Report. The variables for which data were sourced include:

Petroleum profit tax, Company Income tax, Customs and Excise Duties, Personal Income tax, Value added tax.

Data Analysis

This study employed the Auto Regressive Distributed Lag Model. The choice of ARDL was because the variables were stationary at order (1) and (0).

Model Specification

The functional and econometric relationship between the dependent variable and the independent variables are provided in the equation below:

$$\text{InRGDP} = \beta_0 + \beta_1 In\text{PPT} + \beta_2 \text{InCIT} + \beta_3 In\text{CED} + \beta_4 In\text{VAT} + U \quad 1$$

Where:

PPT = Petroleum profit tax,

CIT = Company Income tax

CED = Customs and Excise Duties

VAT = Value Added tax

B_0-β_4 = Coefficients

U = error term

In = natural log notation

Specifying equation (1) in ARDL Cointegration model by incorporating the lag and lead of each of the explanatory variables into the model as part of the explanatory variables. In the short run:

$$\Delta Y_t = \alpha + \sum_{i=1}^{p} \Delta Y_t + \sum_{i=1}^{q} \Delta\beta_1 B_{t-1} + \sum_{i=1}^{q} \Delta\beta_2 C_{t-1} + \sum_{i=1}^{q} \Delta\beta_3 C_{t-1} + \sum_{i=1}^{q} \Delta\beta_4 C_{t-1} + \mu_t$$

In the long run the error correction term is introduced:

$$Y_t = \alpha + \sum_{i=1}^{p} Y_t + \sum_{i=1}^{q} \beta_1 B_{t-1} + \sum_{i=1}^{q} \beta_2 C_{t-1} \sum_{i=1}^{q} \Delta\beta_3 C_{t-1} + \sum_{i=1}^{q} \Delta\beta_4 C_{t-1} + \lambda ECT_{t-1} + \mu t$$

Now adopting the model to the study, with indication of co-integration in the long run of the variables we have:

$$RGDP_t = \psi + + \sum_{i=1}^{q} \alpha_1 PPT_{t-1} + \sum_{i=1}^{q} \alpha_2 CIT_{t-1} + \sum_{pi=1} CED_{t-1} \sum_{pi=1} RGDP_{t-1} -1 + \sum_{i=1}^{q} \beta_1 \Delta PPT_{t-1} + \sum_{i=1}^{q} \beta_2 \Delta CIT_{t-1} + \sum_{i=1}^{p} \beta_3 \Delta + \sum_{pi=1} VAT_t -1 + \sum_{i=1}^{q} \Delta RGDP_t \sum_{i=1}^{p} \beta_5 \Delta CED_{t-1} +$$

$VAT_{t-1} + \lambda ECT_{t-1} + \mu_t$

Where: ψ = intercept $\alpha_{1,2,3,4,,}$= parameter estimates of the regressors in the long run $\beta_{1,2.3,4,,}$= parameter estimates of the regressors in the short run u_t= stochastic error terms.

ECT = Error Correction Term (ECM)

λ= Speed of Adjustment with a negative sign (-) μ= stochastic term ($Y_{t-1} - \Theta X_t$)

Result and Discussions Trends in the Dependent and Independent Variables

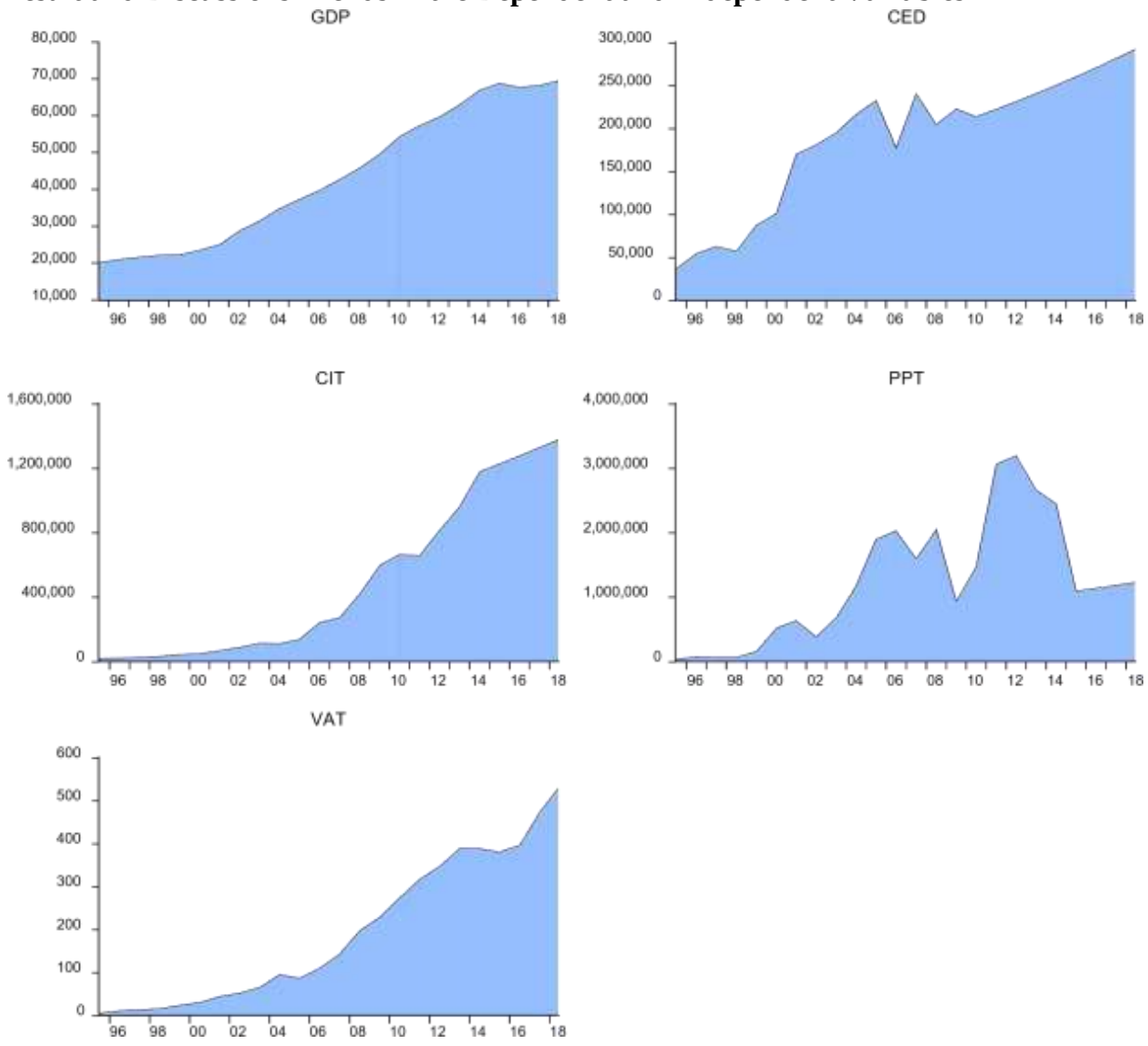

Figure 1. Plots showing the trends in RGDP and the Different Tax Revenue

Figure 1 showed the trend analysis of variations in the variables over the period 1995 – 2018. As clearly shown in the trend, the base year 1995 recorded the lowest custom and exercise duties (CED) revenue and gradually rising reaching its highest in 2018. For company income tax revenue, there has been little revenue received by the government due to the fact that companies had hardly started production until 2007 where there was a significant and gradual

increase that continued to 2018. Similarly, same was observed in the consumption pattern of the household and Value Added Tax (VAT) which had a significant increase in 2013 and 2007 respectively. Petroleum profit tax revenue (PPT) was insignificant in the first six years but gradually increased, experiencing some fluctuations but reaching its highest in 2012. Lastly, real gross domestic product has been steady and increasing throughout the study period.

Unit Root Test

The optimal order of lag for each of the variables was based on schwartz information Criterion (SIC) automatic lag selection procedure. The table showed that the variables became stationary at first difference I (1).

Table 1 Unit Root Test Results

Variables	Critical Integration	KPSS at	Critical	KPSS 1st	Order of	Values level	Values diff
CED	0.146		0.143*	NC	NC	I (0)	
CIT	0.146		0.181	0.146	0.125*	I (1)	
PPT	0.146		0.138*	NC	NC	I (0)	
RGDP	0.146		0.119*	NC	NC	I (0)	
VAT	0.146		0.172	0.146	0.082*	I (1)	

Source: Researchers' computation

Single asterisk (*) implies stationary at 5% level of significance with trend and intercept

As presented in Table 1, the unit root test was carried out at levels and first difference using KPSS approach. From the results, it was discovered that CED, PPT and RGDP were stationary at level. Other variables however became stationary after the first difference, hence the variables showed mixed order of integration I()) and I(1).

Haven ascertained the order of integration of the variables, it was necessary to determine if long run cointegration exists among the variables. However, the order of integration was mixed, it was necessary to conduct the bounds test of cointegration as shown in the table 2 below.

Table 2: ARDL Bounds Test

Variables	F-stat	Bounds (5%)		Outcome
		I0	I1	Long-run
RGDP=*f*(CED,CIT,PPT,VAT)	6.010663	2.56	3.49	cointegration

Source: Researchers' Computation

The bounds test of cointegration estimated to examine the existence of long-run cointegration among the variables in the study is presented in Table 2. The result showed that there is longrun cointegration among the variables as the result revealed F-statistics value is greater than the upper bound I1 at 5% level of significance.

The bounds test of cointegration conducted showed long-run cointegrating relationships, consequently, the ARDL Error correction was estimated and presented in Table 3 below.

Table 3: Regression Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(GDP(-1))	**0.334195**	**0.063403**	**5.270983**	**0.0005**
DLOG(CED)	-0.028553	0.014297	-1.997151	0.0769
DLOG(CED(-1))	**0.066719**	**0.011959**	**5.578846**	**0.0003**
DLOG(CIT)	**-0.044581**	**0.016246**	**-2.744142**	**0.0227**
DLOG(CIT(-1))	**0.091230**	**0.016204**	**5.630079**	**0.0003**
DLOG(PPT)	**-0.018427**	**0.005163**	**-3.569089**	**0.0060**
DLOG(VAT)	**0.086384**	**0.024305**	**3.554160**	**0.0062**
CointEq(-1)*	-0.166629	0.022247	-7.489962	0.0000
R-squared	0.952555	Mean dependent var		0.054219
Adjusted R-squared	0.928832	S.D. dependent var		0.035326
S.E. of regression	0.009424	Akaike info criterion		-6.215825
Sum squared resid	0.001243	Schwarz criterion		-5.819083
Log likelihood	76.37408	Hannan-Quinn criter.		-6.122365
Durbin-Watson stat	2.558262			

Source: Researchers' Computation

From the ARDL-ECM regression result customs and excise duties had a positive and significant influence on Real GDP (PV= 0.0003 < 0.05) in the short run, Based on the sign and magnitude of the coefficient in the one period lag, a unit increase in customs and excise duties brought about a 0.066719-unit increase in real GDP for the period under study.

The one year lag of company income tax had a positive and significant influence on Real GDP (PV= 0.0003 < 0.05) in the short run, also, the sign and magnitude of the coefficient in the one period lag, a unit increase in company income tax brought about a 0.091230-unit increase in real GDP for the period under study.

Petroleum profit tax had a negative but significant influence on real GDP (PV= 0.0006 < 0.05) in the short run. Based on the sign and magnitude of the coefficient in its current period, a unit increase in Petroleum profit tax brought about a -0.018427-unit decrease in real GDP for the period under study. This could be because the tax revenue may have been either diverted to personal purse or it may have been used in the non-productive sectors of the economy

Value added tax had a positive and significant influence on Real GDP (PV= 0.0006 < 0.05) in the short run. Since the sign and magnitude of the coefficient in its current period was positive, a unit increase in value added tax brought about a 0.086384-unit increase in real GDP for the period under study.

It is also important to note that the one-year lag of GDP was also significant in affecting the current level of GDP (PV= 0.0005 < 0.05)

The R-squared of 0.95 implies that about 95% variation in real GDP is explained variations on the tax revenues. The remaining 5% are explained by other variables not included in the model. This showed the model has a good fit for estimation and that variations of real Gross domestic product (RGDP) was explained by the independent variables PPT, CIT, CED and VAT, implying Tax revenue is 95% responsible for changes in Real GDP output in the country, for the period under study.

The error correction term **was correctly** signed. The negative sign of the coefficient is and indication the previous errors are corrected in the current period. The coefficient -0.166629 shows an average speed of adjustment 16.6% to long-run equilibrium. Implying that it will take a speed of adjustment of 16.66% for all variables to converge at equilibrium in the long run. The system is said to correct its previous period of disequilibrium at a speed of 16.66% annually.

Post Estimation Tests

The post estimation test was used to confirm the reliability of the estimated regression models. The test includes Serial correlation test, the Heteroskedasticity Tests and the stability test.

Table 6 Serial Correlation/ Heteroskedasticity Tests

Test	Test Statistics	Value	P-value	Conclusion
Breusch-Godfrey serial correlation LM	F-statistics	3.470022	0.0910	No. serial correlation
Heteroskedasticity	F-statistics	0.663239	0.7508	Homoskedastic

Source: Researchers 'Compilation.

The probability value (0.0910) of the Breusch – Godfrey serial correlation LM test is greater than 0.05, the study accepted the null hypothesis of no serial correlation in the residuals.
Again, as the probability value (0.7508) of the Breusch-Pagan – Godfrey test of Heteroskedasticity is greater than 0.05, it reveals that the residuals are homoscedastic with no problem of Heteroskedasticity.

Stability Test

The test for stability was carried out using the cumulative sum (CUSUM) test as shown below.

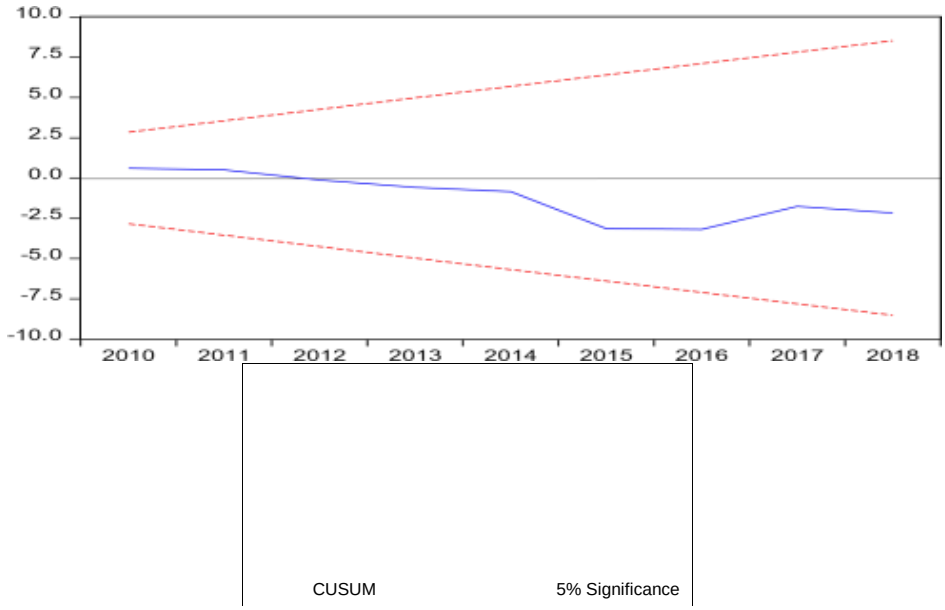

Fig. 2 CUSUM Test of Stability Graph on the Residual of the Model

From the CUSUM result in figure 2, the model was stable as the CUSUM lies within the 5% boundaries. This means that the CUSUM line was within the 5% level of significance. Therefore, the model was stable. Generally, the post estimation test result proved that the model was robust.

Conclusion and Recommendations

This study empirically examined Taxation and economic development in Nigeria given a study period from 1995 to 2018. The main focus was on the revenues gotten from each type of tax such as CED (Custom and Exercise Duties), CIT (Company Income Tax), PPT (Petroleum Profit Tax), VAT (Value Added Tax) on Nigeria's economic development. The reparametrize ARDL-ECM regression disclosed that these tax revenues are significant in increasing economic development in Nigeria.

From the findings, the following recommendations were made:

(i) Governments at all levels should ensure taxes are paid by all citizens and companies by putting in place efficient and effective tax administrators in Nigeria,

(ii) Government should leverage on fiscal discipline to alleviate corruption and ensure that the funds allocated to key sectors of the economy are proper utilized to improve production and output in Nigeria.

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