

Board Attributes and Audit Quality of Quoted Financial Firms in Nigeria

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Abstract

The reliability of accounting information, which heavily depends on the quality of financial Audit reports, is crucial for users. The board of directors, appointed to protect shareholders' interests, is legally empowered to oversee management and ensure high-quality audits of their operations. In this context, this study investigates the relationship between board attributes and audit quality among publicly traded financial firms in Nigeria from 2016 to 2022. The specific objectives are to analyze how board size, board independence and female directors on board relate to the engagement of Big Four audit firms, which represents audit quality. A sample size of 45 firms was selected through purposive sampling. Binary logistic regression was used to analyze the effect of board attributes on audit quality of listed financial firms in Nigeria. The results indicated that board size and significantly and positively affect audit quality, while board independence and female directors on the board have an insignificant effect on audit quality. The study recommends larger board sizes, more independent non-executive directors and more female directors to ensure high-quality audits in the Nigerian financial firms.

Keywords: Audit Quality, Board Diversity, Board Size, Big 4 Audit Firms, Female Directors, Independent non-executive Directors.

1. Introduction

The board of directors (BOD) is an elected group that represents shareholders and is tasked with safeguarding and managing their interests in the firm. Due to the separation between corporate management and ownership, board of directors are essential for protecting shareholders' interests. They are entrusted with overseeing and disciplining senior management to ensure high-quality financial reporting (Abdullahi, 2013). As a key element of corporate governance, especially in the accounting and auditing sectors, the board's characteristics significantly impact its ability to monitor management effectively (Agyei-Mensah, 2019). Shukri and Abdullahi (2022) state that the board is a governing body that regularly meets to set corporate policies and provide oversight, playing a crucial role in influencing company decisions and ensuring compliance with the Code of Corporate Governance. Enang et al. (2022) affirm that governance structures aim to resolve conflicts arising from the principal-agent relationship, particularly when management's self-interests conflict with those of the owners and other stakeholders. To mitigate these conflicts, independent external auditors are engaged to ensure the accountability of both directors and management.

The spotlight has been on board of directors due to failures in major companies like Skye bank in 2019 attributed to poor oversight. Tan and Taufik (2022) highlight that the absence of efficient control mechanisms, which a diverse board can provide through management supervision, often leads to information asymmetry and lower audit quality. According to Vitolla et al. (2020), a financial statement is misleading if it lacks accuracy, relevance, comparability, reliability, or compatibility, or contains fundamental errors or intentional deceptions, such as distortions of accounting records or misapplication

of accounting principles. The use of Big 4 audit firms is considered a measure of audit quality in this study.

Salehi et al. (2017) recognizes the board of directors as a crucial corporate governance mechanism for aligning the interests of managers and all stakeholders. Anulika (2022) argues that effective corporate governance mechanisms are necessary to address the agency problem and its associated costs, which makes it difficult for any single shareholder or stakeholder to monitor managers alone. Information asymmetry often leads to managers acting in their self-interest at the expense of shareholders, resulting in agency problems and potential entrenchment and expropriation of investor value (Sultana et al., 2019). Independent audits are essential in mitigating these managerial excesses. This study examines three features of the boards of financial firms in Nigeria, which distinguish one firm from another: board size, independent non-executive directors and female directors on the board.

Board size refers to the number of directors appointed to serve on a company's board of directors. There is no regulation specifying the exact number of directors required. However, Section 2.2 of the Code of Corporate Governance for Banks and Discount Houses in Nigeria (2014) stipulates that the size of the board for any bank or discount house must be between a minimum of five and a maximum of twenty members. The board size influences the diversity of skills available, which directly impacts the quality of oversight functions and, consequently, audit quality (Enang et al., 2022).

Independent non-executive directors are those who do not hold equity stakes in the company and do not participate in its daily operations. They serve to represent and protect non-controlling interests and contribute their expertise to firm strategy development. According to Section 2.2.7 of the Banks and Discount Houses Code (2014), the remuneration of non-executive directors is limited to directors' fees, sitting allowances for board and board committee meetings, and reimbursable travel and hotel allowances. They do not receive additional benefits or salaries, either in cash or in kind. Lippolis and Grimaldi (2020) note that the independent non-executive directors are a subset of non-executive directors whose contributions to the board enhance the quality of financial and audit reports due to their expected impartiality.

Board female directors, or gender diversity, refers to the representation of women on companies' boards of directors. Gender diversity measures the number of female directors on the board. Companies should have policies to govern this process and set measurable objectives for achieving diversity in gender and other areas. This study focuses on gender diversity, which relates to the proportion of female board members. The presence of women on boards is significant for audit quality, as women are often seen as particularly diligent, contributing to meticulous oversight (Perry et al., 2023).

The global demand for credible and reliable financial information from shareholders has been increasing. Recent instances of institutional failure worldwide have drawn stakeholders' attention to the structure of corporate governance. Notable corporate scandals at the international level, such as the Toshiba accounting scandal (2015), Turing Pharmaceuticals and Martin Shkreli (2015), Valeant's secret division (2015) in Canada, and the Volkswagen Emissions Scandal (2015), have raised concerns among investors about the boards meant to protect their interests. Regarding Enron, Srivastava et al. (2015) highlighted a report by a subcommittee on an investigation that pointed out several significant fiduciary failures by its board, including a lack of independence between board members and management, failure to perform critical fiduciary duties, and a lack of strong intra-board behaviour like questioning one another and providing constructive criticism. These scandals and the subsequent reduction in shareholder wealth have led to severe criticism of boards of directors (Adeniyi & Aderobaki, 2022).

In 2010, the Central Bank of Nigeria, under Sanusi Lamido Sanusi, implemented reforms to enhance stability and confidence in the banking sector. These reforms led to the nationalization and subsequent rebranding and recapitalization of some banks, including Bank PHB, Spring Bank, and Afribank (Sanusi, 2010). In 2016, Skye Bank was taken over by the CBN due to its inability to meet capital adequacy requirements and was eventually rebranded as Polaris Bank. Additionally, Diamond Bank merged with Access Bank in 2019 in response to financial instability, despite robust audit reports (CBN, 2020). This study aims to contribute to the academic literature by examining the effect of board features on audit quality, using the Big 4 audit firms as a benchmark. It also seeks to determine the combined impact of three explanatory variables on audit quality.

A geographical and environmental gap exists in recent studies reviewed, with no Nigerian studies among the works from 2023 and 2024. For instance, Luh (2024) focuses on Ghanaian firms, Alkhazaleh et al. (2023) on Jordan, Perry et al. (2023) on China, Alexeyeva (2023) on Sweden, and Kalia et al. (2023) on multinational firms across 20 countries. This study addresses the absence of Nigerian perspectives in this research area. Additionally, a currency gap is evident in the literature, as many studies use outdated data. For example, Luh (2024) utilizes data up to 2021, Perry (2023) does not specify the period covered, and Kalia et al. (2023) and Alkhazaleh et al. (2023) also stopped at 2021 and 2019, respectively. The most outdated data is in Alexeyeva (2023), which only includes information up to 2015. This study aims to rectify these issues by using more current data.

The main objective of this study is to establish the relationship between board diversity and audit quality of quoted financial firms in Nigeria from 2016 to 2022. The specific objectives are to evaluate the relationship between board size, board independence and female directors on board and audit quality of the financial firms in Nigeria.

2. Literature Review

Theoretical Review

The agency theory developed by Jensen and Meckling (1976), illustrates the relationship between the principal (typically the shareholders) and the agent (usually the managers and caretakers of shareholder funds). Both parties have vested interests in the entity, with the agent bearing a fiduciary responsibility to maximize shareholder wealth, although this responsibility entails certain costs. Lawal et al. (2014) found in their study on the effects of capital structure on firm performance that the ownership and control of large corporations become increasingly separated due to the continuous dilution of equity ownership. As a result of this dispersed ownership, managers are more likely to pursue personal interests over those of the owners, leading to a moral hazard that incurs monitoring and bonding costs. Jensen and Meckling suggest that to mitigate moral hazard (agency costs), an impartial third party, such as an external auditor, should be granted access to financial records to provide unbiased assessments of whether the financial statements accurately reflect the company's financial position.

Agency cost theory is grounded in several basic assumptions: i) Parties are presumed to act in their self-interest and aim to maximize their utility or benefits, ii) There is often an information asymmetry between principals and agents, with agents typically having more intake on about their actions and decisions than the principals, iii) The goals of principals and agents are usually not perfectly aligned, as agents may pursue their objectives, which may not necessarily align with the best interests of the principals, iv) Agents are assumed to be risk-averse and may not take on as much risk as principals would if they were directly managing the business.

The strengths of agency theory include: i) It provides a valuable framework for understanding and addressing governance issues within organizations, particularly in publicly traded companies where shareholders are not directly involved in day-to-day management, ii) It suggests mechanisms for aligning the interests of principals and agents through various incentives, such as performance-based compensation, stock options, and bonus structures. The limitations and weaknesses of agency theory are: i) Its assumptions of self-interest and rational behaviour are considered overly simplistic, as people may have complex motivations and not always act purely in their self-interest, ii) It primarily focuses on the relationship between shareholders and managers, neglecting the interests of other stakeholders, iii) Its overemphasis on formal contracts may lead to a lack of trust and creativity within organizations, as not all aspects of a relationship can be captured in a contract.

This study is anchored on the agency theory that advocates for measure including corporate governance mechanisms which would minimize the moral hazards of the managers and protect the interest of the shareholders.

Empirical Review

Luh (2024) examined the impact of gender in firm leadership and audit committee diversity on the audit quality of Ghanaian universal banks. The study aimed to analyze the effects of having a female board chairperson, a female chief executive officer (CEO), and overall board gender diversity on audit quality, represented by audit fees. Additionally, it sought to determine the combined effect of female leadership and gender diversity within the audit committee on audit fees. Using Ordinary Least Square (OLS) and fixed effect (FE) estimators, the hypotheses were tested on data from 21 universal banks in Ghana spanning from 2010 to 2021. The findings indicated that female leadership (both female CEOs and board gender diversity) correlates with higher external audit quality, as evidenced by higher audit fees. Furthermore, the presence of women on the audit committee enhances internal controls and internal audit procedures, leading to higher quality financial reporting and subsequently lower audit fees. The study recommended leveraging female leadership to ensure high-quality external audits and financial reporting, ultimately reducing information risk for stakeholders.

Alkhazaleh et al. (2023) explored the impact of corporate governance on audit quality, focusing on board size, board independence, family ownership, managerial ownership, and the number of women on the board. The study analyzed 624 observations from a panel of 78 firms listed on the Amman Stock Exchange (ASE) over eight years (2012–2019) using panel-corrected standard error (PCSE) regression. The results showed that board independence and family ownership negatively affect audit quality, while board size and concentration ownership have a positive impact. Managerial ownership and the number of women on the board were found to have no significant impact on audit quality.

Alexeyeva (2023) investigated the impact of multiple directorships on auditor selection within private firms. The study aimed to determine how outside directors affect audit quality, how directors' networks influence the likelihood of hiring high-quality auditors, and the effect of firm size on the choice of quality auditors. Focusing on privately owned Swedish firms from 2006 to 2015, the study employed fixed effect estimation for analysis. The findings revealed a significant positive relationship between the proportion of board members with outside directorships and audit quality. Additionally, directors' networks were found to significantly influence the propensity to hire higher-quality auditors. The size of the companies where board members hold outside directorships also significantly impacted on the decision to invest in higher-quality auditors. The study recommended further research to explore if board characteristics affecting audit quality demand are consistent across different categories of private firms.

Kalia et al. (2023) specifically investigated the effect of board characteristics on audit quality, considering geographical variations, through a meta-analysis of 56 empirical studies published over 25 years (1996–2021). The studies included 147 empirical samples (343,787 firm-year observations) from over 20 countries. The dependent variable was audit fees, and the independent variable comprised 12 different board characteristics measures. The results showed a positive relationship between board characteristics and audit fees, indicating a complementarity between governance mechanisms. The effect size analysis revealed that board size and independence are positively associated with audit fees. However, heterogeneity in the results was noted, particularly across different geographies (developed vs. emerging countries).

Shukri and Abdullah (2022) explored the relationship between corporate governance quality and audit quality in Malaysia by examining board characteristics and using audit fees as a proxy for audit quality. The study analyzed data from 511 publicly listed companies in Malaysia from 2013 to 2019, using multiple linear regression to test the research hypotheses. The results indicated that board characteristics are related to audit fees, suggesting that Malaysia's existing corporate governance framework is effective in monitoring the audit process.

Opoku et al. (2022) examined the impact of board characteristics on audit quality based on evidence from the Ghana Stock Exchange. The study aimed to explore the effects of board size, board independence, board gender diversity, and CEO duality on audit quality. Using a panel regression model, the study analyzed data from 25 listed firms in Ghana from 2012 to 2019. The results showed that board size and board gender diversity have a significant negative relationship with audit quality, while board independence and CEO duality have an insignificant negative relationship with audit quality. The study recommended appointing a more independent board and engaging auditors from the Big Four firms.

Enang et al. (2022) investigated the influence of governance structures, represented by board attributes, on the audit quality of banks in Nigeria from 2005 to 2020. The study aimed to assess the impact of board size, board independence, and board meetings on audit quality. An ex-post facto research design and purposive sampling were used to select 11 out of 14 listed banks. Multiple regression analysis of the data from annual reports showed that board independence has an insignificant positive relationship with audit quality, while board size and the number of board meetings have a significant negative relationship with audit quality. The study concluded that governance structures affect the audit quality of Nigerian banks and recommended prioritizing expertise and competence in board composition, specifying qualifications for board members, and amending governance codes to require more audit committee meetings.

Anulika (2022) examined the impact of board structure on audit quality in selected Nigerian manufacturing firms, focusing on board financial expertise, size, independence, and meetings from 2012 to 2021. Using the Ordinary Least Squares (OLS) method with secondary data from company financial statements, the study found all variables significantly influenced audit quality. Recommendations included increasing board size and ensuring members possess adequate auditing and financial management knowledge.

Odum et al. (2021) explored the impact of board heterogeneity on audit quality in Nigerian banks, focusing on gender, ethnic, and educational diversity from 2014 to 2019. Using OLS regression, the study found that gender and ethnic diversity significantly affected audit quality, whereas educational diversity

did not. The study recommended legislative measures to set minimum qualifications for board members in financial and professional expertise to enhance board effectiveness. However, the use of OLS without panel data analysis and reliance on data up to 2019 were criticized as inappropriate.

Alawaqleh et al. (2021) examined the influence of the board of directors and the CEO on the audit quality of manufacturing firms listed in Jordan. The study aimed to evaluate the impact of CEO tenure, CEO duality, board independence, and board size on audit quality, as well as the role of control variables (client size, leverage, and business complexity) in these relationships. Data was collected from 325 financial reports of manufacturing firms listed on the Amman Stock Exchange from 2014 to 2018 and analyzed using logistic regression. The findings indicated a negative but not significant relationship between CEO tenure and independent directors with audit quality. CEO duality negatively affected audit quality, while board size had a statistically significant impact. Control variables such as client size and leverage positively influenced audit quality, whereas business complexity had an insignificant positive relationship. The study recommended strengthening auditors and internal corporate governance mechanisms to ensure financial reporting quality is maintained, especially when there is a risk of failing to meet earnings targets.

Abdullah et al. (2021) investigated the impact of board gender diversity on the financial reporting quality of Malaysian listed companies from 2016 to 2020. Using panel data analysis, the study found that female directors on boards enhance reporting quality. These results suggest that the presence of female directors influences management decisions and audit quality, advocating for greater emphasis on gender diversity in boards. The study recommended further comparative research in other emerging markets to provide additional insights into the effects of gender diversity on reporting quality across different countries.

Owolabi and Babarinde (2020) analyzed the effect of corporate governance on audit quality in Nigerian deposit money banks (DMBs) from 2007 to 2018. The study focused on gender diversity, board size, non-executive board members, foreign directorship, and board composition. Using panel data estimators and the Hausman test, the study found that gender diversity, ethnic diversity, board composition, and board size significantly affect audit quality in Nigerian DMBs, whereas foreign diversity does not.

Ogoun and Perelayefa (2020) examined the role of corporate governance mechanisms, specifically board independence, on audit quality in non-financial firms from 2008 to 2015. The study measured board independence by the ratio of non-executive directors to total directors and audit quality using a binary variable indicating the use of a Big four auditors. Analyzing data from 71 non-financial firms with binary regression analysis, the study found a negative relationship between board independence and audit quality.

Enofe and Igbinoba (2020) assessed the impact of board characteristics on audit quality in Nigeria, focusing on female board gender, board independence, and board diligence. The study analyzed data from 116 firms listed on the Nigerian Stock Exchange from 2014 to 2018 using descriptive and inferential statistics. Binary probit regression results showed that board independence and diligence positively and significantly affect audit quality but found no evidence of the impact of female board gender alone. The study recommended sustaining the culture of having an independent board to enhance audit quality and increase female representation on boards as mandated by Nigerian regulatory authorities.

3. Methodology

This study adopts an *ex-post facto* research design since the data analyzed were from historical sources that can easily be verified. Several authors including Alexeyeva (2023) and Kalia *et al.* (2023) have used the research design in their previous studies. The population of this study was made up of 49 financial firms quoted in Nigeria from 2016 to 2022. The sample size of this study comprises 46 financial service firms operating on the Nigerian Exchange Group which have complete data for the seven years (2016 to 2022) of the study. The sample size was determined by the purposive sampling method which removed 3 firms including Jaiz bank that could not fit properly to the purpose of this study. The panel data were obtained from secondary sources made up of financial statements and accounts of the firms examined. Binary logistic regression was used to analyse the effect of board attributes on audit quality of quoted financial firms in Nigeria. The choice of Maximum Likelihood (ML) binary logistic regression model is based on the inability of the Ordinary least square multiple regression model to yield reliable coefficients and inference statistics in a situation where the dependent variable is binary (0 and 1). Thus, the binary logistic regression model unlike others is based on the use of a dichotomous dependent variable. A study by Thi (2020) has provided empirical justification for use of a dichotomous variable. Therefore, a dummy value of 1 is used if a firm audited by big4 audit firms, if not, 0, if audited by non-big4. Logistic regression was analysed with the aid of Stata 15 software. Different tests were conducted for the study, such as independent observations, Correlation and Variance Inflation Factor.

Variables Measurement and Justification

Variable	Type	Measurement	Justification
Audit Quality (AQ)	Dependent	Assigned as 1 if audited by the Big 4 audit firms or assigned 0 if otherwise.	Ogoun and Perelavefa (2020). Bakare (2019), Dwekat <i>et al.</i> (2018).
Board Size	Independent	The number of directors on the Board of companies.	Alkhazaleh <i>et al.</i> (2023), Opuku <i>et al.</i> (2022), Enang <i>et al.</i> (2022).
Board Independence (BIND)	Independent	Proportion of independent non-executive directors on board.	Alexeyeva (2023), Anulika (2022), Abulaila <i>et al.</i> (2019)
Female Board Leadership (FDB)	Independent	Proportion of Women on board.	Odum <i>et al.</i> (2021), Oriakhi (2020), Enofe and Igbinobi (2020) and Saidu and Aifuwa (2020).

Source: The Researcher's Compilation.

Model Specification

The model specification of this study is made up of the dependent variable the Big 4 audit firms and the independent variables - board size (BSZ), Board Independence (BIND) and female Board Leadership (FBL) that surrogates board gender diversity. The specified functional linear regression equation for the model is as follows:

$$\text{LOGIT}_{it} = \ln \left(\frac{\text{BIG4}_{it}}{1 - \text{BIG4}_{it}} \right) = \beta_0 + \beta_1 \text{BSZ}_{it} + \beta_2 \text{BIND}_{it} + \beta_3 \text{FBL}_{it} + \mu_{it}$$

Where:

BIG4 = Board Big Four Audit Firms of firm i at time t

β_0 = Constant term (intercept);

$\beta_1 - \beta_3$ = Coefficients for the independent variables

Board Size = Board Size,

Board Independence = Board Independence

BFL = Board Female Leadership

μ = Error Term

A-priori expectations: β_1 , β_2 and β_3 .

4. Results and Discussion

The data of forty-three (43) financial firms regarding big4 (audit quality), board size (BSZ), board independence (BIND) and female board leadership (FBL) are presented in appendix B. The data were analyzed with the aid of Stata 15 software using Descriptive Statistics, Independent Observation Test, Variance Inflation Factor test and logistic regression model based on the data attached in appendix B.

Descriptive Statistics

Table 1: Summarizes the descriptive statistics of the entire data set.

Variable	Min	Max	Mean	Std. Dev.
Big4 (Audit Quality)	0	1	0.7422	0.4378
Board Size (BSZ)	6	20	11.07	2.52
Board Independence (BIND)	0.2	0.58	0.316	0.0498
Female Board Leadership (FBL)	0	1	0.0426	0.2022

Source: Researcher's Computation using STATA 15 software.

The descriptive statistics for audit quality (Big4) indicate a minimum of 0 and a maximum of 1, with a mean value of 0.7422 and a standard deviation of 0.4378. This shows that, on average, about 74% of the sampled firms are audited by Big4 audit firms. The dummy variable nature (0 = non-Big4, 1 = Big4) implies that most firms prefer Big4 auditors, suggesting strong reliance on reputable external auditors. This high proportion may enhance investor confidence and reduce the likelihood of earnings management, given the reputation and credibility associated with Big4 firms. For board size (BSZ), the results show a minimum of 6 members and a maximum of 20 members, with a mean of 11.07 and a standard deviation of 2.52. This indicates that the average board size across the sampled firms is approximately 11 members, reflecting relatively large boards. The moderate variation across firms suggests some level of uniformity in board size. Larger boards may contribute positively by providing diverse opinions and expertise, although excessively large boards (closer to 20) could slow decision-making processes and reduce overall efficiency.

Board independence (BIND) ranges from a minimum of 20% to a maximum of 58%, with an average of 31.6% and a standard deviation of 0.0498. This suggests that, on average, about one-third of board members in the sampled firms are independent directors. While the minimum of 20% implies that some firms are only just meeting regulatory expectations, the maximum of 58% shows that some firms maintain a high level of independence. The low standard deviation indicates limited variation across

firms. Adequate board independence is essential for effective monitoring and control, helping to mitigate agency problems, although firms closer to the minimum level may face governance challenges.

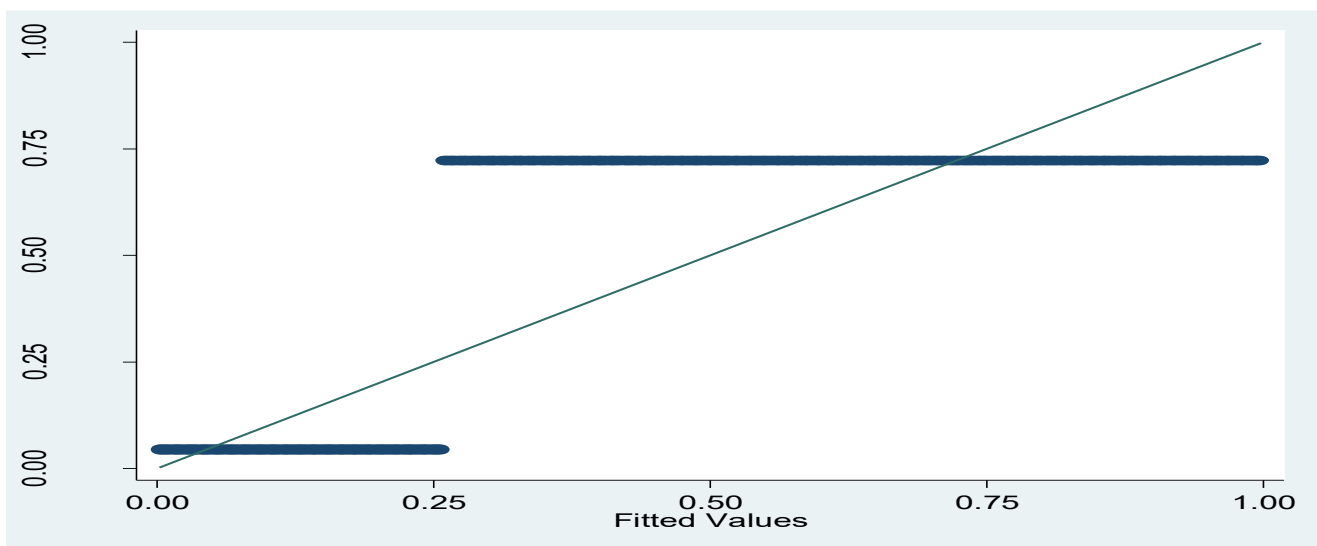
The statistics for female board leadership (BFL) reveal a minimum of 0 and a maximum of 1, with a mean value of 0.0426 and a standard deviation of 0.2022. This shows that only about 4.3% of the sampled firms have female board leadership. Given the dummy variable coding (0 = no female leader, 1 = female leader), the low mean underscores the rarity of female representation in board leadership positions. The high variation relative to the mean suggests considerable disparity across firms. This limited presence of women in leadership roles points to persistent gender imbalance, potentially restricting the benefits of diverse perspectives in corporate governance.

Overall, the descriptive statistics highlight that most firms are audited by Big4 auditors and maintain relatively large boards with moderate levels of independence, which suggests some governance strengths. However, the findings also reveal a significant weakness in gender diversity, as female representation in board leadership remains scarce. This imbalance indicates that while external audit quality and board structures are fairly robust, internal inclusiveness – particularly in terms of gender diversity – remains underdeveloped.

Test for Independent Observations

One of the fundamental assumptions of logistic regression is that the observations are independent, implying that the data should not be derived from repeated measurements of the same unit or exhibit any form of dependence across observations. To evaluate this assumption, the residuals were plotted against time (i.e., the sequence of observations). The plot revealed a random distribution of residuals, suggesting the absence of systematic patterns or temporal dependencies. This outcome provides evidence that the independence of observations assumption is satisfied, thereby supporting the statistical validity of the logistic regression model, as presented in Figure 1.

Figure 1: Plot of Residuals against Time



Source: Researcher's Computation using STATA 15 software

Pearson Correlation

Table 2 below is the Pearson correlation matrix for the data set to show the extent of Associations between the variables.

	big4	bsz	bind	fbl
big4	1			
bsz	0.1988	1		
bind	0.0042	-0.266	1	
fbl	-0.0072	-0.1047	-0.0515	1

Source: Researcher's Computation using STATA 15 software

Table 2 presents the pairwise correlation coefficients among the dependent variable, audit quality (proxied by Big4), and the independent variables: board size (BSZ), board independence (BIND), and female board leadership (FBL). The results show that board size (BSZ) has a positive and moderate correlation with audit quality ($r = 0.1988$), suggesting that firms with larger boards are more likely to engage Big4 auditors. This aligns with corporate governance literature, which emphasizes that larger boards may exert stronger oversight and improve monitoring quality, thereby influencing auditor choice. In contrast, board independence (BIND) has a very weak and statistically negligible positive correlation with audit quality ($r = 0.0042$). This implies that the presence of independent directors may not substantially determine whether a firm engages Big4 auditors in the sampled firms. Similarly, female board leadership (FBL) shows a weak negative correlation with audit quality ($r = -0.0072$), indicating that the presence of female leaders on the board has little to no direct association with audit quality.

Examining inter-correlations among the independent variables, board size (BSZ) is negatively correlated with board independence ($r = -0.2660$), while its correlation with female board leadership (FBL) is also weakly negative ($r = -0.1047$). Furthermore, board independence (BIND) and female board leadership (FBL) show a weak negative association ($r = -0.0515$). Importantly, all correlations among the independent variables are below the conventional multicollinearity threshold ($|r| < 0.80$). This indicates that multicollinearity is not a concern in the regression analysis, and the independent variables can be reliably included in the model without biasing the parameter estimates (Gujarati & Porter, 2009; Wooldridge, 2010). The findings suggest that board size may be a relevant governance mechanism influencing audit quality, while board independence and female board leadership exhibit limited direct influence. The absence of high inter-correlations among the predictors confirms the statistical validity of the regression results, as the independent variables do not threaten model stability through multicollinearity.

Variance Inflator Factor (VIF) Results

Table 3: Variance Inflator Factor (VIF)

Variable	VIF	Tolerance (1/VIF)
Board Size (BSZ)	1.09	0.915
Board Independence (BIND)	1.08	0.923
Female Board Leadership (FBL)	1.02	0.982
Mean VIF	1.06	

Source: Researcher's Computation using STATA 15 software

The results of the variance inflation factor (VIF) analysis for the independent variables – board size (BSZ), board independence (BIND), and female board leadership (FBL), indicate values of 1.09, 1.08, and 1.02

respectively, with a mean VIF of 1.06. These values are substantially below the commonly accepted thresholds for multicollinearity concerns, namely 10 (Kutner et al., 2004) or the more conservative threshold of 5 (O'Brien, 2007). The corresponding tolerance values ($1/VIF$), ranging from 0.915 to 0.982, are also close to 1, further confirming that the independent variables do not exhibit problematic levels of collinearity.

The implication of these findings is that the independent variables (BSZ, BIND, and FBL) are sufficiently distinct and measure unique dimensions of board characteristics. This absence of multicollinearity enhances the robustness and interpretability of the logistic regression estimates linking board characteristics to audit quality (Big4). Specifically, it suggests that board size, board independence, and female board leadership each provide independent explanatory power in predicting the likelihood of engaging a Big4 auditor. Thus, the statistical validity of the regression model is strengthened by the lack of multicollinearity, ensuring that the estimated coefficients are stable and not inflated by redundant explanatory variables.

Effect of Board Characteristics on Audit Quality using Logistic Regression Model

Table 4 below shows the Logistic Regression Model conducted for the estimation of this model.

Table 4: Logistic Regression Results Predicting Big4 Audit Quality

Predictor	Odds Ratio (OR)	SE	z	p
Board Size (BSZ)	1.29	0.07	4.53	<.001
Board Independence (BIND)	64.65	155.16	1.74	.082
Female Board Leadership (FBL)	1.25	0.62	0.45	.655
Constant	0.05	0.06	-2.65	.008

Model Statistics: $N = 516$; $LR \chi^2 (3) = 26.20$, $p < .001$; Log likelihood = -281.38; Pseudo $R^2 = .4405$

Source: Researcher's Computation using STATA 15 software

From the results in Table 4, the $LR \chi^2(3)$ Chi-squared statistic of 26.20 is significant at 1% level of significance. This indicates a good fit and correctness of the distributional assumption of the component error term. This means that the logistic model used to estimate the board characteristics on audit quality is an adequate representation of the data. The pseudo Chi2 of 0.4405 confirms that a large portion of the changes in the audit quality is attributed to the explanatory variables included in the model. This means that 44.05% of the variation in audit quality is explained by the variables included in the model.

Test of Hypotheses

To examine the effect of board attributes on audit quality of listed financial firms in Nigeria, the following hypotheses were tested using the Logistic Regression Technique.

H₀₁: Board size has no significant effect on audit quality of listed financial firms in Nigeria

Table 3 shows the result of the z-statistic value of 4.53 and the corresponding sig. level of 0.001 which is significant at 1% level of significance indicating that board size has a significant effect on audit quality of listed financial firms in Nigeria. Based on this, the null hypothesis one, which says, board size has no significant effect on audit quality of listed financial firms in Nigeria, is rejected.

H₀₂: Board independence has no significant effect on audit quality of listed financial firms in Nigeria

Table 3 also shows that the result of the z-statistic value of 1.74 and the corresponding significant level of 0.082 which is not significant at all levels of significance, indicated that board independence has no significant effect on audit quality of listed financial firms in Nigeria. Based on this, null hypothesis two, which says, board independence has no significant effect on audit quality of listed financial firms in Nigeria is accepted.

Ho₃: Board female leadership has no significant effect on audit quality of listed financial firms in Nigeria

Table 3 further shows the result of the z-statistic value of 0.45 and the corresponding significant level of 0.655 which is not significant at all levels of significance, indicating that the board female leadership has no significant effect on audit quality of listed financial firms in Nigeria. Based on this, null hypothesis three, which says, board female leadership has no significant effect on audit quality of listed financial firms in Nigeria, is accepted.

Discussion of Results

The study revealed that the board size (BSZ) shows an odds ratio of 1.294 ($p < 0.001$), suggesting a statistically significant positive effect on the likelihood of engaging Big4 auditors. This means that for each additional board member, the odds of a firm being audited by a Big4 auditor increase by approximately 29%, holding other factors constant. This finding implies that larger boards may enhance governance oversight and demand higher audit quality. These findings align with previous studies by Alexeyeva (2023), Owolabi and Babarinde (2020) and Opoku *et al.* (2022) who concluded that board size has significant impact on audit quality. The result fails to support the Agency Theory which supports small board size. The a priori expectation that a larger board can mobilize enough resources to engage the services of the big 4 audit firms is confirmed.

The study further revealed that the board independence (BIND) exhibits an odd ratio of 64.65 ($p = 0.082$) which is positive but not statistically significant. Although this coefficient is very large, the wide confidence interval (0.586 – 7134.722) and marginal significance level indicate instability in the estimate, possibly due to variability in the data or the relatively small variation in independence across firms. Nonetheless, the result tentatively suggests that higher board independence may substantially increase the likelihood of engaging Big4 auditors, though the lack of strong statistical significance ($p > 0.05$) warrants cautious interpretation. This finding is consistent with that of Alawaqleh *et al.* (2021) and Alkhazaleh *et al.* (2023) but not in line with the findings of Alexeyeva (2023) and Enang *et al.* (2022). This finding is not in support of the Agency theory's proposition that independent directors safeguard minority shareholders' interests through high-quality audits.

The study finally revealed that the female board leadership (FBL) has an odds ratio of 1.247 ($p = 0.655$), which is positive but not statistically significant. This implies that the presence of female leaders on the board does not have a meaningful influence on the likelihood of a firm choosing Big4 auditors in this sample. The wide confidence interval (0.473 – 3.288) further highlights the uncertainty of this effect which aligns with findings by Alkhazaleh *et al.* (2023) and Enofe and Igbinobi (2020). However, the finding disagrees with the findings of Luh (2024). This result supports the Gender theory's advocacy that female directors would go for higher audit quality and, consequently, the engagement of big 4 auditors.

5. Conclusion and Recommendations

Based on the findings of this study, the following conclusions were derived to guide future research efforts. A larger board size has higher likelihood of firms engaging in the services of big 4 auditors,

indicating a robust positive correlation with audit quality. Independent non-executive directors, who are not involved in daily company operations and hold no significant stake, tend to favour high audit quality. The presence of female directors on boards shows no substantial connection to audit quality, suggesting that the proportion of the female directors hold no significant influence on the board yet.

In line with the findings of this study the following recommendations were made:

- i. Financial firms in Nigeria should ensure a board size above the minimum of 8 stipulated by the Code 2018 members, as a larger board size significantly correlates with audit quality.
- ii. The number of independent non-executive directors should be at least two-thirds of the board size to ensure their ideas and opinions are not suppressed, as their presence enhances the quality of audit exercises.
- iii. The inclusion of more female directors on boards should be encouraged as their number has a positive yet insignificant relationship with audit quality, albeit positive.

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