TOP MANAGEMENT STRUCTURAL FRAMEWORK AND TAX OPTIMIZATION EVIDENCE FROM LISTED INDUSTRIAL GOODS FIRMS IN NIGERIA

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ABSTRACT

This study examines the relationship between top management structural framework and tax optimization among listed non-finance firms in Nigeria, with tax avoidance referring to the legal strategies employed by firms to minimize their tax liabilities. Drawing from agency theory, this study investigates how governance attributes—such as board size, board independence, board gender diversity, and board diligence—affect tax optimization practices. The study fills gaps in existing literature by focusing on Nigeria's unique economic, regulatory, and cultural context. Utilizing a mixed effect multilevel regression analysis, this study analyses data from eleven (11) industrial goods firms over a ten-year period (2014-2023). Findings reveal a positive effect of board size on tax optimization, suggesting that larger boards enhance firms' strategic capabilities in minimizing tax liabilities, while board independence, gender diversity, and diligence show no significant effects. The results contribute to the debate on the role of corporate governance in aggressive tax optimization and accentuate the need for policymakers to develop comprehensive tax governance frameworks that promote oversight, transparency, and ethical corporate tax practices. This study highlights the importance of contextual and firm-specific factors in shaping tax avoidance behaviors and provides valuable insights for stakeholders aiming to balance effective governance with sustainable tax practices in emerging markets like Nigeria.

Keywords: Tax Optimization, Top Management Framework, Resource Dependence, Theory Multi-Level Mixed Effect Regression

Introduction

The interplay between top management structural frameworks and tax optimization constitutes a pivotal focus within the domains of corporate finance and

accounting scholarship. Tax optimization, often described as the deliberate implementation of strategies to minimize tax liabilities, has emerged as a critical subject of investigation due to its profound implications for corporate profitability and public finance systems (Jarboui, Saad, & Riguen, 2020). As a global phenomenon, tax optimization transcends geographical boundaries and is widely regarded as a strategic cost-management practice adopted by corporations across diverse sectors and organizational scales. Chukwu et al. (2019) assert that the practice of tax optimization is intrinsically linked to the structural composition of top management, which exerts a considerable influence on decision-making processes related to tax strategies. Similarly, Goh, Lee, Lim, and Shevlin (2016) and Ibrahim and Farahiyah (2021) emphasize that robust and effective top management structures are instrumental in fostering transparency and accountability, thereby mitigating the prevalence of aggressive tax strategies.

The relationship between top management structural frameworks and tax optimization has been interrogated through various theoretical lenses. Traditionally, tax optimization is posited as a value-maximizing activity that reallocates resources from public coffers to shareholders, thereby enhancing shareholder wealth (Khurana & Moser, 2013; Desai & Dharmapala, 2009). However, this value-enhancing potential is contingent upon the efficacy of the governance frameworks within top management, which may serve either to constrain or amplify tax optimization practices (Richardson et al., 2013; Gospel et al., 2019). In this regard, Abanem and Frank (2022) highlight the critical roles of board independence, board size, gender diversity, and the presence of audit committees in shaping tax policy decisions. Specifically, increased board independence is correlated with reduced tax aggressiveness, as external directors often provide enhanced oversight and curtail managerial opportunism (Ogbeide & Obaretin, 2018; Chukwu et al., 2019). Conversely, agency theory presents a countervailing perspective, positing that boards characterized by insider dominance or conflicts of interest may prioritize tax optimization strategies that generate short-term shareholder returns, often to the detriment of long-term organizational sustainability (Desai & Dharmapala, 2006).

Within the Nigerian corporate context, the phenomenon of tax optimization among listed firms has garnered substantial scholarly attention. Empirical evidence reveals that a significant proportion of listed entities engage in tax optimization, driven by variations in top management structures and inherent firm characteristics. Eguavoen, Ukarin, and Enewerome (2023) demonstrate that board size and gender diversity significantly influence tax strategy formulation within Nigerian firms. Given the indispensable role of taxation in facilitating national development and the propensity of corporations to exploit regulatory loopholes for tax minimization, it becomes imperative to critically examine the interplay between top management structural frameworks and tax optimization to inform policy and practice.

The relevance of this study lies in the ongoing scholarly discourse concerning the influence of top management structural frameworks on tax optimization within the Nigerian corporate landscape. While extant literature has extensively examined firm-specific determinants such as size, leverage, and profitability, there is an emergent stream of research that investigates the role of top management

frameworks in shaping corporate tax strategies. This includes critical dimensions such as board size, board independence, and gender diversity (Onyali & Tochukwu, 2018; Oyeleke et al., 2016). However, much of the extant evidence is skewed toward developed economies, thereby neglecting the unique contextual dynamics of emerging markets such as Nigeria (Chukwu et al., 2019). This oversight is significant, as Nigeria's distinct economic, regulatory, and sociocultural environments may engender governance dynamics and tax optimization practices that deviate from those observed in advanced economies. Empirical findings on the relationship between top management structural frameworks and tax optimization in Nigeria remain fragmented and inconclusive. While some studies have posited that board independence and gender diversity exert a mitigating effect on tax aggressiveness, others have reported either insignificant or positive associations (Ogbeide & Obaretin, 2018; Onyali & Tochukwu, 2018). These inconsistencies underscore a critical empirical gap that necessitates further inquiry, particularly within the context of Nigerian industrial goods firms. Moreover, substantial gaps persist in the methodological approaches employed by prior studies. For instance, research by Ogbeide and Obaretin (2018) and Chukwu et al. (2019) has predominantly relied on simple linear regression models, which are often ill-suited to address the complexities of endogeneity and heterogeneity inherent in studies on governance mechanisms and tax optimization (Richardson et al., 2013). Such methodological limitations undermine the robustness and reliability of the findings and highlight the need for more sophisticated analytical techniques. This study endeavors to address these gaps by employing advanced econometric methods capable of mitigating endogeneity and capturing firm-specific heterogeneity. By examining how various dimensions of top management structural frameworks influence tax optimization practices among listed industrial goods firms in Nigeria, this research aims to contribute substantively to the body of knowledge. The study's findings are expected to provide evidence-based insights that can inform policy interventions and the development of robust regulatory frameworks aimed at curbing aggressive tax practices while fostering governance efficacy in emerging economies.

The next section discusses the relationship between the analysis and the theoretical literature. Section 3 presents the model while Section 4 describes the empirical implications of the model. Finally, section 5 concludes the study with recommendations to follow.

Review of Related Literature
Conceptual Framework
Top Management Framework

The top management framework encompasses the mechanisms, processes, and relational dynamics that govern and strategically manage corporations, balancing authority and accountability among shareholders, the board of directors, executive management, and stakeholders to align decisions with organizational goals and ethical standards (Aguilera, Judge, & Terjesen, 2018). Grounded in agency, stakeholder, and stewardship theories, this framework promotes transparency, accountability, and operational efficiency, mitigating risks of managerial opportunism while enhancing corporate performance and sustainability (Tricker, 2015; Hillman & Dalziel, 2016). Core principles such as fairness, responsibility, and transparency underpin its structure, ensuring compliance with regulatory mandates

and fostering ethical practices (Ali & Zoghlami, 2023). Key attributes, including board composition, independence, diversity, and expertise, shape strategic direction and accountability mechanisms, making the framework essential for aligning organizational objectives with stakeholder interests and securing long-term corporate resilience and value creation.

Tax Optimization

Tax optimization, a concept distinct from tax evasion, involves the strategic organization and management of financial activities within the confines of legal frameworks to achieve the minimization of tax liabilities while optimizing organizational efficiency (Sikka, 2015). Unlike tax evasion, which constitutes illegal practices, tax optimization exploits legal provisions, including loopholes and complexities in tax codes, to reduce tax burdens (Gravelle, 2015). While lawful, the practice occupies an ethically ambiguous domain, raising critical questions about distributive fairness, corporate social responsibility, and its broader socio-economic implications (Christensen & Murphy, 2019). Within the globalized economy, multinational corporations have frequently leveraged intricate financial structures to shift profits to low-tax jurisdictions, amplifying concerns about equity and regulatory inadequacies in international tax systems (Dharmapala, 2016). Emerging literature further highlights the fiscal risks posed by aggressive tax planning strategies, emphasizing the urgency for robust international regulatory mechanisms and enhanced policy cooperation to address the resultant challenges (Beer, De Mooij, & Liu, 2020). Thus, tax optimization remains a central theme in scholarly and policy debates, navigating a complex interplay between legal legitimacy and ethical considerations (Hanlon & Heitzman, 2017).

Theoretical Nexus and Statement of Hypotheses
Top Management Structural Framework and Tax Optimization

The relationship between top management frameworks and tax optimization represents a nuanced and multidimensional area of inquiry, reflecting the complexities inherent in corporate governance and financial decision-making. A positive performance outcome, which suggests that well-structured top management frameworks can reduce aggressive tax optimization practices, aligns with resource dependence theory. This theory asserts that diverse and experienced leadership provides critical resources, strategic oversight, and guidance, which collectively foster adherence to ethical standards and compliance with regulatory frameworks (Hillman, Withers, & Collins, 2009). Supporting this view, Lanis and Richardson (2011) demonstrate that greater independence within top management is associated with a reduced propensity for aggressive tax optimization, indicative of improved accountability and oversight mechanisms. In contrast, the negative performance outcome perspective, rooted in agency theory, posits that top management dominated by insiders or those entangled in conflicts of interest may prioritize tax optimization strategies to maximize short-term shareholder value, often undermining the firm's long-term sustainability (Desai & Dharmapala, 2006).

This perspective is reinforced by the work of Armstrong, Blouin, and Larcker (2012), who identify instances where powerful CEOs with disproportionate influence

over strategic decision-making pursue aggressive tax strategies to enhance reported profitability and personal financial gains. A neutral performance outcome perspective introduces the possibility that the impact of top management frameworks on tax optimization may be marginal, as external factors such as industry norms, regulatory environments, and firm-specific characteristics could overshadow their influence. Zahra and Pearce (1989) argue that the governance role of top management is often diluted by these external contingencies, resulting in variability in observed outcomes across different contexts. This stance is corroborated by Minnick and Noga (2010), who found no significant relationship between management attributes and tax optimization, suggesting that the complexity of tax strategies and external pressures may neutralize the direct influence of top management structures.

The divergent findings in the literature underscore the multifaceted and context-dependent nature of the interplay between top management frameworks and tax optimization. These outcomes highlight the importance of considering regulatory frameworks, firm-specific dynamics, and broader environmental factors when analyzing the governance mechanisms influencing tax optimization strategies. This underscores the need for further empirical investigation, particularly within emerging economies, where governance and regulatory conditions differ markedly from those in more developed contexts.

Corporate Board Size and Tax Optimization

The relationship between corporate board size and tax optimization remains a subject of diverse findings in the literature, reflecting its complex and multifaceted nature. Some studies, such as Anggraeni and Kurnianto (2020) and Minnick and Noga (2010), suggest a positive relationship, asserting that larger boards bring a broader diversity of expertise and oversight, thereby facilitating enhanced tax planning and more effective minimization of tax liabilities. This perspective is grounded in resource dependence theory, which emphasizes the value of diverse resources and knowledge in improving decision-making processes. In contrast, research by Lanis and Richardson (2011) indicates a negative relationship, where larger boards are associated with increased agency problems and inefficiencies, ultimately leading to less aggressive tax optimization.

This aligns with agency theory, which posits that larger boards may dilute accountability and oversight, thus reducing the emphasis on tax minimization. Other studies, such as Hoi, Wu, and Zhang (2013), adopt a neutral stance, finding no significant correlation between board size and tax optimization, thereby suggesting that the effect of board size may be overshadowed by other factors, such as corporate governance quality, regulatory environments, or firm-specific attributes. This perspective is informed by contingency theory, which posits that the influence of board size on tax optimization is contingent upon contextual factors. Against this backdrop, this study hypothesizes that board size has no significant effect on tax optimization.

Corporate Board Gender Diversity and Tax Optimization

The relationship between corporate board independence and tax optimization is inherently complex, influenced by competing theoretical perspectives

and empirical findings. One perspective posits that greater board independence fosters increased tax optimization, as independent directors, motivated by their fiduciary duty to maximize shareholder wealth, may endorse aggressive tax strategies to enhance profitability (Desai & Dharmapala, 2006). This view aligns with agency theory, which emphasizes the role of independent boards in effectively monitoring management and implementing strategies that prioritize shareholder interests (Jensen & Meckling, 1976). In contrast, another perspective suggests that independent boards actively deter tax optimization practices to safeguard corporate reputation, ensure regulatory compliance, and mitigate potential legal and reputational risks. This view is underpinned by stakeholder theory, which advocates for broader corporate accountability to various stakeholders, including governments and communities, beyond mere profit maximization (Freeman, 1984; Lanis & Richardson, 2011).

A third, neutral stance asserts that board independence may have no significant effect on tax optimization, positing that the effectiveness of independent directors is mediated by contextual factors such as the firm's governance structure, regulatory environment, and industry norms (Armstrong, Blouin, Jagolinzer, & Larcker, 2015). Institutional theory supports this perspective, suggesting that organizational practices, including tax strategies, are often shaped by external norms and societal expectations (Meyer & Rowan, 1977). Consequently, this study hypothesizes that board independence has no significant effect on tax optimization, acknowledging the multifaceted and contingent nature of this relationship.

Corporate Board Independence and Tax Optimization
The relationship between corporate board gender diversity and tax optimization represents a complex and multifaceted dynamic, eliciting divergent perspectives in the literature. Some empirical studies posit that greater gender diversity on corporate boards enhances ethical governance and strengthens oversight mechanisms, thereby mitigating tax optimization behaviors (Adams & Ferreira, 2009). This view aligns with resource dependency theory, which suggests that diverse boards contribute varied perspectives, competencies, and experiences, fostering improved decision-making and heightened accountability in governance (Hillman et al., 2007).

In contrast, other scholars argue that increased gender diversity may lead to inefficiencies in board operations, including potential communication challenges and conflicts, which could inadvertently promote tax optimization as firms seek alternative avenues for achieving financial objectives (Smith et al., 2006). A third perspective, emphasizing a neutral stance, asserts that gender diversity does not exert a significant influence on tax optimization, contending that such behaviors are predominantly shaped by firm-specific factors, regulatory environments, and the broader effectiveness of corporate governance structures rather than gender composition (Gul et al., 2011). These diverse interpretations underscore the nuanced and context-dependent nature of the nexus between board gender diversity and tax optimization, necessitating further empirical investigation to elucidate its underlying

mechanisms. Accordingly, this study hypothesizes that: Board Gender Diversity has no significant effect on Tax Avoidance.

Corporate Board Diligence and Tax Optimization

The relationship between corporate board diligence, often proxied by the frequency of board meetings, and tax optimization is a subject of considerable debate in the literature, reflecting its complex and multifaceted nature. Proponents of the positive governance impact argue that frequent board meetings enhance oversight, promote rigorous monitoring, and foster the implementation of robust internal controls and ethical standards, thereby reducing aggressive tax optimization behaviors (Min & Koo, 2019; Huse, 2007). This view suggests that diligent boards, through their proactive engagement and increased scrutiny, are better equipped to ensure compliance with regulatory frameworks and discourage opportunistic tax practices. Conversely, a contrasting perspective posits that an elevated frequency of board meetings may signal governance inefficiencies or managerial entrenchment, which could exacerbate tax optimization practices.

Vafeas (1999) contends that frequent meetings might reflect reactive governance structures addressing crises rather than promoting proactive oversight, thereby potentially increasing tax aggressiveness. Further, some studies suggest a neutral relationship, emphasizing that meeting frequency alone is not a sufficient determinant of tax optimization. Instead, other factors such as board composition, financial expertise, and the broader governance environment may exert a more significant influence on corporate tax strategies (Chen et al., 2016). Collectively, the diverse findings underscore the intricate interplay between board diligence and tax optimization, advocating for a multidimensional analysis that accounts for contextual and structural factors to unravel the governance dynamics underpinning corporate tax behaviors. Therefore hypothesis 4 states that: Board diligence has no significant effect on tax avoidance.

Theoretical Framework
Agency Theory

Agency Theory, as proposed by Ross (1973) and refined by Jensen and Meckling (1976), provides a compelling theoretical framework to understand the relationship between top management structural frameworks and tax optimization. The theory addresses inherent conflicts of interest between corporate principals (shareholders) and agents (management), stemming from the separation of ownership and control. In this context, top management frameworks are critical mechanisms for aligning managerial actions with shareholder objectives, mitigating the potential for self-serving behaviors such as aggressive tax optimization that may conflict with broader organizational goals. Managers, driven by self-interest and empowered by asymmetric information, may employ tax strategies to achieve short-term profitability, potentially exposing the firm to long-term financial and reputational risks (Fama & Jensen, 1983).

Effective top management structures—encompassing board oversight, executive incentives, and transparency mechanisms—curtail these agency conflicts by reducing information asymmetry and enforcing accountability (Desai & Dharmapala, 2006). By fostering alignment between managerial decision-making and shareholder interests, such frameworks promote responsible tax strategies that

balance regulatory compliance with shareholder wealth maximization. This perspective underscores the importance of robust governance mechanisms, including board independence, audit committees, and executive oversight, in managing tax optimization behaviors, as highlighted in the work of Armstrong, Blouin, Jagolinzer, and Larcker (2015). Thus, Agency Theory offers a foundational lens for examining how top management structures influence corporate tax strategies and their alignment with long-term value creation.

Empirical Literature

Aganthasyah et al. (2025) examine the role of audit committees in mitigating tax avoidance within the coal mining industry in Indonesia. The study aims to assess how audit committee attributes influence tax avoidance behaviors, focusing on the mining sector, particularly companies listed on the Indonesia Stock Exchange. Data were collected from 28 coal mining firms over the period of 2019 to 2023. The study considers tax avoidance as the dependent variable, with audit committee attributes as the independent variable, and includes control variables such as profitability and leverage. Employing a quantitative research design with a purposive sampling technique, the research incorporates 130 firm-year observations. The theoretical framework is anchored in agency theory, emphasizing the alignment of management interests with shareholder objectives to curb opportunistic tax behaviors. Data were sourced from annual financial reports available on the Indonesia Stock Exchange's official website, and multiple linear regression analysis was utilized to test the hypotheses. The findings reveal that an effective audit committee significantly reduces tax avoidance by enhancing transparency and accountability, while profitability exerts no significant influence, and leverage demonstrates a positive effect. This study underscores the importance of robust audit committee mechanisms in improving tax compliance within high-risk sectors.

Sani and Bitrus (2024) examined the effect of board characteristics on tax avoidance among listed manufacturing firms in Nigeria using data sourced from the Nigerian Exchange Group from 2018 to 2022. The dependent variable is tax avoidance, while the independent variables include board size, board independence, and board gender diversity with firm size and leverage functioning as control variables. Correlational and ex-post facto research designs were utilized with secondary data from 21 selected firms, filtered based on criteria for completeness over the study period. Findings suggest that both board size and board independence positively impact tax avoidance, implying that larger and more independent boards may be more inclined to pursue aggressive tax strategies. Board gender diversity exhibited a negative insignificant effect on tax avoidance.

Olanisebe, Haruna, and Mustapha (2024) examined the influence of ownership concentration on tax avoidance of Nigerian companies, introducing profitability as a potential mediator in this relationship. Using data from companies listed on the Nigerian Exchange Group from 2011 to 2022, the research covers cuts across the manufacturing and services industries. Tax avoidance was analyzed against ownership concentration, with profitability serving as a mediating variable, while firm size, age, and leverage were included as control variables. Utilizing a

correlational research design with a sample of 121 companies, the study applied Structural Equation Modeling (SEM) and Monte Carlo simulations to assess the hypotheses. The findings revealed that increased ownership concentration drives tax avoidance behaviors, suggesting that major shareholders influence management decisions toward tax reduction strategies to enhance shareholder returns.

Fransisco, Oktavianthie, and Setiany (2024) examined the impact of board characteristics, audit quality, and chief executive officer narcissism on tax avoidance among consumer staple companies listed on the Indonesian and Australian stock exchanges. This study spans the period from 2018 to 2020. Utilizing a causal research design and purposive sampling, the study includes a total of 126 observations from Indonesian and Australian companies. The findings reveal that CEO narcissism has a significant negative effect on tax avoidance, suggesting that narcissistic CEOs are less inclined to engage in tax avoidance, possibly due to reputational concerns. In contrast, other board characteristics, including board independence, gender diversity, board size, showed insignificant impact on tax avoidance.

Amri, Ben Mrad Douagi, and Guedrib (2023) investigated the effect of corporate governance mechanisms on tax aggressiveness among non-finance Tunisian companies, with a particular focus on both internal and external governance factors. Utilizing data from the Tunisian Stock Exchange from 2003 to 2016, the study included a diverse array of non-financial firms within Tunisia's emerging market. Tax aggressiveness, was regressed against the presence of controlling shareholders, CEO duality, board size, audit committee expertise, and the likelihood of tax audits. Findings revealed that the presence of controlling shareholders and CEO duality were positively associated with tax aggressiveness, whereas the likelihood of tax audits had a significant negative effect, suggesting that increased regulatory scrutiny reduces aggressive tax behaviors. underscoring the importance of both ownership structure and external oversight in shaping corporate tax practices in Tunisia.

Obarolo, Josiah, and Atu (2023) assessed how specific attributes of chief executive officers' influence tax avoidance practices of non-finance firms listed on the Nigerian Exchange Group with data spanning from 2012 to 2021. This study utilized ex-post facto research design with 74 non-finance as sampled firms. Tax avoidance, was regressed against CEO tenure, ownership, gender, and nationality. Results indicated that CEO ownership had a negative effect on tax avoidance, suggesting that CEOs with significant ownership stakes are less inclined to pursue aggressive tax strategies, likely due to increased scrutiny from shareholders. CEO gender and nationality, however, positively influenced tax avoidance, with foreign and female CEOs tending to adopt more conservative tax strategies.

Research Methods

This study is a quantitative study using secondary data obtained from audited published annual reports. The data collection used documentation techniques. The population of this study comprises of all seventeen (17) industrial goods firms listed on the Nigerian Exchange Group (NGX) as of December 31st, 2023. This study employed purposive sampling technique which resulted in eleven (11) industrial goods firms over the 2014 to 2023. The criteria for determining the sample is shown in table 1. The statistical technique employed in testing the stated hypotheses is the mixed effect multilevel regression analysis technique. Mixed effect multilevel

regression analysis offers several advantages over traditional effects regression analysis techniques. Gelman and Hill (2007) explain that this method accounts for both fixed and random effects, enabling more accurate modeling of data with nested structures. Snijders and Bosker (2012) emphasize its flexibility in handling data with hierarchical or clustered designs, thereby reducing potential biases and improving inference accuracy.

Table 1   **Sampling Criteria**

S/N	Explanation	Total
1	Number of firms in the industrial goods sector of the NGX during 2014-2023	17
2	Number of firms in the industrial goods sector that did not publish audited annual reports at some points during the 2014 - 2023 period	4
3	Number of firms that did not provide data related to the research variables	2
4	The number of companies in industrial goods sector that make up the sample size	11
5	Research period (2014-2023)	
6	Total Observations (11Firms x 10Years)	**110**

Source: Authors' Compilation 2025

Model Specification

The study specified an econometric model to capture top management structural effect on tax optimization of listed industrial goods firms in Nigeria. For the purpose of this study, the model of Bash and Zoghlami, (2023) was modified and expressed econometrically as:

$OPTAX_{it} = \beta_0 + \beta_1 SCBOD_{it} + \beta_2 ICBOD_{it} + \beta_4 GDCBOD_{it} + \beta_5 DCBOD_{it} + eit$ ... (1)

Where:

OPTAX	=	Tax Optimization
SCBOD	=	Size of Corporate Board
ICBOD	=	Independence of Corporate Board
GDCBOD	=	Gender Diversity of Corporate Board
DCBOD	=	Diligence of Corporate Board
FIRML	=	Firm Financial Leverage
FSIZE	=	Firm Size
"{i}"	=	Cross Section (Sample Companies)
"t"	=	Time Frame (2014 to 2023)
e_{it}	=	Stochastic error Term

Table 2   **Operationalization of Variables**

Variables	Measurement	Source
Tax Avoidance (Dependent Variable)	Debt Tax Shield; which is obtained as finance cost divided by total asset	Malenya, Olweny, Mutua, and Mukanzi, (2017).

Size of Corporate Board (Independent Variable)	Computed as the total numbers of all directors of a company including the Chairman +Vice Chairman +CEO/Managing director + Executive Directors +Non-Executive Directors or Independent Directors excluding the company secretary	Ruslim, (2023).
Independence of Corporate Board (Independent Variable)	Computed as the ratio of female directors to total board size	Safira and Jaunanda, (2023).
Gender Diversity of Corporate Board (Independent Variable)	Computed in percentages as the ratio of non-executive directors to total board size.	Utami and Danarsari, (2023).
Diligence of Corporate Board (Independent Variable)	Total number of Board meeting held within one year	Barros & Sarmento, (2020).
Firm Leverage (Control Variable)	Computed as the ratio of debt to asset	Widyastuti, Meutia and Candrakanta, (2022).
Firm Size (Control Variable)	Logarithm Value of Total Asset	Warih, (2019).

Source: Researcher's Compilation 2025

Results and Discussion of Findings

Descriptive Statistics

Each variable is examined based on its mean, standard deviation, maximum and minimum values over the study period under consideration using descriptive statistics with results presented in Table 3

Table 3   Descriptive Statistics Result

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  VARIABLE |     OBS      MEAN   STD. DEV.     MIN      MAX
-------------+-----------------------------------------------------
    OPTAX |    110   2.134954   2.473748       0    13.95
    SCBOD |    110   8.605505   3.410274       4      19
    GDCBOD |    110   16.91505   15.63486       0    71.43
    ICBOD |    110   75.23374   11.0079    28.57    94.44
    DCBOD |    110   4.626168   1.240233       2      10
    FIRML |    110   63.59807   33.23886    3.55   222.97
    FSIZE |    110   6.82844   1.112962    5.24     9.38
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Authors' Computation 2025

The table 3 shows a summarized result that describes the basic statistics of the variables. From the table it is seen that on average, the value of tax optimization is 2.13 with a standard deviation value of 2.47 and maximum value of 13.95 during the period under discussion. This result reveals some insightful information about the use of debt tax shield strategy among industrial goods firms in Nigeria. The average value of 2.13 indicate that most firms in the sample leverage debt to reduce their tax burden to this extent. The standard deviation of 2.47 suggests a considerable variation (distance) around the mean, reflecting differing levels of debt utilization across firms. The relatively high standard deviation in relation to the

mean emphasizes the variability in tax aggressiveness among the firms studied. Further, the maximum value is particularly notable, highlighting that some firms aggressively use debt to achieve tax saving objectives. The wide range underscores the diversity in corporate strategies and financial practices concerning tax optimization.

For the variable of corporate board size, the descriptive statistics show a mean value of 8.6 with a standard deviation of 3.4 indicating a more than 8member board size for listed industrial goods firms in Nigeria during the period under review. Further, the descriptive statistics result also shows that the mean value of corporate board independence is 75.23 corresponding to a standard deviation of 11.01 revealing that on average, the independence of top management board that make up industrial

goods firms in Nigeria scaled up to 75%, during the period under consideration. Further, a cursory look at the variable of corporate board diligence shows a mean value of 4.63 implying that on average, four board meetings were held per year during the period under consideration. Firm leverage and firm size showed average mean values of 63.59 and 6.83 respectively for sampled industrial firms in Nigeria.

Table 4   **Tax Avoidance Regression Mode**

	Pooled OLS Model	Fixed Effect Model	Random Effect Model	Multi-Level Mixed Effect Model
SBOD	***0.596	0.260	**0.372	***0.596
	(0.000)	(0.113)	(0.016)	(0.000)
GDBOD	0.006	-0.196	-0.101	0.006
	(0.946)	(0.097)	(0.300)	(0.944)
INBOD	0.116	0.072	0.093	0.116
	(0.214)	(0.397)	(0.255)	(0.195)
DBOD	-0.134	-0.104	-0.109	-0.134
	(0217)	(0.312)	(0.281)	(0.199)
LEVE	**0.229	0.019	0.058	*0.229
	(0.033)	(0.876)	(0.603)	(0.026)
FSIZE	-0.278	0.631	-0.149	-0.278
	(0.070)	(0.30)	(0.494)	(0.058)
F-stat/Wald Stat	5.47	1.54	12.08	35.14
	(0.0001)	(0.1731)	(0.0602)	(0.0000)
R- Squared	0.247	0.093	0.0721	0.1913
VIF Test	<5			
Hausman Test Prob>chi2	11.65 (0.0702)	Test for Random Effects Error **Test for Fixed Effects Error**	***0.0000 ***0.0000	

Note: (1) bracket () are p-values; (2) **, ***, implies statistical significance at 5% and 1% levels respectively

Test Prob>chi2	(0.0702)	Effects Error **Test for Fixed Effects Error**	***0.0000	

Note: (1) bracket () are p-values; (2) **, ***, implies statistical significance at 5% and 1% levels respectively

Discussion of Result

The result in table 4 indicates an R-squared value for the random effect model 0.0721 suggesting that corporate board size, corporate board independence, corporate board gender diversity, corporate board diligence, firm leverage and firm size all explained about 07% variation in tax optimization of listed industrial goods firms in Nigeria during the period under investigation. Also, F value of 35.14 with corresponding P_ value of 0.0000 suggests that the model is well fitted at 1% significance level. The variance inflation factor test was conducted to check for the existence of multicollinearity among the explanatory variables under consideration. The mean value of the variance inflation factor obtained from the ordinary least square regression model is seen to be less than 5 suggesting that there is no unacceptable level of multicollinearity among the explanatory variables. The random effect regression model which was selected by the Hausman specification test indicated statistically significant attributes of heteroscedasticity as obtained in the Prob > chibar^2 = 0.0000 of the Breusch and Pagan Lagrangian multiplier test for random effects. This outcome informed the need for a more robust regression analysis technique which led to use of mixed effect multilevel regression analysis model.

Further, the table 4 shows that corporate board size has a positive statistically significant effect on tax optimization indicating that on average under the ceteris paribus assumption, a one-member increase in board size will significantly increase debt tax by about 0.596. Larger boards, as per agency theory, may enhance the oversight capacity, ensuring that management actions align with shareholder interests, thereby facilitating strategic financial decisions like tax optimization to reduce corporate tax burdens while adhering to regulatory standards (Fama & Jensen, 1983).

This aligns with the view that a diverse and extensive board brings a broader pool of expertise and resources, enabling better decision-making in complex financial contexts such as debt financing and its tax implications (Hillman, Withers, & Collins, 2009). The result is particularly plausible for industrial goods firms in Nigeria, where capital-intensive operations and reliance on debt financing are prevalent due to significant infrastructure and machinery investments. The high leverage typical in this sector inherently increases the opportunities to exploit the debt tax shield. Larger boards, which often include members with diverse expertise, may strategically guide firms in optimizing their capital structure to maximize tax efficiency while maintaining compliance. This perspective aligns with findings of Min & Koo (2019), which demonstrate that larger boards contribute to governance practices that facilitate strategic financial decisions, including tax-related optimizations. But board independence, board gender diversity and board diligence revealed to be statistical insignificant factors that affects tax avoidance with respect to listed industrial goods firms in Nigeria.

Conclusion and Recommendation

In relation to agency perspective of tax, the problem that needs to be solved by investors is simply managerial shirking. Unethical tax optimization is also considered another form of the agency problem: managerial opportunism or resource diversion. Desai and Dharmapala (2006) argued that complex tax optimization behaviors and practices can provide management with tools, masks, and justifications for opportunistic managerial behaviors, such as earnings manipulations, related party transactions, and other resource-diverting activities. In other words, tax optimization and managerial diversion have been seen to be complementary. In line with the empirical evidence obtained in this study, it is carefully argued that larger boards will function effectively in reducing tax burdens.

This will greatly run against the desires of the state and tax authorities who require higher tax revenue for economic development. Therefore, considering the potential negative but positive implications for government and management of listed industrial goods firms' respectively, this study recommends a balance approach for effective governance and tax policies adherence. In this regard, policy makers should focus on enhancing the governance framework related to taxation and foster collaboration between regulatory bodies, the government, and listed industrial goods firms in Nigeria. This can be achieved by developing comprehensive tax governance guidelines specifically tailored towards listed industrial goods firms. Such guidelines should provide clear expectations for boards in terms of oversight, transparency, and ethical considerations related to tax planning vis-à-vis tax optimization.

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