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Tax Mix and Net Investments of Listed Oil and Gas Firms in Nigeria

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Abstract

Taxation plays a vital role in shaping corporate financial decisions and investment capacity, particularly in capital-intensive industries like oil and gas. In Nigeria, the tax mix comprising company income tax (CIT), tertiary education tax (TET), capital gains tax (CGT), and withholding tax (WHT) serves as a key revenue generation tool while influencing firms' net investment. This study examines the impact of tax mix on net investment in listed Nigerian oil and gas firms. Employing an ex-post facto research design, data were collected from the annual reports of seven purposively selected firms listed on the Nigerian Exchange Group as of December 31, 2023. Panel least squares analysis was conducted using STATA 14. The results indicate that CIT (coefficient = 1.985, p = 0.000) and TET (coefficient = 14.339, p = 0.000) positively and significantly affect net investment, with TET having the strongest effect. Conversely, CGT exerts a non-significant negative effect (coefficient = -64.679, p = 0.757), while WHT significantly reduces net investment (coefficient = -13.466, p = 0.017). A comparative analysis confirms a statistically significant difference in the effects of CIT, TET, CGT, and WHT (F-statistic = 11.23, p = 0.000). The study concludes that the tax mix significantly affect net investment in Nigeria's oil and gas sector, necessitating balanced corporate tax policies. It recommends enhancing transparency in TET utilization, revising CGT policies, and mitigating WHT-related liquidity constraints to promote sustainable sectoral investment.

Keywords: *Tax mix; Company income tax; Tertiary education tax; Capital gains tax; Withholding tax; Net investment.*

1.1 Introduction

Taxation is a fundamental tool for economic planning and development, playing a crucial role in government revenue generation and corporate financial decision-making. It encompasses various direct and indirect taxes that influence firms' financial strategies and investment capacity. In Nigeria, corporate taxation is governed by the Companies Income Tax Act (CITA) and managed by the Federal Inland Revenue Service (FIRS). The tax regime includes company income tax (CIT), tertiary education tax (TET), capital gains tax (CGT), and withholding tax (WHT), each with distinct implications for corporate investment.

The concept of a tax mix refers to the combination of these tax components, affecting firms differently based on their tax obligations. CIT, a profit-based tax, has evolved under the Finance Act (2019), introducing tiered tax rates based on company size. CGT, set at 10% on long-term gains, can influence reinvestment decisions by discouraging asset sales. TET, levied at 3% on assessable profits, supports tertiary education but adds to firms' tax burdens, potentially restricting reinvestment. WHT, serving as an advance tax on specific payments, affects liquidity and investment capacity, particularly in capital-intensive sectors like oil and gas.

Net investment, defined as capital expenditure minus depreciation, is essential for firms' long-term growth. High taxes can reduce retained earnings, limiting reinvestment opportunities, as explained by the pecking order theory. Despite taxation being a key revenue source, its effect on net investment remains debated. This study examines the comparative effect of CIT, TET, CGT, and WHT on the net investment of listed Nigerian oil and gas firms from 2014 to 2023, addressing a critical gap in empirical research.

1.2 Statement of the problem

Investment in the oil and gas sector is vital for sustaining industry operations and contributing to the overall economic growth of Nigeria, a nation heavily dependent on oil exportation as its principal revenue source. However, the sector faces significant challenges due to the influence of various taxes, including company income tax, tertiary education tax, capital gains tax, and withholding tax. These taxes, while critical for government revenue generation, can have detrimental effects on the sector by constraining liquidity and reducing funds available for reinvestment in critical areas such as infrastructure, technology, and exploration. High tax burdens may discourage long-term investments, particularly in a capital-intensive industry, leading to slowed growth and diminished operational efficiency.

These constraints raise important concerns about whether the current tax mix fosters or stifles investment within this critical sector. Although significant studies have examined the influence of various taxes on corporate performance and investment, the focus has largely been on other industries. For instance, Ahmed and Abubakar (2024) investigated the impact of withholding tax and tertiary education tax on financial performance in listed manufacturing companies in Nigeria.

Similarly, Alpheaus et al. (2024) examined the effect of company income tax, capital gains tax, and education tax on profitability in food and beverage firms. Furthermore, Oshiole et al. (2024) analyzed the relationship between company income tax, tertiary education tax, value-added tax, and net investment in communication firms. While these studies provide valuable insights into tax-related challenges in other sectors, there is a noticeable gap in literature specifically addressing the oil and gas sector, which operates under unique economic and regulatory dynamics.

To the best of the researcher's knowledge, no study has conducted a comprehensive comparative analysis of how company income tax, tertiary education tax, capital gains tax, and withholding tax collectively influence net investment decisions in listed oil and gas firms in Nigeria. This study seeks to address this gap by assessing the effect of tax mix on net investment of oil and gas firms listed on the Nigerian Exchange Group between 2014 and 2023.

1.3 Objectives of the study

The main objective of this study was to assess the effect of the tax mix on the net investment of listed oil and gas firms in Nigeria. The specific objectives were:

1. to evaluate the effect of company income tax on net investment of listed oil and gas firms in Nigeria.

2. to assess how tertiary education tax affect net investment of listed oil and gas firms in Nigeria.

3. to analyze the effect of capital gains tax on net investment of listed oil and gas firms in Nigeria.

4. to examine the effect of withholding tax on net investment of listed oil and gas firms in Nigeria.

5. to compare the relative effect of company income tax, tertiary education tax, capital gains tax and withholding tax on net investment of listed oil and gas firms in Nigeria.

2.0 Literature review and theoretical framework

Tax mix

Tax mix refers to the combination of various tax liabilities that corporations must manage, including profit-based taxes (corporate income tax) and non-profit-based taxes (real estate and labor-related taxes) (Sebastian & Costel, 2018). A well-structured corporate tax mix is essential for effective tax planning, enabling firms to optimize financial performance while ensuring compliance (Lazăr & Istrate, 2018). Corporate tax planning helps mitigate tax burdens through strategic classification and utilization of incentives, deferrals, and exemptions (Citron, 2001). Tax consultants play a crucial role in guiding firms to manage tax obligations efficiently, reducing excessive payments and enhancing financial stability (Mucai et al., 2014). Tax incentives, a key component of the tax mix, are designed to attract investment, stimulate industry growth, and support economic development (Iormbagah et al., 2018). These incentives create a competitive business environment, benefiting both new and existing firms (Lazăr & Istrate, 2018). Tax mix can be categorized into personal and corporate tax structures, each serving distinct purposes. While

personal tax mix focuses on individual tax reliefs, corporate tax mix emphasizes tax incentives and deferred taxes to optimize corporate tax liabilities (Godwin & Iyoha, 2024). Ihe (2012) defines tax incentives as government measures to reduce tax burdens and encourage business expansion. A well-balanced tax mix fosters corporate growth while maintaining fiscal responsibility, underscoring its importance in financial planning and economic sustainability.

Net investment

Net investment refers to the total expenditure on capital assets, minus depreciation, reflecting a firm's commitment to growth and productivity (Oshiole et al., 2024; Amahalu & Obi, 2020). It encompasses spending on physical capital such as property, plant, and equipment (Tejvan, 2020) and serves as a key indicator of a company's increasing productive capacity (Eyide & Nzewi, 2021). Beyond asset acquisition, net investment represents strategic reinvestment to enhance competitiveness and future prospects (Portelli & Narula, 2006; Akinsanya, 2023). By expanding and upgrading capital assets, firms position themselves for sustained market relevance, operational efficiency, and new opportunities. On a macroeconomic scale, continuous corporate reinvestment drives economic growth, innovation, and job creation (Hunjra et al., 2021). Investments in technology and infrastructure not only benefit firms but also contribute to broader economic advancement (Tassey, 2014). However, net investment presents challenges, requiring firms to balance growth aspirations with financial stability. High investment demands substantial capital, impacting cash flow, especially if returns are delayed (Gatti & Chiarella, 2020). External factors such as economic downturns, tax policies, and market fluctuations further influence investment decisions (Hunjra et al., 2021). Strategic investment planning is crucial to ensuring long-term profitability and business sustainability.

Company income tax and net investment

The effect of company income tax on net investment can be both positive and negative. Tax incentives, such as investment tax credits and accelerated depreciation, can encourage firms to reinvest profits, boosting net investment. Conversely, high corporate tax rates reduce disposable income, raising the cost of capital and discouraging investment. Empirical findings are mixed: while studies like Ogudu et al. (2018) and Chude & Chude (2015) suggest a positive relationship due to improved infrastructure from tax revenue, others, including Eyide & Nzewi (2021) and Oshiole et al. (2024), report a negative impact, citing reduced cash flow for reinvestment. Similarly, Gatsi et al. (2013) and Ishola et al. (2020) highlight corporate tax as a financial burden that hampers firms' investment capacity. However, Kurawa & Saidu (2018) and Ogbonna et al. (2020) found an insignificant or no effect, suggesting the impact varies based on industry and economic conditions. Thus, the relationship between company income tax and net investment remains complex, contingent on tax policies and corporate strategies.

Tertiary education tax and net investment

Tertiary education tax can affect net investment both positively and negatively. On one hand, its revenue, when effectively allocated, enhances educational infrastructure and human capital development, fostering innovation and productivity that can stimulate corporate investment. On the other hand, it imposes additional financial burdens on firms, reducing available funds for expansion and technological upgrades. Empirical findings are mixed: studies like Inyiama & Nwankwo (2016) and Uwaifo & Obaretin (2022) highlight its positive impact on economic growth, while others, such as Ahmed & Abubakar (2024) and Ndah et al. (2024), report no significant effect on corporate financial performance or net investment. Some, like Oshiole et al. (2024) and Eneisik et al. (2023), indicate a negative impact on net investment and profitability. The overall effect of tertiary education tax on net investment largely depends on tax allocation efficiency, industry-specific factors, and corporate financial strategies.

Capital gains tax and net investment

The effect of capital gains tax (CGT) on net investment can be both positive and negative. High CGT rates may discourage asset sales, reducing reinvestment and limiting net investment, while lower rates can incentivize frequent reinvestment, boosting investment activity. Additionally, if CGT revenues are effectively allocated to infrastructure and economic development, they can enhance the investment environment. Empirical findings are mixed: Kabiru et al. (2023) suggest that CGT negatively affects SME profitability by eroding reinvestment funds, whereas Muli & Ombati (2020) find a positive relationship between capital gains and business performance, aligning with earlier studies by Omboi (2011), Hou (2010), and Knight Frank (2011). Ultimately, the effect of CGT on net investment depends on tax policy design and economic conditions.

Withholding tax and net investment

Withholding tax impacts net investment both positively and negatively. As an advance tax payment, it simplifies compliance, enhances financial predictability, and can improve government revenue for infrastructure development, indirectly fostering investment. However, it also reduces immediate cash flow, limiting funds available for reinvestment, particularly in capital-intensive industries. High withholding tax rates or delayed refunds can further strain businesses, discouraging new investments. Empirical findings are mixed: Nwanyanwu (2012) found a positive association between withholding tax, cash flow, and profit after tax, while Ahmed & Abubakar (2024) and Ezugwu & Akubo (2014) reported negligible or statistically insignificant effects on corporate financial metrics.

Theoretical framework Stakeholder theory by Edward Freeman (1984)

Edward Freeman's (1984) Stakeholder Theory posits that businesses are interconnected with various stakeholders, including customers, suppliers, investors, and communities, all of whom influence and are influenced by corporate activities. Unlike shareholder theory, which prioritizes shareholder value maximization, stakeholder theory emphasizes accountability to a broader group. Donaldson & Preston (1995) highlight that stakeholders have inherent interests in organizations,

while Solomon (2010) argues that large companies must consider their societal impact. With globalization and technological advancements, firms must navigate the interests of multiple stakeholders, as unexpected groups can significantly impact corporate performance (Parmar et al., 2010).

This theory is relevant to tax policies and net investment, as tax decisions impact multiple stakeholders. Eneisik et al. (2023) link tax aggressiveness to stakeholder concerns, noting that minimizing tax liabilities can reduce government revenue and hinder economic development. Governments influence corporate net investment through tax policies such as rate adjustments, tax credits, and allowances. These policies can either incentivize or discourage investment, shaping firms' financial strategies and broader economic growth. Thus, stakeholder theory provides a lens to examine how corporate tax obligations affect both businesses and society.

Empirical review

Ahmed and Abubakar (2024) explored the impact of withholding tax and education tax on the financial performance of listed manufacturing companies in Nigeria, using Return on Assets (ROA) as a measure of profitability. It analyzed secondary data from five companies Guinness Nigeria Plc, Honeywell Flour Mills Plc, Nestlé Nigeria Plc, Flour Mills of Nigeria Plc, and Nigerian Breweries Plc over the period from 2014 to 2023. Regression analysis was employed to assess the relationship between the tax variables and ROA. The regression model produced an R-squared value of 0.445, indicating that 44.5% of the variance in ROA was explained by the model, although this outcome was largely influenced by factors beyond the tax variables studied. The coefficients for WHT and EDT were reported as statistically insignificant (WHT: $\beta = -0.122$, $p = 0.548$; EDT: $\beta = 0.030$, $p = 0.491$), indicating that neither tax had a significant effect on financial performance.

Alpheaus et al. (2024) examined the effect of corporate taxes on the profitability of selected listed food and beverage firms in Nigeria from 2013 to 2022, using secondary data sourced from the annual reports of these firms listed on the Nigerian Exchange Group. It employed Generalized Method of Moments (GMM) regression analysis as the estimation technique. The assessment included the impact of independent variables company income tax (CIT), capital gains tax (CGT), and education tax (ET) on the dependent variable, return on equity (ROE), with firm size (FS) as a control variable. Panel data series were validated using a unit root test, which revealed a mixed order among the variables, justifying the use of the Panel GMM approach. The findings indicated that both company income tax and capital gains tax had a significant and positive effect on return on equity, while education tax had a significant but negative effect on ROE. The study concluded that corporate taxes significantly influenced the profitability of listed food and beverage firms in Nigeria.

Godwin and Iyoha (2024) focused on the contemporary issue of corporate tax mix, firm attributes, and firm performance of listed non-financial companies in Nigeria. It employed a panel research design and secondary data from 36 non-financial companies listed on the Nigeria Stock Exchange, all of which reported their accounts up to December 31 each year. Covering an eight-year period

from 2015 to 2022, the study utilized descriptive and inferential statistical techniques to assess the reliability and predictive power of the model in determining the acceptance or rejection of the null hypothesis. A panel least squares regression method with random effects was used for hypothesis testing, facilitated by the P-value. The results revealed that company income tax and leverage had a positive and significant impact on firm performance. Firm size was found to influence performance negatively, while the effective tax rate had a negative relationship with an insignificant impact on firm performance, reflected by a coefficient value of -0.094057 and a P-value of 0.2958. Tangibility and firm age were reported to have a positive association but an insignificant impact on firm performance. The study recommended that corporate managers of listed firms engage tax consultants with specialized knowledge of loopholes in the Finance Act (2021) to minimize company income tax liabilities through tax incentives, waivers, and tax avoidance strategies, ultimately enhancing firm performance.

Ndah et al. (2024) examined the effect of taxes on the net investment of industrial goods firms in Nigeria, focusing specifically on the impact of Company Income Tax (CIT), Tertiary Education Tax (TET), Value Added Tax (VAT), Capital Gains Tax (CGT), and Industrial Training Tax (ITT) on net investment (NI). The research adopted an ex-post facto design and analyzed data from a population of 13 listed industrial goods firms over an 11-year period (2013–2023) using panel regression analysis. The results indicated that company income tax had an insignificant but positive effect on net investment, while tertiary education tax had an insignificant but negative effect. Furthermore, the study found that VAT and capital gains tax were negatively significant, whereas industrial training tax had a positively significant impact on net investment. The study concluded that apart from company income tax and tertiary education tax, tax liabilities significantly influenced net investment in industrial goods firms in Nigeria.

Adewara et al. (2023) used a survey research method and analyzed the data with correlation and multiple regression analysis. The population included all registered and functional SMEs located in Ado Ekiti, Nigeria that had been in existence for over five years with valid proof of tax payment. The results found that multiple tax burdens and multiple tax administrations had a significant negative relationship with the financial performance of SMEs in Ekiti State, Nigeria, while the ability to pay tax exhibited a significant positive relationship. Based on these findings, it was concluded that multiple taxes significantly reduced the investment potential of SMEs, negatively affecting the revenue generated by the sector in the state. The study suggested that the Joint Tax Board and other institutions responsible for managing multiple taxes in the state should fulfil their functions and harmonize all government revenue to prevent the burden of multiple taxes from hindering the survival of SMEs in the state.

Douglas et al. (2023) looked at the effect of multiple taxation on the growth of SMEs in Abakaliki, Ebonyi State, Nigeria. Surveying 400 SME operators, the research captured data on profit levels, tax payment status, types of taxes paid, the timing of tax payments, multiple taxation experiences, business locations, and energy sources. Ordinal logistic and ordinal probit regressions were applied, revealing that tax payments significantly decreased the log odds of achieving higher profit levels

by -0.7 units. While sales tax and royalties had no significant impact, environmental levies and business premises levies significantly reduced the log odds of attaining higher profit levels by -0.133 and -0.134, respectively. Being taxed from the second year of business reduced the log odds of higher profit by -0.37, whereas being taxed from the third year increased the odds by 0.22. Overall, multiple taxation lowered the log odds of higher profit levels. Marginal effects analysis showed that multiple taxation increased the probability of reporting low profit by 7% and decreased the likelihood of normal or high profit by 5% and 3%, respectively. The study concluded that multiple taxation is detrimental to SMEs in Ebonyi State and recommended that the State Government should impose only one of either environmental or business premises levies and grant SMEs at least a two-year tax holiday to support their survival.

Adefunke and Usiomon (2022) examined the impact of company income tax on corporate performance, utilizing data from twelve listed firms on the Nigerian Stock Exchange. The data, sourced from the annual reports of these companies, covered a ten-year period from 2011 to 2020. Regression analysis was conducted using SPSS 2020 as the data analysis technique. The findings indicated that company income tax (CIT) had a positive and significant effect on profit after tax (PAT) and returns on equity (ROE). Additionally, it was found that a change in shareholders' funds (CSHF) had a negative but significant effect on ROE, while CIT positively and significantly influenced shareholders' earnings.

Owoniya and Olaoye (2022) assessed the impact of company income tax on the profitability of quoted manufacturing companies in Nigeria, focusing on the effect of the effective tax rate on earnings per share for 10 selected firms over a 10-year period (2007-2016). Panel data were pooled, and various analysis techniques, including pooled OLS estimation, fixed effect, and random effect estimations, were employed, with the most consistent and efficient estimator selected through post-estimation tests, such as the restricted F-test and Hausman test. The results revealed that the effective tax rate had an insignificant negative impact on earnings per share, with a reported coefficient estimate of -0.0223004 ($p=0.209 > 0.05$). The study concluded that for improved profitability of quoted manufacturing firms in Nigeria, corporate taxation should receive greater attention from policymakers, management, and regulatory authorities in the manufacturing sector.

Eyide and Nzewi (2021) assessed the effect of taxes on the net investment of quoted healthcare firms in Nigeria from 2010 to 2019. Its specific objectives were to investigate the extent to which company income tax (CIT) and value-added tax (VAT) affected the net investment of these firms. An ex-post facto research design was adopted, and a sample of seven healthcare firms was purposively selected from a total of ten quoted healthcare firms based on data availability. The secondary data were collected from the published financial statements of the selected firms, and the panel data used covered a period from 2010 to 2019. The study employed panel least square regression analysis to analyze the data, using E-Views 10.0 software. The regression results revealed a significant negative effect of both company income tax and value-added tax on net investment at a 5% significance level. Based on these findings, the study recommended that the government should reduce the rates of company income and value-added taxes to enhance both

domestic and foreign direct investment, lower the cost of doing business, reduce poverty and unemployment rates, and bolster investment activities of firms, thereby encouraging consumption in Nigeria.

Amahalu (2020) determined the effect of taxes on the net investment of listed communication firms in Nigeria over a ten-year period from 2010 to 2019. Eight communication firms were purposively sampled from a population of eleven listed communication firms in Nigeria. Taxes were represented by proxies such as the Information Communication Tax, Education Tax, and Company Income Tax, while net investment was used as the dependent variable. To test the study's hypotheses, Pearson Correlation Coefficient and Panel Least Square (PLS) Regression analysis were conducted using E-Views 10.0 statistical software. The findings indicated that Information Communication Tax, Education Tax, and Company Income Tax all had a significant negative effect on net investment at a 5% level of significance. Based on these results, the study recommended that the Federal Government of Nigeria should reduce the overall tax liabilities at the end of the year to make more funds available for further investment.

3.0 Methodology

This study adopted an ex-post facto research design, as the data had already been recorded, leaving no room for manipulation. The population comprised all eight oil and gas firms listed on the Nigerian Exchange Group as of December 31, 2023. Due to incomplete data, Capital Oil Plc was excluded, resulting in a sample size of seven firms: Conoil Plc, Eterna Plc, Japaul Gold & Ventures Plc, MRS Oil Plc, Oando Plc, Seplat Energy Plc, and TotalEnergies Marketing Nigeria Plc. A purposive sampling technique was used to ensure data availability. Secondary data were sourced from the Nigerian Exchange Group fact books and the audited annual financial reports of the sampled firms, ensuring reliability and consistency. Prior studies (Ogudu et al., 2018; Maharani et al., 2020) validated the reliability of these data sources. The validity of the research instrument was ensured by adapting models from previous studies (Eyide & Nzewi, 2021) and expert review from Akwa Ibom State University. Panel least squares regression analysis was employed using STATA 14 to examine the effects of company income tax, tertiary education tax, capital gains tax, and withholding tax on net investment. Decision criteria were based on a 5% significance level, where null hypotheses were rejected if the p-value was below 0.05.

Model specification and variable measurement

The model for this study were adapted from the work of Eyide and Nzewi (2021) and modified to suit this study. The econometric function of the model is given below:
Net investment =f (Company income tax, tertiary education tax, capital gains tax, withholding tax)

NINV = f (CIT, TET, CGT, WHT)

$NINV_{it} = \alpha_0 + \beta_1 CIT_{it} + \varepsilon$ *Equation 1*

$NINV_{it} = \alpha_0 + \beta_2 TET_{it} + \varepsilon$ *Equation 2*

$NINV_{it} = \alpha_0 + \beta_3 CGT_{it} + \varepsilon$ *Equation 3*

$NINV_{it} = \alpha_0 + \beta_4 WHT_{it} + \varepsilon$ *Equation 4*

$NINV_{it} = \alpha_0 + \beta_1 CIT_{it} + \beta_2 TET_{it} + \beta_3 CGT_{it} + \beta_4 WHT_{it} + \varepsilon$ *Equation 5*

Where:

NINV = Net investment
CIT = Company income tax
TET = Tertiary education tax
CGT = Capital gains tax
WHT = Withholding tax
α_0 = Model intercept
β_{1-3} = Coefficient to be estimated, where $\beta_{1-3} > 0$
it = Cross section of listed companies with time variant
ε = Stochastic error term

Table 3.1: Measurement of variables

Variable	**Measurement**	**Sources**	**Apriori expectation**
Net investment (Dependent variable)	Purchase of new capital assets minus total depreciation.	Oshiole et al. (2024)	-ve
Company income tax (Independent variable)	Assessable profit paid	PwC (2024)	-ve
Tertiary education tax (Independent variable)	Assessable profit paid	Ahmed and Abubakar (2024)	-ve
Capital gains tax (Independent variable)	Assessable profit paid	Kabiru et al. (2023)	-ve
Withholding tax (Independent variable)	Assessable profit paid	Ahmed and Abubakar (2024)	-ve

Source: Researcher's compilation (2024)

4.0 Data presentation, analysis and discussion of findings

Table 4.1.1 Descriptive statistics of tax mix and net investment of listed oil and gas firms in Nigeria (2014-2023)

Variable	Obs	Mean	Std. Dev.	Min	Max
ninv (N'000)	70	8613466.7	21854460	-14498063	1.205e+08
cit (N'000)	70	3892266.9	7379790	0	45949000
tet (N'000)	70	474859.84	1208093.4	0	8968000
cgt (N'000)	68	2319.147	13062.345	0	105043
wht (N'000)	70	146323.33	274250.8	0	1201243
grossinv (N'000)	70	13539703	23106418	140	1.208e+08
dep (N'000)	70	4926235.9	9080588.2	112000	48560494

Source: Researcher's computation (2024)

Table 4.1.1 presents descriptive statistics for net investment (ninv) and various tax components, including company income tax (cit), tertiary education tax (tet), capital gains tax (cgt), and withholding tax (wht), among others. The statistics reveal significant variability in net investment, with a mean of N8,613,466.70 and a standard deviation of N21,854,460. The minimum observed value was -N14,498,063, indicating instances where depreciation exceeded gross investment. Company income tax (cit) averaged N3,892,266.90, with a high variability (std. dev. = N7,379,790). The highest observed company income tax was N45,949,000, while some firms paid none, likely due to tax exemptions. Similarly, tertiary education tax (tet) exhibited a mean of N474,859.84, with firms occasionally exempt. Capital gains tax (cgt) was low on average (N2,319.15), reflecting infrequent asset sales. Withholding tax (wht) had a mean of N146,323.33, highlighting varying dividend distributions across firms.

Table 4.1.2 Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
ninv	70	0.559	27.132	7.178	0.000
cit	70	0.563	26.922	7.161	0.000
tet	70	0.380	38.157	7.919	0.000
cgt	68	0.211	47.457	8.380	0.000
wht	70	0.667	20.483	6.566	0.000

Source: Researcher's computation (2024)

The Shapiro-Wilk test indicated that all variables, including net investment and the tax components, deviate significantly from normality ($p < 0.01$). Causes of non-normality may include outliers,

skewness, or multiple peaks in the data distribution. However, this does not critically affect regression analysis.

Table 4.2.1 Spearman's rank correlation coefficients

Variables	(1)	(2)	(3)	(4)	(5)
(1) ninv	1.000				
(2) cit	0.321	1.000			
(3) tet	0.459	0.828	1.000		
(4) cgt	-0.083	0.353	0.303	1.000	
(5) wht	-0.110	-0.096	-0.233	0.320	1.000

Spearman rho = 0.320

Source: Researcher's computation (2024)

Spearman's rank correlation was used due to non-normality. Net investment (ninv) showed a moderate positive correlation with company income tax (0.321) and tertiary education tax (0.459), suggesting that higher taxes often accompany higher investments. However, capital gains tax (-0.083) and withholding tax (-0.110) had weak or no correlation with net investment.

Table 4.2.2 Regression results

Models	Coef. (1)	t-stat (2)	P>|t| (3)	R^2 (4)	F-Stat (Prob > F)	F-test (Prob > F) (5)
(1) cit	1.985	4.83	0.000	0.449	23.24(0.000)	
(2) tet	14.339	10.72	0.000	0.628	114.94(0.000)	11.23(0.000)
(3) cgt	-64.679	-0.31	0.757	0.002	0.10(0.757)	
(4) wht	-13.466	-2.44	0.017	0.029	5.96(0.017)	

Source: Researcher's computation (2024)

The regression results presented above are for the individual models used to test for the formulated hypotheses related to relationship between the tax mix and net investment of listed oil and gas firms in Nigeria. From the output presented above, models cit, tet, cgt and wht showed F-statistics (corresponding p-values) of 23.24(0.000), 114.94(0.000), 0.10(0.757) and 5.96(0.017) respectively. These implies that cit, tet and wht models were all fit for statistical inferences while cgt model was not, as its p-value was statistically non-significant at the 5% level. For cit, the model showed an R-squared of 0.449 meaning that about 45% of changes in net investment could be explained by company income taxes. For tet, 0.628 was the case, implying that tertiary education taxes could explain about 63% of the variations in net investments. cgt showed an R-squared value of 0.002 entailing that 0.2% of variations in net investments in the oil and gas sector could be

explained by capital gains taxes. Lastly, wht model showed an R-squared of 0.029 implying that just 3% of the variations in net investments could be attributed to withholding taxes.

Table 4.2.3 Diagnostics for model selection

	Hettest(Prob>chi2)	Lagrange(Prob>chibar2)
	(1)	(2)
(1) cit	12.25(0.001)	0.00(1.000)
(2) tet	0.29(0.590)	0.00(1.000)
(3) cgt	0.99(0.321)	0.00(1.000)
(4) wht	8.60(0.003)	0.00(1.000)

Source: Researcher's computation (2024)

Homoscedasticity, which ensures constant variance of error terms, was tested using the Breusch-Pagan test in Stata 14. The results (Prob>chi²) were 12.25 (0.001) for CIT, 0.29 (0.590) for TET, 0.99 (0.321) for CGT, and 8.60 (0.003) for WHT. These indicate that TET and CGT met the homoscedasticity assumption, while CIT and WHT exhibited heteroscedasticity. For models violating homoscedasticity (CIT and WHT), robust standard errors were applied in the regression analysis. Results for CIT and WHT were obtained using robust pooled OLS, while TET and CGT were analyzed using standard pooled OLS, as robust adjustments would yield identical results.
The Lagrange Multiplier test (Breusch & Pagan, 1980) was conducted to determine whether the random-effects GLS or pooled OLS model was more suitable. The null hypothesis states that no random effects exist, making OLS sufficient. Results (Test Statistic: 0.00, p-value: 1.000 for all models) indicate acceptance of the null hypothesis, confirming that pooled OLS was appropriate for analysis. Therefore, all results in Table 4.2.3 were derived using pooled OLS, except for those requiring robust adjustments.

Hypothesis one

H_{o1}: Company income tax has no significant effect on net investment of listed oil and gas firms in Nigeria.

H_1: Company income tax has a significant effect on net investment of listed oil and gas firms in Nigeria.

Regression results indicate that company income tax (Coefficient: 1.985, p-value: 0.000) has a significant positive effect on net investment in listed oil and gas firms in Nigeria. As the p-value is significant at the 5% level, the null hypothesis is rejected in favor of the alternative hypothesis, confirming the impact of company income tax on net investment.

Hypothesis two

Ho_2: Tertiary education tax has no significant effect on the net investment of listed oil and gas firms in Nigeria.

H_2: Tertiary education tax has a significant effect on net investment of listed oil and gas firms in Nigeria.

Regression results (Coefficient: 14.339, p-value: 0.000) show that tertiary education tax has a significant positive effect on net investment in listed oil and gas firms in Nigeria. As the p-value is significant at the 5% level, the null hypothesis is rejected in favor of the alternative hypothesis.

Hypothesis three

Ho_3: Capital gains tax has no significant effect on net investment of listed oil and gas firms in Nigeria.

H_3: Capital gains tax has a significant effect on net investment of listed oil and gas firms in Nigeria.

Regression results (Coefficient: -64.679, p-value: 0.757) show that capital gains tax has no significant effect on net investment in listed oil and gas firms in Nigeria. As the p-value is not significant at the 5% level, the null hypothesis is accepted.

Hypothesis four

Ho_4: Withholding tax has no significant effect on net investment of listed oil and gas firms in Nigeria.

H_4: Withholding tax has a significant effect on net investment of listed oil and gas firms in Nigeria.

Regression results (Coefficient: -13.466, p-value: 0.017) show that withholding tax has a significant negative effect on net investment in listed oil and gas firms in Nigeria. As the p-value is significant at the 5% level, the null hypothesis is rejected.

Hypothesis five

Ho_5: There is no significant difference in the effects of the company income tax, tertiary education tax, capital gains tax and withholding tax on net investment of listed oil and gas firms in Nigeria.

H_5: There is a significant difference in the effects of the company income tax, tertiary education tax, capital gains tax and withholding tax on net investment of listed oil and gas firms in Nigeria.

The F-test results (F-statistic: 11.23, p-value: 0.000) indicate a significant difference in the effects of Company Income Tax (CIT), Tertiary Education Tax (TET), Capital Gains Tax (CGT), and Withholding Tax (WHT) on the net investment of listed oil and gas firms in Nigeria. Therefore, the null hypothesis is rejected.

Company income tax and net investment

The regression analysis revealed a significant positive effect of company income tax (1.985 [0.000]) on the net investment of listed oil and gas firms in Nigeria. This indicates a linear relationship in the same direction, implying that higher company income tax leads to increased net investment. This finding contradicts the study's initial expectation of a negative effect but may be explained by several factors. One possible reason is that tax revenues, when effectively utilized, enhance public infrastructure, reducing operational costs and creating a favorable investment climate. Given Nigeria's infrastructural deficits, improved roads, ports, and electricity from tax-funded projects may benefit oil and gas firms, encouraging further investment. This aligns with Ogudu et al. (2018), who highlighted the expansionary impact of tax revenue on socio-economic infrastructure. Additionally, the oil and gas sector is capital-intensive with high entry barriers, meaning firms prioritize long-term profitability over short-term tax costs. Higher tax payments may reflect strong profits and cash flows, enabling firms to sustain investments in exploration, drilling, and facility upgrades. Reinvestment is crucial in this sector due to resource depletion and technological advancements. Firms may also use increased investments strategically to align with government policies, enhance their corporate image, and maintain their social license to operate. This is particularly relevant in Nigeria, where oil and gas companies face political and social scrutiny. This study's findings align with Ogudu et al. (2018) and similar studies (Chude & Chude, 2015; Olatunji & Oluwatoyin, 2019; Adefunke & Usiomon, 2022; Aondohemba et al., 2021), which found positive relationships between company income tax and investment indicators. However, contrary findings exist in Eyide & Nzewi (2021), Oshiole et al. (2024), and Amahalu (2020), who reported a negative relationship, while Ogbonna et al. (2020) found no significant link between company income tax and investment metrics. These mixed findings suggest that the effect of company income tax on investment may vary depending on industry characteristics, profitability levels, and government tax utilization efficiency.

Tertiary education tax and net investment

The regression results (14.339 [0.000]) indicate that tertiary education tax has a significant positive effect on the net investment of oil and gas firms in Nigeria. This suggests that higher education tax payments lead to increased investments, highlighting a linear relationship in the same direction. A key reason for this positive effect is that tertiary education tax funds higher education institutions, enhancing the skilled labor force essential for the oil and gas sector. A well-trained workforce reduces recruitment and training costs, improving operational efficiency and justifying increased investments. Additionally, firms may view this tax as part of their corporate social responsibility (CSR), strengthening their public image, fostering goodwill, and ensuring regulatory compliance. A stable and favorable operating environment encourages reinvestment in assets and long-term

competitiveness. Moreover, the broader economic stability fostered by investments in education reduces operational risks for firms, leading to fewer disruptions and lower transaction costs. This aligns with Uwaifo & Obaretin (2022), who found a positive impact of education tax on economic development. However, contrary findings exist in Ahmed & Abubakar (2024), Chude & Chude (2015), and Ndah et al. (2024), who reported limited or no significant effects on corporate performance and investment. These mixed results suggest that the effect of tertiary education tax may vary by sector and government efficiency in utilizing tax revenues for economic growth.

Capital gains tax and net investment

The regression results (-64.679 [0.757]) indicate that capital gains tax has no significant effect on the net investment of oil and gas firms in Nigeria. The insignificant p-value suggests insufficient evidence of a relationship between capital gains tax and net investment. This aligns with industry characteristics, as oil and gas firms focus on capital-intensive, long-term investments like exploration and infrastructure rather than frequent asset sales that would trigger capital gains tax. High asset retention further reduces their exposure to this tax, making it an inconsequential factor in investment decisions. Additionally, investment patterns in the sector are primarily influenced by profitability, cash flow, and financing options rather than taxes on asset disposals. Weak enforcement or low effective tax rates may also explain the lack of significance, as firms might not view capital gains tax as a substantial financial burden. Furthermore, the timing of tax liabilities upon asset sales may not align with reinvestment decisions, obscuring any direct impact on net investment. This finding contradicts Kabiru et al. (2023), who found a negative effect of capital gains tax on SME profitability, and Muli (2020), who reported a positive link between capital gains and business performance. The results suggest that capital gains tax plays a minimal role in shaping investment behavior in Nigeria's oil and gas sector.

Withholding tax and net investment

The regression results (-13.466 [0.017]) indicate that withholding tax has a significant negative effect on the net investment of oil and gas firms in Nigeria, implying an inverse relationship. This suggests that higher withholding tax reduces net investment in the sector. A key reason is that withholding tax reduces immediate cash flow by deducting payments at the source, limiting funds available for capital expenditures. Given the capital-intensive nature of the oil and gas industry, constrained liquidity can hinder exploration, infrastructure upgrades, and technological investments. Additionally, inefficiencies in tax refund processes may cause firms to perceive withholding tax as an added burden rather than a temporary deduction, discouraging reinvestment. The tax also increases operational costs, as contractors may pass on the tax burden through higher service charges. This limits the capital available for expansion, prompting firms to adopt conservative financial strategies rather than invest in growth. Furthermore, withholding tax represents an opportunity cost, diverting funds that could have been used for revenue-generating projects in a highly competitive global energy market. This finding aligns with Ezugwu & Akubo (2014), who reported mixed effects of withholding tax on corporate metrics. However, it

contradicts Nwanyanwu (2012), who found a positive association between withholding tax and cash flow, and Ahmed & Abubakar (2024), who reported no significant effect on return on assets.

Comparative effects of company income tax, tertiary education tax, capital gains tax and withholding tax on net investment of listed oil and gas firms in Nigeria

Regression results show that company income tax, tertiary education tax, and withholding tax have significant effects on net investment, while capital gains tax does not. Tertiary Education Tax (Coefficient: 14.339, R^2: 0.628) has the strongest positive effect, explaining 63% of the variation in net investment. This highlights its critical role in shaping investment decisions. Company Income Tax (Coefficient: 1.985, R^2: 0.449) also has a positive effect, explaining 45% of the variation, indicating a moderate effect. Withholding Tax (Coefficient: -13.466, R^2: 0.029) has a significant negative effect, reducing net investment but with low explanatory power (3%). Capital Gains Tax (Coefficient: -64.679, R^2: 0.002) has an insignificant negative effect, contributing just 0.2% to net investment variations, making it the least influential.

Summary

Tertiary education tax has the most significant and strongest positive effect on net investment, followed by company income tax. Withholding tax negatively affects investment, while capital gains tax has no meaningful effect.

5.0 Summary, conclusion, and recommendations

Summary of findings

This study assessed the effect of tax mix on net investment in listed oil and gas firms in Nigeria from 2014 to 2023. Using regression analysis, the study examined the effects of company income tax, tertiary education tax, capital gains tax, and withholding tax on net investment. Findings revealed that company income tax had a significant positive effect on net investment ($\beta = 1.985$, $p = 0.000$), explaining 45% of the variation. Tertiary education tax showed the strongest positive effect ($\beta = 14.339$, $p = 0.000$), accounting for 63% of net investment variation. Capital gains tax had an insignificant negative effect ($\beta = -64.679$, $p = 0.757$), with only 0.2% explanatory power. Withholding tax significantly negatively affected net investment ($\beta = -13.466$, $p = 0.017$), explaining 3% of the variation. An F-test ($F = 11.23$, $p = 0.000$) confirmed significant differences in the effects of these taxes, with tertiary education tax having the highest positive effect, followed by company income tax, while withholding tax had a negative effect.

Conclusion

The study concludes that tax mix significantly affects net investment in Nigeria's oil and gas sector. While company income tax and tertiary education tax positively affect investment, withholding tax imposes liquidity constraints, and capital gains tax remains largely irrelevant. A well-structured

tax system is essential to balancing government revenue needs with business growth and investment sustainability.

Recommendations

1. Maintain a balanced corporate tax regime with incentives for reinvestment, such as tax credits and capital expenditure allowances.

2. Ensure effective allocation of funds to higher education and workforce development while improving transparency and accountability.

3. Align policies with industry realities by considering exemptions or reductions for reinvestments within the sector.

4. Streamline refund and credit processes to ease liquidity constraints and introduce exemptions for reinvestment activities.

5. Tailor tax policies to the sector's dynamics, maintaining the benefits of income and education taxes while mitigating the negative effects of withholding and capital gains taxes.

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