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Article

Effect of Tax Gaps on Emerging Economies: Evidence from Nigerian Economic Development

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Abstract: This study examines the effect of tax gaps on emerging economies from 2008 - 2024. Specifically, the study assessed how gaps in petroleum profits tax, education tax, national information technology development fund tax, and capital gains tax affect economic development. Ex-post facto research design was adopted, utilizing secondary data sourced from the Nigeria Revenue Service (NRS) and the Central Bank of Nigeria (CBN) Statistical Bulletin from 2008-2024. Stationarity of the data were tested using the Augmented Dickey-Fuller (ADF) method, while hypotheses were evaluated using the Vector Autoregressive (VAR) model @ 5% significant level with p-values estimated via Gauss-Newton/Marquardt steps. The findings revealed that: petroleum profits tax gap has a negative and non-significant effect on economic development in Nigeria; education tax gap has a negative and significant effect on economic development in Nigeria; national information technology development fund tax gap has a positive and non-significant effect on economic development in Nigeria. Capital gain tax gap has a positive and non-significant effect on economic development in Nigeria. By implication, shortfalls in expected revenue from the education tax have a reverse or indirect effect on economic development, while increase in expected revenue has a direct effect on economic development. The study recommends that the Nigeria Revenue Service should intensify efforts to audit and monitor the petroleum sector more strictly to reduce profit-shifting and under-reporting of taxable income by oil companies. TETFund and the Federal Ministry of Education should collaborate with NRS to ensure strict enforcement of the Education Tax Act by large corporations. The National Information Technology Development Agency (NITDA) should prioritize awareness campaigns targeting ICT companies and corporate taxpayers to increase voluntary compliance.

Keywords: Tax Gaps, Emerging Economies, Nigerian Economic Development

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1. Introduction

The origin of taxation in Nigeria dates back to the Sahara trade era and the introduction of Islam between 800AD and 1400 AD [1]. The first legal framework for taxation was however established in 1904 when Sir Lord Lugard introduced the Income Tax Act. Initially conceived as a community tax, it evolved and led to the enactment of the Native Revenue Ordinance in 1917. Following Nigeria's independence in 1960, the government promulgated three significant tax legislations: the Federal Income Tax Act

(1961) regulating personal income tax at the federal level, the Income Tax Management Act (1961) establishing administrative procedures for tax collection and assessment of corporates tax based on Companies Income Tax Act (1961) governing the taxation of corporate profits .These tax laws have now been replaced by Nigeria's new unified tax framework called the Nigeria Tax Act (2025) and its companion legislations such as the Nigeria Tax Administration Act, the Nigeria Revenue Service (Establishment) Act, and the Joint Revenue Board (Establishment) Act. These laws officially came into effect on January 1, 2026, consolidating and modernizing Nigeria's tax regime. By extension taxation serves as an instrument for economic development, capable of stimulating investment, generating employment and reducing income disparities, thereby promoting social equity [2].

As a vital instrument and primary revenue source, taxes enable governments to finance essential programs (such as healthcare and education), services (including law enforcement and public utilities), and infrastructure (like road construction and environmental protection), thereby supporting societal development. The primary purpose of government taxation is to fund public expenditure and redistribute wealth, thereby financing national development initiatives and other government capital expenditures [3]. The desire for economic development is to bring about improvements in standard of living, ensure equitable income distribution, generate sufficient employment for the citizens and overall achieve a significant increase in per capita income, which is one of the indicative measures of economic development. Economic development involves the fundamental transformation of an economy, leading to long term economic benefits. Nigeria Revenue Service (2021) reported that many taxpayers fail to pay taxes every year leading to tax gap. Tax gap is the difference between tax amounts that tax payers should pay and what they actually pay voluntarily and on time. Most of these tax gaps come from non-compliance by individuals and businesses participating in officially recorded economic activities, who are either failing to file tax returns, underreporting taxes owed on tax returns, or failing to pay taxes due on time.

The tax gaps comprising of Petroleum profit tax gap, education tax gap, National Information Technology Development Fund tax gap, stamp duties tax gap and Capital gains tax gap are exacerbated by factors such as tax evasion, avoidance and non-compliance [4]. Based on the raw data presented in Appendix A, between 2008 and 2024, the Petroleum Profits Tax Gap (PPT_TG) was the most volatile and dominant component, reaching its peak at ₦6.04 trillion in 2024, followed by ₦2.55 trillion in 2023 and ₦2.19 trillion in 2019. However, it also recorded the lowest values over the years, notably ₦-1.41 trillion in 2012 and ₦-1.23 trillion in 2020, indicating instability in petroleum revenue compliance. The Education Tax Gap (EDU_TG) peaked at ₦133.75 billion in 2021, but declined steeply to its lowest level of ₦-937.85 billion in 2024. The National Information Technology Development Fund (NITDF) Tax Gap showed relatively smaller movements, with a high of ₦30.68 billion in 2018 and a low of ₦-23.64 billion in 2024. The Capital Gains Tax Gap (CG_TG) remained the smallest throughout, with the highest value of ₦17.57 billion in 2017 and the lowest at ₦-79.93 billion in 2016.

Nigeria faces a persistent and widening gap in tax revenue collection, which poses a serious threat to sustainable fiscal development, public service delivery and economic development. Despite its vast economic potential, the country collects only about 30% of its taxable revenue, leaving a 70% shortfall that translates to an estimated ₦20 trillion in annual losses [5]. The Finance Act 2023 has harmonized the Petroleum Profits Tax Act (PPTA) with the Petroleum Industry Act (PIA) introducing key amendments. Notably, the PIA reduces tax rates for petroleum companies, imposing a hydrocarbon tax rate of 30% for onshore and shallow water operations, significantly lower than the PPTA's previous rate of 85%. Lack of clear guidelines in National Information Technology Development Act on who is liable to pay National Information Technology Development fund is a source of confusion and cause of underpayment of this tax. For instance, Fintech companies were initially unclear about their liability to pay the fund. Furthermore, the rapid revolution of the Fintech industry makes it challenging for tax authorities to keep pace with the changing landscape, leading to tax gaps in National Information

Technology Development Fund. Non-compliance by companies obligated to pay NITDEF tax and weak enforcement mechanisms by regulatory agencies are also contributors to tax gap in NITDEF tax.

The 2023 Finance Act's amendments to the Capital Gains Tax Act enable taxpayers to offset capital losses against gains and provide rollover relief for share disposal gains. Additionally, taxpayers leverage on the loopholes in the tax system to evade and avoid taxes, reducing government revenue. This issue of tax avoidance and evasion is especially pronounced for capital gains tax, which relies heavily on voluntary compliance, resulting in a significant capital gains tax gap. Furthermore, economic stagnation constrains investment and diminishes capital gains, thereby yielding reduced tax revenues. All these elements cumulatively exacerbate the disparity in capital gains tax, resulting in a significant tax gap. While existing literature has examined the tax gap nexus in various contexts, including Nigeria, for example; Nkanor and Chukwu [6] investigated the impact of tax gap on government budget implementation in Nigeria and found that petroleum profit tax gap and education tax gap have positive and significant impact on government budget implementation in Nigeria, while capital gains tax gap has positive and no significant impact on government budget implementation in Nigeria, Nwamgbebu [7] researched on the impact of tax gap on external public debt in Nigeria for the period (2005 to 2021), The study also discovered that company income tax gap, value added tax gap and education tax gap have negative and significant impact on external public debt in Nigeria. A significant research gap still exists. Specifically, no study explored the effect of tax gaps on Nigeria's economic development during 2008-2024, nor has any research investigated the relationship between the National Information Technology Development Fund tax gap and economic development in Nigeria. This study's investigation into these unexplored areas underscores its importance and relevance, even though the results of previous studies are contestable. This study's broad objective was to examine the effect of tax gaps on economic development of Nigeria from 2008 to 2024. Using four key parameters of tax gaps such as Petroleum profit tax, capital gain tax education tax gap and National information technological tax gap and effect on Nigerian economic development.

Literature Review

Taxation as a system raising taxes constitutes a compulsory, non-returnable payment to the government in exchange for periodic provision of public goods and services. Tax payments are usually made to the government by private businesses and consumers [8]. Okolo, et al. [9] conceptualized the idea that taxation keeps evolving in line with developments in the economic environment for improvement of human capital development. Over time, there have been modifications in tax bases, rules of assessments, the scope of taxable events, and tax rates. tax income enables governments to fund public goods and services, while also supporting the maintenance of peace and social order. Taxes are used to regulate certain economic sectors and to pool resources for public goods and services, including infrastructure, health, education, and security, among others. In light of the foregoing, taxation is viewed as a crucial mechanism for fostering economic development across nations, distinguished by its mandatory nature and the absence of a direct relationship between the amount contributed and the services rendered. Taxation as the method used by governments to raise money from citizens and companies to pay for public products and services. As a fiscal policy tool, it is used by the government to stimulate economic growth and development. It is a fundamental aspect of government fiscal policy, financing public goods and services like education, defense and infrastructure. The Nigeria Revenue Service (NRS) is the principal tax administration body at the federal level, established by the Nigeria Revenue Service (Establishment) Act, 2025.

Nigerian Tax Gaps

The tax gap, as per the International Monetary Fund's definition, represents the shortfall between the potential tax revenue from the economic base and the actual revenue realized. The tax gap can be decomposed into two key elements: Compliance Gap and Policy Gap [10], [11]. The World Bank defines the tax gap as the divergence between

potential (legal) tax revenue and actual collections. Revenue potential refers to the maximum tax revenue that can theoretically be collected under a country's existing legal and policy framework, while actual revenue is the amount successfully collected by the tax authority. The difference between these two amounts constitutes the tax gap [12]. The tax gap is commonly defined as the difference between potential tax revenue and actual tax revenue and can be decomposed into compliance and policy gaps [10], [11].

The Australian Taxation Office (ATO) [13] defines the tax gap as the disparity between projected tax collections and the amount that would be collected under conditions of perfect tax compliance. The aforementioned definitions emphasize the intrinsic relationship between tax gaps and revenue loss. The International Monetary Fund characterizes the policy gap as revenue losses attributable to intentional tax policy decisions, wherein certain segments of the tax base are either exempted from taxation or subjected to differential tax treatment. This policy gap is largely a function of discretionary government decisions, thereby sharing similarities with tax expenditures. Predominantly, the definitions pertain to the compliance gap, which encompasses revenue losses incurred by the tax system as a result of taxpayer non-compliance, whether due to inadvertent errors or deliberate actions. The term compliance gap is relatively infrequently employed in the literature, with tax gap often being used interchangeably to denote the disparity arising from taxpayer non-compliance. In essence, the tax gap signifies the revenue shortfall resulting from taxpayers' failure to comply with tax obligations, including instances of tax evasion and avoidance.

Globally, governments consider the tax gap a pressing issue, as it undermines the effectiveness and efficiency of taxation systems. A substantial tax gap can result in diminished government revenues, thereby constraining the provision of public goods and services [14]. The United Nations Development Programme [15] reported that the tax gap can result in curtailed public services, such as healthcare, education, and infrastructure development, thereby adversely affecting citizens' well-being. Furthermore, decreased government revenue and diminished public services can intensify poverty and inequality, given that marginalized populations are typically most dependent on these services [16]. These factors have profound economic consequences, as governments may resort to borrowing to finance their activities, thereby increasing debt servicing costs and potentially crowding out private investment [17].

Tax gaps manifest in various forms, including personal income tax, value added tax, companies' income tax, stamp duty tax gap, custom and excise duties tax gaps. This study specifically focuses on the tax gaps related to petroleum profits tax, education tax, national information technology development fund tax, stamp duties and capital gains tax. According to International Monetary Fund [18], different tax gaps have unique features and challenges. For example, personal income tax gaps often pertain to individual taxpayers, while companies' income tax gaps are linked to companies [18]. Non-compliance with tax laws and regulations can stem from various factors, including lack of knowledge, complexity of tax codes, or insufficient awareness. The Organization for Economic Cooperation and Development [19] opined that tax gap can also be attributed to technological shortcomings, particularly the limited adoption of data analytics and artificial intelligence, which can impede effective tax administration and contribute to persistent tax gap.

The conceptual model (Figure 1) expresses the relationship between the independent variables: and dependent variables: economic development are shown below:

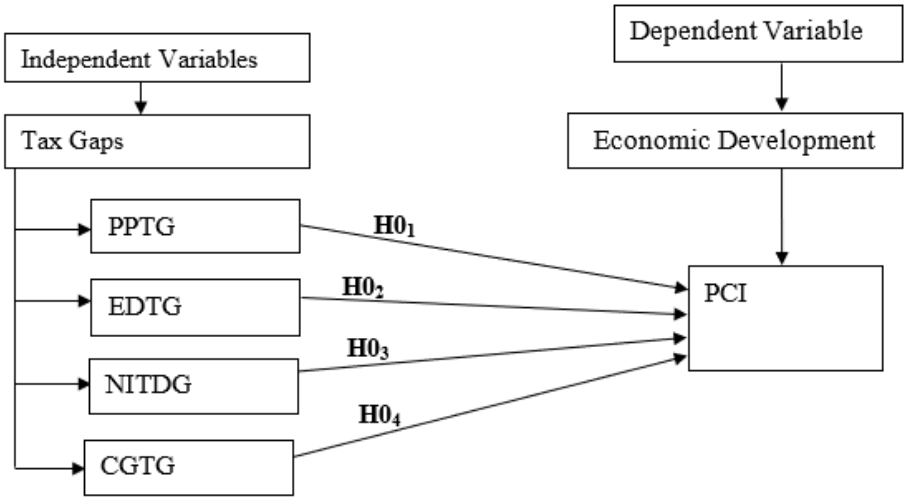


Figure 1. Conceptual Framework of the Study
Source: Conceptualized by the Researcher

Petroleum Profits Tax Gap

Petroleum Profits Tax is a fiscal tool levied on the profits of petroleum companies engaged in upstream petroleum activities. In Nigeria, it is governed by the Petroleum Profits Tax Act which was first promulgated in 1959 and has undergone a series of amendments which led to its consolidation into the Petroleum Profits Tax Act, 1990 and PIA act of 2021 that accommodated other key players of energy sector. The Petroleum Profits Tax (PPT) gap, refers to the difference between the actual petroleum profit tax revenue collected by a government from oil and gas companies and the potential petroleum profit tax revenue that could have been collected if all companies complied fully with the tax laws and regulations [20]. For the purpose of this study, it is the difference between the actual petroleum profit tax revenue collected by the Nigeria Revenue Service from oil and gas companies and annual targeted revenue for the fiscal year based on budgetary needs, economic conditions, and other factors.

Education Tax Gap

Education tax is a fiscal policy tool designed to support the development of tertiary education. Taxpal Africa [21] explained that in Nigeria, the tertiary education tax is a levy imposed on the profits of companies operating in Nigeria, aimed at funding tertiary education, except for non-resident companies, sole proprietorships, unincorporated entities and small companies with annual turnover below 25 million naira. It is imposed on the assessable profits of Nigerian companies to generate funds for infrastructure, research, and academic programs in public tertiary institutions. The education tax gap refers to the difference between the actual education tax revenue collected by a government and the potential education tax revenue that could have been collected if all tax payers complied fully with the tax laws and regulations. The tax is governed by the Tertiary Education Trust Fund (Establishment, Etc.) Act, 2011, which repealed the earlier Education Tax Act of 1993. The Tertiary Education Trust Fund (TET Fund) is responsible for administering the tertiary education tax and allocating the revenue towards enhancing facilities and infrastructure utilized in public tertiary institutions, in addition to enhancing educational quality in Nigeria [21]. Initially set at 2%, the rate was increased to 2.5% in 2021 and later to 3% in 2023 [22], [23].

According to PWC [24], the tax is payable within two months of an assessment notice from the Nigeria Revenue Service, but in reality, many companies remit the tertiary education tax concurrently with their income tax, on a self-assessment basis. Funds collected are managed by the Tertiary Education Trust Fund (TET Fund) and distributed in the ratio 2:1:1 among Universities, Polytechnics and Colleges of Education. The education tax gap is a significant concern for governments, as it affects the overall revenue generation for education development. United Nations Educational Scientific and Cultural Organization (2019) observed that a large education tax gap can lead to reduced

government revenue, which in turn can impact the provision of quality education and the achievement of educational goals [25].

National Information Technology Development Fund Tax Gap

The NITDEF tax, also known as the National Information Technology Development Levy, is a statutory levy imposed on certain companies in Nigeria to fund the development of the country's information technology infrastructure. National Information Technology Development Fund tax is an income tax payable by certain categories of companies that have an annual turnover of at least one hundred million naira; it is calculated as 1% of the Profit Before Tax (PBT) of liable companies" [26]. It was established under section 12 of the National Information Technology Development Agency (NITDA) Act, 2007 [27]. The National Information Technology Development Fund tax gap refers to the difference between the actual NITDF revenue collected by a government from companies operating in the information technology (IT) sector and the potential NITDF revenue that could have been collected if all companies complied fully with the tax laws and regulations [28]. It is the difference between the actual National Information Technology Development Fund tax collected by the Nigeria Revenue Service from companies with annual turnover of #100 million and above, as well as Global System for Mobile Communications (GSM) service providers and other telecom companies and annual targeted revenue for the fiscal year based on budgetary needs, economic conditions, and other factors. In other words, the NITDF tax gap represents the revenue lost due to non-compliance, evasion, or avoidance (Alm, 2019) of NITDF by information technology companies. Additionally, the rapid growth of Information Technology sector and the increasing use of digital technologies can also contribute to the NITDF tax gap, as they out space the development of tax laws and administration, making it difficult for tax authorities to keep up with new tax collection challenges. The levy was designed to promote Information and Technology development across Nigeria, fund initiatives such as Information and Technology parks, digital literacy and cybersecurity programs, and support research, standardization, and regulation of Information and Technology systems.

Capital Gains Tax Gap

Capital gains tax is a levy imposed on the profit realized from the disposal of chargeable assets. It is governed by the Capital Gains Tax Act, Cap C1, Laws of the Federation of Nigeria (LFN) 2004, originally enacted in 1967 and amended in 1999 [29]. Stanbic IBTC brokers (2021) explained that capital gains tax is calculated as the difference between the sale proceeds and the cost of the asset, with the relevant rate then applied to this gain [30]. The Capital Gains Tax Act targets all profits arising from the disposal of assets by any person within a given assessment year. Capital gains tax is charged at a flat rate of 10% on the net gains from asset disposal [31], and it applies to both individuals and corporate entities. Assets located within or outside Nigeria are taxable if the gains are brought into Nigeria [32]. The capital gains tax (CGT) gap refers to the difference between the actual CGT revenue collected by a government and the potential CGT revenue that could have been collected if all taxable capital gains were properly reported and taxed [33].

Tax Gap Analysis (Components of Tax Gap)

The tax gap remains a persistent challenge for fiscal authorities across the globe. This discrepancy not only undermines revenue mobilization but also erodes public trust in the equity and efficiency of tax systems. In developing economies like Nigeria, where informal economic activities dominate and administrative capacity is often constrained, the tax gap assumes even greater significance. Understanding its components is therefore essential for designing targeted interventions that enhance compliance and strengthen fiscal sustainability. The tax gap is typically decomposed into three interrelated components: non-filing, underreporting, and underpayment. Each reflects a distinct dimension of taxpayer behavior and administrative oversight. The non-filing gap arises when individuals or entities fail to submit tax returns despite being legally obligated to do so. This phenomenon is particularly prevalent in economies with large informal sectors, such as Nigeria and Ghana, where a significant proportion of economic actors

operate outside the purview of formal registration and taxation [34]. The reasons for non-filing are multifaceted, ranging from lack of awareness and low tax morale to high compliance costs and weak enforcement mechanisms. Underreporting, often the largest component of the tax gap, involves the deliberate misrepresentation of income, deductions, or credits by taxpayers who do file returns

Economic Implications of Tax Gap

The tax gap poses serious economic consequences for both developing and developed nations. In Nigeria and across sub-Saharan Africa, the tax gap undermines fiscal sustainability, weakens infrastructure development, and distorts macroeconomic planning. Its ripple effects extend beyond government coffers, influencing investment climates, public service delivery, and long-term economic growth. One of the most immediate economic implications of a persistent tax gap is the erosion of government revenue. Taxes are the lifeblood of public finance, funding essential services such as education, healthcare, transportation, and security. When a significant portion of potential tax revenue goes uncollected, governments are forced to either cut spending or resort to borrowing, both of which carry economic risks. In Nigeria, for example, the shortfall in tax revenue has contributed to rising public debt and constrained capital expenditure, particularly in infrastructure development. The tax gap also distorts fiscal policy and planning. Governments rely on accurate revenue forecasts to design budgets and allocate resources. A large and unpredictable tax gap introduces volatility into the budgeting process, leading to underfunded programs and stalled development initiatives. Ombati [35] in Kenya found a significant negative relationship between the tax gap and real gross domestic product, indicating that as the gap widens, economic performance deteriorates. This is particularly concerning in economies where tax revenue constitutes a major share of national income. Moreover, the tax gap can increase inequality and social unrest.

Salawu [36] found that in Nigeria, the over-reliance on indirect taxes has been criticized for disproportionately affecting the poor, while wealthy individuals and firms exploit loopholes to avoid taxation. Another critical implication is the impact on foreign investment. A large tax gap signals weak enforcement and governance, which can deter investors concerned about regulatory uncertainty and fiscal instability. Countries with high tax gaps often struggle to attract long-term investment, as businesses prefer environments with predictable tax regimes and transparent fiscal policies. The international Monetary Fund has emphasized that narrowing the tax gap through improved compliance and administration is essential for creating a stable macroeconomic environment conducive to investment and growth [35]. The relationship between tax gap and economic development is central to understanding fiscal sustainability in developing economies like Nigeria. A persistent tax gap undermines government capacity to fund public services, while robust development can strengthen tax administration and compliance. The tax gap is the difference between the total taxes legally owed by taxpayers and the taxes they actually pay on time. It arises from tax evasion, tax avoidance, and administrative inefficiencies [37], [38]. Economic development on the other hand denotes sustained improvements in income levels, education, healthcare, infrastructure, and overall quality of life. Common indicators of economic development include GDP per capita, Human Development Index (HDI), and poverty reduction metrics [39]. In Nigeria, the effect of tax gaps on economic development has been a subject of investigation, with studies examining its impact on per capita income, human capital index, foreign direct investment, and gross domestic product.

Justification for Anchoring the Study on Tax Compliance Theory

This study draws on three foundational theories to examine the effect of tax gap on economic development in Nigeria: Optimal tax theory, fiscal contract theory, and tax compliance theory. While optimal tax theory offers a normative framework for designing equitable and efficient tax systems, its assumptions- such as perfect rationality and observability of taxpayer ability, limit its applicability in Nigeria's informal and administratively constrained environment. Similarly, fiscal contract theory emphasizes the reciprocal relationship between taxpayers and the state, but its reliance on institutional

trust and effective service delivery makes it less suitable in contexts where governance is weak and tax morale is low. By focusing on the risk-reward calculus of evasion, this theory directly addresses the root causes of the tax gap and its implications for revenue mobilization and development. Therefore, tax compliance theory serves as the most appropriate anchor for this study.

Empirical Review

Sallau, Mahmoud and Shamsudeen [40] researched on impact of tax reform on economic development in Nigeria for the period 2013 to 2022. *Ex-post facto* research design was adopted and multiple regression was used in the analysis. The regression result showed that reforms in value added tax has significant negative impact, while petroleum profit tax and company income tax have significant positive impact and reform in custom and excise duty tax has insignificant impact on economic development in Nigeria. Furthermore, Nkanor and Chukwu [6] tested the impact of tax gap on government budget implementation in Nigeria. Similar variables were used in the study and the findings discovered that petroleum profit tax gap and education tax gap have positive and significant impact on government budget implementation in Nigeria, while capital gains tax gap have positive and no significant impact on government budget implementation in Nigeria the research examined multiple tax categories, The study provides a strong empirical foundation for understanding how tax gaps undermine fiscal planning and execution in Nigeria. Nwakaeze, Oshiole and Onwuliri [41] explored tax gap assessment between oil tax and non-oil tax revenue in Nigeria: practical measures for trimming the gap in none oil tax. The study found that, although non-oil tax revenue recorded a stronger correlation, it has a significantly wider tax gap, 40% above that reported by oil tax. In a related development, Nwamgbebu [7] analyzed the impact of tax gap on external public debt in Nigeria for the period. The outcome of the regression analysis revealed that petroleum profit tax gap (PPTG) had positive and significant impact on external public debt in Nigeria, while capital gains tax gap had positive and no significant impact on Nigeria's external debt.

Gap in Literature

A review of extant literature reveals that so many studies abound on tax gap nexus currently in Nigeria such as; Nkanor and Chukwu [6], Nwakaeze, Oshiole and Onwuliri [41], Nwamgbebu [7], Rath [42], Ejemai, et al. [43], for different time frames respectively. However, the relationship between tax gaps and economic development remains a fertile ground for exploration, particularly in the context of National Information Technology Development Fund tax gap. The effect of National Information Technology Fund tax gap on economic development remains a mystery with scant attention paid to its potential significance. Also, a significant period gap exists, as existing research has focused on disparate time frames, leaving a knowledge void for the period spanning 2008 to 2024.

2. Materials and Methods

Data Sources and Methods

This study adopted an *ex-post facto* research design. The geographical focus of this research is Nigeria; a country located in West Africa and organized under a federal system. Nigeria comprises 36 states and the Federal Capital Territory (FCT), with economic activities spanning agriculture, petroleum, manufacturing, and services. The country's tax structure is managed at the federal level by the Nigeria Revenue Service (NRS), and economic data were compiled from the Central Bank of Nigeria (CBN) Statistical Bulletin. This study relied entirely on secondary data, which were obtained from reputable and publicly available institutional sources. Specifically, data on tax revenue gaps for each tax gap type (PPT, EDU, NITDF, CGT) were obtained from the Nigeria Revenue Service (NRS) tax reports spanning 2008 to 2024. This study employed a combination of descriptive statistics, unit root tests, and Vector Autoregression (VAR) analysis. Descriptive statistics were used to summarize the trend, central tendency, and dispersion of all the variables using EViews.

This study adopted a Vector Autoregression (VAR) model to estimate the short-run and dynamic effects of tax gaps on economic development in Nigeria. VAR models are well-suited for macroeconomic analysis involving interdependent time-series variables. They allow each variable in the system to be explained by its own lagged values and the lagged values of all other variables in the system. This makes it possible to account for the feedback and dynamic interactions among economic variables.

The baseline VAR model for this study is specified as:

$$PCINC_t = \alpha_0 + \sum_{i=1}^{p} \beta_{1i} PCINC_{t-i} + \sum_{i=1}^{p} \beta_{2i} PPT_TG_{t-i} + \sum_{i=1}^{p} \beta_{3i} EDU_TG_{t-i} + \sum_{i=1}^{p} \beta_{4i} NITDF_TG_{t-i} + \sum_{i=1}^{p} \beta_{5i} STMD_TG_{t-i} + \sum_{i=1}^{p} \beta_{6i} CG_TG_{t-i} + \varepsilon_{1t}$$

Where:
PCINC_t = Per Capita Income at time t
PPT_TG = Petroleum Profits Tax Gap
EDU_TG = Education Tax Gap
NITDF_TG = National Information Technology Development Fund Tax Gap
CG_TG = Capital Gains Tax Gap
β = Coefficients to be estimated
k = Optimal lag length
μ_t = Error term

Description of Model Variables

Table 1. Description of Variables

Variable Code	Variable Name	Description
PCINC	Per Capita Income	A measure of the average income earned per person per year in Nigeria.
PPT_TG	Petroleum Profits Tax Gap	The difference between potential and actual petroleum profits tax revenue collected.
EDU_TG	Education Tax Gap	The difference between potential and actual education tax revenue collected.
NITDF_TG	National Information Technology Development Fund Tax Gap	The difference between potential and actual tax revenue collected from the IT development levy.
STMD_TG	Stamp Duties Tax Gap	The difference between potential and actual tax revenue collected from stamp duties.
CG_TG	Capital Gains Tax Gap	The difference between potential and actual capital gains tax revenue collected.

Source: Researcher's Compilation, 2025.

3. Results

Empirical Results

Descriptive Analysis

Table 2 shows the descriptive analysis of the data.

Table 2. Descriptive Analysis

	PCINC (in ₦)	PPT_TG (₦' Billion)	EDU_TG (₦' Billion)	NITDF_TG (₦' Billion)	STMD_TG (₦' Billion)	CG_TG (₦' Billion)
Mean	595349.2	177.5617	-88.23191	1.886971	-14.93983	-5.800424
Median	523811.0	-386.1789	-8.292400	-0.385100	1.628500	1.284600
Maximum	1194212.	6040.990	133.7500	30.68280	60.23500	17.56530
Minimum	252030.0	-1407.604	-937.8500	-23.64000	-181.8880	-79.93370
Std. Dev.	268060.3	1856.687	253.3308	10.90479	55.56600	21.63924
Skewness	0.734902	2.110609	-2.567430	0.552153	-1.798229	-2.498775
Kurtosis	2.721697	6.968087	8.806936	5.474941	6.108169	9.329804
Jarque-Bera	1.585092	23.77478	42.56184	5.202584	16.00495	46.07137
Probability	0.452691	0.000007	0.000000	0.074178	0.000335	0.000000
Observations	17	17	17	17	17	17

Source: Eviews 10 Statistical Output, 2026

Per Capita Income (PCINC) in Table 2 shows a mean of ₦595,349.20, representing the average income earned per Nigerian from 2008 to 2024. The income peaked at ₦1,194,212 in 2024, while the lowest value was ₦252,030 in 2008, showing a consistent growth trend. The standard deviation of ₦268,060.30 indicates moderate dispersion in income levels. The positive skewness of 0.73 suggests a rightward tilt in distribution, with higher-than-average values pulling the distribution to the right. Petroleum Profits Tax Gap (PPT_TG) had an average of ₦177.56 billion over the period, indicating a moderate shortfall in expected versus actual petroleum tax receipts. The highest tax gap occurred in 2024 at ₦6.041 trillion, while the lowest was a deficit of ₦1,407.60 billion (or ₦1.408 trillion) in 2012 — showing significant volatility Education Tax Gap (EDU_TG) averaged ₦-88.23 billion, indicating a consistent revenue shortfall in education tax collection. The best-performing year was 2021 with a surplus of ₦133.75 billion, while the worst shortfall came in 2024 at ₦-937.85 billion, approaching the trillion-naira mark. The high standard deviation of ₦253.33 billion illustrates significant fluctuation over the period. A skewness of -2.57 reflects a heavy left tail, meaning extreme shortfalls were more common than surpluses.

NITDF Tax Gap (NITDF_TG) reflects a small average of ₦1.89 billion, indicating marginal discrepancies between expected and collected funds under the National Information Technology Development Fund. The maximum value reached ₦30.68 billion in 2018, while the lowest was ₦-23.64 billion in 2024. A standard deviation of ₦10.90 billion denotes modest dispersion, and skewness of 0.55 points to a slight positive skew. Kurtosis at 5.47 shows moderate peakedness and presence of outliers. The Jarque-Bera probability of 0.074 is slightly above the conventional 0.05 threshold, suggesting that while not perfectly normal, the distribution is within acceptable range for parametric tests in many econometric applications. Capital Gains Tax Gap (CG_TG) had the smallest average gap at ₦-5.80 billion, suggesting relatively minor revenue losses or inefficiencies in this category. The best year recorded a surplus of ₦17.57 billion in 2017, while the worst deficit was ₦-79.93 billion in 2016. A standard deviation of ₦21.64 billion indicates low dispersion relative to other tax gaps. The skewness of -2.50 highlights a strong negative skew, confirming the prevalence of large negative deviations.

Unit Root Test and Model Diagnostics

The Augmented Dickey-Fuller (ADF) test presented in Table 3: Summary of Unit Root Test Results Using Augmented Dickey-Fuller is employed to assess the stationarity of the time series variables, which is a crucial precondition in time-series econometrics to avoid spurious regression results. A variable is considered stationary if its statistical properties such as mean and variance remain constant over time.

Table 3. Summary of Unit Root Test Results Using Augmented Dickey-Fuller

Variables	T-ADF	Lag Length	P-value	Remark
LogPCINC	-4.272956	I(2)	0.0062	Stationary
LogPPT_TG	-3.125899	I(1)	0.0462	Stationary
LogEDU_TG	-3.721539	I(2)	0.0166	Stationary
LogNITDF_TG	-3.953638	I(1)	0.0101	Stationary
LogSTMD_TG	-4.189541	I(1)	0.0065	Stationary
LogCG_TG	-4.528731	I(0)	0.0031	Stationary

Source: Eviews 10 Statistical Output, 2026.

As shown in Table 3, the ADF test statistic for LogPCINC was -4.272956 with a p-value of 0.0062, indicating significance at the 5% level. Since the series was stationary only after the second differencing, it is integrated of order two, I(2). This means the series had to be differenced twice to become stable, and it can now be safely used in VAR analysis. The ADF test on the log-transformed Petroleum Profits Tax Gap (LogPPT_TG) produced a test statistic of -3.125899 and a p-value of 0.0462. This result is significant at the 5% level, implying that the variable becomes stationary after first differencing (I(1))., the ADF test yielded a test statistic of -3.721539 and a p-value of 0.0166. Since the result is significant at the 5% level only after the second difference, the series is considered stationary at I(2). This implies that the data must be differenced twice to remove unit roots and be usable in regression models without spurious correlation issues.

The ADF test for the National Information Technology Development Fund Tax Gap (LogNITDF TG) showed a test statistic of -3.953638 and a p-value of 0.0101. With significance at the 5% level, the series is stationary after the first difference, I(1). This suggests the variable is initially non-stationary but becomes stable upon differencing once, making it appropriate for inclusion in the VAR model. Unlike the others, the Capital Gains Tax Gap (LogCG_TG) was found to be stationary at level (I(0)), as shown by the ADF test statistic of -4.528731 and a p-value of 0.0031. This implies that no differencing was required to stabilize the series, indicating a strong inherent stationarity, making the variable directly usable in VAR analysis without transformation. Therefore, to make the data suitable for VAR estimation, all variables were differenced as needed to achieve stationarity. Specifically, variables such as PCINC and EDU_TG originally integrated at order two (I(2)) were differenced twice, while those at order one (I(1)) were differenced once, ensuring all series were stationary at the same level before applying the VAR model.

Test of Hypotheses

Table 4 below shows the regression estimates used in testing the hypotheses. The coefficients in Table 9 are same with the VAR coefficients shown in Appendix D.

Table 4. Test of Hypotheses

Dependent Variable: LOGPCINC
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 07/20/26 Time: 02:56
Sample (adjusted): 2011 2024
Included observations: 14 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)

LOGPCINC = C(1)*LOGPCINC(-1) + C(2)*LOGPPT_TG(-1) + C(3)*LOGEDU_TG(-1) + C(4)*LOGNITDF_TG(-1) + C(5)*LOGSTMD_TG(-1) + C(6)*LOGCG_TG(-1) + C(7)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.141761	0.240689	0.588979	0.5744
C(2)	-9.968730	9.156110	-1.088752	0.3123
C(3)	-132.8441	32.75551	-4.055626	0.0048
C(4)	245.5371	602.0253	0.407852	0.6956
C(5)	72.16817	285.4895	0.252788	0.8077
C(6)	89.28315	361.1227	0.247238	0.8118
C(7)	5463.411	9037.421	0.604532	0.5646
R-squared	0.640931	Mean dependent var		7463.000
Adjusted R-squared	0.333158	S.D. dependent var		24581.28
S.E. of regression	20073.17	Akaike info criterion		22.95901
Sum squared resid	2.82E+09	Schwarz criterion		23.27854
Log likelihood	-153.7131	Hannan-Quinn criter.		22.92943
F-statistic	2.082479	Durbin-Watson stat		1.389800
Prob(F-statistic)	0.179713	Wald F-statistic		16.44413
Prob(Wald F-statistic)	0.000833			

Source: Eviews 10 Statistical Output, 2026.

Table 4 presents the results of the least squares estimation using Gauss-Newton / Marquardt steps, with HAC (Newey-West) standard errors applied to correct for autocorrelation. The R-squared of 0.6409 suggests that approximately 64.1% of the variation in economic development (proxied by log of per capita income) is explained by the model's independent variables, which include tax gap components. The Wald F-statistic has a p-value of 0.000833, indicating that the model is statistically valid and that, collectively, the explanatory variables significantly affect economic development at the 5% significance level. The constant term (C) has a coefficient of 5463.411 with a p-value of 0.5646, which implies that although it has a positive marginal effect, it is not statistically significant, meaning the base value of per capita income (when all explanatory variables are zero) is not reliably different from zero in this model.

Test of Hypothesis I

HO_1: Petroleum profits tax gap has no significant effect on economic development in Nigeria.

The coefficient of LOGPPT_TG is -9.9687, meaning that a 1% increase in the petroleum profits tax gap leads to a 9.97% decrease in economic development (proxied by log of per capita income), indicating a negative marginal effect. However, with a p-value of 0.3123, this effect is not statistically significant at the 5% level. This suggests that although there is a negative effect, the influence of petroleum profits tax gap on economic development is weak and statistically unreliable.

Test of Hypothesis II

HO_2: Education tax gap does not significantly influence economic development in Nigeria.

The coefficient of LOGEDU_TG is -132.8441, which implies that a 1% increase in the education tax gap results in a 132.84% decrease in economic development. This demonstrates a very large negative marginal effect. More importantly, the p-value of 0.0048 indicates that this effect is highly statistically significant at the 5% level. Therefore, we accept the alternate hypothesis and conclude that the education tax gap has a significant and adverse effect on economic development in Nigeria.

Test of Hypothesis III

$H_0$3: The disparity in National Information Technology Development Fund tax does not exert a significant effect on economic development in Nigeria.

The coefficient of LOGNITDF_TG is 245.5371, suggesting that a 1% increase in the NITDF tax gap is associated with a 245.54% increase in economic development, indicating a strong positive marginal effect. However, the p-value is 0.6956, which is well above the 5% significance threshold. This implies that, despite the apparent magnitude of the coefficient, the effect is statistically insignificant.

Test of Hypothesis IV

HO_4: Capital gains tax gap does not significantly affect economic development in Nigeria.

The coefficient of LOGCG_TG is 89.2832, which implies that a 1% increase in the capital gains tax gap is associated with an 89.28% increase in economic development, showing a strong positive marginal effect. Nonetheless, the p-value of 0.8118 is well above the 5% threshold, indicating that the effect is not statistically significant. Therefore, we accept the null hypothesis (HO5) that the capital gains tax gap does not significantly affect economic development in Nigeria.

4. Discussion

Petroleum Profit Tax Gap and Economic Development in Nigeria

Although the petroleum profits tax gap showed a negative sign, its effect on economic development was not statistically significant. This may be due to several factors, including the volatility in global oil prices, Nigeria's over-reliance on oil revenue, and inefficiencies in petroleum tax administration. The petroleum sector is riddled with corruption, leakages, and lack of transparency in reporting, which could make tax collection efforts inconsistent and their economic impact minimal in statistical terms despite the sector's size. The non-significant negative effect of the petroleum profits tax gap partly supports Optimal Tax Theory, which identifies the extractive sector as a prime source of efficient revenue. However, the weak statistical link suggests that Nigeria is not effectively harnessing this potential, possibly due to tax evasion, subsidies, or corruption. This undermines Fiscal Contract Theory, as poor transparency and revenue utilization from petroleum taxes diminish public trust and voluntary compliance. Similarly, Tax Compliance Theory helps explain the persistence of this gap due to perceived low enforcement or unfair tax practices. The finding also indicates misalignment with Global Development Frameworks, which stress the importance of transparent and efficient resource taxation to finance development.

This finding aligns with Okpe et al [44] findings, who concluded that petroleum profit tax does not significantly affect GDP in Nigeria.

Education Tax Gap and Economic Development in Nigeria

The significant negative relationship between the education tax gap and economic development in Nigeria suggests that under-collection or evasion of education tax substantially hampers national development. Education tax is intended to fund tertiary institutions and improve human capital, a crucial driver of economic progress. When there is a gap, either through non-compliance or poor enforcement, it deprives the education sector of vital funding, limiting the quality and accessibility of education, which in turn diminishes the productivity and innovation capacity of the workforce. The finding that the education tax gap significantly and negatively affects economic development supports the Fiscal Contract Theory, suggesting that when citizens do not see tangible educational outcomes from their taxes, trust erodes and compliance declines. This finding accords with what Inyiama and Nwankwo found in 2016, that corporate and tertiary education taxes significantly influence Nigeria's economic growth [45]. Similarly,

Omodero et al. [46] findings emphasized the crucial role of education taxes and IT levies in funding the educational system in Nigeria.

National Information Technology Development Fund Tax Gap and Economic Development in Nigeria

The positive and non-significant effect of the NITDF tax gap suggests that while information technology development is crucial to modern economic infrastructure, gaps in its dedicated tax funding do not yet show a clear statistical influence on Nigeria's overall development. This could be due to the relatively recent implementation of such taxes or the limited scale of their current impact. Alternatively, it may reflect the mismatch between collected funds and actual IT development outcomes, possibly due to administrative inefficiencies or misappropriation. The positive and non-significant effect of the NITDF tax gap appears inconsistent with Optimal Tax Theory, which would expect a growing digital sector to be a strategic and minimally distortionary tax base. Moreover, the result suggests Nigeria has not yet fully embraced the digital taxation principles advocated in Global Development Frameworks, particularly those of the OECD. This result is consistent with Charlie [47] findings, who studied the influence of multiple IT taxes and noted mixed outcomes on economic development, emphasizing inefficiencies and policy overlap. Omodero et al. [46] findings also mentioned the weak impact of IT development funds unless well-managed and targeted. Nnamani and Akintoye [48], in their study on digital taxation, found that IT-related taxes have potential for fostering development, but currently fall short due to poor structuring. Raczkowski [49] findings further support the notion that tax gap drivers vary by sector and may not uniformly impact development, helping explain the weak significance of NITDF gaps.

Capital Gains Tax Gap and Economic Development in Nigeria

The positive and non-significant effect of the capital gains tax gap indicates that although bridging the gap might increase revenue, its current influence on economic development is negligible. Capital gains tax in Nigeria is often under-utilized due to poor documentation of asset sales, weak enforcement, and a narrow tax base. This limits its potential impact despite its logical contribution to progressive taxation and capital resource mobilization. The positive and non-significant relationship between the capital gains tax gap and economic development conflicts with Optimal Tax Theory, which advocates taxing capital income due to its efficiency and equity potential. The muted effect implies that such taxes are not effectively captured or reinvested.

This result agrees with Garga and Akanegbu [50] findings, who analyzed the impact of direct taxes and found capital gains tax to have minimal effects on growth. Similarly, Ogunsola [51] in his findings argued that unless well-administered, taxes like capital gains have little macroeconomic relevance.

5. Conclusion

The results show that most tax gaps in Nigeria, specifically petroleum profits tax, National Information Technology Development Fund (NITDF) tax, stamp duties, and capital gains tax, have no statistically significant effect on economic development. This implies that variations in the amounts lost through these tax types do not meaningfully influence Nigeria's development outcomes. The weak statistical relationships suggest that either the economic contribution of these specific taxes is limited, or that the institutions managing the revenues are not effectively converting tax receipts into developmental gains. Where revenue is not strategically linked to productive public investment, even closing the tax gap does not necessarily translate into measurable development progress. However, the one tax category that shows a statistically. The non-significant results associated with petroleum, stamp duties, capital gains, and IT taxes indicate that closing these gaps alone may not yield tangible improvements in development unless institutional and spending mechanisms are effectively aligned.

Based on the findings of the study, the following recommendations are made: The Nigeria Revenue Service should intensify efforts to audit and monitor the petroleum

sector more strictly to reduce profit-shifting and under-reporting of taxable income by oil companies; TETFund and the Federal Ministry of Education should collaborate with NRS to ensure strict enforcement of the Education Tax Act by large corporations. A digital tracking and compliance system should be established to monitor remittances and penalize defaulters. This will enhance educational financing and reverse the current negative effect the education tax gap has on Nigeria's economic development; The National Information Technology Development Agency (NITDA) should prioritize awareness campaigns targeting ICT companies and corporate taxpayers to increase voluntary compliance; The Federal Ministry of Finance, in collaboration with the Securities and Exchange Commission (SEC) and the Nigerian Exchange Group (NGX Group), should implement automated reporting systems for capital transactions to improve transparency and detect tax evasion.

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