IMPACT OF TAX REFORMS ON MACROECONOMIC UNCERTAINTY IN NIGERIA

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ABSTRACT

This study investigates the impact of tax reforms on macroeconomic uncertainty using quarterly data of CBN statistical bulletin and FIRS tax statistics from 2011-2021 on four variables; GDP growth rate (GDPGR) to capture macroeconomic uncertainty, company's income tax (CIT), and value added tax (VAT) revenue as proxy of tax reform, while standard deviation uncertainty (SDVAT) as the control variable. The Autoregressive Distributed Lag (ARDL) and Bound test technique was employed to assess the long and short-run properties of the variables, as the Augmented Dickey Fuller (ADF) tests revealed that all series were found to be integrated of mix order. Findings reveal that change in corporate tax rate (CIT) has a dynamic significant effect on economic growth rate in both the short and long run, while value added tax (VAT) has a positive effect on macroeconomic uncertainty and become significant in the long run and standard deviation uncertainty (SDVAT reveals a positive minimal significant impact on economic growth rate. The study recommends that policymakers should assess the wider impact of tax policy before implementing them due to its significant role in economic sustainability. Despite the data scope limitation, this study contributes novel insights into fiscal dynamics impact on economic growth and predictability of macroeconomic outcome.

Keywords: *ARDL, Economic growth rate, Macroeconomic, Tax reform, Uncertainty,*

1.1 INTRODUCTION

Nigeria's economy has combated significant macroeconomic uncertainty in recent years, due to structural fiscal weaknesses, volatility in oil prices, and the challenges of managing a diverse economy and fast-paced ppulation (Bawa et al., 2021). Especially, the severe plunge in West Texas Intermediate (WTI) crude oil to an all-time low on April 20, 2020, largely driven by the COVID-19 epidemic, sent shock waves through the economy. This crash signaled policymakers the urgent need to buffer the effect of the economic outcomes, and taxation is the first policy tool that comes to mind. It plays a crucial role in stabilizing the macroeconomic environment, redistributing income, mobilizing public resources, shaping aggregate demand, and financing public goods.

Over the years, Nigerian has experienced a series of tax reforms since 1904 till date. These include the introduction of income tax in Nigeria between 1904 and 1926; the grant of autonomy to the Nigerian Inland Revenue in 1945; the Raisman Fiscal Commission of 1957; the formation of the

Inland Revenue Board in 1958; the promulgation of the Petroleum Profit Tax Ordinance No. 15 of 1959; the promulgation of Income Tax Management Act 1961; establishment of the Federal Board of Inland Revenue under CITA 1979; establishment of the Lagos State Inland Revenue Department; the promulgation of the Companies Income Tax Act (CITA) 1979; establishment of the Federal Inland Revenue Service between 1991 and 1992and tax policy and administration reforms amendment 2001 and 2004.

A more recent reform embarked upon by the Nigerian government was instituting the Study Group on the Nigerian Tax System. The outcome of the reform was the approval of nine (9) new bills on tax reforms which were subsequently passed as an act; Value Added Tax Act 2004; Federal Inland Revenue Service Act 2004; National Sugar Development Act 2004; Companies Income Tax Act 2004; Petroleum Profit Tax Act 2004; Personal Income Tax Act 2004; Education Tax Act 2004; Customs, Excise Tariffs, etc. (Consolidation) Act 2004; and National Automotive Council Act 2004. Successively, the introduction of finance act bill becomes a yearly fiscal tool, complemented by executive orders to augment annual Nigeria's budget.

Several studies have found that reducing corporate tax rates can lead to higher levels of investment and economic growth, particularly in more capital-intensive industries. For example, a study by Dharmapala and Riedl (2013) found that a one percentage point reduction in the corporate tax rate leads to a 0.6% increase in investment in the manufacturing sector.
Also, Bloom (2009) examined the impact of macroeconomic uncertainty on various aspects of the economy and found that higher levels of uncertainty can lead to lower levels of investment, as firms become more cautious and risk averse. Micro-level uncertainty is transmitted to the macro level because uncertainty about the return to investment at a micro level may create cyclical fluctuations in aggregate investment at a macro level (Bernanke, 1983).

Willink (2009) explores the role of sample standard deviation' of a set of repeated measurements that might be used in the expression of accuracy or uncertainty. A distinction is made between using the sample standard deviation, s, to calculate a figure of merit for the measurement procedure and using s to express uncertainty in the estimate of a measurand. The uncertainty generally includes many components which may be evaluated from experimental standard deviations based on repeated observation. Standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities, equal to the positive square root of a sum of terms, the terms being the variances or covariances of these other quantities weighed according to how the measurement result varies with changes in these quantities" (ISO 21748:2010 – 2.2, Zilli, 2013).

Caldara et al. (2012) claimed that uncertainty can lead to lower levels of consumer, as individuals become more hesitant to make large purchases in an uncertain economic environment. Economic uncertainty can hurt economic stability, leading to decreased investment, consumption, and employment. Given these dynamics, understanding the potential effects of tax reform on macroeconomic uncertainty is pivotal for policymakers in designing more effective and efficient tax policies that minimize negative economic consequences.

This paper aims to explore that nexus, and their implication on goods market equilibrium stability. This problem vis-à-vis incessant reviews of tax laws and rates has continued to linger on, while

pleading for urgent attention. The rest of the paper is structured as follows: literature review, trend analysis, methodology, discussion of findings and recommendation.

2.0 REVIEW OF RELATED LITERATURE

2.1 Theoretical Review

Myriads of scholars have analysed the nexus of tax reforms, economic growth, and macroeconomic uncertainty with different theoretical framework base on their objectives. However, the three plausible theories of economic that justify the link between tax reforms and macroeconomic uncertainty: Keynesian Aggregate Demand Theory, the Theory of Optimal Taxation, and the Laffer curve Theory.

The pivotal part of Keynes's theory, which has come to bear his name, is the assertion that aggregate demand measured the sum of spending by households, businesses, and the government and the most important driving force in an economy. He posits that fiscal tools, particularly taxation influence the aggregate demand and general output level in an economy. In his view, taxes have direct relationship with all the components of aggregate demand (C, consumption, I, investment, G, government spending). A rise in value added tax (VAT) or personal income tax (PIT) could reduce household's demand and affect firms' profit margins, the multiplier effect would impact investment behaviour. Thus, incessant changes in tax rate and policy could introduce uncertainty and cause macroeconomic fluctuation.

Optimal tax theory, on the other hand, is the study of designing and implementing a tax that maximises a social welfare function subject to economic constraints. Tax revenue is used as income-redistribution mechanism within a society. However, changes in taxes distort household behaviour and unpredictable or poorly communicated tax reforms may discourage long-term investment and hamper efficient resources allocation. It's a social welfare function typically used for individuals' utilities, so the tax system is chosen to maximise the aggregate of individual utilities. This is most commonly forming the utilitarian function.

Arthur Laffer explained Laffer curve theory with a concave curve of 0% to 100% and argued that there is optimal level that maximalize revenue; above the optimal level, revenue will start to decline as tax evasion will increase proportionally. The shape of the curve is a function of taxable income elasticity (i.e., taxable income changes in response to changes in the rate of taxation). Thus, incessant changes in tax policy will not achieve the revenue target but also amplify the uncertainty in the overall economy of the country.

Conclusively, these theories provide a strong theoretical foundation for understanding the link between tax reform and macroeconomic uncertainty. The Keynesian model highlights the demand-side impact of taxes; the optimal taxation theory stresses the role of design and efficiency in stabilizing the macroeconomy; while the Laffer curve theory justify how uncertainty about tax policy can distort investment timing and economic outcomes can either alleviate or change household behaviours and economic expectations.

2.3 Empirical Review

Empirical research on tax reform and macroeconomic uncertainty in Nigeria has yielded several important findings. The tax reform in Nigeria is spreadhead by the Federal Inland Revenue

Services which is geared to achieving greater revenue collection, voluntary and willing compliance, and breaking the long piercing phobia between taxpayers and tax collectors. Empirical studies on the link between tax reforms and macroeconomics uncertainty are scanty, evolving, and mixed findings. These mixed findings are often on economic growth or real GDP and methodologically driven.

Gbeke and Nkak (2021) examined the intertwining nexus between tax revenue and economic growth in Nigeria, using time series data from 1995–2019. Their study employed the Autoregressive Distributed Lag (ARDL) technique, with value added tax, petroleum profit tax, company's income tax, and customs and excise duties as variables of interest to measure tax revenue, while RGDP was used to capture economic growth. They found that company's income tax and customs & excise duties (CED) have a positive impact on economic growth, while value added tax (VAT) and petroleum profit tax (PPT) have a negative effect on economic growth.

In the same vein, Abomaye, Michael, and Friday (2018) analysed tax revenue and economic growth in Nigeria (1980 -2015) using multiple regression. Their co-integration results revealed that there was a long-run relationship among the variables (Gross Domestic Product (GDP) as the dependent variable, and Petroleum Profit Tax (PPT), Company Income Tax (CIT), and Customs and Excise Duties, but in short-run regression result depicted that only customs and excise duties had a significant relationship with economic growth in Nigeria during the period under study. Rumbling this mix nexus, Akhor and Ekundayo (2016) using Error Correction Model on time series data from the Central Bank of Nigeria statistical bulletin (1993-2013), found that only the value added tax had a negative and significant impact on real gross domestic product, while custom and excise duty had a positive but insignificant impact.

In contrast opinion, Eneche and Stephen (2020) used secondary data from CBN and FIRS from 2003- 2017 to refine the relationship between tax revenue and Nigeria's economic growth. Their regression analysis revealed that Petroleum Profit Tax (oil tax revenue) has a positive but insignificant relationship, while Value Added Tax and Companies Income Tax (non-oil tax revenue) have a significant relationship with Nigeria's economic growth. Supplementing this, Herbert, Nwarogu, and Nwabueze (2018) examined the effect of tax reforms on the economy over a 16-year period, 2000–2015 and depicted that VAT reforms had a positive relationship with economic stability but insignificant, while CIT and PPT were identified as the key levers to Nigeria's fiscal economy.

Exploring the long run effect of tax policy, Adudu and Ojonye (2015) employed Granger–causality co-integration framework to examine the impact of tax policy (reforms) on economic growth in Nigeria. They used time series data between 1990 and 2011. They established the existence of a long-run relationship between economic growth and tax components. Their study recommended removal of distortions in taxation, discouragement of tax holidays to multinationals companies (MNCs), and diversification of the revenue base to enhance sustainable economic growth.

Likewise, Olaoye, Ogundipe, and Oluwadare (2019) used the Vector Error Correction Model (VECM) to estimate the impact of taxation on the economic development of Nigeria from 2003 to 2017. They found that taxation has a significant long-run relationship with Nigeria's economic development, and they advised the government to trade off the increase in companies' income tax rate for value added tax, due to its long-run detrimental effects. Xing (2011) examined the effects

of revenue-neutral tax structure changes on the long-run level of income per capita for the period 1970-2004 in 17 OECD countries using panel data. The study indicates that the shares of personal income taxes, corporate income taxes and consumption taxes in total tax revenue are all found to be negatively related to the long-run level of income per capita.

On a broader view, Jelilov, Abdulrahman, and Isik (2015) proofed that tax reforms have a significant impact on economic growth in Nigeria. They capture post-structural adjustment by obtaining additional data from Office of the Accountant General of the Federation for a period of 26 years (1986–2012). In the same vein, Van (2019) investigated the macroeconomic effects of tax reforms in the EU between 2000 and 2016, employing real-time estimates of discretionary fiscal adjustments, covering personal income taxes, social insurance contributions, corporate income taxes, and value added taxes as variables of interest. The VAR model revealed that unanticipated tax cuts tend to lead to immediate output increases, while anticipated cuts can be associated with decreases in economic activity due to firms' and consumers' decisions to postpone investment and consumption until the actual implementation. They concluded that revenue-based output multipliers are in the range of -1.8 to -2.3.

Bertolotti and Marcellino (2019) assessed whether the effects of fiscal policy depend on the extent of uncertainty in the economy. Focusing on tax shocks, identified by the narrative series by Romer and Romer (American Economic Review, 2010, 100(3), 763–801), and various measures of uncertainty, they used a VAR model and found that the economy responds more positively to tax cuts during periods of low uncertainty. In response to tax increases, the response of main aggregates is more negative in more uncertain times. They concluded that controlling for monetary policy in fiscal VARs is important to avoid omitted variable bias.

Conclusively, the nexus between tax reforms and economic growth rate does not follow a unique pattern. Hence, the dynamic pattern of the tax reforms will be reviewed under goods market theory to reveal the actual behaviour, and the findings are method sensitive. Although, all the studies under review establish the existence of long run relationship, but not the dynamic impact. Thus, economic growth rate is proxied as the variable of interest unlike the use of real-GDP found in the literature. The GDP growth rate captures the uncertainty and reflects the volatility associated with of tax reforms changes.

3.0 THEORETICAL FRAMEWORK AND MODEL SPECIFICATION

3.0 Theoretical Framework

This study adopts the Keynesian equilibrium condition analysis in the goods market to examine the actual behaviour of tax reform (i.e change tax rate) in goods market equilibrium condition. This model assumes that the economy is closed, $X = IM = 0$,

$$Z \equiv C + I + G \quad \text{.....} \quad (1)$$

Consumption (C) is expressed as a function of disposable income (Y_D). Thus,

$$C = C_o + C_1 Y_D^{(+)} \quad \text{.....} \quad (2)$$

Let reparametrize the disposable income Y_D:

$$Y_D \equiv Y - T_v \quad (T_v \text{ is proxy as Value Added Tax}) \quad \text{.....} \quad (3)$$

Value Added Tax (VAT) was assumed to have direct effect on consumption through the disposable income as it might impede the purchasing power

Therefore, eqn. (2) and (3) can be expressed as:

$$C = C\,(Y - T_v) \quad \text{.....} \quad (4)$$

Investment (I)

Now, investment (I) is expressed under the profit theory of investment. Investment behaviour depends on interest rate and profit, while profit is influenced by tax (Company Income Tax).

Let:

T_c = Company Income Tax

$$I = I\,(\text{ɾ}, \pi - T_c) \quad \text{.....} \quad (5)$$

where ɾ is interest rate, and π is pre-tax profit

Therefore eqn. (5) is expressed as:

$$I = I\,(\pi - T_c) \quad \text{.....} \quad (6)$$

Government Expenditure (G)

The third component of the aggregate demand model is government spending (*G*), and for simplicity of this model, it is treated as exogenous. Thus, government spending arises from all tax income.

Let:

$$G = \bar{G} \text{ (exogenously determine)} \quad \text{.....} \quad (7)$$

Putting all together (recall eqn.1):

$$Z = C\,(Y - T_v) + I\,(\pi - T_c) + \bar{G} \quad \text{.....} \quad (8)$$

For the equilibrium condition, let:

Note: Standard deviation of VAT was excluded from this condition for clarity on how direct changes of tax rates (Tax reforms) might affect aggregate output. Economic growth rate and macroeconomic uncertainty will be used interchangeably in this study.

Where *Y* will be the aggregate economic output, simply put as GDP.

Therefore, Z = Y and changes in T_v *or* T_c will have one-for-one impact aggregate economy output (economic growth rate)

3.1 Nature and Sources of Data

This study adopted secondary data and a historical research design to examine the relationship between tax reforms and macroeconomic uncertainty in Nigeria. It employed quarterly data from CBN statistical bulletin and FIRS tax statistics/reports (2011- 2021). The study used the Autoregressive Distributed Lag (ARDL) technique.

3.2 Model Specification

Gross Domestic Product (GDP) growth rate was used as a macroeconomic indicator used to measure the health of a nation. In this study, GDP growth rate (GDPGR) is proxy as macroeconomic uncertainty, as there is no single best proxy for macroeconomic uncertainty. The GDP growth rate is influenced by all other macroeconomic variables such as inflation, unemployment rate, interest rate and exchange rates.

However, uncertainty is modelled by calculating the standard deviation of independent variable (VAT), due to its frequency (monthly) collection. Statistically, standard deviation is a pivotal indicator of uncertainty, as it captures the spread of data points around the mean. (Willink, 2009)

$$s \equiv \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n - 1}},$$

Therefore, dependent variable is GDP growth rate while the independent variables are CIT, VAT and SDVAT as control variable. Thus, the model is expressed as:

$GDPGR = \int (CIT, VAT\ SDVAT)$ ..... (1)

Where:

GDPGR = Gross domestic product growth rate (proxy for macroeconomic uncertainty)
CIT = Company income tax (proxy for company income tax reform)
VAT = Value-added tax (proxy for value-added tax reform)
SDVAT = Standard Deviation Value-added tax (uncertainty in tax reform as control variable)

Let equation (1) into econometric linear form yields equation 2 as follows:

$GDPGR_t = \beta_{0t} + \beta_1 LCIT_t + \beta_2 LVAT_t + \beta_3 SDVAT_t + \mu_t$ ..... (2)

The logarithmic transformation2 of equation (2) is designed to bring the variables to the same base, hence the model becomes:

$GDPGR_t = \beta_{0t} + \beta_1 lnCIT_t + \beta_2 lnVAT_t + \beta_3 SDVAT_t + \mu_t$ ..... (3)

Where:

$\beta 0$ = Constant (intercept) term
$\beta 1$, $\beta 2$ and $\beta 3$ = Coefficient parameters of the independent variables
μ_t = Stochastic error term (A priori; $\beta 0 > 0, \beta 1 > 0, \beta 2 > 0, \beta 3 > 0$.)

3.3 Unit Root Test

A test of stationarity was carried out using the Augmented Dickey-Fuller (ADF) test on each variable to test for stationarity and avoid spurious regression as suggested by Engel and Granger (1975).

$\Delta GDPGR_t = \alpha\ 0 + \beta t\ GDPGR_{t-1} + \delta 1 \Delta LCIT_{t-1} + \delta 2 \Delta LVAT_{t-p} + \delta p \Delta SDVAT_t + \mu_t \ldots$ (4)

Where $\beta 0$ is a constant, βt is the coefficient of the time trend and p is the lag order of the autoregressive process and Δ is the difference operator. The unit root test then carried out under

H0: $\delta 1 = 0$ (unit root or non-stationary)
H0: $\delta 1 < 0$ (no unit root or stationery)

If the ADF test statistics are greater (in absolute value) than the critical value let say at 5% and 10% level of significance, the null hypothesis of $\delta 1 = 0$ is rejected and no unit root is present.

Table 1: Unit Root Test Results

At Level			**At 1st difference**		
Aug. Dickey-Fuller Test			**Aug. Dickey-Fuller Test**		
Variables	**t-stat**	**5% CL**	**t-stat**	**5% CL**	**Order of Int.**
GDPGR	-14.29	-3.50			I (0)
LCIT	-3.171	-3.529	-14.61	-3.526	I (1)
SDVAT	-0.98	-3.52	-9.569	-3.52	I (1)
LVAT	-2.216	-3.518	-9.20	-3.52	I (1)

Optimal lag order for ADF are determined using the Schwarz Info Criterion

Source: Author's Computation (2025)

The result indicated that the GDP growth rate is stationary at level, I(0) while the LVAT, SDVAT (the uncertainty measure), and LCIT are stationary at the first difference I(1). Therefore, with the order of integration of the variables, we are allowed to run the bound cointegration test as Pesaran et al. (2001) who proposed the Bound Test is suitable for the combination of I (0) and I (1)

variables. Before estimating the bounds test to cointegration the Augmented Dickey Fuller (ADF) test was used to access the stationarity properties of the variables and, we established that none of the variables were I(2), as they were either I(1) or I(0).

Autoregressive Distributed Lag (ARDL) Model

This paper adopts the autoregressive distributed lag cointegration technique or bounds test. The ARDL approach is employed because it addresses the limitation of other cointegration techniques for testing short-run relationships between series that are non-stationary.

Now (4)

$$\Delta GDPGR_t = \alpha_0 + \beta_{1t}\, CIT_{t-1} + \beta_{2t}\, VAT_{t-1} + \beta_{3t}\, SDVAT_{t-1} + \sum_{j=1}^{n} \varphi \Delta GDPgr_{t-1} + \sum_{j=1}^{n} \emptyset \Delta \ln CIT_{t-1} + \sum_{j=1}^{n} \lambda \Delta \ln VAT_{t-1} + \sum_{j=1}^{n} \rho \Delta \ln SDVAT_{t-1} + \mu_t$$

The null hypothesis of no long-run relationship is tested against the alternate hypotheses of a long-run relationship as shown below.

H_0: $\alpha = \beta_1 = \beta_2 = 0$

H_1: $\alpha \neq \beta_1 \neq \beta_2 \neq 0$

4.0 DATA AND EMPIRICAL RESULTS

Table 2 shows the summary of the descriptive statistics of the variables; GDPGR, LCIT, SDVAT, and LVAT with mean values of 0.01095, 5.5982, 1.8941, and 5.2447 respectively, and this shows the average value of the variables over the period of years covered.

Table 2: Descriptive Statistics

	GDPGR	LCIT	SDVAT	LVAT
Mean	0.010959	5.598209	1.894155	5.244711
Median	0.036104	5.653835	1.993050	5.150741
Maximum	0.128710	6.321254	3.562613	6.079521
Minimum	-0.144685	4.721716	-1.002450	4.734804
Std. Dev.	0.085242	0.439200	0.962878	0.356291
Skewness	-0.733977	-0.199669	-0.888782	0.896267
Kurtosis	2.151048	1.934566	4.195026	2.933770
Jarque-Bera	5.271953	2.373471	8.411006	5.898866
Probability	0.071649	0.305216	0.014913	0.052369
Sum	0.482213	246.3212	83.34283	230.7673
Sum Sq. Dev.	0.312446	8.294546	39.86677	5.458576
Observations	44	44	44	44

Source: Author's Computation (2025)

The difference between the maximum and the minimum of all the variables indicates that there is evidence of significant variation in the data set. From the statistical distribution of the series, the results show that all the series are negatively skewed, except LVAT that is positively skewed. The kurtosis values explain the normal distribution, the flatness or peakiness of values of a variable over time. These (2.151, 1.9345, 4.195, and 2.9337) indicates that all the variables are platykurtic except SDVAT. Finally, the Jarque-Bera test implies that the all variables are normally distributed given their p-values at 5%, 10% level, except for LCIT.

Table 3: Correlation Analysis

Probability Correlation	**GDPGR**	**LCIT**	**SDVAT**	**LVAT**
GDPGR	1.000000			
LCIT	0.479011	1.000000		
SDVAT	-0.008479	-0.056261	1.000000	
LVAT	0.033982	0.544513	0.224005	1.000000

Source: Author's Computation (2025)

Table 3 shows the correlation which measures the linear relationship between two variables. Its values lie between 0 and 1. From the table, we found that LVAT, LCIT, are weakly positively correlated with GDP growth rate, while SDVAT is weakly negatively correlated.

TABLE 4: CO-INTEGRATION BOUNDS TEST

F-Bounds Test

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	14.80330	10%	2.72	3.77
K	3	5%	3.23	4.35
		2.5%	3.69	4.89
		1%	4.29	5.61

t-Bounds Test

Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-5.401586	10%	-2.57	-3.46
		5%	-2.86	-3.78
		2.5%	-3.13	-4.05
		1%	-3.43	-4.37

Source: Author's Computation (2025) using EViews 10 >>>>>>>>>>>>>>>>>

The results of Bound cointegration test are shown in table 4 with both the F-value and t-value statistics showing evidence of a long-run cointegrating equation.

In the table above, the F-stat value is greater than the I (1) upper bound at 1%, 5%, and 10% critical values. This confirms the existence of a long-run relationship and cointegration equation. Thus, we reject the null hypothesis and accept the alternative, that there is a long-run relationship between the variable and such the both short-run model of ARDL Auto Regressive Distributed lag and the long-run model of Error Correction Model (ECM) will be employed. The findings of Adudu and Ojonye (2015); Olaoye, Ogundipe, and Oluwadare (2019) also attested the existence of the long run relationship between taxation and economic growth.

TABLE 5: ESTIMATED LONG-RUN COEFFICIENTS.

Variable	Coefficients	Standard Error	T- Statistics	P-value
C	0.2126	0.0710	2.9926	0.0069*
GDPGR (-4)	0.8765	0.1386	6.3244	0.0000*
LCIT (-3)	-0.0305	0.1111	-2.7453	0.0121**
LVAT (-3)	0.0721	0.0323	2.2306	0.0367**
SDVAT (-3)	0.0028	0.0009	3.1379	0.0050*
R^2	0.9882			
Adj R^2	0.9779			
DW Stat	2.5259			
Prob (F-stat)	0.0000			

Notes: (*) and (**) indicates 1% and 5% significance level respectively.

Source: Author's Computation (2025)

Table 5 shows that in the long run, if all other things were held constant, value-added tax (LVAT), and standard uncertainty (SDVAT) has a significant positive impact on the macroeconomic uncertainty (GDPGR) measured by economic growth rate, except company's income tax (LCIT). A percentage change in economic growth lags period or value added tax would increase the macroeconomic uncertainty by 87%, or 7% respectively, while standard deviation uncertainty would have a minimal effect of 0.28% on macroeconomic behaviour.
On contrary, a unit increase in company's income tax (LCIT), would decrease the economic growth rate and influence the macroeconomic uncertainty behaviour by 3%. This is in tandem with the findings of empirical studies reviewed. Van (2019); Bertolotti and Marcellino (2019).

Thus, the overall significance of the entire model P > F (0.0001) is to test dependent variable. Since, the probability of F-statistic is ≤ 0.05, and the explanatory variables' parameter estimates are jointly statistically significant. The R-squared value of 0.9882 reveals that the independent variables explained about 98% of the variation in the dependent variable, and the DW value of **2.52** suggests no serial correlation in the residual.

TABLE 6: ESTIMATED SHORT-RUN COEFFICIENTS. (4, 3, 4, 4)

Variable	Coefficients	Standard Error	T- Statistics	P-value
GDPGR (-1)	-0.7186	0.0611	-11.7601	0.0000*
LCIT (-1)	0.0494	0.0109	4.5354	0.0002*
LVAT (-1)	0.0296	0.0227	1.3015	0.2072
SDVAT (-1)	0.0014	0.0007	2.0501	0.0530*
ECM (-1)	-0.3234	0.0678	-4.7720	0.0001*

Notes: (*) and (**) indicates 1% and 5% significance level respectively.

Source: Author's Computation (2025)

From table 6, the lagged of GDP growth rate have a negative and significant impact on the current GDP growth rate, indicating past growth influences the current growth rate.

In short run LCIT is positively and statistically significant in the second and first quarters, respectively. This suggests that corporate tax influence economic growth rate positively with a significant change as against its effect in the long run. This dynamic effect supports the findings of Gbeke and Nkak (2021); Herbert, Nwarogu, and Nwabueze (2018).

All things being equal, in the short run, value added tax (VAT) has a positive insignificant on itself up to lags 2, while at lag 3, it has a positive significant influence. While standard deviation uncertainty (SDVAT) has a significant positive on itself up to lags 3. However, coefficient of ECM (-0.3234) is significant at 1%. This implies the speed of adjustment and shows that 32% of disequilibrium in the previous year is corrected within the first quarter of the subsequent year. The negative sign of the coefficient confirms convergence with quick reaction.

4.2. Model Diagnostics

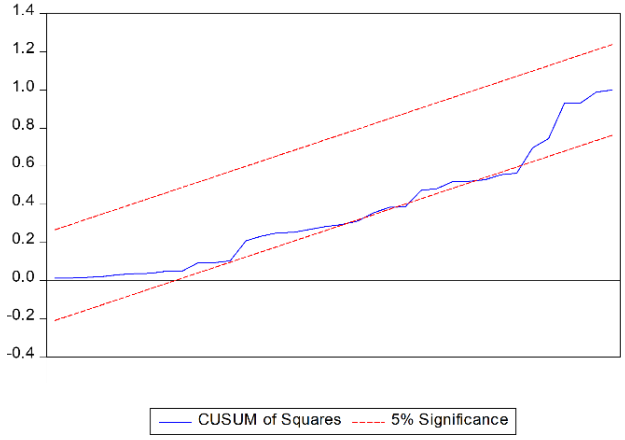
It is crucial to examine model specification and avoid spurious results. Therefore, post-diagnostics test was conducted assess unstable parameters.

Econometrics Diagnostics Tests	**F-statistic**	**Probability**
Heteroskedasticity Test	1.573217	0.1726
Autocorrelation LM Test	1.119310	0.2552
Normality test	1.651887	0.437822

Source: Author's Computation (2025) using EViews 10 >>>>>>>>>>>>>>>>

The above table shows post-diagnostic test result. The **White** Heteroskedasticity shows that the probability value of 0.1726, which is greater than 0.05. Based on this, we conclude that there is homoscedasticity. Also, Breusch-Godfrey Autocorrelation test of greater than 0.05. Thus, there are no pieces of evidence of serial correlation of stochastic error terms in the model.

Conclusively, the null hypothesis is not rejected since the Jarque-Bera probability is 0.437822 > 0.05). Thus, residuals are normally distributed. This satisfied the assumption of a normal distribution.



The Figure above shows the stability of the model with the cumulative sum of squares of recursive residuals (CUSUM of squares) as the line equally lies within the critical bounds of the straight line and is significant at 5% which equally confirmed the stability of the model

5. CONCLUSION

This research is carried out to empirically ascertain the impact of tax reform on macroeconomics uncertainty in Nigeria. To achieve this objective, quarterly time series data on company income tax, value added tax was employed as proxy of tax reform, and standard deviation of VAT as proxy of uncertainty for control variable. While GDP growth rate data were collected for periods between 2011 and 2021 (quarterly) to measures macroeconomic uncertainty.
Descriptive statistics, and correlation analysis were conducted to understand the nature of the data. Augmented Dickey Fuller (ADF) test was employed to assess the stationarity properties of the series. All variables (LCIT, LVAT, SDVAT) are integrated of order one, I(1) while, GDPGR growth rate is stationary levels I (0). Autoregressive Distirbuted Lag model was used to estimate the long-run and Error correction model was employed to analyse the adjustment mechanism.

Findings reveal that change in corporate tax rate (CIT) has a dynamic significant effect on economic growth rate in both the short and long run. Value Added Tax (VAT) reveals an insignificant impact on economic growth rate in short run, while standard deviation uncertainty measured by standard deviation of VAT depicted a significant positive relationship with macroeconomic uncertainty proxy by economic growth rate with minimal effect.

Consequently, the study recommends that policymakers should carefully assess the broader impact of tax policy before implementing, considering their crucial role in economic stability. Such evidence-based will help inform future tax reform decisions in Nigeria with a goal of promoting economic growth and development.

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