Re-investigating Tax Effects on Economic Growth in Nigeria: A Disaggregated Analysis

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Abstract

Taxation stands as a pivotal fiscal tool in economic management, affecting growth either positively or negatively. This study, spanning 1990-2022, delves into disaggregated analysis of tax effects on economic growth, considering variables like domestic investment, trade volume, inflation, unemployment, and population. The study scrutinises five key tax elements: Personal income tax, corporate income tax, petroleum profit tax, education tax, and customs and excise duties. With data sourced from various reputable institutions, the analysis reveals that personal income tax exerts a short-run positive influence on economic growth while petroleum profit tax exerts nil effect, similarly to customs and excise duties, corporate income tax, and education tax in both the short-run and the long-run. The result also shows that domestic investment and trade volume are positively signed while inflation, unemployment, and population are negatively signed but have weak influence on economic growth. Short-run dynamics are captured through error correction terms, suggesting a robust relationship among variables and the potential for adjustment to equilibrium. The study concludes with a call for a comprehensive overhaul of Nigeria's tax policy to foster the desired growth, alongside urgent measures to address inflation, unemployment, and population growth while bolstering trade volume and domestic investment.

Introduction

Economic growth is a key macroeconomics goal. In Nigeria, government works towards the achievement of economic growth through fiscal policy, tax being a vital tool. Tax is a compulsory levy on household, firms, individuals, and

properties in a country. The government is also saddled with some roles relating to the welfare of citizens. These functions include provision of social amenities and public infrastructures like good roads, water, education, and health services among others. But the government needs to generate revenue to execute the functions. Tax is a source of revenue to the government for execution of various public expenditures, which include provision of defense, social amenities, and economic infrastructures (Manukaji, 2018). The government finances other public expenditures like public debt, printing of currency, and drawing down of cash reserve with the apex bank through revenue generated through tax and other sources of revenue (Ogundana et al., 2017). Tax as a source of revenue in the federation account is shared among the three tiers of government in Nigeria (Nzotta, 2007). It is an important fiscal tool to stimulate economic growth. Economic growth arises from a sustainable increase in the gross domestic product (GDP) of a country from year to year. Aside from being a good source of government revenue, taxation is ideal for equitable distribution of wealth, price stabilisation, control of production and consumption, and regulation of the economy. Studies on developed and underdeveloped countries stressed the importance of implementing effective tax system to attain sustainable economic growth terrain (Emmanuel, 2010).

Accordingly, countries have applied various reforms to their tax systems in the attempt to generate optimal tax revenue without discouraging investment (Ehigamusoe, 2014). Adefolake and Omodero (2022) show that petroleum profit tax and VAT have positive effect on GDP, separately. The study substantiates the significance of tax-economic growth linkage in Nigeria. A given type of tax may be productive or unproductive. For instance, an upward review of personal income tax can cause a distortion in the labour market. It may lead to the decision to reduce labour hours supply to production, which will have certain effects on the GDP. It can also diminish the propensity for higher education due to morale lost. A decrease in the desire for higher education will lower the supply of skilled manpower needed to propel the economy to the path of stability and sustainable growth. A tax arrangement that discourages investment is inimical to economic growth. A particular tax may be harmful and unsustainable to economic agents. Personal income tax can cause distortion in household expenditure just as corporate income tax may distort productivity of the business sector. A dis-incentive taxation could have an adverse effect on R & D, a development that could be inimical to technological advancement and economic progress of a nation. Tax effects vary from one tax form to another. Consumption-related tax may have different effects compared with investment-related tax. A net-positive

effect of tax on economic growth is expected, but it depends on how effective and efficient the tax policy in place is.

From the foregoing, the following questions are germane to this study on Nigeria. What are the descriptive characteristics of various tax variables, non-tax variables, and economic growth? Are there any significant associations among each of the key tax variables with economic growth? What are the differing effects of various tax variables on economic growth? Hence, this study examines the effects of taxes on economic growth amidst domestic investment, volume of trade, inflation, unemployment, and population growth in Nigeria with a cursory check on the short-run and long-run evidences. The study provides a clarification on the mixed evidences on the relationship between tax and economic growth in developing countries. The literature is replete with active debate on the direct or inverse relationship of tax to economic growth (Umoru, 2013). With different tax elements in the economy, if tax is harmful or beneficial to economic growth at the level of aggregation, the general effect might still be misleading in the way it veils the specific effect a given type of tax could have on economic growth. A disaggregated analysis of tax effects would always help in shedding more light on how tax impacts economic growth by revealing the effect of a specific tax on growth at a given point in time. This study identifies five tax variables in conjunction with five other extraneous variables to explain economic growth rate during the time frame 1990-2022.

Literature Review
The literature on taxation hovers around various theories. The theory of Benefit Principle is based on the distribution of tax burden. It states that citizens should pay tax according to the benefits enjoyed or the utility derived from government services and social goods. The higher the utility derived, the higher the tax levied should be. The theory has direct functional relationship with utility derived from government services. The theory has been criticised on the difficulty of measurement of benefits or utility enjoyed. Also, because the poor derives higher utility from governments services than the rich, the theory may tamper with the law of fairness and justice especially against the poor in connections with services such as low-cost housing, free education, and free water supply among others. The theory would make the poor to pay higher tax than the rich. It is non-exclusive.

Theory of Equal Sacrifice by J. S Smith addresses the criticisms on the Benefit Principle. Equal taxation means equality of sacrifice. It has three components: Equal Absolute Sacrifice (EAS), Equal Proportional Sacrifice (EPS), and Equal Marginal Sacrifice (EMS). EAS proposes equal total utility of income sacrificed in tax by all tax payers. All tax payers pay the same rate which takes more from lower income earners than higher income earners. EPS maintains that sacrifices of income utility in tax be shared according to magnitude of total income of each tax payer, which is expressed as:

$$\frac{Sacrifice\ of\ A}{Total\ Income\ of\ A} = \frac{Sacrifice\ of\ B}{Total\ Income\ of\ B} \qquad (1)$$

EMS advocates equal sacrifice of the marginal utility of income by all tax payers, which makes the rich pays more. That is,

$$MUS_{X_1} = MUS_{X_2} = \cdots = MUS_{X_n} \qquad (2)$$

MUS = Marginal Utility Sacrificed for the payment of taxes, and $X_1, X_2, \ldots X_n$ are all tax payers in the economy. This is the most acceptable part of the theory. Knight's Theory of Endogenous Growth categorises factors of production into three. Land is fixed; labor is slightly variable and limited in the short-run by the size of working population; and physical capital, which can easily be increased overtime. Knight assumes that technology progresses at an exogenously determined rate. Capital is subjected to constant returns with its growth rate depending on the capacity to accumulate both physical capital and technical method of production. Output is the function of net taxable income and government transfer, which is divided by the income earner into consumption and investment. An increase in output is as a result of investment and savings, which will not be affected by diminishing returns to capital. However, tax causes a decline in output level and rate of economic growth. This is as a result of tax weakening the rate of return on capital and discouraging the tax payer from accumulating more physical output and technical knowledge needed for increased productivity.

The Payment Ability Theory (PAT) is popular and has the largest acceptance on the basis of justice and equity. It was propounded by Adams Smith. It states that citizens who benefit more from higher income and higher wealth should be obliged to pay more tax. Various views on ability to pay emerged including

measurement by ownership of property, magnitude of expenditure, and basis of income. Property Ownership was not accepted on the grounds that a person who earns higher income but acquires less or nil property would pay lower or nil tax. Magnitude of Expenditure was criticised in favour of individuals who already have greater burden of responsibilities. The view on the basis of income has higher acceptance till date. Tax system in most countries of the world today is progressive relative to regressive and proportional taxes. Different authors at different point in time have expressed their views on tax. Appah (2010) conceptualises tax as a compulsory levy by the government on citizens necessary for improvement of societal welfare with the provision of social amenities and other services. The benefits extend to both tax payers and non-tax-payers. The basic amenities include good roads, security, pipe borne water, and electricity (Appah & Oyadonghan, 2011). Tax is a compulsory responsibility of citizens. Objectives of tax reform include making efforts at continually improving on tax laws to make tax administration more convenient, reliable, responsive, and competent, and thereby reduce tax evasion and tax avoidance. From 1904 to date, the Nigerian tax system has undergone many reforms. The effects of reforms in the country according to Jelilof, Abdulrahman and Izik (2016) outlines the reforms to include Income Tax between 1904 and 1926, Nigerian Inland Revenue autonomy in 1945, and Inland Revenue Board formation in 1958. Others include Petroleum Profit Tax Ordinance No. 15 of 1959 and Companies Income Tax Act 1979 promulgation, and Federal Inland Revenue Service establishment between 1991 and 1992. Later, Personal Income Tax Act 2004, Value Added Tax Act 2004, Education Tax Act 2004, Customs, Excise Tariffs Act 2004, and National Sugar Development Act 2004 were enacted. The various acts and reforms stressed the significant roles of taxes in the fiscal management of the economy. This study picks five tax components with four non-tax variables to unfold specific tax effects on economic growth in Nigeria.

Economic growth is achieved when real per capita income of a country can be sustained over a period of time (Salami, Apelogun, Omidiya & Ojoye, 2015). Comparison between and across years could also reveal the trend of economic growth. Technological progress, increase in the capital stock, and improvement in the quality and level of literacy result in economic growth. Studies have shown that economic growth can be represented by some macroeconomic indicators like GDP, and per capita income. Ibadin and Oladipupo (2015) suggests that real GDP is a preferred measurement of economic growth to nominal GDP because the former makes adjustments for inflation. Improvement in real GDP results in major

progress in living standards, and leads to expansion of existing markets and opening of new ones (Nchege, Aduku, Ezinne & Nwosu, 2019). Economic growth implies improvement in the capability of a nation to increase national output level. Inefficient tax policies can discourage investment decisions by making investment less profitable and causing a decline in a country's output. According to Saheed, Abarshi, and Ejide (2014), petroleum taxation aims at providing revenue from the petroleum extraction industry resources while encouraging investment and economic recovery of the hydrocarbon resources. The objectives and responsibilities of a tax system include generation of revenue to finance public expenditures and provision of basic amenities to reduce the burdens of the private sector; provision for external security and defense against external attacks; provision for internal security; redistribution of wealth in order to reduce poverty; regulation of the economy to promote economic stability and healthy economic growth; fighting inflation and unemployment (Soyode & Kajola, 2006). Tax can be used as an instrument of stabilisation through increase in taxes to reduce consumption during inflation or reduction of tax rates during economic depression (Uzonwanne, 2015).

Ample number of studies show that tax affects economic growth. Mendoza et al. (1997) investigates how tax and economic growth are related in 18 OECD countries. The result shows a weak linkage between tax and economic growth. Kneller et al. (1999) examines government expenditure and tax effects on economic growth in 22 OECD countries during 1970-1995. The result shows that distortionary taxation reduces growth, while non-distortionary taxation enhances it. Using time series data from 1960-2002, Koch et al. (2005) explores the tax and economic growth interconnections. Tax revenue was measured as the proportion of revenues from indirect tax to total tax. The result shows that a rise in indirect taxes reduces economic growth. Mamatzakis (2005) investigates how economic growth responds to shocks in tax composition for the Greek economy, using vector autoregressive model on time series data 1960-2003. Tax mix is measured as the share of revenues from indirect tax to direct tax. From the result, tax mix has positive influence on economic growth. Using a panel dataset over the period 1970-1997 to unfold tax-economic growth effects, Lee and Gordon (2005) finds a negative effect of corporate income tax on economic growth.

Adefolake and Omodero (2022) employs a dataset data spanning 2000-2021 to examine the tax revenue cum economic growth effects on Nigeria. The ADF unit root tests indicate GDP, PPT, CIT, and VAT being I(1). The study establishes positive effects of PPT and VAT on GDP, negative effect of CIT on GDP, and

stresses the importance of sensitisation and human capital development proprammes by tax agencies to all categories of all tax payers. Aliyu and Mustapha (2020) assesses how tax impacts economic growth in Nigeria during 1981-2017. The OLS and ARDL techniques employed by the study reveal cointegration among the variables. The long-run interrelationships indicate petroleum profit tax, VAT, and government domestic debt being positively related to GDP while company income tax, and customs and excise duties indicate negative relationship with economic growth.

Arvin et al. (2021) examines the relationships among tax, institutional quality, government expenditure, and GDP in low-income countries and lower middle-income countries with a dataset covering 2005-2019. The study includes four variables on various tax sources to obtain short-run and long-run outcomes. From the findings, short-run endogenous links exist among tax, government expenditure, institutional quality, and economic growth. The robust results across all samples indicate tax, government expenditure, and institutional quality having significant long-term relationship with economic growth. Gurdal, Aydin, and Inal (2021) focuses on Canada, France, Germany, Italy, Japan, the UK, and the USA during 1980-2016 to investigate the linkages among tax, government expenditure, and economic growth. The study employs two panel causality approaches for comparison. Time domain causality results show economic growth and government expenditure causing each other while tax causes government expenditure, but tax and economic growth having no causality. The frequency domain causality results show tax and economic growth causing each other in both the short-run and long-run. In the long-run, economic growth and government expenditure cause each other. The study submits that taxation policies align with the economic conditions of the G7 countries and can be a potent fiscal tool, capable of advancing economic objectives.

Maganya (2020) examines how Tanzania can use taxation to achieve sustainable growth. The study employs the ARDL model on a dataset over the period 1996-2019. The results reveal positive indirect tax effect and negative income tax effect on GDP growth. Bidirectional Granger causality is found between indirect tax and GDP growth. Basumatary (2022) investigates the role of tax and capital expenditure on economic growth of the Union Territory of Puducherry, India, using the OLS multivariate regression. The results indicate that tax and capital expenditure have positive effects on economic growth. Edewusi and Ajayi (2019) investigates the relationship between tax revenue and economic growth in

Nigeria, specifically focusing on the impact of petroleum profit tax, company profit tax, and VAT. The study employs multiple regression analysis, co-integration, and other post-estimation tests to assess the short-run and long-run effects of these taxes on economic growth. The study reveals petroleum profit tax, company profit tax, and VAT all having positive impacts on economic growth. Egbunike et al. (2018) examines the relationship between tax and economic growth in Nigeria and Ghana, considering tax as a sustainable financing option for government needs. With multiple regression for analysis, the study reveals a positive impact of tax on GDP in the two countries. Eneche and Stephen (2023) examines the relationship between tax and economic growth in Nigeria. The study suggests that the Nigerian government should address widespread corruption and leakages in tax administration. It emphasises transparent and judicious use of tax revenue to provide quality public goods and services.

The literature is not specific on which particular tax is good or bad for economic growth. Some scholars believe that indirect taxes are better source of revenue because it is not easy to evade. It, however, leads to an increase in the prices of goods and services, raising the cost of living. Other scholars are of the view that direct taxes are fair enough to drive economic growth. Among studies that adopted a disaggregated approach to model the effect of taxes on economic growth, none of them is specific on the simultaneous inclusion of the five key components of taxes emphasised in this study. Tax exerts certain effects on domestic investment, volume of trade, inflation, unemployment, and population growth. This study tackles this dimension to analysis of tax effects on economic growth process in Nigeria during 1990-2022.

The study is based on the Knightian endogenous growth model. Knight categorised factors of production into three: land which is fixed; labour which is slightly variable but is really limited in the short-run by the size of working population; and physical capital which can easily be increased overtime. The model assumes that technological progress occurs at an exogenously given rate. The three factors of production are classified under capital and subjected to constant returns. Economic agents combine capital with knowledge to produce output in time t as expressed in Equation (3)

$$Y_t = AK_t \tag{3}$$

Y = output, A is the technological progress, ruling out exogenous technical change. A is not effectively related to K_t, the capital stock. The equation implies

that marginal returns to capital is constant represented by A, unlike the Solow exogenous growth model where there is an assumption of diminishing returns to capital.

$$R = A > R^*$$ (4)

R = rate of returns on capital, R^* is the rate of returns on capital that makes the representative agent not to see reasons to save, and A is the constant exogenous technical progress. Equation (4) implies that the rate of returns on capital do not fall to the critical level since $R = A$, and A is constant. In other words, the economic agents will have the propensity to continually accumulate stock of technical knowledge. Economic growth continues as long as this propensity is sustained. Income tax rate, τ, pulls down the marginal return schedule as specified in Equation (5)

$$R^\tau = A(1 - \tau)$$ (5)

R^τ is the rate of returns on capital after tax. Equation (3) shows that as $R = A$, tax reduces the rate of returns on capital, limiting the economic agent's ability to accumulate capital. By this, the model predicts that tax policies affect both aggregate output level and economic growth rate. High tax rate reduces the ability of firms to search for more efficient methods of production. This is shown by $A(1 - \tau)$ in Equation (5).

Tax determines the long-run growth rate. The agent's total "money" comprises output after tax $Y_t(1 - \tau)$ and government transfer, G_t, overtime, t, which is spent as specified in Equation (6).

$$Y_t(1 - \tau) + G_t = C_t + I_t$$ (6)
$$K_{t+1} = (1 - \delta)K_t + I_t$$ (7)

Equation (7) shows that the agent increases capital stock in the next year, K_{t+1}, by investing the current year (I_t) with δ being the rate of depreciation. Studies have shown that the solution to maximisation problem is such that consumption, capital, and output always grow at a constant rate (w) as expressed in these equations.

$$w = \frac{Y_{t+1}}{Y_t} = \frac{K_{t+1}}{K_t} = \frac{C_{t+1}}{C_t} \qquad (8)$$

$$w = \beta[(1-\tau)A + (1-\delta)] \qquad (9)$$

Tax, in essence, negatively affects output level, and thus, economic growth rate.

Research Methodology
This study adapts Ibadin and Oladipupo (2015) in which real GDP is expressed as a function of petroleum profit tax, and VAT. Real GDP is modified in this study as GDP growth rate, being a function of personal income tax, company profit tax, petroleum profit tax, education tax, and customs and excise duties, controlling for trade volume, inflation rate, unemployment rate, and population growth rate as extraneous variables.

$$Y_t = \boldsymbol{\beta} X_t + \boldsymbol{\Omega} Z_t + \xi_t \qquad (10)$$

The dynamic form of the model is given as:

$$Y_t = \Gamma Y_{t-1} + \boldsymbol{\beta} X_t + \boldsymbol{\Omega} Z_t + \xi_t \qquad (11)$$

Y = GDP growth rate as a proxy for measuring economic growth.

Y_{t-1} = one period lag of dependent variable included as an independent variable.

X = vector of key independent variables: personal income tax, company profit tax,

     petroleum profit tax, and customs and excise duties
Z = vector of control variables: inflation rate, population growth rate, and

     unemployment rate
ξ = error term

t = time period

$\Gamma, \boldsymbol{\beta}, \boldsymbol{\Omega}$ = vector of parameters to be estimated

The result from Equation (11) cannot divulge the short-run effect of tax on growth from the long-run effect. In order to account for the short-run effect of tax amid other variables on economic growth, the generalised ARDL model takes the form

$$\Delta InX_t = \Omega_{0i} + \sum_{i=1}^{p} \Gamma_i' X_{t-i} + \sum_{i=0}^{q} \beta_i' Y_{t-i} + \epsilon_{it} \qquad (12)$$

X_t' is a vector and the variables in $(Y_t')'$ are said to be purely I(0) or I(1) variables. $\boldsymbol{\Gamma}$ and $\boldsymbol{\beta}$ are parameters to be estimated; $\boldsymbol{\Omega}$ represents the constant term; i=1, 2, …, k; (p, q) are the optimal lags for estimation; ϵ_{it} is a vector of white noise error terms. The error correction version of the ARDL model is of the form:

$$\Delta InX_t = \Omega_{0i} + \sum_{j=1}^{p} \theta_j' X_{t-j} + \sum_{h=0}^{q} \varphi_h' Y_{t-h} + \pi^* ECM_{t-1} + \xi' Z_t + e_{it} \quad (13)$$

All variables in Equation (13) except the ECM are I(1). The coefficient of the ECT, π^*, is expected to have a negative sign, be significant, and have value in the range $0 < \pi^* < 1$. The data used for this study were obtained from World Development Indicators, CBN Statistical Bulletin and Organisation for Economic Co-operation and Development. Other complementary sources include Federal Inland Revenue Board and Nigerian Bureau of Statistics.

Table 1: Variables, measurement, and description

Code	Measurement	Description
GDPG	Economic Growth	The annual average rate of change of GDP at market prices, and calculated as the difference between current and previous GDPs divided by previous GDP, all at constant prices and multiplied by 100. It is measured in percentage.
PIT	Personal Income Tax	The direct tax levied on the income of all wage income earners in Nigeria. It is a progressive form of tax.
CIT	Corporate Income Tax	This is a direct tax levied at a flat rate of 30% on the profits of all resident local and foreign companies owned by Nigerians. It is scaled down to 20% for smaller companies with turnover not exceeding ₦1m. It is measured in Naira.
PPT	Petroleum Profit Tax	It is a direct tax levied on the profit of petroleum industries in the upstream sector, payable by residents, and non-residents. Tax rate varies from 50-85% depending on the age of the company and its relationship with the NNPC. It is measured in Naira
EDT	Education Tax	The percentage of tax charged on the profits of all companies for funding tertiary education in Nigeria. The current rate is 3%.
CED	Customs and Excise Duties	This is an indirect tax charged on imported goods and services. Tax rate ranges from 2.5 to 100% depending on the restriction placed on the product.
IFR	Inflation Rate	The rate at which the price of goods and services or the cost of living rises overtime. It affects tax taxes. It's measured in percentage.
PGR	Population Growth Rate	This is the rate at which the population of a country or a geographical area increases overtime. The more the population, the more revenue is needed to cater for them which may necessitate more tax payments.
UER	Unemployment Rate	The proportion of people who are in labour force without a gainful job to all people in labour force, stated in percentage.
TRV	Trade Volume	The sum of import and export divided by GDP multiplied by 100

Source: Authors' Compilation (2024)

Presentation and Analysis of Results

Table 2 presents the result of the descriptive statistics on GDP growth rate (GDPG); the five tax components: personal income tax (PIT), corporate income tax (CIT), petroleum profit tax (PPT), customs and excise duties (CED), and education tax (EDT); and the four non-tax control variables: inflation (IFR), population growth (PGR), unemployment (UER), and trade volume (TRV). The Nigeria economy recorded a dismal performance by having a negative GDP growth rate. It is evidence of economic downturn during the period under investigation. While this may be due partly to political instability, insurgency, and insecurity, global uncertainty could also be a factor. The highest GDP growth rate during the period is 15.33%.

Table 2: Descriptive statistics

	GDPG	CPT	PIT	PPT	IFR	PGR	EDT	CPI	CED	TRV	UER
Mean	4.17	1.97mill.	11.6mill.	3.3mill.	17.93	2.58	96915	112.16	412903	34.02	4.88
Median	4.23	1.27mill.	7.15mill.	3.6mill.	12.88	2.57	52348	70.02	269326	37.02	3.83
Maximum	15.33	9.96mill.	36.9mill.	4.9mill.	72.84	2.68	279359	361.20	884760	53.28	10.50
Minimum	-2.04	140463	112371	1.16mill.	5.39	2.49	12165	2.73	169327	7.78	3.59
Std. Dev.	4.02	2.36mill.	12.29mill.	1.15mill.	16.12	0.07	86849	107.58	251892	12.31	2.14
Skewness	0.50	2.24	0.79	-0.47	2.22	0.18	0.76	1.00	0.60	-0.57	1.56
Kurtosis	3.26	7.25	2.20	1.94	6.89	1.65	2.02	2.78	1.60	2.52	3.75
J-Bera	1.49	52.48	4.32	2.74	48.01	2.69	4.50	5.57	4.64	2.13	14.21
Prob.	0.47	0.00	0.12	0.25	0.00	0.26	0.11	0.06	0.10	0.34	0.00
CoV (%)	96.4	119.7	106.0	34.9	89.9	2.7	89.6	95.9	61.0	36.2	43.8

Source: Authors' Compilation (2024)

Seven of the variables have skewness around zero, indicating normal distribution. Four of the variables portray mesokurtic distribution with values hovering around 3. Both the values on skewness and kurtosis of the dependent variable are about the normal measure of each of the statistics. Coefficient of variation is a measure of variability of data points around the mean. A value less than 100% is said to have low variability while a value above 100% implies high variability. All the variables with exception of two have coefficients of variation below 100%, which implies that they are not far from the mean. Jarque-Bera statistic is a further proof of the normality of the residuals. All variables except three of them have the probability of Jarque-Bera statistic to be greater than 0.05, implying a normal univariate distribution.

From the results of the unit root test in Table 3, all the variables except PGR are I(1). PGR is I(0). The ADF unit root test indicates I(0) for UER while the KPSS returns I(1), which is the worst scenario that this study aligns with. The coefficient

of variation (CoV) is a measure of relative variability. It is used in comparing the degree of variation in the data.

Table 3: Unit root results

Variable	Level				First Difference			
	ADF		KPSS		ADF		KPSS	
	t-stat	5% CoV	t-stat	5% CoV	t-stat	5% CoV	t-stat	5% CoV
GDPG	-3.448	-3.558	0.245	0.146	-9.296	-3.563	0.094	0.146
PIT	-0.559	-3.558	0.377	0.146	-4.725	-3.563	0.043	0.146
CPT	-2.285	-3.558	0.259	0.146	-5.646	-3.563	0.073	0.146
PPT	-2.909	-3.558	0.251	0.146	-6.047	-3.563	0.041	0.146
EDT	-3.307	-3.558	0.188	0.146	-7.216	-3.563	0.036	0.146
CED	-1.762	-3.558	0.248	0.146	-4.692	-3.563	0.118	0.146
TRV	-2.361	-3.558	0.811	0.146	-5.558	-3.568	0.014	0.146
IFR	-2.644	-3.558	0.372	0.146	-9.315	-3.588	0.081	0.146
PGR	-4.417	-2.968	0.124	0.146	-	-	-	-
UER	-4.886	-4.859	0.176	0.146	-	-	0.104	0.146

Source: Authors' Compilation (2024)

Table 4 presents the results of cointegration test from both Hansen and Phillip-Ouliaris. The null hypothesis in Hansen specifies series as cointegrated but Phillips-Ouliaris tests the null hypothesis of the series not cointegrated. Accordingly, the null hypothesis in Hansen cannot be rejected at 5% critical value while the null hypothesis in Phillips-Ouliaris test can be rejected at 5% critical value. Cointegrated variables have long-run equilibrium relationships in a model and confirms the suitability of the estimation technique. The ARDL bound test for cointegration and the results presented in the Table 4 confirm the existence of cointegration. The computed F-stat of 6.57 is greater than the upper bound value of 3.79 at 5%. This implies that the variables are cointegrated and have long-run equilibrium relationship.

Table 4: Result of Cointegration Tests

Hansen		Phillips-Ouliaris		ARDL Bound	
Test-Statistic	P-value	Test-Statistic	P-value	F = 6.57	
LC = 0.1194	0.200	tau = -6.3276	0.006	Critical Value	
		z = -34.3002	0.011	Bounds at 5% SL	
				I(0)	2.62
				I(1)	3.79

Source: Authors' Compilation (2024)

The study estimates the specified models using the DOLS technique. The result of model estimation presented in Table 5 shows that personal income tax (PIT) has a significantly positive effect, while education tax (EDT) has a positively insignificant effect on economic growth. The result also shows that while petroleum profit tax (PPT) has negatively insignificant effect, corporate income tax (CIT) as well as customs and excise tax (CED) have negatively significant effect on economic growth. It is also revealed from the result that trade volume (TRV) has positively insignificant effect while domestic investment (GFCF) has negatively insignificant effect. Unemployment was found to be negatively insignificant while inflation (IFR) and population (PGR) negatively and significantly influenced economic growth. The low value of the Adjusted R-square can be analysed with the number of statistically significant variables. The ARDL model gives reliable results of the short-run effects of the variables.

Table 5: Result of model estimation from DOLS

	Dependent variable: GDPG		
IV	Coefficients	t-statistic	p-value
C	820.4160**	3.002767	0.0398
CIT	-18.00767***	-4.855849	0.0083
PIT	25.65363**	3.030929	0.0387
PPT	-1.062569	-0.106747	0.9201
CED	-59.51667**	-3.869618	0.0180
EDT	6.291522	1.599666	0.1849
GFCF	-0.386331	-0.047775	0.9642
TRV	0.019222	0.154570	0.8846
IFR	-0.264641*	-2.280217	0.0848
PGR	-92.55276*	-2.227525	0.0899
UER	-2.01328	1.07234	0.3444
Adjusted R-square = 0.44			

*, **, *** indicate significance at 10%, 5%, 1%, respectively
Source: Authors' Compilation (2024)

Table 6 shows that there is absence of serial correlation in the model, to mean the non-rejection of the null hypothesis at 5% critical value. The probability value of Q-statistic in both cases are greater than 0.05. Also, the normality of the residuals is ascertained since the probability value of Jarque-Bera statistic is greater than 0.05.

Table 6: Model Diagnostic Results

	Statistic		P-value
Autocorrelation	Q-statistic =	2.689	0.101
	Q-statistic =	0.032	0.857
Normality	JB-statistic =	0.087	0.958

Source: Authors' Compilation (2024)

The result of model estimation from ARDL is presented in Table 7 and Table 8. It is only personal income tax (PIT) that has positively significant effect on economic growth in the short-run. In the long-run, PIT influences economic growth positively, although not significant. Petroleum profit tax (PPT) has a positive influence on economic growth but not significant in both the short-run and long-run as well. Education tax (EDT), corporate income tax (CIT) as well as custom and excise duties (CED) all exert negative influence though insignificant in both the short and long-run on economic growth. Domestic investment and trade volume have positive but insignificant effect on economic growth. Inflation has negatively significant effect only in the short-run. Unemployment and population growth have negatively insignificant influence on economic growth not only in the short-run but in the long-run also. The coefficient of the error correct term lagged one period is negative, significant, and lies in the acceptable range of between 0 and 1. This confirmed a strong long-run relationship among the variables as well as the possibility of adjustment to long-run equilibrium path whenever there is a short-run deviation. The ECM indicates the speed of equilibrium adjustment could complete in about one and a half years.

Table 7: Short-run results of ARDL-ECM

Variable	Short-run Model		
	Coefficients	t-stat	P-value
D(CIT)	-0.6923	-0.6278	0.5376
D(PIT)	19.6460**	2.1878	0.0414
D(PPT)	2.1664	0.8941	0.3825
D(CED)	-0.6946	-0.1257	0.9013
D(EDT)	-0.5001	-0.2845	0.7791
D(GFCF)	0.00009	0.8858	0.3868
D(TRV)	0.0232	0.2769	0.7849
D(IFR)	-0.1424*	-1.7850	0.0902
D(PGR)	-19.3249	-0.7047	0.4896
D(UER)	-1.1677	-1.2632	0.2218
ECM	-0.862461***	-4.1028	0.0006

***, **, * indicate significance at 1%., 5%, 10%, respectively
Source: Authors' Compilation (2024)

Table 8: Long-run results of ARDL model

| Variable	Long-run Model		
	Coefficients	t-stat	P-value
CIT	-0.8027	-0.5974	0.5573
PIT	2.5713	1.3126	0.2049
PPT	2.5119	0.8475	0.4073
CED	-0.8053	-0.1272	0.9001
EDT	-0.5799	-0.2774	0.7844
GFCF	0.00009	0.8882	0.3855
TRV	0.0269	0.2797	0.7827
IFR	-0.1651	-1.6384	0.1178
PGR	-22.4067	-0.6396	0.5300
UER	-1.3540	-1.1735	0.2551
C	16.4886	0.1843	0.8557

Source: Authors' Compilation (2024)

The summary of the post estimation results displayed in Table 9. The null hypothesis of no specification error in the models cannot be rejected at 5% level [F-statistic = 1.1676; p-value = 0.334]. This indicates that there is no specification error in the models. Also, there is absence of partial autocorrelation in the residuals [Q-stat = 0.0187; p-value=0.891]. Similarly, there is absence of serial correlation [F-stat = 0.1276; p-value=0.881]. The result also shows that the residuals are homoscedastic [F-stat = 0.7754; p-value = 0.471]. Figure 1 portrays stability of the model. The trend line is closely around the mean value of zero, and within the upper and lower CUSUM lines.

Table 9: Result of the diagnostic tests

TEST	Statistic	P-value
Linearity Ramsey RESET	F-stat (1.1676)	0.334
Correlogram of residuals	Q-stat (0.0187)	0.891
Breusch-Godfrey Serial Correlation LM Test	F-stat (0.1276)	0.881
Heteroscedasticity ARCH-LM	F-stat (0.7754)	0.471

Source: Authors' Compilation (2024)
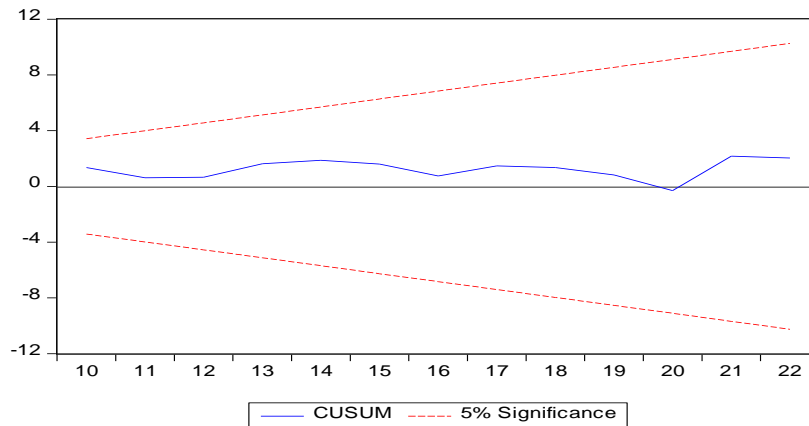
Figure 1: Diagnostic Result: Recursive Residual CUSUM

The findings from the regression analysis provide insights into the influence of various tax components on economic growth with consideration on domestic investment, trade volume, population, inflation, and unemployment in Nigeria. Firstly, Corporate Income Tax appears to have a significant negative influence on economic growth in line with Fuest and Riedel, (2020); and Eneche and Stephen (2023). This aligns with existing research suggesting that high corporate taxes can deter investment and hinder overall economic growth. Conversely, Personal Income Tax demonstrates a positive and statistically significant influence on economic growth. This result aligns with Johansson et al. (2008) but in conflict with Maganya (2020). This suggests that revenue from personal income tax could potentially stimulate economic activity through public investment and social welfare programmes.

Petroleum Profit Tax (PPT) exerts a positive, but insignificant influence on economic growth. This might imply that changes in petroleum profit tax rates may not have a substantial influence on overall economic growth in Nigeria. The positive influence of PPT corroborates with Adefolake and Omodero (2022). Similar finding on Customs and Excise Duties shows an insignificantly negative influence on economic growth. This corroborates Nicita et al. (2011) which implies that high import tariffs and excise duties could dampen trade activities and consequently hinder economic growth in the country. Education Tax displays a negative, though not statistically significant influence on economic growth. This agrees with Johansson et al., (2008). Domestic investment and trade volume, despite having a positive influence on economic growth, the influence doesn't appear to be substantial enough to influence economic growth. This suggests that

there might be other complementary factors to consider to allow the influence of domestic investment and trade volume to be meaningfully and substantially felt on the overall economic growth trajectory in Nigeria. Inflation shows a significant negative impact on economic growth in line with Kumar and Woo (2010). High inflation rates could erode purchasing power and reduce consumer confidence, thereby hampering economic growth. Population Growth Rate exerts a negative influence on growth although not statistically significant as found in Bloom et al. (2003). This finding contrasts with some literature suggesting that population growth can stimulate economic growth through increased labor supply and consumption. This depends on the skillfulness and resourcefulness of the population. Lastly, Unemployment Rate demonstrates a negative influence, implying that high unemployment rates could hinder economic growth. However, this effect is not statistically significant at conventional levels. This is in line with Blanchard and Summers (1986). The way and manner fiscal policy of taxation is conducted around the complementary variables in this study matters for economic growth. It is very shocking that most of these tax components have negative effect contrary to expectation. Where the effect is even positive, it's mostly statistically insignificant. Given the above, there exist a complex interplay between taxation, domestic investment, trade, inflation, unemployment, population, and economic growth in Nigeria. This study reveals the level of effectiveness and efficacy of fiscal policy of taxation. Appropriate authority should take necessary measure to ensure that the fiscal policy on taxation produces the desired growth effect on the Nigerian economy.

Conclusion and Policy Recommendation
Considering the role of fiscal policy of taxation on the growth of any economy, this study examined the tax effect with consideration to domestic investment, trade volume, inflation, unemployment and population on economic growth. Five tax variables were used as key exogenous variables while four other non-tax variables were used as extraneous variables. The variable used as endogenous variable in each of the models is growth rate of GDP as a proxy for economic growth. Two methods of estimation were used to achieve the study objectives. The first method, DOLS, can only unfold the long-run effect of the exogenous variables on the endogenous variable while the second method, ARDL, can provide information on both the short-run and long-run effects of the exogenous variables. The result showed that personal income tax and petroleum profit tax amid other variables exerted positive influence on growth in both the short-run and long-run. Tax components such as corporate income tax, education tax as well as customs and excise duties had negatively insignificant short-run and long-run

influence on economic growth. While domestic investment and trade volume had positive effect, inflation, population, and unemployment had negative effects both in the short-run and long-run. Any deviations from the equilibrium path were completely restored in about one and a half years, given the ECM coefficient of 0.862. This result demonstrated a strong indication of long-run association between the tax and non-tax variables involved in this study.

Further investigations might be needed to assess the level of effectiveness of education tax, corporate income tax, VAT, and customs and excise duties to stimulate economic growth. The study recommends the use of optimal tax policy that will enable authorities to make use of the growth potential of fiscal policy of taxation by always ensuring that an appropriate and optimal tax rate is determined and applied for each of the various tax components to stimulate economic growth in the country.

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