

Tax Revenue and Economic Growth: Evidence from Nigeria

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Abstract

This study is an empirical investigation into the relationship between tax revenue and economic growth in Nigeria, using time series data from 1990 to 2022. Gross domestic product (GDP) growth is examined as the dependent variable, with hydrocarbon tax, company income tax, value-added tax, population growth, public expenditure, and initial GDP growth as explanatory variables. The study uses the autoregressive distributed lag (ARDL) model and the Bounds test to check for a long-term connection between the variables. Hydrocarbon and value-added taxes positively impact GDP growth in the short run, while company income tax is statistically insignificant. In the long run, hydrocarbon and value-added taxes negatively affect GDP growth, while company income tax positively contributes. Public expenditure has an unexpected negative effect on GDP growth, and population growth shows mixed results. The study concludes that effective tax policies, including public education, broadening the tax base, and imposing penalties for tax evasion, are essential for leveraging hydrocarbon and value-added taxes to foster economic growth in Nigeria.

Keywords: Tax Revenue, Economic Growth, ARDL Model, Public Expenditure

1. Introduction

Taxation is often considered a means of redistributing wealth transferred from the economy's private to public sectors [1,2]. This redistribution assists the country in reaching its economic objectives – reduction in the level of income disparity and social objectives – supply of necessary services and infrastructures: health care services, road and infrastructure [2,3]. Through the reallocation of wealth, the imposition of taxes has also proven useful in regulating businesses in the economy [3,4.] While protecting new and local industries from unhealthy competition and rivalry.

Taxation is a compulsory, non-repayable financial charge levied by the government on citizens, corporate entities, businesses or possessions that yield revenue. Taxation, as an economic term, relates to all sorts of compulsory levies, from earnings to capital profits to property taxes [5]. Once levied, taxes require payment from every taxable person. This could explain why individuals with taxes levied on them often feel burdened. The fact remains that the amendments are not deliberate but rather a mandate imposed by a legislative authority through its appointed agents [6-9]. For instance, the Nigerian government has the legal authority to

impose various taxes on its citizens as it deems appropriate [10]. The emphasis is on the method of imposition. Taxes are categorised as either direct taxes or indirect taxes. The direct taxes are levied on taxpayers' personal or corporate income, that is, precisely attributed to an individual or an organization using a document known as assessment notification to remit payment. Therefore, the notification of such tax payments must have reached the taxpayer. Direct taxes are paid directly to the government by the payers [11].

Conversely, indirect taxes are levied on the sale of goods and services, or trading that involves profit/loss. The tax burdens here are not borne by the people or entities upon which taxes were imposed. Rather, the burdens are transferred to other individuals, for instance, the final consumers in place of the initial buyer [11,12]. Anisere-Hameed mentions that direct and indirect taxes differ in terms of the knowledge of taxpayers or the knowledge of the incidence of a specific tax [8]. The burden is either borne knowingly, as with direct taxes, or unknowingly, as regards the indirect taxes imposed. Hydrocarbon Tax (formerly called petroleum profit tax), Withholding Tax, Capital Gains Tax, Company Income Tax and Stamp Duties are examples of direct taxes imposed on

individuals and companies. Indirect taxes include Value Added Tax, Customs and Excise Duties paid and borne indirectly by the taxpayers.

The imposition of taxes affects economic activities, not limited to production, consumption, investment and employment. There have been uncertainties about the exact impact taxation could have on growth. This is because taxes, depending on their rates, have the potential to either enhance or inhibit economic growth. Oftentimes, economies consider the net impact. The tax policies implemented by the government influence choices made by individuals and firms. Gale and Samwick identify four channels through which tax implementation and policies can affect economic performance [13]. Two of these channels are *cuts in income taxes* and *tax reforms* (which included tax base broadening). It is said that well-crafted tax policies could help to increase economic growth; however, some hindrances might not ensure that all tax modifications will enhance economic performance. The reduction in income tax rates could have either a substitution effect or an income effect. With the substitution effect, the tax reductions raise the after-tax benefits of working, saving and investing [13]. Individuals and firms are thus motivated as the marginal return to work increases. In response, as leisure becomes expensive, more efforts are devoted to working, supplying labour services, saving and investing, which would increase the productive capacity of the economy and productivity [14-16]. In addition, tax cuts enhance capital formation at the supply side, and the economy's aggregate supply curve shifts outwards. The income effect of tax cuts, on the other hand, works through increasing the purchasing power of individuals. Households' disposable income increases following a tax cut, so there is more to invest and spend on goods and services. Government often employs tax cuts as an expansionary fiscal measure to boost aggregate demand and thus increase productivity since firms will want to meet the rising demands [15,16].

However, income effect of tax cuts could be negative such that an increase in after-tax income at every level of labour supply disincentivises workers and thus reduces labour supply [13,17]. As the after-tax income of individuals rises and they demand more leisure, their propensity to work, save and invest might become lessened [14,16]. With this, productivity

and thus economic growth are hampered. Such an outcome could only mean that the impact of tax cuts on labour supply is ambiguous. Furthermore, immediate government spending cuts must counterbalance tax cuts [13,15,16]. This would act against accumulating huge budget deficits and federal borrowing, which would have reduced the potential for long-term growth.

The other channel through which tax policy could influence growth is tax reforms, which involve tax cuts and a base-broadening measure. The broadening of the tax base occurs when tax expenditures are reduced or eliminated [13,14]. The reduction in tax expenditures raises marginal effective tax rates, and as expected, labour supply, saving and investment face a downturn. However, base broadening helps reallocate resources across sectors towards those having the highest economic return, thereby enhancing effectiveness and potentially increasing the overall size, capable of boosting the aggregate economy [13]. However, taxation brings some distortions, and these distortions could adversely affect economic growth. The fact that it is a fiscal encumbrance placed on individuals and property proprietors of many distortions. Being a civic responsibility for individuals, taxes are practically unavoidable. Individuals cannot easily evade or avoid taxes. At eat-and-go stalls, individuals sometimes pay indirect taxes (sales tax) at the end of their meal. The burden could also reflect on a country's human resources when labour chooses to prioritise leisure over work [18].

In Nigeria, budgetary revenues are derived from different types of taxes, with its primary source from the petroleum profit taxation, import and excise duties and mining rents and royalties. The Nigerian economy imposes taxes on both income and consumption. The income taxes are levied on net income from labour and capital over a particular time, usually annually. The consumption taxes, on the other hand, are levies on expenditures on the utilisation of commodities and services usually imposed at the time of purchase –either at the last point of sale to the end customer, or on intermediate transactions among businesses, or by levies on specific goods or services, including excise taxes, customs fees and import tariffs (Organisation for Economic Co-operation and Development *OECD*, 2014) [19].

Tax Type	Overview/Objectives	Rate
Companies Income Tax (CIT)	Levied on company profits. Governed by the CIT Act.	30% of assessable profits, varies by turnover.
Personal Income Tax (PIT)	Applies to individuals, families, trustees, and others. Administered by states and FIRS.	7–24% based on income; minimum 1% for income < ₦300,000.
Capital Gains Tax (CGT)	Levied on gains from the disposal of assets, with exemptions.	10% flat rate; may vary with asset holding period.
Hydrocarbon Tax	Tax on upstream petroleum profits. Exemptions apply to specific asset types.	50% for PSC; 65.75% (first 5 years), 85% (after); 30% for upstream profits.
Tertiary Education Tax	Levied on companies to fund education.	2% of assessable profits.
Withholding Tax (WHT)	Deducted at source on dividends, interests, etc. Used for advance income tax.	5–10% depending on the transaction type.

National Information Technology Development (NITD) Levy	Applies to select firms (e.g., telecoms, banks) with ₦100m plus turnover.	1% of profit before tax.
Source: Author’s compilation based on Adefolake and Omodero (2022) & Federal Inland Revenue Service <i>FIRS</i> , (2023) [2,20].		

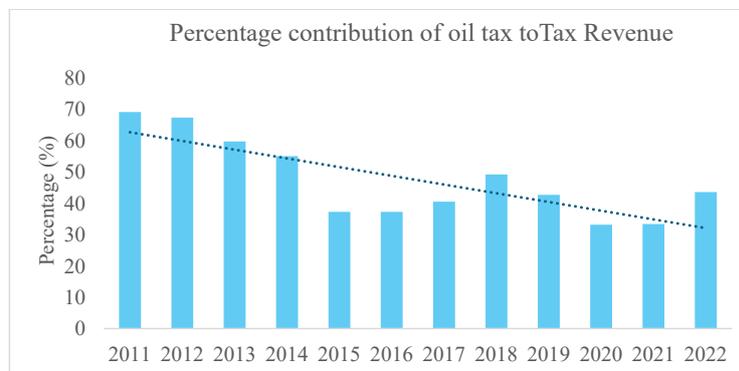
Table 1.1a: Composition of Income (Direct) Taxes in the Nigerian Tax System

Tax Type	Overview/Objectives	Rate
Value Added Tax (VAT)	Imposed on most goods/services, excluding exempted items.	5% standard; 0% for some exports.
Stamp Duties	Levied on legal documents and financial transactions.	Varies by document type.
Source: Author’s compilation based on <i>FIRS</i> (2023).		

Table 1.1b: Composition of Consumption (Indirect) Taxes in the Nigerian Tax System

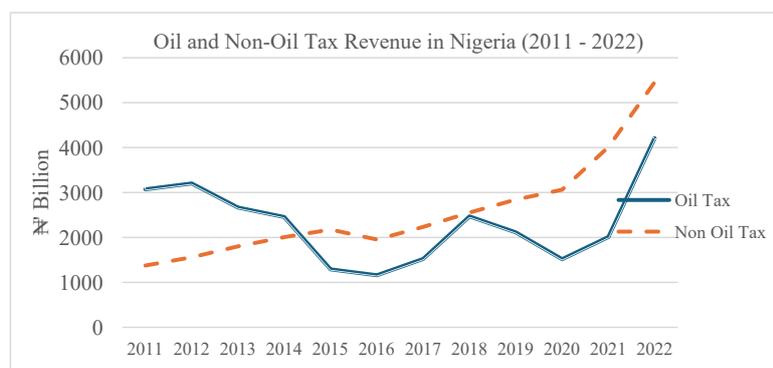
¹The tax on petroleum profit accounts for 65% of the budgetary revenues. The federally collected revenue in Nigeria has been either oil revenue or non-oil revenue since revenue from the oil industry is seen as the major driver of revenue in the economy [5]. The oil revenue is said to cover the income earned by oil and gas operations, while the non-oil revenue refers to any income earned from other sources apart from the country’s oil and gas activities. The hydrocarbon tax has certain features owing to the distinctive attributes of the oil sector. Festus and Samuel opine that the company income tax (CIT) could have been the main source of income in Nigeria. However, the non-compliance with tax laws and reg-

ulations by taxpayers has limited the contribution of CIT to total revenue generation. Individuals who are self-employed and those in the unquoted private companies’ group mostly evade tax [1]. Entities subject to PPT are exempt from Companies Income Tax (CIT) on the same income. Certain profits are exempt from Corporate Income Tax if they are not generated from the company’s trade or business activities, such as those of a cooperative society. To support the foregoing, Studies have shown that the hydrocarbon tax has been the primary source of revenue to the Nigerian economy, while the company income tax contributes mainly to the non-oil revenue [8,22]].



Source: Author’s computation from *FIRS* (2022).

Figure 1: Percentage Composition of Oil Tax to Total Revenue (2011- 2022)

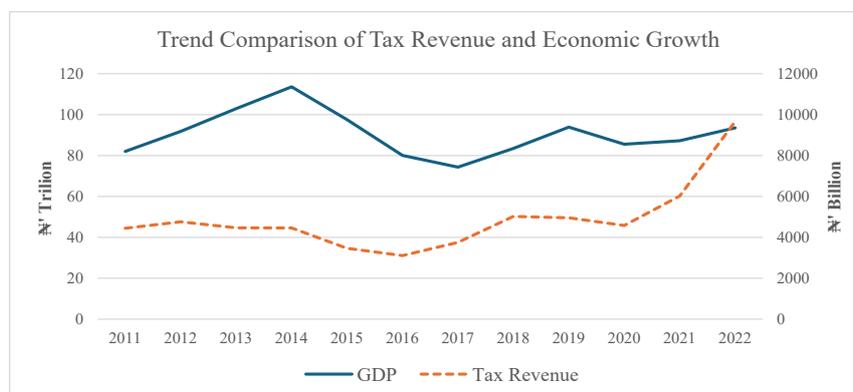


Source: Author’s computation from Federal Inland Revenue Service [*FIRS*] (2022).

Figure 2: Oil and Non-Oil Tax Revenue in Nigeria (2011-2022)A

Figure 1 above illustrates the percentage of oil tax contribution to total tax revenue over the years. Oil tax comprised more than half of the total tax generated for four consecutive years from 2011 to 2014. Although the percentage share decreased in subsequent years, it remained relatively high, averaging

40%. The decline in the percentage share stemmed from a reduction in funds generated by the oil sector, as indicated in Figure 2, and a corresponding increase in revenue from other non-oil sources. Over the last decade, there has been a significant rise in revenue from sources outside the oil sector.



Source: Author's computation. FIRS (2023) and World Bank Development (2023).

Figure 3: Trend Composition of Tax Revenue and Economic Growth (2011-20220)

Figure 3 above illustrates the relationship between tax revenue trends and the country's economic growth, as indicated by gross domestic product (GDP). The comparison highlights how fluctuations in tax revenue may correspond with changes in economic performance, providing insight into the potential impact of fiscal policies on broader economic outcomes. A strong alignment between tax revenue and GDP growth could suggest that higher tax collection is associated with economic expansion, while discrepancies may indicate inefficiencies or structural issues within the economy's fiscal system. This brings us to the ongoing debate regarding the contribution of tax policies to economic growth.

In some developed economies, tax revenue has been a significant driver of economic development. For instance, the United Kingdom generates three-fifths of its 2022/23 revenue from income tax, National Insurance contributions (NICs), and Value Added Tax (VAT), accounting for 40% of its GDP [24]. In contrast, in developing countries, particularly in sub-Saharan Africa, taxes are often seen as a hindrance to growth rather than a facilitator, as their revenues are declining [25]. The dwindling level of tax revenue generation in developing countries has made it difficult for taxes to be used as instruments of fiscal policy for the achievement of economic development [26]. In Nigeria, the impact of tax income on fostering growth and development is not perceived. Onakoya and Afintinni, Anisere-Hameed, Nwachukwu, and this has been attributed to poor administration, tax non-compliance, corruption of tax officials, poor accountability, as well as the poor collection method [1,8,27].

In line with recent institutional developments, Nigeria has embarked on a series of tax reforms aimed at improving revenue mobilisation, expanding the tax net, and correcting the distortions in the fiscal system. These developments, notably the introduction of the Tax Reform Bill, were designed to foster a tax climate that supports labour productivity, investment, and entrepreneurship [28]. These changes represent

updates in tax laws, policies, regulations, and initiatives. Key developments include the introduction of the Tax Reform Bill, the implementation of carbon tax policies, the issuance of excise duties on non-alcoholic beverages, and the 2022 Finance Bill, among others. The establishment of the Presidential Committee on Fiscal Policy and Tax Reforms in 2023, chaired by Taiwo Oyedele, marks a significant step in aligning the Nigerian tax system with international best practices. The reform initiative seeks to simplify the tax structure, eliminate multiple taxation, and enhance the efficiency of tax administration by harmonising revenue collection functions across federal and subnational governments. A major objective is to increase the tax-to-GDP ratio from its current level of approximately 10% to at least 18% by 2026, in line with the African average [29,30]. This ongoing reform underscores the government's recognition of the critical role taxation plays in sustainable development and macroeconomic stability. All of these reforms are geared towards boosting revenue and subsequently, impact the economy as a whole. The question then is, "Has the Nigerian tax structure, tax revenue impacted the economy both in the short and long run?"

With a focus on tax structure, tax revenue on growth both in the short run and long run, this study significantly contributes to the budding literature on tax revenue and economic growth in Nigeria, as the existing studies have narrowly focussed on the long-term impact of tax revenue on economic growth reporting a positive relationship between tax revenue and economic growth, especially in the context of changing economic conditions or policy reforms Uzochukwu, Nwachukwu, a few others Ojong, Austin, Shafiq ascertain negative relationship between tax revenue and economic growth and Onakoya and Afintinni, Aliyu and Mustapha, Anisere-Hameed, Adefolake and Omodero, found it hard to conclude the effect of tax policies as the different tax components employed produced varying results and relationships to the growth of the economy [1,2,5,7,8,9,27,31]. Therefore, this study aims to empirically investigate whether tax rev-

enue has spurred overall economic growth. Specifically, the study analyses the design of the Nigerian tax structure, ascertains the effect of tax revenue on economic growth and determines the extent of the short-run and long-run relationship between tax revenue and economic growth in Nigeria between 1990 and 2022.

Following the introductory segment, this study is organised into five sections; Section Two delves into a review of the theoretical, methodological, empirical literature and the underpinning theoretical framework adopted in the study. Section Three describes the model specification, estimation and data presentation. The discussion of findings is presented in Section Four. Finally, the recommendation and conclusion is contained in Section Five based on the findings of this study.

1.1. Literature Review and Theoretical Framework

1.1.1. Theoretical Review

Over the past few centuries, economists have been preoccupied with understanding the various means of generating revenue in the face of dwindling federal government allocation. Principles and canons of taxation were put forward by Adam Smith in his book “*The Wealth of Nations*” in 1776, to various models and theories, then the shift in focus to internally-generated revenue through taxation, which has now been popularly adopted by all tiers of government, including government parastatals. This section discusses some theories on the taxation and economic growth nexus.

1.1.2. Laffer Curve Theory

Underscoring the need for tax revenue maximisation, this theory suggests that there is an optimal tax rate that maximises government revenue. That is, the change in the tax rate of government revenue has two distinct effects: the arithmetic effect and the economic effect. The arithmetic effect suggests that a lessening in tax rate will lead to a cutback in tax revenue, which is proportionate to the drop-in tax rate. The reverse holds when the tax rate increases. The economic effect, on the other hand, recognises the positive impact of a lower tax rate on labour, production and employment. The reduction, which has been attributed to the tax rate base, will stimulate economic growth by incentivising work, investment and entrepreneurship [2]. The Laffer curve proponents argued that the resulting increase in economic activity can lead to higher overall tax revenue despite lower tax rates. The result of these effects, when combined, is that the impact of a tax rate change might be less apparent. However, at a very high tax rate, the negative economic effect might dominate the positive arithmetic effect, thereby causing a decline in tax revenue [32].

1.1.3. The Expediency Theory

The expediency theory suggests that practical considerations, rather than moral and philosophical principles, should be the basis for shaping tax policies. It is imperative to ascertain that every tax policy must meet the government’s sole principle for deciding on a tax policy [33]. The need for government revenue must be the determining factor for deciding on a tax proposal. Ayuba (2014) mentions that the abstract notions of fairness or justice in taxation, in

addition to the state’s social and economic goals, should be disregarded [34]. The notion of expediency is predicated on a connection between tax liabilities and government actions [2,35]. It assumes that the members of the society should be charged for the services they are provided by the state. However, this theory does not take into consideration the principles that guide equitable tax.

1.1.4. The Ability to Pay Theory

The theory advocated by Adam Smith and many other economists suggests that individuals should be taxed in proportion to their income or wealth. Being rooted in the idea of fairness, it dictates that people with higher incomes should pay more taxes than people with lower incomes. The notion is often associated with the works of economists like John Stuart Mill (1990s); Pigou’s (1920) “*The Economics of Welfare*”, and it is widely accepted because it is predicated on individual abilities, which is adjudged to be a good measurement of one’s ability to pay [36]. Ayeni mentioned that the ability to pay theory is one of such theories that promotes income and wealth redistribution, fairness and equity, achieving the goals of fiscal sustainability, economic efficiency and social justice [37]. However, this theory favours the low-income earners more than the rich few in the society.

2. Methodological Review

2.1. Cross-National Studies

Cross-national studies on the taxation-growth nexus typically employ panel data methodologies that allow for comparisons across countries and time. Stoilova and Patonov (2013) analyse 27 European Union member states using static panel data regressions to investigate the differential effects of direct and indirect taxes on growth [38]. Their model, though straightforward, facilitated inter-country comparisons but does not account for possible endogeneity. Similarly, Macek employs cross-sectional regression for OECD countries, assessing the long-run relationship between tax structure and economic performance without dynamic modelling or correction for reverse causality [39]. In a more advanced approach, Balasiou apply both fixed effects and the Generalised Method of Moments (GMM) to estimate the effects of corporate and personal income taxes across EU countries [17]. Their dynamic panel framework allows for lagged dependent variables and corrects for potential simultaneity between taxation and economic growth, thus enhancing causal inference.

2.1.1. Evidence from Developed Countries

Studies focused solely on developed countries have ranged from static regressions to more dynamic panel models. Ferede and Dahlby, in their study of Canadian provinces, likely adopt time series or panel econometric techniques that accounted for regional heterogeneity [40]. Their focus aims at estimating the marginal cost of public funds across different tax instruments. Macek (2015) applies standard regression analysis to OECD countries, omitting the dynamic structure but exploring tax composition in relation to long-term growth [40]. In contrast, Balasiou *et al.*, (2023) offer a more robust methodological framework, using GMM to explore how the impact of taxes varies depending on the efficiency

of fiscal systems [17]. Their study stands out by integrating institutional capacity into the modelling, offering more nuanced insights for high-income economies.

2.1.2. Evidence from Developing Countries

Methodologies employed in developing countries typically rely on time series data and country-specific models. Khumbuzile and Hlalefang, analysing South Africa, utilise the Autoregressive Distributed Lag (ARDL) model to estimate both short-run and long-run relationships between taxation and growth [41]. Their model addresses stationarity issues and allows for flexible lag structures, which are suitable for small samples. Shafiq adopt a similar ARDL framework for Pakistan, supplementing it with Ordinary Least Squares (OLS) to verify robustness [42]. Likewise, Suna in the context of Turkey, employ the ARDL methodology, indicating a preference among researchers in developing countries for models that handle mixed orders of integration and small sample sizes [43]. These studies tend to rely on unit root tests, bounds testing for cointegration, and short-run dynamic adjustment models.

2.1.3. Evidence from Nigeria

In the Nigerian context, methodological approaches mirror those of other developing countries but with increasing use of dynamic time series models. Aliyu and Mustapha, Adefolake and Omodero and Suna all adopt the ARDL bounds testing technique, which has become a dominant empirical tool due to its capacity to disentangle short-run from long-run effects even in the presence of mixed integration orders [4,43]. Uzochukwu took a less technical approach, employing multiple linear regression within an ex post facto research design [5]. While straightforward, this approach is often criticised for not addressing potential endogeneity or dynamic interactions. Onakoya and Afintinni apply the Vector Error Correction Model (VECM), capturing both long-run equilibrium relationships and short-term adjustments, while Austin employs a Vector Autoregression (VAR) framework with cointegration analysis to explore the intertemporal dynamics between tax revenue and output [27,31]. These models signify a gradual methodological shift towards more sophisticated time series techniques in Nigerian fiscal research.

2.2. Empirical Review

There have been a lot of empirical studies and evidence to examine taxation and economic growth nexus and prosperity across different economies with different levels of development, within varying scopes using different techniques. This section thus provides previous empirical works from cross-national studies, developed economies, developing economies and Nigeria.

2.2.1. Empirical Evidence from Cross-National Studies

The impact of revenue generated from taxation on economic growth in OECD countries was investigated by Macek [39]. The study's scope spanned from 2000 to 2011. The linearity correlation existing amongst the variables was captured using a mathematical multiple regression model. The tax variables considered include personal income tax, corporate income tax, social security contribution, property tax, val-

ue-added tax and tax on consumables. This is similar to the World Tax Index classification, except for social security contributions. Gross Domestic Product, capital accumulation, human capital and government spending were used as the economic growth variables. The empirical results revealed that the personal income tax, corporate income tax and social security contribution were detrimental to growth.

Michael and Ben carry out a panel study to examine the causes and consequences of imposing the value-added tax in 143 countries for a period of 25 years [44]. The empirical results show that the imposition of tax has a mixed but significant effect on the countries researched. For countries that had benefited from the taxes being imposed, there had been an increase in the total tax revenue, and as a consequence, the economies are witnessing growth. However, there were some other countries whose economies had been greatly affected negatively. Using a pooled panel of data, Stoilova and Patanov study the basic trends in the allocation of the total tax burden in the 27 European Union member states during the period 1995-2010 [36]. The total tax revenue was broken down into direct taxes, indirect taxes and social contributions. The impact of taxation on the EU's economic growth was examined using a regression analysis. The finding shows that the imposition of direct taxes is more efficient in supporting economic growth in the EU countries. This is because of the efficiency gains of revenue accumulation through taxation of wealth. Indirect taxes, on the other hand, are inefficient due to their shrinking effects on production and sales.

2.2.2. Empirical Evidence from Developed Economies

Ferede and Dahlby study the nexus between tax rates and economic growth in ten Canadian provinces from 1977 to 2006 [40]. It is revealed that there exists a link between these variables. It is concluded that taxes could either boost or inhibit economic growth. It is mentioned that higher taxes on corporate profits would restrict economic growth, putting off both domestic and foreign investors. Taxes could also reduce the efficiency of resource allocation, which could adversely affect the efficiency of the production components. On the other hand, taxes could also boost economic growth by increasing overall factor productivity. In a similar vein, a study by Alesina examine the relationship between taxation and economic growth across several OECD countries [45]. The study finds that higher taxes on capital and labour income negatively affects economic growth in the long run. They conclude that while taxes can be used to fund public goods and services, excessive taxation, particularly on income and capital, may reduce the incentives to work, save and invest, thereby hindering overall economic growth in developed economies.

2.2.3. Empirical Evidence from Developing Economies

Suna investigate the effect of direct and indirect taxation on economic growth in Turkey while employing the Auto-Regressive Distributed Lag (ARDL) econometric technique [43]. The empirical investigation reveals that the Turkish economy is better off with the imposition of indirect taxes rather than direct taxes. This is because indirect taxes has a positive and significant impact on the country's growth,

while direct taxes, on the other hand, reduce disposable income, which in turn adversely affects the aggregate demand for goods and services. Thus, its impact on economic growth is detrimental. In addition to other fiscal policy variables, Shafiq examine the impact of tax revenue on Pakistan's economic growth using data spanning from 1985 to 2021 [42]. It is proposed that a high tax rate has the tendency of slowing economic growth, and that government policy objectives could be achieved most effectively by lowering tax collection costs and pursuing an efficient taxation system.

2.2.4. Empirical Evidence from Nigeria

Adefolake and Omodero assess the effects of tax revenue on the economic growth of Nigeria from 2000 and 2021. Specifically, the study considers revenue generated from corporate income tax, petroleum profit tax, and value-added tax [4]. The reason for the choice is that they have been considered the most efficient tax forms, having a great relevance in generating revenue for the government. The cointegration analysis reveals that a long-run relationship exists between the variables. In evaluating the effects of the tax revenue on economic growth with the Vector Error Correction model, it is concluded that tax revenue would improve the workings of the economy, leading to economic growth, as the effects of petroleum profit tax and Value Added Tax are found to be positive and significant, although the corporate income tax has a negative and significant relationship with economic growth. Yadawananda and Achal investigate both the short-run and long-run relationship between Nigeria's tax structure and growth performance at the state level [46]. The scope of the study is from 1991 to 2016. The empirical results reveal that commodity and service taxes could be inflationary and are thus bad for the economy. However, the imposition of income taxes is found to be beneficial as it influences savings and labour supply, which tends to promote economic growth.

With similar objectives, Uzochuckwu examine taxation and its implications for the Nigerian economy [5]. The authors use an ex-post-facto research design, with data spanning 10 years, from 2011 to 2020. Multiple Linear regression is the method of econometric analysis employed. It is found that taxation has a positive and significant effect on economic growth in Nigeria. The authors attribute the positive contribution to the ease and flexibility of the tax system used in the country, which enables prompt and regular payments from the taxpayers. It is assumed that taxpayers are aware of the social, economic and growth benefits of their civic responsibility to the government. However, this is different from the conclusion made by Austin, as it is mentioned that the economy has a weak tax collection system [31]. With the empirical evidence provided, it can be said that the impact of taxation and tax revenue generated on economic growth and development has been mixed and inconclusive. The results are different across countries and the different tax components. Taxes could either boost economic growth, as evidenced by Awa and Ibeanu, Uzochuckwu, Nwachukwu or inhibit growth as studies Ojong, Khumbuzile and Hlalefang Austin, Balasiou have revealed. Most of the studies reviewed, how-

ever, report mixed effects of taxation on economic growth as their conclusion [1,5,7,17,31,40].

2.3. Theoretical Framework

The study's theoretical framework aligns with the expediency theory, which holds that practical considerations form the basis of tax policy implementation, rather than economic and social objectives. Government revenue should be the sole deciding factor in the tax system. The revenue generated can then be channelled into achieving fiscal objectives. According to this theory, the tax policies that economies should implement must be those that effectively generate the necessary funds to support the government's fiscal and economic objectives. In Adam Smith's words, the tax should be based on the principles of 'economy' and 'practicality'. A practical progressive tax system reduces inequality by redistributing income from the 'few' rich to the many 'poor'. For this study, however, the components of the tax burden to employ are the top three tax revenue contributors, after examining the tax structure of the Nigerian economy. These Components have been characterised as the most efficient and relevant in generating revenue for the government [4]. These include the oil tax revenue (hydrocarbon tax), the company income tax, and the value-added tax. This is an effort to achieve a more reliable conclusion on the impact of taxation revenue on the Nigerian economy.

2.4. Model Specification, Estimation and Presentation

2.4.1. Data and Model Specification

Drawing on the expediency theory as the study's theoretical framework, this study specifies a linear model such that economic growth is determined by tax revenue and other control variables. This study adopts a framework similar to Stoilova and Patanov, Shafiq, thus specifying the model as [38,42].

$$GDP_t = F(GDP_{t-1}, POP_t, HCT_t, VAT_t, CIT_t, PEXP)$$

The study model's economic growth using gross domestic product (GDP_{t-1}) as the dependent variable, with the initial gross domestic product growth rate included as a determinant. Key explanatory variables are Nigeria's three major tax components: hydrocarbon tax (HCT), company income tax (CIT) and value-added tax (VAT), representing oil and non-oil tax revenues. Population growth and public expenditure are also incorporated as control variables, with public expenditure reflecting the government's utilisation of tax revenue for fiscal objectives. These variables were selected based on prior empirical [5,31,46]. The addition of the extent of public spending is based on the premise that the government will spend most, if not all, of what it receives as revenue. Since the government's intention of taxing the residents is to generate the required funds needed for fulfilling its fiscal objectives, the extent of its spending from what it receives as revenue should be a factor in determining the rate of economic growth. This spending makes evident the budgetary allocation of the government and how well it is determined in achieving its goals.

Variables	Descriptions	Sources of Data
GDP	Gross Domestic Product Growth	CBN, Statistical Bulletin
GDP _{t-1}	Initial Gross Domestic Product Growth	CBN, Statistical Bulletin
POP	Population Growth	NBS
HCT	Hydrocarbon Tax	FIRS
CIT	Company Income Tax	FIRS
VAT	Value Added Tax	FIRS
PEXP	Public Expenditure	CBN, Statistical Bulletin

Source: Author's compilation based on data from the Central Bank of Nigeria Statistical Bulletin (2022), Federal Inland Revenue Service (2022), and Nigeria Bureau of Statistics (2022) [47].

Table 2: Variables and Definitions

In modelling the specified functional form, the autoregressive distributed lag (ARDL) model and the Bounds testing cointegration approach developed by Pesaran and Shin are proposed [48]. Hence, a general specification of the ARDL model is given as:

$$\Delta GDP_t = \alpha_0 + \sum_{j=1}^{n1} \alpha_{1j} \Delta GDP_{t-j} + \sum_{j=0}^{n2} \alpha_{2j} \Delta POP_{t-j} + \sum_{j=0}^{n3} \alpha_{3j} \Delta HCT_{t-j} + \sum_{j=0}^{n4} \alpha_{4j} \Delta CIT_{t-j} + \sum_{j=0}^{n5} \alpha_{5j} \Delta VAT_{t-j} + \sum_{j=0}^{n6} \alpha_{6j} \Delta PEXP_{t-j} + \beta_1 GDP_{t-1} + \beta_2 POP_{t-1} + \beta_3 HCT_{t-1} + \beta_4 CIT_{t-1} + \beta_5 VAT_{t-1} + \beta_6 PEXP_{t-1} + \epsilon_t$$

where $\alpha_0, \alpha_1, \alpha_2, \alpha_3,$ and α_4 captures the short-run dynamics, and $\beta_1, \beta_2, \beta_3,$ and β_4 are the long-run parameters provided that there is a long-run cointegrating relationship from the Bounds test. In that case, the error-correction model (ECM) is given as

$$\Delta GDP_t = \alpha_0 + \sum_{j=1}^{n1} \alpha_{1j} \Delta GDP_{t-j} + \sum_{j=0}^{n2} \alpha_{2j} \Delta POP_{t-j} + \sum_{j=0}^{n3} \alpha_{3j} \Delta HCT_{t-j} + \sum_{j=0}^{n4} \alpha_{4j} \Delta CIT_{t-j} + \sum_{j=0}^{n5} \alpha_{5j} \Delta VAT_{t-j} + \sum_{j=0}^{n6} \alpha_{6j} \Delta PEXP_{t-j} + \lambda \widehat{ECT}_{t-1} + \epsilon_t$$

such that the long-run dynamic relationship is compressed into the error-correction term, ECT, with λ representing the speed of adjustment parameter.

Beyond being a technique that has been adapted by previous related studies, the choice of the ARDL stems from the objective of the study, as it provides a convenient framework to model both the short-run and long-run (if there is cointegration) dynamic relationship between tax revenue and economic growth in Nigeria between 1990 and 2022.

In addition, ARDL allows for regression of series with mixed order of integration provided they are I (0) and I (1), that is, stationary at levels or integrated of order zero, and stationary at first difference or integrated of order one respectively.

2.4.2. Descriptive Statistics

Before reporting the results from the model, a brief discussion of the summary statistics for the empirical analysis is undertaken. Table 3 shows that between 1990 and 2022, **GDP** had an average of ₦1,083.05 billion, reflecting moderate economic output with a standard deviation of ₦433.78 billion, indicating significant variation. The positive skewness (1.07%) suggests occasional periods of higher growth. Initial GDP (GDP_{t-1}) averages ₦1,067.28 billion, showing stability in Nigeria's economic growth. The skewness of 1.22 points to some positive deviations in growth over time. Population Growth (POP) averages 2.73%, indicating a high growth rate that puts pressure on resources. The standard deviation of 0.081 suggests stability in population growth. Hydrocarbon Tax (HCT), averaging ₦1,334.55 billion, is the largest revenue source but highly volatile (standard deviation of ₦1,155.64 billion). The positive skewness (0.49) indicates occasional spikes in revenue. Company Income Tax (CIT) averages ₦555.23 billion with a high standard deviation (₦664.55 billion), reflecting fluctuations due to changes in corporate profits. The positive skewness (1.33%) suggests some higher-than-average revenue periods. Value Added Tax (VAT) averages ₦509.70 billion, with a standard deviation of ₦622.47 billion, indicating variability in consumer spending. The positive skewness (1.66%) shows occasional revenue surges. Public Expenditure (PEXP) averages ₦96,097.31 billion, showing high government spending. The large standard deviation (₦199,275.27 billion) and positive skewness (3.01%) reflect large fluctuations in spending levels.

	Mean	Std. Dev	Kurtosis	Skewness	Minimum	Maximum	Confidence Level (95%)
GDP	1083.05	433.78	0.12	1.07	579.39	1851.08	146.77
GDP _{t-1}	1067.28	347.21	0.25	1.22	436.71	1734.67	135.54
POP	2.732	0.081	0.34	1.12	2.598	2.922	0.027
HCT	1334.55	1155.64	-0.58	0.49	26.91	4209.02	409.77
CIT	555.23	664.55	1.51	1.33	3.00	2649.19	235.64
VAT	509.70	622.47	2.79	1.66	3.26	2511.52	220.72

PEXP	96097.31	199275.27	10.25	3.01	701.10	947690.00	70659.94
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Source: Author's computation using EViews 9

Table 3: Descriptive Statistics of the Variables

2.4.3. Correlation Matrices

The correlation matrix shows the correlation coefficients among the different variables in the model. The coefficient

measures the degree of linear relationship that exists between the data variables, using Pearson's Product Moment and it is expected to range between +1 and -1.

	Gross Domestic Product	Initial Gross Domestic Product	Population Growth	Hydrocarbon Tax	Company Income Tax	Value Added Tax	Public Expenditure
Gross Domestic Product Growth	1						
Initial Gross Domestic Product Growth	0.669	1					
Population Growth	-0.783	-0.792	1				
Hydrocarbon Tax	0.720	0.736	0.901	1			
Company Income Tax	0.980	0.924	0.628	0.743	1		
Value Added Tax	0.977	0.935	0.9277	0.725	0.970	1	
Public Expenditure	-0.365	-0.562	-0.582	-0.488	-0.345	-0.333	1

Source: Author's computation using EViews 9

Table 4: Correlation Matrix

Table 4 shows that the gross domestic product has a positive correlation with all tax variables, with the company income and value-added taxes almost at a near-perfect correlation. This indicates that the imposition of these various taxes might have a positive impact on the Nigerian economy. The hydrocarbon tax has the least positive contribution; however, it is far above the average. The Nigerian government can utilise the revenue generated from these sources in enhancing the economic activities of the state, thereby promoting growth and sustainability. The extent of public expenditure, however, has a negative correlation with the rate of economic growth. This could only mean that government expenditure has not been targeted towards

improving economic prosperity, or perhaps it has not been adequate to positively influence growth.

2.4.4. Unit Root Test

To ascertain the suitability of the ARDL model for this empirical investigation, the augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) stationarity tests are carried out to robustly test for the presence of a unit root at levels and first differences. The Akaike Information Criterion (AIC) is used, based on which GDP, GDP_{t-1}, POP, and PEXP are found to be I (0) series, while HCT, CIT, and VAT are found to be I (1). Therefore, we proceed to estimate the autoregressive distributed lag model.

	Augmented Dickey-Fuller (ADF)			Phillips-Perron (PP)		
	Levels	1st Diff.	I (d)	Levels	1st Diff.	I (d)
GDP	-2.656 ^a	-	I (0)	-4.842 ^{***a}	-	I (0)
GDP _{t-1}	-3.076 ^b	-	I (0)	-1.962 ^b	-1.768 ^a	-
POP	-4.051 ^{**b}	-	I (0)	-1.731 ^a	-4.374 ^{***a}	I (1)
HCT	-1.516 ^a	-5.511 ^{***b}	I (1)	-1.635 ^a	-3.929 ^{***a}	I (1)
CIT	0.070 ^b	-4.190 ^{**b}	I (1)	2.298 ^b	-3.014 ^{**a}	I (1)
VAT	3.153 ^b	-0.881 ^b	I (1)	3.315 ^b	-1.305 ^{tb}	I (1)
PEXP	-3.469 ^{tb}	-	I (0)	-3.469 ^{*b}	-	I (0)

^{*}, ^{**} and ^{***} represent significance at 10%, 5% and 1% respectively

^a, ^b, and ^c represent specifications with intercept, intercept and trend, and none, respectively

Source: Author's computation using EViews 9

Table 5: Summary of the Unit Root Tests

The stationarity result is mixed for both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP). With the ADF test, all variables except for GDP and PEXP were non--nonstationary at levels. The other variables became stationary after the first differencing at varying levels of significance. The results from the PP test give the same conclusion. GDP and PEXP were the only variables stationary at levels.

2.4.5. Estimation Results

With the series being of different and mixed levels of integration, the study uses the most appropriate estimation technique – the Autoregressive Distributed Lag model (ARDL) in addition to the Bounds Test cointegration test to check for the presence of a long-run relationship between the variables.

Variables	Coefficients
LGDP _{t-1} (-1)	0.7366***
(0.0922)	
LOG (POP)	-0.1776
(1.1450)	
LOG (POP(-1))	6.5408***
(1.6394)	
LOG (LHCT)	0.0892*
(0.05037)	
LOG (CIT)	0.0354
(0.0223)	
LOG (VAT)	0.1302***
(0.0238)	
LOG (VAT(-1))	-0.1203***
(0.0297)	
PEXP	-0.000408***
(0.000113)	
PEXP(-1)	0.000225***
(0.000077)	
PEXP(-2)	-0.00099***
(0.000137)	
C	0.7704*** (0.2154)
R-Square	0.999654
R- Square Adj	0.999486
F-Statistic	43.31567
Prob F- Stat	0.0000
DW Stat	2.079
*, ** and *** denote 10%, 5% and 1% significance levels, respectively.	
Source: Author's computation (E-Views 9 results)	

Table 6: ARDL Results for Specified Model

The model selection order is run before analyzing using the ARDL model in Table 5. The model selection order is automatic and the optimal lag lengths have been based on the Schwarz criteria for the entire analysis. The model selection order for the specified model is ARDL (1,1,0,0,1,2). The ARDL results for the specified model are given in Table 6 above. From Table 6 above, which shows the ARDL results for the specified model, bearing in mind that LGDP is the dependent variable, the tax variables LOG (LHCT), LOG (CIT), and LOG (VAT) have positive effects on LOG (GDP). LOG (LHCT) and LOG (VAT) have a positive and significant

impact on LGDP but at different significance levels. However, LOG (CIT) shows an insignificant positive impact on LOG (GDP). The lagged one period for LOG (VAT) has a negative and significant impact. PEXP shows a negative and significant impact on LOG (GDP). There are also reports of PEXP for two lag periods. The PEXP lagged one period shows a positive impact on the current PEXP, while the PEXP lagged two periods shows a negative impact. However, both effects were significant at the 1% significance level. The initial gross domestic product growth measured by LGDPt-1(-1) has a positive and significant impact on the current rate of

economic growth. Population growth has shown a negative effect on LGDP, though insignificant. However, the lagged one period of population growth has shown a positive and significant effect on the rate of economic growth. The model has an R-squared value of 0.999654, indicating that the model can explain almost all of the variation in LGDP. The F-statistic shows that the overall significance of the model is

at 43.31567, while the DW-statistic for the model indicates no serial autocorrelation with its value at approximately two. Testing for cointegration and the presence of a long-run relationship in the model was done using the Bounds test. The null hypothesis is that there is no long-run relationship between the variables in the model. The result for the ARDL Bounds test is given in Table 7

Test Statistic	Value	K
F-statistic	9.021	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	3.03	4.06
5%	3.47	4.57
2.5%	3.89	5.07
1%	4.4	5.72
Source: Author's Computation (E-Views 9 results)		

Table 7: Summary of Bounds Cointegration Test

The bounds cointegration test in Table 7 has the F-statistic for the model exceeding the upper bound even at the 1% significance level. This means that the null hypothesis of no long-run relationship will be rejected. Therefore, the cointegrating equation, the error correction model, and the long run relationship needs to be estimated.

2.5. ARDL Cointegrating Equations and Long-Run Forms of the Specified Model

Holding LGDP as the dependent variable for the model, Table 6 shows the short-run impact and the error correction per annum. In the short run, all the tax variables show a positive impact on the level of gross domestic product measured with LGDP. However, the impact of the corporate income tax, LOG (CIT), was insignificant even at the 10% significance level. A 1% increase in the rate of the hydrocarbon tax and the value-added tax captured by LOG (HCT) and LOG (VAT) will cause an improvement in the rate of economic growth by about 0.089% and 0.13% respectively, in the short run. The extent of public expenditure by the government shown by

PEXP, will have a negative and significant effect on the rate of economic growth in the short run. A 1-point increase in PEXP will deter growth by 0.02% in the short run. This is in contrast to the *a priori* expectation. However, the lagged one-period value of PEXP shows a positive and significant impact on the economy's prosperity. A one-point increase in PEXP (-1) will cause economic growth to improve by about 0.05%. Population growth as measured by LOG (POP) has a negative though insignificant impact on GDP in the short run, such that a 1% increase in population growth will deter the rate of economic growth by 0.18% in the short run. Its lagged one-period shows a similar negative impact, though it is significant at 5%.

The error correction model (ECM) coefficient shown by Cointegration Equation (-1) measures the speed at which the adjustment from the short run to the long run is made. The ECM coefficient for the model is quite low at 26.3%, although it shows the correct negative sign and significance is at 1%.

Variables	Coefficients
DLOG (GDP _{t-1} (-1))	0.5522*** (0.1364)
DLOG (POP)	-0.1776 (1.1450)
DLOG (POP(-1))	-0.5607** (0.2305)
DLOG (LHCT)	0.0892* (0.0504)
DLOG (CIT)	0.0354 (0.0223)
DLOG (VAT)	0.1303*** (0.0238)
D(PEXP)	-0.00022*** (0.00005)

D(PEXP(-1))	0.000518*** (0.00006)
CointEq(-1)	-0.3932*** (0.0922)
Cointeq = LGDP - (0.789*LOG (GDP _{t-1})) + 8.857*LOG(POP) + 0.3388*LOG(LHCT) + 0.1342*LOG(CIT) + 0.0379*LOG(VAT) -0.0000*PEXP + 2.9252 + 0.0215*@TREND)	
*, ** and *** denote 10%, 5% and 1% significance levels, respectively. Source: Author's Computation (E-Views 9 results)	

Table 8: Cointegration Equation Results and the ECMs for the Specified Model

As stated earlier in Table 7, the null hypothesis of no long-run relationship was rejected for the model following the results of the Bounds test presented in the previous table. The coefficients for this long-run relationship are estimated in Table 8. From Table 8, it is shown that among the three tax variables, only LOG (CIT) has a significant effect on the rate of economic growth. This explains that LOG(CIT) has a long-run impact on economic growth, while LOG (HCT) and LOG (VAT) have no impact on economic growth in the long run. A 1% increase in the corporate income tax will help improve the rate of economic growth by 0.13% in the long run. The impacts of the tax variables were not consistent in both

the short run and the long run. With LOG (HCT) and LOG (VAT) having impacts only in the short run and no long run impact, LOG (CIT) has its impact on economic growth only in the long run. The control variable, PEXP, however, has both short and long run impacts on the rate of economic growth. A 1-point increase in the extent of public expenditure will cause growth to decrease minimally by 0.061%. Population growth was seen to positively impact growth in the long run, such that a 1% increase in population growth will cause the rate of GDP to increase by approximately 0.86% in the long run.

Variables	Coefficients
DLOG(GDPt-1)	0.7898***
(0.2347)	
LOG(POP)	0.8565***
(1.9524)	
LOG(LHCT)	0.3388
(0.2846)	
LOG(CIT)	0.1342*
(0.0719)	
LOG(VAT)	0.0379
(0.1287)	
PEXP	-0.000612***
(0.000204)	
C	2.9252***
(0.2323)	
*, ** and *** denote 10%, 5% and 1% significance levels, respectively. Source: Author's Computation using E-Views 9	

Table 9: Long-Run Coefficients Results for the Specified Model

3. Discussion of Findings

In line with the set objective to empirically investigate the dynamic relationship between Economic growth and tax revenue in Nigeria, the ARDL estimation technique is adopted and, in this section, the findings of this study are situated in the existing body of economic literatures related to the subject matter. First, the estimated ARDL model shows that tax revenue surely has an impact on the rate of economic growth in Nigeria. The tax variables examined have shown a positive relationship with economic growth in Nigeria over the period considered. The hydrocarbon tax and the value-added tax have positively influenced the rate of economic

growth in Nigeria in the short run. However, in the long run, the revenue from these tax variables will have negative effects on economic growth, as it has been indicated by the insignificant coefficients. It is the imposition of the company income tax that will positively influence economic growth in the long run. This indicates that the Nigerian government's reliance on tax revenue for its fiscal purposes has been positive, though with minimal effects in the short run. The revenue sourced from these taxes will be used productively to fund the government's social and economic goals. In response to the study's third objective, the generation of tax revenue has a positive short-run and long-run relationship

with the rate of economic growth. This is analogous to the conclusions made by Aliyu and Mustapha, Hohn and Dickson, Uzochukwu and Adefolake and Omodero [2,5,9,49]. Just as these studies had concluded, there is a positive relationship between the hydrocarbon tax and the value-added tax with economic growth in Nigeria. The conclusion on the company income tax has been diverse. Some studies found a negative relationship, while others found a positive and insignificant relationship, except for concluding that the effect was positive and significant [5]. For this study specifically, the company income tax has a positive impact on economic growth, but it is insignificant in the short run. Explaining the current impact of taxation on economic growth in Nigeria, given the inconclusiveness of some of the previous studies, this study concludes that the imposition of taxes on Nigerian citizens is beneficial and rewarding to the economy as a whole. The federal government, in achieving its fiscal purpose and objectives, could impose taxes while targeting the three greatest contributors: the hydrocarbon tax, the company income tax, and the value-added tax. It has been mentioned that well-designed tax policies will improve economic sustainability and growth. It could also be used to provide public goods that would otherwise not be produced by the private sector.

4. Recommendation and Conclusion

This research has been required by the inconclusiveness of the influence of tax income on Nigeria's economic growth. To carry out its operations and meet its social and economic goals, the Nigerian government has been depending on the income from several tax components. Many empirical studies have been done to determine how the action affects the economy. The outcomes, though, are varied. While some other research showed negative consequences of these policies on growth, others found it difficult to conclude. Other studies, however, found that the application of the tax policies helps the economy by promoting development and sustainability. Hence, this study aims to investigate how tax revenue affects Nigeria's economic growth. It first looks at how the Nigerian tax system is set up. Second, given the mixed and inconclusive empirical data, it investigates how taxes affect the growth rate of the Nigerian economy. Balanced data from 1990 to 2022 is used for the study, employing the Bounds test and the Autoregressive Distributed Lag estimation technique. The results show that amidst the various tax components, there are three main contributors to tax revenue generated by the Nigerian government. Consequent upon the discussion of the study's findings, the following policy recommendations are made specifically for the Nigerian government.

Organising training, seminars, and workshops will help government agencies to inform the broader public, including people and businesses, on the significance of tax income to the economy. Furthermore, the tax regulatory authorities should efficiently monitor the tax income and government spending on revenue generation to enhance the safety and security of the tax revenue purposes, therefore guaranteeing that money directed at bolstering tax regulatory authorities is not misused. Lastly, tax vacations or incentives should be granted to firms, institutions, and individuals who have

been compliant with tax payment, while imposing a stiff penalty on any individual or corporate body that indulges in any sort of tax evasion. Put another way, Nigeria would be better positioned to maximise and harness the possibilities that abound in the administration and payments of tax by her people with improvement in the service provided by tax regulatory agencies and the regulatory framework.

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