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Corporate Tax Mix and Capital Investment of Listed Oil and Gas Firms in Nigeria

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ABSTRACT: This study investigated the effect of corporate tax mix on capital investment of listed oil and gas firms in Nigeria, using data for the period of 2013-2024. The objective of this study were to: evaluate the effect of capital gain tax on capital investment of listed oil and gas firms in Nigeria; assess the effect of Petroleum profit tax on capital investment of listed oil and gas firms in Nigeria; assess the effect of education tax on capital investment of listed oil and gas firms in Nigeria; Panel least squared (PLS) method of data analysis was adopted because of its Best Linear Unbiased Estimators (BLUE) properties. The data for the variables used were sourced from annual report of the selected oil and gas firms in Nigeria. The variables were on capital gain tax, Petroleum profit tax, education tax and capital investment. The study adopted the descriptive statistics, correlation approach, as well as panel least square. E- View software was used for the analysis. The study found that Capital gain tax has negative and significant effect on capital investment of listed oil and gas firms in Nigeria. (T-test -3.002813, p=0.0007). Petroleum profit tax has negative and significant effect on capital investment of listed oil and gas firms in Nigeria. (T-test -2, 590932, p=0.0109). The study recommends that, Government should consider reviewing and moderating capital gain tax rates to reduce its negative impact on investment decisions. A more investment-friendly rate would encourage shareholders and firms to reinvest profits into productive capital projects. The petroleum profit tax structure should be re-evaluated to strike a balance between revenue generation and investment stimulation. Lower or more flexible tax rates, especially during periods of economic stress, can help improve the capital investment capacity of oil and gas firms.

Keywords: Capital gain tax, Petroleum profit tax, Tax mix, education tax and capital investment

1. INTRODUCTION

Taxation remains one of the major sources of revenue generation for governments across the world, particularly in developing economies such as Nigeria. Governments rely heavily on tax proceeds to finance public expenditures, provide social amenities, develop infrastructure, and stimulate economic growth (Abdullahi, Ude, Ekpa, Ahuoiza & Sadiq, 2025). In Nigeria, the oil and gas sector constitutes a significant contributor to government revenue due to the strategic importance of petroleum resources to the national economy. Consequently, several forms of taxes are imposed on oil and gas firms operating within the country to ensure adequate revenue generation and economic

stability. Among these taxes are petroleum profit tax, education tax, and capital gains tax, which collectively form part of the corporate tax mix influencing corporate investment decisions (Akwa, Uwah & Imoh 2025; Ogunewe, Ananwude & Nduka, 2020).

Corporate tax mix refers to the combination of different taxes imposed on corporate entities by government authorities. It encompasses various tax components that organizations are required to pay based on their profits, gains, or operational activities (Ogbo, Aladei, & Chime, 2026).. The structure and administration of corporate taxes can significantly influence business performance, investment decisions, and the overall growth of firms (Oguejiofo and Manafa, 2025).

In the Nigerian oil and gas sector, taxation policies are particularly important because of the capital-intensive nature of the industry. Oil and gas firms require substantial investments in exploration, drilling, refining, transportation, and technological development (Adetola, Hussein Johnson & Mobolaji.2023).. Therefore, the nature and magnitude of taxes imposed on these firms may either encourage or discourage capital investment.

Capital investment refers to the expenditure incurred by firms on long-term assets such as plants, machinery, equipment, technology, and infrastructure for the purpose of increasing productivity and enhancing future profitability (Ohiokha and Agbonrha-Oghoye 2024).. In the oil and gas industry, capital investment is essential because firms constantly require modern facilities and advanced technology to sustain operations and remain competitive in the global market. The ability of listed oil and gas firms in Nigeria to undertake substantial capital investment may be affected by government tax policies, especially when tax burdens reduce retained earnings and available investment funds (Obiejesi, Ofor, & Okoye, 2026).

Petroleum profit tax is one of the major taxes imposed on companies engaged in petroleum exploration and production activities in Nigeria. It is charged on the profits generated from upstream petroleum operations (Iormbagah, & Mary-Fidelis & Ibiam, Oti, (2021). The petroleum sector has historically served as the backbone of the Nigerian economy through foreign exchange earnings and government revenue generation. However, the high rate of petroleum profit tax has generated concerns among investors and corporate managers regarding its impact on business expansion and investment activities (Awotomilusi, Aluko. & Awodiran, 2024).

Excessive petroleum taxation may reduce the profitability of oil and gas firms, thereby limiting their ability to reinvest earnings into capital projects. Conversely, an efficient petroleum tax system may enhance government revenue while still encouraging corporate investment and sustainable industry growth (Ede, Logan, Okanya, Nduka, Manasseh, Onoh, Olelewe, Okeke & Umah, 2025).

Ezeokafor, Oguejiofor and Manafa, (2025) examined education tax is another important component of the corporate tax mix in Nigeria. It is levied on the accessible profits of companies to finance the development of the educational sector. The introduction of education tax was aimed at improving educational infrastructure, research, and human capital development within the country (Okwu, Nweke-Charles, Okeke, Oketa, Emuobosa, 2025; Nduka, Okolie & Ngangah, 2025). Although the tax serves an important developmental purpose, firms often perceive it as an additional financial obligation capable of reducing disposable profits available for investment purposes

(Manafa, Okeke, & Atueyi 2022). Listed oil and gas firms, which already operate under significant financial and operational pressures, may experience reduced capital investment capacity when education tax liabilities increase substantially (Okwu, Nweke-Charles, Okeke, Oketa, Emuobosa, 2025).

Capital gains tax represents a tax charged on profits arising from the disposal of chargeable assets such as shares, land, buildings, and other forms of investments (Manafa, Okeke, & Anah 2026). For oil and gas firms, capital gains tax may affect decisions relating to asset restructuring, mergers, acquisitions, and disposal of long-term investments (Ahmed, & Abubakar, 2024).

Since capital investment decisions frequently involve the acquisition and disposal of assets, the imposition of capital gains tax can influence the willingness of firms to engage in investment expansion strategies. High capital gains tax rates may discourage firms from reallocating resources into potentially profitable investment opportunities, while moderate and investor-friendly tax policies may stimulate investment activities. Against this background, this study seeks to examine the effect of corporate tax mix on capital investment of listed oil and gas firms in Nigeria (Ekwunife, Nduka & Ogini, 2022).

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.

Empirical studies on corporate taxation and investment have produced mixed findings. Some studies revealed that high corporate taxes negatively affect investment decisions by reducing after-tax profits and internally generated funds available for expansion. Other studies argued that taxation may not necessarily discourage investment if tax revenues are effectively utilized to provide infrastructure and economic stability that support business operations. However, limited studies have comprehensively examined the combined effect of capital gains tax, education tax, and petroleum profit tax on capital investment among listed oil and gas firms in Nigeria. This study seeks to address this gap by assessing the effect of corporate

tax mix on capital investment of listed oil and gas firms in Nigeria.

1.3 Objectives of the Study

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

1. To evaluate the effect of capital gain tax on capital investment of listed oil and gas firms in Nigeria.
2. To assess the effect of petroleum profit tax on capital investment of listed oil and gas firms in Nigeria.
3. To assess the effect of education tax on capital investment of listed oil and gas firms in Nigeria.

LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 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; Nduka, A. J., Atueyi, Osakwe & Mbanefo, 2021).

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; Orjinta et al., 2025). Ihe (2012) defined 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.

2.1.2 Capital investment

Capital 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; Monogbe, Omotayo, Achugbu & Nduka, 2016). 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, 2016; Akinsanya, 2023; Manasseh, Logan, Okanya, Nduka, Ede, Okeke, Lawal & Ugwu, 2025). 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.

2.2 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.

2.3 Empirical Review

Akwa, Uwah and Imoh, (2025) examined 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). It recommends enhancing transparency in TET utilization, revising CGT policies, and mitigating WHT-related liquidity constraints to promote sustainable sectoral investment.

Nmorsi, Egungwu and Nduka (2026) examined the effect of selected tax revenue on economic development in Nigeria for a period of 31years, 1993-2023. To achieve this objective, Real Gross Domestic Product (RGDP), served as the dependent variables for this study proxied for economic development, while company income tax (CIT), petroleum profit tax (PPT), personal income tax (PIT), value added tax (VAT), education tax (EDT) and customs and excise duties (CED) served as the independent variables (explanatory variables). Ex-post-facto research design was utilized for the study with data used were sourced from Central Bank of Nigeria (CBN) Statistical Bulletin, Central Bank of Nigeria Economic

and Annual Report Account, Federal Inland Revenue Service (FIRS), the Federal Reserve Bank of St. Louis, and the World Bank Database. Descriptive statistics, Phillips-Perron (PPT) Unit root test, Johansen Co-integration, Granger causality and Vector Autoregressive model (VAR) were the analytical tools for this study. The results revealed that there exist a long run relationship between tax revenue indicators and economic development. The Vector Autoregressive results show that tax revenue indicators were statistically significant with RGDP. The study recommended that government should ensure that taxation is appropriately controlled in order to foster economic growth, minimize inflation, and boost employment in the nation.

Udom, Ukpong and Uwah, (2025) examined the effect of tax mix on price to earnings ratio of industrial goods firms listed on the Nigerian Exchange Group from 2014 to 2023. The independent variable of the study, tax mix, was proxied by withholding tax and value added tax, while the dependent variable was price earnings ratio. The research design adopted for this study was ex post facto. Secondary data were used and the population of the study was 13 listed industrial goods firms in Nigeria. The sample size of this study was 11 industrial goods firms which were purposively selected. The robust least square regression technique was used in analyzing the data and the statistical software employed was STATA 14. The results of the analysis revealed that withholding tax has non-statistically significant effect on price to earnings ratio while value added tax has significant negative effect on price to earnings ratio of listed industrial goods firms in Nigeria. It was therefore recommended that policymakers should simplify withholding tax procedures to further reduce administrative burdens on firms without impacting their valuation. It was also recommended that the government should evaluate the VAT structure to minimize its adverse impact on businesses, especially in highly taxed industries

Ohiokha and Agbonrha-Oghoye (2024) centered on the prevalent contemporary issue of corporate tax mix, firm attribute and firm performance of listed non-financial companies in Nigeria. It used a panel research design and secondary source of data for 36 selected samples of non-financial companies trading at the Nigeria stock exchange group which make accounts to 31st December each year. The study covered an eight years period from 2015 to 2022. The study used descriptive methods and inferential statistical analytical techniques to determine the reliability and predictive power of the model in enhancing judgment of acceptance or rejection of the null hypothesis using a panel least square regression method. The result shows that company income tax, leverage has a positive association and significant impact on firm performance. Firm size determines firm performance but the association negative with coefficient, effective tax rate has a negative relationship with an insignificant impact on firm performance with coefficient value of - 0.094057 and a P-value of 0.2958. Tangibility and firm age exhibited a positive association and an insignificant impact on firm performance of listed non-financial companies. This study recommends that corporate managers of listed firms should use the service of tax consultants that has requisite knowledge of loopholes in the Finance Act (2021) that reduces company income tax liabilities through tax incentive strategies, tax wavers, tax avoidance strategies which enhances firm performance.

SweetWilliams, Onmonya and Ebire (2023) examined the effect of corporate tax on the financial performance of Nigerian listed consumer goods companies from 2011 to 2021. A sample of sixteen (16) consumer goods firms was used for the study. Secondary data source was generated from the

annual reports of the selected firms. The random effect panel regression results revealed that company income tax negatively affects financial performance. The study also revealed that education tax has a significant positive effect on financial performance. While Value Added Tax (VAT) has a significant negative effect on financial performance. Based on these findings, the study recommends that to leave enough net income in the hands of the listed consumer goods companies, the federal government should offer more tax exemptions that will lower company income tax payments.

METHOLOGY

3.1. Research Design

In this study, *ex-post facto* design was adopted. According to Devin (2000), *ex-post facto* research design is a quasi experimental study examining how an independent variable, present prior to the study affects a dependent variable.

3.2. Area of Study

This research focuses on quoted Oil and Gas firms in Nigeria from which the data required for a thorough analysis was derived.

3.3. Population of the Study

The population of the study was comprised of ten quoted oil and gas companies listed on the Nigerian Exchange Group (NGX) as of 1st June 2024. The details of the companies are shown in Table 3.1 below.

Table 3.1: List of quoted oil and gas firms in Nigeria

S/No	Company	Ticker	Date Listed	Date Incorporated
1	ARDOVA PLC [MRF][CG+]	ARDOVA	-	November 12,1964
2	CAPITAL OIL PLC [MRF]	CAPOIL	-	August 29, 1985
3	CONOIL PLC	CONOIL	-	June 30, 1970
4	ETERNA PLC.	ETERNA	-	January 13, 1989
5	JAPAUL GOLD & VENTURES PLC	JAPAULGOLD	August 10, 2005	June 29, 1994
6	MRS OIL NIGERIA PLC.	MRS	-	August 12, 1969
7	OANDO PLC [MRF]	OANDO	February 24, 1992	August 25, 1969
8	RAK UNITY PET. COMP. PLC. [MRF]	RAKUNITY	-	December 20, 1982
9	SEPLAT ENERGY PLC [CG+]	SEPLAT	-	June 17, 2009
10	TOTAL ENERGIES MARKETING NIGERIA PLC	TOTAL	-	January 6, 1956

Source: Nigerian Exchange Group (2026)

The study adopts a purposive sampling technique. The researcher selected all the oil and gas firms in Table 3.1 shown above. Hence, the scope of the study restricted the focus to companies classified under the oil and gas sector, of the Nigeria Stock Exchange.

3.4. Sample Size and Sampling Method

The ten (10) listed firms represent the sample size for this study. Purposive sampling method was used (that is selected firms that filed their annual financial statements with NSE from 2013-2024 without missing any year was selected for this study). The total number of oil and gas firms in Nigeria exchange limited were ten (10), as at 31st December 2024 the researcher choose five firms from them, Conoil, seplat energy plc, japaul Gold & ventures plc, MRS oil and Oando

3.5 Source of Data

This study made use of secondary data mainly. The data were sourced from publications of the Nigerian Exchange Limited (NEL), the annual report and accounts of the listed Oil and Gas firms, particularly the comprehensive income statement and statement of financial positions of these companies as well as their respective notes to the accounts. Both the dependent and independent variables were computed from the data extracted from publications of the Nigerian Exchange Limited (NEL),, the annual report and accounts of the listed firms and ratios was computed from the figures as reported in the annual reports for Nine (9) years from 2013-2024.

3.6. Data Analysis Techniques

This study employs ordinary least square using panel data between 2013 and 2024 covering period of twelve years for 10 firms, to estimate and provide evidence on the nature of association between tax mix and capital investment. Inferential statistics, as well as descriptive statistics of the hypotheses were carried out with the aid of E-view 9.0 statistical software, using coefficient of correlation which is a good measure of relationship between two variables, tells us about the strength of relationship and the direction of relationship as well. Ordinary least Square Regression analysis will be for the study. Regression analysis predicts the value of a variable based on the value of the other variables and explains the impact or effect of changes in the values of the variables.

3.7. Model Specification

In an attempt to determine the tax mix on capital investment, we develop an empirical model to ascertain the association that exists between the variables. Specification of economic model is based on accounting theory and from prior empirical work on the variables. The multiple regression model used was adapted from the work of Akwa, Uwah & Imoh (2025) who examined tax mix and net investments of listed oil and gas firms in Nigeria. Their model is:

ROA= F (CIT, TET, CGT, WHT)

Where:

ROA – Return on assets
CIT - Company income tax
TET - Tertiary education tax
CGT - Capital gains tax
WHT - Withholding tax

This model was adapted into:

CPI= F (CGT, WHT, CIT)

Where

CPI – Capital investment
CGT - Capital gains tax
WHT - Withholding tax
CIT - Company income tax

F = Functional Notation

Our model can be restated in an econometric form as:

$CPI -= BO + B_1CGT + \beta_2PPT + \beta_3EDT + u$

Where:
CPI – Capital investment
CGT - Capital gains tax
PPT – Petroleum tax
EDT - Education tax

F = Functional Notation

Where:
B_0 = Autonomous Intercept
B_1 = Coefficient of parameter CGT
B_2 = Coefficient of parameter PPT
B_3 = Coefficient of parameter EDT
U = Stochastic error term

3.8 Variables and Measurement

Variable	measurement	Sources
Dependent Variable Capital investment	(total current assets) - (total operating liabilities) + (total non-current assets)	Eyide, & Nzewi, (2021)
Independent Variable Capital gains tax	(Transfer value- Adjusted cost) x 5%	Iormbagah, Abiahu, & Ibiam, (2021)
Petroleum tax	Assessable profit-capital allowances X tax rate	Akwa, Uwah & Imoh (2025)
Education tax	Assessable profit X 3%	Akwa, Uwah & Imoh (2025)

3.9 Decision Rule

The test of hypotheses and the decision on whether to accept or reject each hypothesis was based on the result of the T-Test/T-Stat in the multiple regression analysis. The t-statistics was used to test the significant

contribution from each predictor to the regression models. Hypotheses were tested at 5% (0.05) level of significance. The null hypothesis was accepted if the probability ' P-value ' of T-stat is greater than the stated 5% level of significance otherwise reject. P>0, 0.5, Accept Ho. P< 0.05, Reject Ho.

DATA PRESENTATION, ANALYSIS AND INTEPRETATION

4.1 Descriptive Analysis

The descriptive statistics for the dependent and independent variables used in this study were presented in table 4.1 below:

Table 4.1: Summary of descriptive statistics for the variables employed in this study:

	LCPI	LCGT	PPT	EDT
Mean	14.55996	2.767998	8.394777	2.171918
Median	11.06530	4.342024	9.401573	3.307619
Maximum	15.91707	3.071538	8.818482	4.679679
Minimum	12.98719	2.478815	7.751475	0.810866
Std. Dev.	0.921593	0.111170	0.220053	0.736649
Skewness	0.371775	0.338799	-0.139672	0.828667
Kurtosis	1.553993	4.089827	2.900976	4.131708
Jarque-Bera	13.21902	8.234311	0.439195	20.13758
Probability	0.001347	0.016291	0.802842	0.000042
Sum	1747.195	332.1597	1007.373	260.6302
Sum Sq. Dev.	101.0707	1.470706	5.762361	64.57555
Observations	120	120	120	120

Source: Researchers' computation (2026) from E-view 11
*Note: *1% level of significance **5% level of significance*

The table shows the descriptive of mean, standard deviation, Jarque-Bera (JB) Statistics normality test, minimum, median and maximum values of the variables used. The study used data for 120 observations of annual reports from the Nigerian Exchange Limited for a period of 12 years spanning 2012 to 2023. From the table above, the dependent variable is performance of oil and gas firms while the independent variables were- capital investment (CPI), Capital gain tax (CGT), petroleum profit tax (PPT), and education tax (EDU), As shown in the table 4.1 above, the average or mean value of capital investment stood at 14.5% while the median value was 11.0 and the standard deviation was 0.92%, the maximum and minimum values stood at 12.9 and 15.9% respectively. The result provided some insight into the nature of the selected oil and gas firms under study. Firstly, the great difference between the mean and median values of capital investment shows that the sampled firms differ greatly; this was also reaffirmed by the standard deviation value which indicates that the sampled oil and gas firms are not dominated by the firms whose performance is below average.

It shows that half of the selected firm of the oil and gas firms sampled has high mix tax on dependent variables. The variation in the maximum and minimum values of performance of selected oil and gas firms revealed that our sampled firms are homogeneous and the selected estimation techniques must not take into consideration hetero-scedasticity problem.

This therefore justifies the use of Panel Least Square (PLS) least squared regression techniques. In the same vein, capital gain tax stood at mean value of 2.7% approximately suggesting that half of the oil and gas firms under study having well structured tax mix. Furthermore, we observed on the average that capital gain tax in our sampled oil and gas is comprised of 4.342% while the maximum and minimum values stood at 3.07% and 2.47% respectively.

Again, petroleum profit tax (PPT), expressed in oil and gas firms indicates that on average 8.39%, while the medium is 9.401 maximum and minimum is 8.81 and 7.75 approximately . Similarly education tax (PPT), and education tax (EDU), mean is 2.17with minimum of 4.67 and maximum of a 0.81 respectively.

Lastly, in table 4.1, the Jarque–Bera (JB.) which test for normality or existence of outliers or extreme value among the variables shows that capital investment (CPI), and petroleum profit tax (PPT), and education tax (EDU), at 1% level of significance while capital gain tax and petroleum profit tax is normally distributed at 5% level of significance. This means that no variables with outlier, even if there are, they are not likely to distort the conclusion and are therefore reliable for drawing generalization. The descriptive statistics in general revealed that there is no sample selection bias or outlier in the data that would impair the generalization from this study. This also justifies the use of panel Least Square estimation techniques. Hence, any recommendations made to a very large extent would represent the characteristics of the true population of study.

4.2. Correlation Analysis

A square matrix that displays the correlation coefficients between two variables is called a correlation matrix. The strength and direction of a linear relationship between two variables are measured by correlation coefficients. Frequently used in multivariate analysis and statistics, a correlation matrix looks at the relationships between several variables. It is possible to assess the link between two variables by using a correlation matrix: A relationship is strong if the relationship value is 1. The relationship is neutral if the relationship value is 0. In the event that the relationship's value is -1, it is weak or negative.Therefore, in examining the association among the variables, we employed the Pearson correlation coefficient (correlation matrix) and the results are presented in the table 4.2 below.

Table 4.2 Result of Pearson Correlation Matrix
Source: Researcher's summary of correlation analysis (2025). E-view 11

	LCPI	LCGT	LPPT	LEDT
LCPI	1.000000	0.042131	0.623781	-0.153910
LCGT	0.042131	1.000000	0.005098	0.100032
LPPT	0.623781	0.005098	1.000000	0.084269
LEDT	-0.153910	0.100032	0.084269	1.000000

Sources: E-VIEW OUTPUT 2026

A close look at the value of the Pearson correlation coefficient results revealed that all the variables are strongly associated with capital investment. Therefore, in checking for multicollinearity problem, the study noticed from the correlation table above that no two explanatory variables were perfectly correlated and thereby ruled out the case of having an outlier. This indicates the absence of multi-collinearity problem in the model used for the analysis. This also justifies the use of the Panel Least Square (PLS).

4.3 Fixed and Random Effect Test (Hausman Test)

To choose between these two regressions models, Hausman test can be run to examine whether the difference between the random effects regression and the fixed effects regression is zero. In other words, H0: random effect is preferred. Based on the present analysis, Hi was strongly rejected (p-value= 0.000) which means that the random effects model was preferred.

Table 4.3 Fixed and Random Effect Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	7.840817	3	0.0494

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LCGT	-0.368484	-0.350610	0.000780	0.5220
LPPT	0.238267	0.328221	0.001392	0.0159
LEDT	0.062303	0.056756	0.000047	0.4199

Result of Hausman test in Table 4.4 revealed high Chi-Sq. Statistic value to the tune of 7.840817, alongside p-value of 0.0494. Probability value is below 0.05 ($p > 0.05$). Findings revealed a positive and statistically significant result which implies that fixed effect estimation result is the most efficient and consistent estimation result that can track true nature of the nexus between tax mix and capital investment of oil and gas firm. Based on the results of post estimation test carried out, it is established that fixed effect estimator is appropriate

4.4 Test of Hypotheses and Discussion of findings

In order to examine the relationship between the dependent variable (capital investment) and the independent variables (LCGT, LPPT, LEDT) and to test the formulated hypothesis, we employed a Panel Regression Analysis since the data had both time series (2013-2024) and longitudinal properties (10 quoted companies) our analysis is presented in table 4.3 below:

$$CPI_{it} = \beta_0+\beta_1 LCGT_{1t}+\beta_2 LPPT_{1t}+\beta_3 LEDT_{1t} + \varepsilon \ldots\ldots\ldots\ldots 1$$

Table 4.4: Robust Random Effect Model

Dependent Variable: LCPI
Method: Panel EGLS (Cross-section weights)
Date: 05/23/26 Time: 01:15
Sample: 2013 2024
Periods included: 12
Cross-sections included: 10

Total panel (balanced) observations: 120
Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.088414	0.809512	4.068063	0.0000
LCGT	-0.277584	0.138597	-3.002813	0.0007
LPPT	-0.216579	0.083591	-2.590932	0.0088
LEDT	-0.041132	0.015871	-3.591649	0.0009

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.798138	Mean dependent var	74.35115
Adjusted R-squared	0.797930	S.D. dependent var	69.20221
S.E. of regression	0.198252	Sum squared resid	4.205529
F-statistic	47.80648	Durbin-Watson stat	1.652999
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.745626	Mean dependent var	14.55996
Sum squared resid	5.495568	Durbin-Watson stat	1.595077

Source: Author's Computation Using E-views (2026)

A weighted adjusted R-squared value of 0.797930 and a weighted R-squared value of 0.798138 were given in Table 4.4. This graph indicates that around 79% of the variances in the tested companies' investment might be attributed to the tax mix used in the study. The probability value of 0.0000 and the F-statistic of 40.80648 show how well the regression model describes the data. Once more, the model shows that it is still very statistically significant even at 5% levels. In the meantime, the Durbin Watson estimate of 1.652999 shows that autocorrelation has little impact on the model. This suggests that the model is fit for prediction. It is on these bases that, each of the research hypothesis postulated in earlier chapter of this research were tested in the next section of this chapter.

4.5. Test of Hypotheses

Ho_1: Capital gain tax has no significant effect on capital investment of listed oil and gas firms in Nigeria.

The regression result in table 4.4 reported a coefficient value of -0.277584, t-statistics value of 3.002813 which is higher than 1.96 benchmark and a probability value of 0.007 which is less than 5% level of significance but less than 95% confidence level. By implication, the probability value which is less than 5% level of significance but higer than 95% confidence level shows that the Capital gain tax has significant effect on capital investment of listed oil and gas firms in Nigeria is statistically significant. It is on this basis; the study accepts the alternative hypothesis one and rejects the null hypothesis. As such, the study reaffirmed that, Capital gain tax has significant negative effect on capital investment of listed oil and gas firms in Nigeria.

Ho_2: Petroleum Profit tax has no significant effect on capital investment of listed oil and gas firms in Nigeria.

The regression result in table 4.4 reported a coefficient value of -0.216579, t-statistics value of 2.590932 which is higher than 1.96 benchmark and a probability value of 0.0088 which is less than 5% level of significance but greater than 95% confidence level. By implication, the probability value which is less than 5% level of significance but greater than 95% confidence level shows that petroleum profit tax has significant effect on capital investment of listed oil and gas firms in Nigeria. It is on this basis; the study rejects the null hypothesis two and accepts the alternate hypothesis two instead. As such, the study reaffirmed that; petroleum profit tax has significant effect on capital investment of listed oil and gas firms in Nigeria.

Ho_3: Education tax has no significant effect on capital investment of listed oil and gas firms in Nigeria.

In the case of hypothesis three, the regression result in table 4.4 reported a coefficient value of -0.041132, t-statistics value of 3.581649 which is higher than 1.96 benchmark and a probability value of 0.0009 which is less than 5% level of significance but greater than 95% confidence level. By implication, thin Education tax has significant effect on capital investment of listed oil and gas firms in Nigeria, within the periods under review. It is on this basis; the study accept the null hypothesis three which states that Education tax has significant effect on capital investment of listed oil and gas firms in Nigeria

5. CONCLUSION

Based on the findings of the study, it can be concluded that capital gain tax, petroleum profit tax, and education tax all have significant negative effects on capital investment of listed oil and gas firms in Nigeria. This indicates that higher corporate tax burdens reduce the financial capacity of firms to undertake capital investment activities by lowering retained earnings and after-tax profits. Consequently, excessive taxation in the oil and gas sector tends to discourage investment, limit business expansion, and reduce overall sectoral performance. The study therefore suggests the need for a more balanced and investment-friendly tax policy that can sustain government revenue generation while also promoting capital investment and growth in the oil and gas industry. On the basis of the findings and conclusions of the study the paper recommends among others that:

i. Government should consider reviewing and moderating capital gain tax rates to reduce its negative impact on investment decisions. A more investment-friendly rate would encourage shareholders and firms to reinvest profits into productive capital projects.
ii. The petroleum profit tax structure should be re-evaluated to strike a balance between revenue generation and investment stimulation. Lower or more flexible tax rates, especially during periods of economic stress, can help improve the capital investment capacity of oil and gas firms.
iii. Although education tax serves an important developmental purpose, its administration should be made more efficient and transparent. Government should ensure that the burden placed on firms does not become excessive, so as not to discourage reinvestment in the oil and gas sector.

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