



FIRM SPECIFIC FACTORS AND CORPORATE TAX AGGRESSIVENESS AMONG LISTED MANUFACTURING FIRMS IN NIGERIA

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Abstract

Corporate tax aggressiveness remains a significant challenge to government revenue generation in Nigeria, particularly given the country's heavy reliance on corporate taxes. The problem is more pronounced among manufacturing firms, whose capital structures, asset compositions, and governance arrangements may provide opportunities for aggressive tax practices. This study investigates the effect of firm-specific factors on corporate tax aggressiveness among listed manufacturing firms in Nigeria. The study employs an *ex post facto* research design and utilizes secondary data extracted from the annual reports and audited financial statements of sampled listed manufacturing firms over a ten-year period spanning 2014 to 2023. The population comprises all 34 listed manufacturing firms in Nigeria, from which a sample of 17 firms was purposively selected based on data availability. Corporate tax aggressiveness was proxy using the effective tax rate. Panel data regression analysis was employed, with Panel-Corrected Standard Errors (PCSEs) used to address heteroskedasticity and autocorrelation, alongside relevant diagnostic tests. The findings reveal that Capital intensity has a positive and significant effect on the effective tax rate ($\beta = 0.185, p = 0.002$), implying that firms with higher capital intensity exhibit lower levels of tax aggressiveness while financial distress shows a positive but insignificant effect ($\beta = 0.024, p = 0.392$). Leverage also has a positive and significant influence on tax aggressiveness ($\beta = 0.143, p = 0.010$). The study concludes that corporate tax aggressiveness among listed manufacturing firms in Nigeria is largely driven by capital intensity and leverage rather than financial distress. It therefore recommends that tax authorities strengthen monitoring of capital allowances, and leverage-related tax incentives, while corporate boards and auditors should promote transparency and responsible tax practices to balance tax efficiency with compliance.

Keywords: Capital Intensity, Leverage, Financial Distress, Corporate Tax Aggressiveness

JEL Classification: H26, H25, M41, G32, D22

1. Introduction

Corporate tax aggressiveness has become a major concern globally due to its adverse implications for public revenue mobilization, fiscal sustainability, and economic equity. It refers to corporate strategies that exploit legal loopholes and accounting flexibility to minimize tax liabilities in ways that may contradict the intent of tax laws (Wibowo, 2024). Empirical evidence shows that multinational and large domestic firms engage in income shifting, strategic use of deductions, and complex financial reporting structures to reduce effective tax rates, thereby eroding national tax bases (Umeaduma, 2022). In many developing economies, the problem is more pronounced due to weak institutional capacity and limited enforcement mechanisms.

African countries, for instance, experience significant revenue losses from tax avoidance activities facilitated by regulatory gaps, frequent tax policy changes, and administrative inefficiencies (Kimeat et al., 2023). As a result, tax incentives designed to attract investment such as capital allowances, tax holidays, and investment tax credits are often exploited beyond their intended purpose, leading to substantial fiscal leakages.

Nigeria presents a particularly important context for examining corporate tax aggressiveness. Despite the expansion of corporate activity, the country continues to record a persistently low tax-to-GDP ratio estimated at about 10–12%, significantly below the Sub-Saharan African average of over 15% and the OECD benchmark of over 30%. At the same time, the manufacturing sector contributes approximately 9–12% of GDP, yet corporate tax revenue growth has remained relatively sluggish, raising concerns about erosion of the corporate tax base and efficiency of tax administration (Sriharikarthik& Ammal, 2026). This mismatch suggests that firms may be engaging in aggressive tax practices that limit effective tax contributions despite sectoral growth.

The Nigerian tax system also provides several incentive regimes intended to stimulate industrial growth, including the Pioneer Status Incentive (PSI) under the Industrial Development (Income Tax Relief) Act, capital allowances on qualifying assets, and investment tax credits for priority sectors. While these incentives are designed to encourage industrialization, weak monitoring, ambiguous eligibility criteria, and inconsistent enforcement create opportunities for firms particularly in manufacturing to engage in strategic tax planning that reduces taxable income beyond policy expectations. Empirical studies in Nigeria confirm that firms exploit these institutional features through earnings management, excessive debt utilization, and aggressive capital allowance claims (Akosile&Tapere, 2024; Olabisi, 2022; Yahaya, 2024). However, the persistence of declining corporate tax yields suggests that the drivers of such behaviour remain insufficiently understood, particularly within the manufacturing sector.

Firm-specific characteristics have been identified in literature as key determinants of corporate tax aggressiveness, yet their effects remain context-dependent and underexplored in Nigeria. Capital intensity influences tax outcomes through depreciation allowances and capital-based deductions, which may either reduce or increase tax aggressiveness depending on utilization patterns. Leverage provides interest tax shields that can be strategically used to lower taxable income, while financial distress may incentivize firms to conserve cash through aggressive tax planning (Iloh et al., 2026; Kovacova et al., 2022; Menicacci& Alexander, 2025; Sinebe&Ebiaghan, 2024). Despite this theoretical relevance, existing studies often examine these variables in isolation, with limited integration in the Nigerian manufacturing context. Manufacturing firms are particularly relevant for this study due to their asset-intensive operations, reliance on debt financing, and significant exposure to tax incentive schemes. These characteristics make them more likely to engage in tax planning strategies that influence effective tax rates. However, empirical evidence on how capital intensity, leverage, and financial distress jointly influence corporate tax aggressiveness among listed manufacturing firms in Nigeria remains limited, inconsistent, and fragmented. This study therefore addresses this gap by examining the effect of firm-specific factors on corporate tax aggressiveness among listed manufacturing firms in Nigeria. Unlike prior studies that either focus on broader sectors or single determinants, this study integrates key internal financial characteristics within a

unified framework to provide more robust evidence. The focus on listed manufacturing firms on the Nigerian Exchange Group (NGX) ensures data availability, comparability, and reliability.

The study covers a ten-year period from 2014 to 2023, a period characterised by major economic and policy developments including the 2014–2016 oil price shock, the 2016 recession, the introduction and amendments of Finance Acts (2019–2022), and the COVID-19 pandemic. These events provide a rich analytical context for understanding shifts in corporate tax behaviour. Accordingly, the study examines how capital intensity, leverage, and financial distress influence corporate tax aggressiveness in Nigeria's manufacturing sector.

2. Literature Review

Conceptual Review

The conceptual review serves to identify in-depth analysis of the concepts under study. It entails clarifying key concepts, identifying relationships among the concepts, exploring their implications as well as assessing their significance and relevance within the context of the study.

Corporate Tax Aggressiveness

Corporate tax aggressiveness refers to discretionary managerial actions aimed at reducing corporate tax liabilities by exploiting ambiguities and loop holes in tax laws and accounting standards, often operating at the margins of legality and beyond routine tax planning (Hanlon & Heitzman, 2010). It reflects management's willingness to pursue aggressive and uncertain tax positions that result in unusually low effective tax rates and potential regulatory or reputational risks (Frank et al., 2009; Chen et al., 2010). The literature identifies tax aggressiveness through proxies such as effective tax rates, book-tax differences, and deferred tax accounts, and classifies prior studies into measurement, determinants, and consequences streams (Frank et al., 2009; Rego, 2003; Desai & Dharmapala, 2006; Dyreng et al., 2019). Both external factors such as tax regulation and enforcement and internal factors such as firm characteristics and governance mechanisms significantly influence aggressive tax behavior (Atwood et al., 2012; Rego & Wilson, 2012; Armstrong et al., 2015).

Firm Specific Factors

Firm-specific factors refer to internal financial and structural characteristics unique to a firm that influence managerial decisions and strategic behaviour, including corporate tax planning and aggressiveness (Rego, 2003). These factors determine firms' exposure to tax liabilities, availability of tax shields, and tolerance for tax-related risks, thereby explaining variations in corporate tax aggressiveness. The literature identifies firm-specific factors such as capital structure, asset composition, profitability, financial health, and accounting choices as key drivers of aggressive tax behaviour, as they shape managerial incentives and constraints (Armstrong et al., 2015). Empirical evidence shows that these attributes, particularly in manufacturing firms with asset-intensive operations and complex financing structures, interact with governance mechanisms and regulatory environments to influence tax aggressiveness (Hanlon & Heitzman, 2010). Accordingly, this study focuses on capital intensity, financial distress, leverage, audit quality, and deferred tax assets as proxies for firm-specific factors, given their direct influence on taxable income, risk exposure, monitoring intensity, and accounting flexibility.

Capital Intensity

Capital intensity refers to the extent to which a firm's investment is concentrated in fixed assets such as property, plant, and equipment relative to total assets, reflecting reliance on capital assets in production activities (Rego, 2003). Capital-intensive firms typically generate substantial depreciation expenses, which create tax shields that can be used to defer tax payments and reduce effective tax rates (Stickney & McGee, 1982). Empirical evidence suggests a positive relationship between capital intensity and corporate tax aggressiveness, as firms with higher fixed-asset investments are more likely to exploit depreciation allowances and capital incentives to minimize tax liabilities (Gupta & Newberry, 1997; Noor et al., 2010). However, excessive capital intensity may also attract regulatory scrutiny that constrains aggressive tax behaviour (Richardson et al., 2016). Accordingly, this study measures capital intensity as the ratio of property, plant, and equipment to total assets.

Financial Distress

Financial distress refers to a firm's weakened financial condition arising from declining cash flows, high leverage, or sustained losses, which threatens its ability to meet financial obligations (Altman, 1968). Firms experiencing financial distress often have stronger incentives to conserve cash and may adopt aggressive tax strategies to reduce tax payments and improve liquidity (Richardson et al., 2015). Such firms may pursue risky tax positions despite potential penalties or reputational costs (Hanlon & Slemrod, 2009). Empirical evidence on the relationship between financial distress and corporate tax aggressiveness is mixed, with some studies reporting a positive association (Brondolo, 2009) and others suggesting that increased regulatory and audit scrutiny constrains aggressive tax behaviour (Lisowsky, 2010). Accordingly, this study measures financial distress using an accounting-based indicator such as the Altman Z-score.

Leverage

Leverage refers to the extent to which a firm finances its operations through debt rather than equity and is commonly measured as the ratio of total debt to total assets (Modigliani & Miller, 1963). Leverage influences corporate tax aggressiveness because interest expenses on debt are tax-deductible, creating a tax shield that reduces taxable income. Highly leveraged firms may therefore record lower effective tax rates, while firms with moderate leverage may combine debt financing with other tax avoidance strategies to further minimize tax liabilities (Graham, 2000).

Empirical evidence on the leverage-tax aggressiveness relationship is mixed, with studies reporting negative, positive, or insignificant associations (Richardson et al., 2016). Accordingly, this study measures leverage as total debt divided by total assets.

Theoretical Framework

This study is anchored primarily on Trade-Off Theory and Political Cost Theory, which collectively provide a theoretical basis for explaining corporate tax aggressiveness among listed manufacturing firms in Nigeria. These theories explain how firms utilize their financial and operational characteristics to minimize tax liabilities and maximize firm value.

Trade-Off Theory was developed by Modigliani and Miller (1963) and further refined by Kraus and Litzenberger (1973). The theory posits that firms seek an optimal capital structure by balancing the benefits of tax savings against the costs associated with financial distress. One of the major benefits of debt financing is the tax deductibility of interest expenses, which creates a

tax shield capable of reducing taxable income. The theory is particularly relevant to this study because it explains how leverage influences corporate tax aggressiveness. Firms with higher debt levels possess greater opportunities to reduce tax liabilities through interest deductions and are therefore expected to exhibit higher levels of tax aggressiveness. Trade-Off Theory also explains the role of financial distress. While firms experiencing financial distress may be motivated to engage in aggressive tax planning to preserve liquidity and improve cash flows, excessive financial distress may constrain their ability to undertake sophisticated tax planning activities. Consequently, the relationship between financial distress and tax aggressiveness remains an empirical issue.

Political Cost Theory, developed by Watts and Zimmerman (1986), argues that firms respond strategically to political and regulatory pressures in order to minimize costs arising from government intervention and public scrutiny. The theory suggests that firms adopt accounting and financial strategies that reduce their exposure to regulatory attention and tax burdens. This theory is particularly applicable to capital-intensive firms. Manufacturing firms with substantial investments in fixed assets often benefit from capital allowances, depreciation deductions, and other investment-related tax incentives. These provisions create opportunities to reduce taxable income and influence effective tax rates. Consequently, capital intensity is theoretically associated with corporate tax aggressiveness because firms may utilize capital-related tax benefits to minimize tax obligations.

Based on the propositions of Trade-Off Theory and Political Cost Theory, the study expects leverage to have a positive relationship with corporate tax aggressiveness because debt financing provides tax-saving opportunities through interest deductibility. Capital intensity is also expected to positively influence corporate tax aggressiveness due to the availability of depreciation allowances and capital-related tax incentives. Financial distress is expected to influence tax aggressiveness as firms facing financial pressure may seek to conserve cash through tax-reducing strategies, although the direction and magnitude of this relationship remain subject to empirical verification. Therefore, Trade-Off Theory and Political Cost Theory provide an appropriate theoretical foundation for examining how capital intensity, financial distress, and leverage influence corporate tax aggressiveness among listed manufacturing firms in Nigeria.

Empirical Review

Capital Intensity and Corporate Tax Aggressiveness

Capital intensity has been widely examined as a determinant of corporate tax aggressiveness due to the tax benefits associated with capital investments. Capital-intensive firms generally possess substantial fixed assets that qualify for depreciation deductions and capital allowances, thereby creating opportunities for tax minimization. Empirical evidence on the relationship between capital intensity and tax aggressiveness remains mixed. Richardson, Taylor, and Lanis (2016) reported that capital-intensive firms are more likely to engage in aggressive tax planning due to their ability to utilize depreciation-related tax benefits. Similarly, Erawati and Sularso (2022) found that capital intensity positively influences tax aggressiveness among mining firms in Indonesia. Sumantri et al. (2022) also documented a significant relationship between capital intensity and tax avoidance, suggesting that firms with higher investments in fixed assets possess greater opportunities to reduce taxable income. Conversely, Afrianti & Uzliawat (2022) found that capital intensity does not significantly influence tax avoidance among Indonesian

firms, indicating that the effect may depend on institutional and regulatory conditions. In Kenya, Mukami (2023) reported that capital intensity contributes positively to manufacturing firm performance, although the study did not directly examine tax aggressiveness. In Nigeria, limited empirical evidence exists regarding the influence of capital intensity on corporate tax aggressiveness, particularly within the manufacturing sector. Given the extensive capital allowance provisions available under Nigerian tax laws and the asset-intensive nature of manufacturing firms, further investigation is warranted. Based on the foregoing empirical evidence, the following hypothesis is formulated:

H₀₁: Capital intensity has no significant effect on corporate tax aggressiveness among listed manufacturing firms in Nigeria.

Financial Distress and Corporate Tax Aggressiveness

Financial distress reflects a firm's inability to meet its financial obligations and is often associated with increased pressure on management to preserve liquidity and maintain business continuity. Consequently, financially distressed firms may resort to aggressive tax planning strategies to reduce tax payments and improve cash flows. Empirical studies provide mixed evidence regarding this relationship. Gregova et al. (2020) demonstrated the importance of financial distress indicators in corporate decision-making and risk management. Mulamula et al. (2023) found that financial constraints negatively influence tax planning activities among East African firms, suggesting that distressed firms may have limited resources to engage in sophisticated tax planning. In contrast, Richardson et al. (2015) argued that financially distressed firms are more likely to engage in aggressive tax behaviour to conserve cash and improve short-term survival prospects. In Kenya, Kibe et al. (2023) reported that profitability and operational efficiency significantly affect financial distress, while firm size moderates the relationship. Although Nigerian studies have examined financial stability using book-tax differences (Orji & John-Akamelu, 2023), evidence directly linking financial distress to corporate tax aggressiveness remains scarce. The inconsistency in prior findings and the limited evidence from Nigeria necessitate further investigation into the relationship between financial distress and corporate tax aggressiveness among manufacturing firms. Accordingly, the study hypothesizes that:

H₀₂: Financial distress has no significant effect on corporate tax aggressiveness among listed manufacturing firms in Nigeria.

Leverage and Corporate Tax Aggressiveness

Leverage is one of the most extensively examined determinants of corporate tax aggressiveness because interest expenses on debt financing are generally tax deductible. Firms with high debt levels can therefore reduce taxable income through interest tax shields, potentially encouraging aggressive tax planning behaviour. Empirical evidence largely supports a positive association between leverage and tax aggressiveness. Afrianti and Uzliawat (2022) found that leverage positively and significantly affects tax avoidance among Indonesian firms. Similarly, Sumantri et al. (2022) reported that leverage influences tax avoidance, with profitability strengthening the relationship. These findings support the argument that debt financing provides firms with opportunities to reduce effective tax burdens. In Nigeria, Salihu, Obid, and Annuar (2013) observed that debt financing constitutes an important mechanism through which firms reduce tax liabilities. Furthermore, manufacturing firms often depend on external borrowing to finance capital-intensive operations, making leverage a potentially important determinant of tax aggressiveness. Despite extensive international evidence, findings remain inconclusive across

different institutional settings, and empirical evidence focusing specifically on listed manufacturing firms in Nigeria remains limited. Consequently, further investigation is required.

Based on the reviewed literature, the following hypothesis is proposed:

H₀₃: Leverage has no significant effect on corporate tax aggressiveness among listed manufacturing firms in Nigeria.

Conceptual Framework

The conceptual framework for this study outlines the relationship between firm specific and governance related factors on corporate tax aggressiveness among listed manufacturing companies in Nigeria.

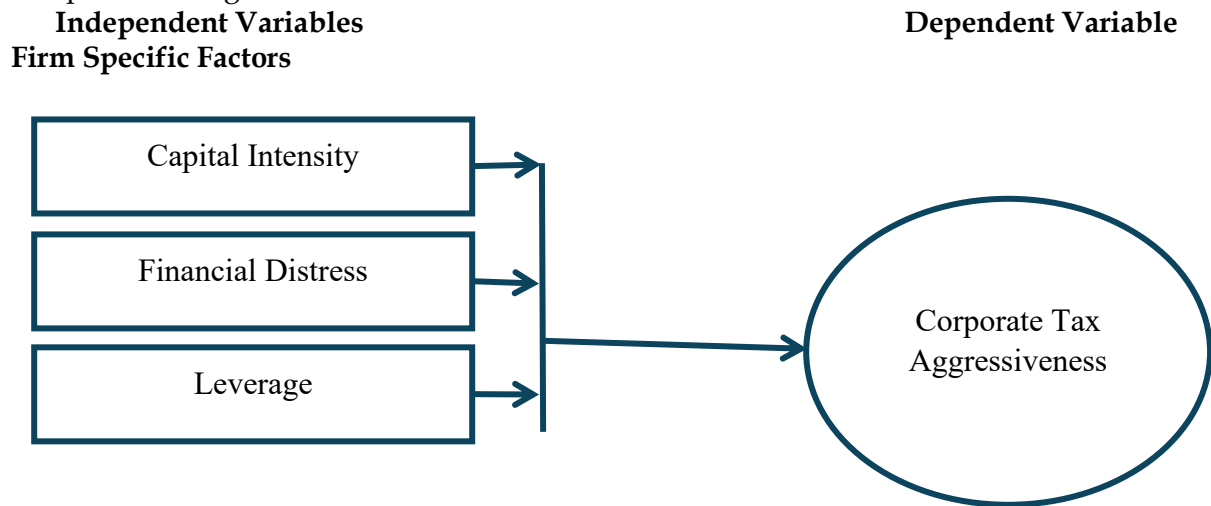


Figure 2.1: Diagrammatic Representation of the Conceptual Framework for the study

3. Methodology

This section presents the methodology of the study with regards to data collection and analysis. The chapter highlights the research process encompassing the model specification, research design, population, sample size and sampling techniques, sources and method of data collection as well as measurement of variables used in the study.

Research Design

This study adopts an ex-post facto research design, which allows for the examination of the effects of independent variables on the dependent variable without manipulation. The design is suitable for assessing the determinants of tax planning strategies and their impact on the profitability of selected quoted manufacturing companies in Nigeria. The study utilizes quantitative methods, employing secondary data from annual financial statements and reports of the companies under study.

Population for the Study

The population for this study includes all manufacturing companies listed on the Nigerian Exchange Group (NGX) as at 2023. This comprises a total of 34 manufacturing companies, with 21 in the Consumer Goods sector and 13 in the Industrial Goods sector. The inclusion of these

companies ensures a standardized reporting framework and a consistent regulatory environment, which enhances the reliability and comparability of the data.

Sample Size and Sampling Technique

The sample for this study consists of 17 manufacturing companies listed on the Nigerian Group Exchange (NGX), Out of a total of 34 manufacturing companies (21 in the Consumer Goods sector and 13 in the Industrial Goods sector) and purposive sampling method were use to select them. This method was chosen to ensure that only companies meeting specific criteria, such as having complete financial data for the study period and relevance to the manufacturing sector were included. By focusing on these criteria, the selected companies are expected to provide comprehensive and pertinent data to meet the study's objectives. This approach ensures a representative subset of the manufacturing companies, enhancing the robustness of the analysis.

Source and Methods of Data Collection

The study relies on secondary data, specifically the annual financial statements and reports of the selected companies. Data on variables such as capital intensity, financial distress, leverage and Effective Tax Rate were collected. The financial statements were obtained from the companies' official websites, the NGX, and other reputable financial information sources.

Mode Specification

To test the hypotheses of this study, the study utilized a panel data regression model to capture the dynamic relationships among the variables over time and across the sampled companies. The mode of Monika and Noviari (2021) was adopted and adapted by this study. Monika and Noviari (2021) examined the effect of financial distress, capital intensity, and audit quality on tax avoidance in Indonesia. Their model is stated below:

$$TAV_{it} = \alpha + \beta_1 FD_{it} + \beta_2 CI_{it} + \beta_3 AQ_{it} + \epsilon_{it} \dots \dots \dots (1)$$

The model of this study is specified as follows:

$$CTA_{it} = \alpha + \beta_1 CI_{it} + \beta_2 FD_{it} + \beta_3 LEV_{it} + \gamma X_{it} + \epsilon_{it} \dots \dots \dots (2)$$

Where:

CTA_{it} : Corporate Tax Aggressiveness of firm i at time t , measured by Effective Tax Rate

α : Constant term. $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$: Coefficients of the independent variables.

CI_{it} : Capital Intensity of firm i at time t , measured as the ratio of total fixed assets to total assets.

FD_{it} : Financial Distress of firm i at time t , measured using the Altman Z-score.

LEV_{it} : Leverage of firm i at time t , measured as the ratio of total debt to total assets.

ϵ_{it} : Error term.

Measurement of Variables

This section outlines the measurement of variables used in the study, detailing their classifications, acronyms, and respective measurement approaches. The variables are categorized into independent and dependent variables. Independent variables include capital intensity, financial distress, and leverage which are measured using relevant financial ratios and indicators. Corporate Tax Aggressiveness serves as the dependent variable, assessed using Effective Tax Rate.

Table 1 Measurement of Variables

Variables	Variable Type	Acronym	Measures	Sources	References
Capital Intensity	Independent	CI	Total Assets/Total Revenue	Annual financial statements	Monika and Noviari (2021), Sumantri et al. (2022), Mukami (2023)
Financial Distress	Independent	FD	Altman Z-score*	Annual financial statements	Altman (1968), Monika and Noviari (2021), Dang and Tran (2021)
Leverage	Independent	LEV	Total debt to total assets ratio	Annual financial statements	Chen et al. (2021), Kibe et al. (2023).
Corporate Tax Aggressiveness	Dependent	CTA	ETR	Annual financial statements	Erasmus and Ukwikor (2021).

Source: Author's Compilation (2026) from prior studies

The Altman Z-score* is a widely used measure to predict financial distress or bankruptcy risk. The formula varies depending on whether the firm is publicly traded, privately held, or in the non-manufacturing sector. For a publicly traded manufacturing firm, the original Altman Z-score formula is:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5Z$$

Where:

X_1 = Working Capital / Total Assets (Liquidity position)

X_2 = Retained Earnings / Total Assets (financial stability)

X_3 = EBIT / Total Assets (Operating efficiency & earnings power)

X_4 = Market Value of Equity / Total Liabilities (Leverage & solvency strength)

X_5 = Sales / Total Assets (Asset turnover & operational efficiency)

Risk Interpretation:

Z-score > 2.99 → Low risk of financial distress (healthy firm)

$1.81 \leq Z \leq 2.99$ → Moderate risk (gray zone)

Z-score < 1.81 → High risk of financial distress (potential bankruptcy)

Methods of Data Analysis

The data collected were analyzed using descriptive and inferential statistics. Descriptive statistics, including mean, median, standard deviation, and range, were used to summarize the data. Inferential statistics, specifically panel data regression analysis, was employed to test the study's hypotheses. The panel-corrected standard errors (PCSEs) approach was used to address heteroscedasticity and autocorrelation issues in the panel data.

4. Results and Discussions

This section presents the results of the data analysis, including descriptive statistics, diagnostic tests, and model evaluation.

Descriptive Statistics

Table 2: Summary of Descriptive Statistics

Variable	Mean	Std. Deviation	Minimum	Maximum	Skewness	Kurtosis
Capital Intensity	0.8055	0.2891	0.0851	1.8993	0.317	-0.937
Financial Distress	3.3634	0.7130	1.069	4.419	-0.544	0.398
Leverage	0.3247	0.1915	0.0174	4.5035	4.391	21.673
Corporate Tax Aggressiveness	0.2971	0.4745	-0.8629	5.1837	7.5147	77.9037

Source: Author’s Computation (2026)

The descriptive statistics provide an overview of the key variables in the study, including their central tendency, dispersion, and distribution characteristics. Capital Intensity has a mean value of 0.8055 with a standard deviation of 0.2891, indicating moderate variability across firms. Its skewness (0.317) suggests a slight rightward skew, while the negative kurtosis (-0.937) indicates a relatively flat distribution. Financial Distress has a mean of 3.3634 and a standard deviation of 0.7130, with a slight leftward skew (-0.544) and a positive kurtosis (0.398), implying a fairly normal distribution. Leverage exhibits a mean of 0.3247 but shows substantial variation (standard deviation = 0.1915), with extreme positive skewness (4.391) and high kurtosis (21.673), reflecting the presence of significant outliers. Effective Tax Rate (ETR) has a mean of 0.2971 and a standard deviation of 0.4745, indicating substantial variability in tax aggressiveness among the sampled firms. The distribution is highly right-skewed (7.515), suggesting that while most firms exhibit moderate ETR values, a few firms report extremely high rates. The kurtosis value of 77.904 indicates a sharply peaked distribution with very heavy tails, reflecting the presence of extreme observations in ETR across the firms.

Diagnostic Test

Table 3: Diagnostic Test Results

Test	Statistic	p-value
Normality (Shapiro-Wilk)	0.945	0.055
Heteroskedasticity (Breusch-Pagan)	18.375	0.000
Autocorrelation (Durbin-Watson)	1.923	-

Source: Author’s Computation (2026)

The normality test using the Shapiro-Wilk statistic yielded a value of 0.945 with a p-value of 0.055. Since the p-value is greater than the conventional significance level of 0.05, the null hypothesis that the residuals are normally distributed cannot be rejected. This suggests that the distribution of residuals meets the assumption of normality, which is essential for reliable statistical inference in regression analysis. Ensuring normality in residuals enhances the validity of hypothesis testing and confidence intervals in panel-corrected standard errors (PCSEs). The Breusch-Pagan test for heteroskedasticity produced a test statistic of 18.375 with a p-value of 0.000, which is highly significant. This indicates the presence of heteroskedasticity, meaning that the variance of the residuals is not constant across observations. Heteroskedasticity can lead to inefficient estimates and unreliable statistical inferences if not addressed. Given this

finding, the use of PCSEs is justified, as they provide robust standard errors that correct for heteroskedasticity, ensuring that the regression results remain valid and unbiased.

The Durbin-Watson test for autocorrelation produced a statistic of 1.923, which falls within the acceptable range of 1.5 to 2.5. This suggests that there is no significant autocorrelation in the residuals, meaning that the errors are independent across observations. The absence of autocorrelation is critical in regression analysis, as it prevents biases in standard errors and ensures the efficiency of coefficient estimates. Overall, the diagnostic test results confirm that while normality and independence of residuals are satisfied, heteroskedasticity is present, reinforcing the appropriateness of PCSEs in handling these econometric issues.

Collinearity Test

Multicollinearity occurs in regression analysis when independent variables are highly correlated, potentially inflating standard errors, reducing the reliability of coefficient estimates, and complicating model interpretation. The Variance Inflation Factor (VIF) is commonly used to detect multicollinearity, as it quantifies how much the variance of a regression coefficient is increased due to collinearity. A VIF value exceeding 10 is generally considered indicative of problematic multicollinearity that may distort regression results. In this study, VIF values were assessed to ensure that multicollinearity does not significantly affect the regression model.

Table 4 Collinearity Test Results

Variable	VIF
Capital Intensity	1.215
Financial Distress	1.357
Leverage	1.621

Source: Author’s Computation (2026)

The collinearity test results in Table 4.3 show that all independent variables have VIF values well below the threshold of 10, indicating that multicollinearity is not a concern. Capital Intensity has a VIF of 1.215, Z-Score 1.357, Leverage 1.621, and Deferred Tax Assets 1.472, all within acceptable limits. These findings confirm that the independent variables are sufficiently distinct, allowing reliable regression analysis without inflated standard errors.

Panel-corrected standard Errors (PCSEs) regression

Panel-corrected standard Errors (PCSEs) regression is applied to address heteroskedasticity and autocorrelation in panel data, ensuring robust parameter estimates. This method improves inference reliability compared to OLS by accounting for cross-sectional dependence and non-constant variance. The analysis examines the effects of Capital Intensity, Financial Distress and Leverage on tax aggressiveness.

Table 5 Regression Results

Variable	Coefficient	Std. Error	t-value	p-value
Capital Intensity	0.185	0.060	3.08	0.002
Financial Distress	0.024	0.028	0.86	0.392
Leverage	0.143	0.055	2.60	0.010
Obvs.	170			

Source: Author’s Computation (2026)

The regression results presented in Table 5 show the effects of capital intensity, financial distress, and leverage on corporate tax aggressiveness based on 170 firm-year observations. Capital intensity has a positive and statistically significant influence on corporate tax aggressiveness ($\beta = 0.185$, $t = 3.08$, $p = 0.002$), indicating that firms with higher levels of investment in fixed assets tend to engage more in tax-aggressive activities. This may be attributable to the availability of tax benefits associated with capital investments, such as depreciation allowances and investment tax incentives. Similarly, leverage exhibits a positive and significant effect on corporate tax aggressiveness ($\beta = 0.143$, $t = 2.60$, $p = 0.010$), suggesting that highly leveraged firms are more likely to adopt aggressive tax planning strategies, possibly because interest expenses provide additional opportunities for reducing taxable income.

In contrast, financial distress has a positive but statistically insignificant relationship with corporate tax aggressiveness ($\beta = 0.024$, $t = 0.86$, $p = 0.392$). The insignificance of the coefficient implies that financially distressed firms do not significantly differ from financially healthy firms in their tax aggressiveness practices within the sampled firms. Overall, the findings indicate that capital intensity and leverage are significant determinants of corporate tax aggressiveness, whereas financial distress does not exert a meaningful influence. These results suggest that firms' asset structure and financing decisions play a more prominent role in shaping tax planning behaviour than their financial condition.

Restatement of Hypotheses and Interpretation of Regression Results

The study effect of firm specific factors on corporate tax aggressiveness among listed manufacturing firms in Nigeria. Below is the restatement of the hypotheses, along with a comprehensive interpretation of the regression results.

H₀1: Capital intensity does not significantly influence the tax aggressiveness of listed manufacturing companies in Nigeria.

Capital Intensity has a positive and statistically significant effect on tax aggressiveness ($\beta = 0.185$, $p = 0.002$). This suggests that firms with higher capital intensity tend to exhibit higher effective tax rates, possibly due to increased investment in depreciable assets that affect their tax positions. Since the p-value (0.002) is less than the 0.05 significance level, the null hypothesis (H₀1) is rejected, and the alternative hypothesis is accepted. This indicates that capital intensity significantly influences tax aggressiveness among listed manufacturing firms in Nigeria.

H₀2: Financial distress does not significantly impact the tax aggressiveness of listed manufacturing companies in Nigeria.

Financial Distress has a positive but statistically insignificant effect on tax aggressiveness ($\beta = 0.024$, $p = 0.392$). Since the p-value (0.392) is greater than 0.05, the null hypothesis (H₀2) is not rejected, indicating that financial distress does not have a significant impact on the tax aggressiveness of listed manufacturing firms. This implies that financially distressed firms do not significantly differ in their tax behavior compared to non-distressed firms, possibly because their tax positions may be driven more by operational realities than by strategic tax decisions.

H₀3: Leverage does not have a significant effect on the tax aggressiveness of listed manufacturing companies in Nigeria.

Leverage has a positive and statistically significant effect on tax aggressiveness ($\beta = 0.143$, $p = 0.010$). Since the p-value (0.010) is less than the 0.05 significance threshold, the null hypothesis

(H₀₃) is rejected, and the alternative hypothesis is accepted. This confirms that leverage significantly affects tax aggressiveness. The result suggests that firms with higher debt levels exhibit higher effective tax rates, possibly due to interest deductions and debt-related tax treatments influencing their tax positions.

Table 6 Summary of Hypothesis Testing Decisions

Hypothesis	Variable	p-value	Decision
H ₀₁	Capital Intensity	0.002	Rejected ✓
H ₀₂	Financial Distress	0.392	Not Rejected ✗
H ₀₃	Leverage	0.010	Rejected ✓

Source: Author’s Computation (2026)

Discussion of Findings

Capital Intensity and Tax Aggressiveness

The empirical findings reveal that capital intensity has a positive and statistically significant effect on tax aggressiveness ($\beta = 0.185$, $p = 0.002$). This implies that manufacturing firms with a higher concentration of fixed assets relative to total assets are more likely to engage in aggressive tax planning practices. Capital-intensive firms typically benefit from tax provisions such as capital allowances, depreciation, and investment incentives, which expand the scope for reducing taxable income. These incentives create opportunities for firms to strategically structure their tax positions, thereby increasing tax aggressiveness. From a theoretical standpoint, this finding is consistent with Agency Theory, which suggests that managers, acting as agents, may exploit available tax incentives to minimize tax payments in order to enhance firm value or meet performance-based compensation targets. The availability of capital-related tax shields provides managers with discretion to pursue aggressive tax strategies that may not always align with shareholders’ long-term interests. The result also aligns with Political Cost Theory, as capital-intensive firms tend to be larger and more visible, thereby facing greater political and regulatory scrutiny. To offset potential political costs such as higher taxation or regulatory pressure, these firms may engage in aggressive tax planning to reduce reported taxable income. Empirically, this finding supports Afrianti et al. (2022) and Mukami (2023), but contradicts Sumantri et al. (2022), who reported no significant relationship between capital intensity and tax aggressiveness.

Financial Distress and Tax Aggressiveness

The results indicate that financial distress has a positive but statistically insignificant effect on tax aggressiveness ($\beta = 0.024$, $p = 0.392$). Although distressed firms may have incentives to conserve cash by reducing tax payments, the insignificant relationship suggests that financial distress does not strongly motivate aggressive tax behavior among the sampled manufacturing firms. This outcome can be explained using Agency Theory, which posits that firms experiencing financial distress are subject to heightened monitoring by creditors, auditors, and regulators. Such increased oversight constrains managerial discretion and limits the ability of managers to engage in aggressive tax planning. Managers may instead prioritize firm survival and compliance to avoid further reputational or legal risks. From the perspective of Political Cost Theory, distressed firms may deliberately avoid aggressive tax strategies to prevent attracting regulatory attention that could exacerbate their financial difficulties. This finding contradicts earlier studies (Isayas, 2021; Kamal & Khazalle, 2021; Diang & Tran, 2021) that reported a significant positive relationship but is consistent with Monika and Noviari (2021)

and Kibe et al. (2023), who found no significant effect. Overall, the result suggests that financial distress alone is insufficient to drive tax aggressiveness in the presence of strong external monitoring.

Leverage and Tax Aggressiveness

The findings show that leverage has a positive and statistically significant effect on tax aggressiveness ($\beta = 0.143$, $p = 0.010$). This indicates that highly leveraged manufacturing firms are more inclined to adopt aggressive tax planning strategies. Firms with higher debt levels tend to exploit interest expense deductibility, thereby using debt as an effective tax shield to reduce taxable income. This finding is strongly supported by Trade-off Theory, which argues that firms balance the benefits of debt (such as tax shields) against the costs of financial distress. As firms increase leverage, the tax advantage of debt becomes more pronounced, encouraging managers to complement financing decisions with aggressive tax planning to maximize tax savings. Additionally, Agency Theory provides further explanation, as managers may prefer debt financing combined with aggressive tax strategies to improve short-term performance indicators and cash flows. The result is consistent with prior studies by Dang and Tran (2021), Chen et al. (2021), and Afrianti et al. (2022), which documented a positive association between leverage and tax aggressiveness.

5. Conclusion and Recommendation

This study provides important empirical insights into the determinants of tax aggressiveness among listed firms in Nigeria. Based on the findings, the study concludes that firm-specific characteristics factors play critical roles in shaping the tax aggressiveness behaviour of Nigerian listed firms. Specifically, capital intensity and leverage were found to have significant influences on corporate tax aggressiveness, while financial distress exhibited an insignificant effect. These findings affirm that firms' investment structures, financing decisions, and tax-related accounting practices materially affect their propensity to engage in aggressive tax planning.

Based on the findings and conclusions of this study, the following key recommendations are proposed to address corporate tax aggressiveness and promote more responsible tax behaviour among listed firms in Nigeria.

- i. Given that capital intensity significantly influences corporate tax aggressiveness, the Nigerian Revenue Service (NRS) should strengthen the monitoring and verification of capital allowance claims by manufacturing firms. Regular audits of capital expenditure and related tax deductions should be conducted to ensure that capital allowances are claimed only on qualifying assets and in accordance with existing tax regulations. This will minimize abuse of investment-related tax incentives while preserving their intended objective of promoting industrial growth.
- ii. In view of the significant effect of leverage on corporate tax aggressiveness, policymakers should strengthen the enforcement of existing thin-capitalisation and interest deductibility regulations. This will limit the excessive use of debt financing as a tax-reduction mechanism and help safeguard corporate tax revenues without discouraging legitimate business financing activities.
- iii. Corporate managers of manufacturing firms should adopt prudent financing and investment decisions that balance tax efficiency with regulatory compliance. Specifically, firms should avoid excessive dependence on debt-driven tax planning and ensure that tax benefits arising from capital investments are transparently reported and fully

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compliant with tax laws. This will reduce regulatory risks and promote sustainable corporate tax practices.

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