



MODERATING EFFECT OF FIRM SIZE ON THE RELATIONSHIP BETWEEN AUDIT COMMITTEE ATTRIBUTES AND CORPORATE FRAUD OF LISTED MANUFACTURING FIRMS IN NIGERIA

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KEYWORDS

Agency Theory, Audit Committee, Beneish M-Score, Corporate Fraud, Firm Size

ABSTRACT

Corporate fraud poses a persistent threat to the integrity and sustainability of listed manufacturing firms, particularly in emerging economies like Nigeria where governance structures are evolving. Hence, the need to investigate the moderating effect of firm size on the relationship between audit committee attributes and corporate fraud of listed manufacturing firms in Nigeria for the periods of 2014 to 2024. The main objective was to examine how firm size conditions the impact of audit committee gender diversity, meeting frequency, and independence on corporate fraud, measured by the Beneish M-Score. Adopting a longitudinal research design, the study employed a quantitative panel data approach. The population comprised all 38 manufacturing firms listed on the Nigerian Exchange Group. Using a filtering sampling technique to exclude firms listed after 2013, a final sample of 36 firms was analyzed over an eleven-year period. Secondary data was extracted from audited annual reports. The data was analyzed using Fixed Effects panel regression, selected via the Hausman test, with diagnostic checks for multicollinearity, heteroskedasticity, and serial correlation. The findings revealed that audit committee gender diversity had a significant negative effect on fraud, while audit committee meeting frequency also demonstrated a significant negative effect, but these effects diminished as firm size increased, as shown by the positive and significant interaction terms. Conversely, audit committee independence had a positive main effect, but a significant negative interaction with firm size, indicating independence becomes a potent fraud deterrent only in larger firms. The study concludes that firm size is a critical moderator, transforming governance effectiveness. It recommends that regulators move towards scalable, size-contingent governance codes and that firms tailor their audit committee structures to their specific scale to optimize fraud prevention.

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1. Introduction

Corporate fraud remains a pervasive global challenge that transcends geographic boundaries and industrial sectors, severely undermining investor confidence and the integrity of financial markets (Sadique et al., 2019). Historically, high-profile scandals involving multinational giants such as Enron, WorldCom, and Parmalat have demonstrated the devastating repercussions of fraudulent activities, which include not only substantial financial losses but also the erosion of brand value, loss of employee morale, and broader social instability. Globally, regulatory bodies have responded by mandating more rigorous corporate governance frameworks designed to enhance transparency and accountability (Olabisi et al., 2022). Despite these efforts, the persistence of corporate scams suggests that firm-level monitoring mechanisms, particularly the audit committee, require continuous evaluation to ensure they effectively deter unethical management behaviour.

In the Nigerian context, the alarming rate of corporate failures and accounting scandals has highlighted the vulnerability of listed firms to financial reporting malpractices. Nigeria has witnessed significant financial reporting mishaps involving prominent entities such as Cadbury Nigeria Plc, Afri Bank, and Intercontinental Bank, which have collectively eroded trust in the reliability of corporate disclosures (Ibrahim et al., 2024; Olabisi et al., 2022). To combat this malaise, the Securities and Exchange Commission and other regulatory authorities have implemented various codes of corporate governance to compel compliance and sanction deviants. For the manufacturing sector, which is a critical driver of the national economy, maintaining high financial reporting quality is essential

for attracting the investment needed for industrial growth, yet the sector remains susceptible to managers who deliberately misrepresent financial health to maintain their positions (Ibrahim et al., 2024; Subair et al., 2020).

The audit committee serves as a vital internal governance mechanism responsible for monitoring the financial reporting process and evaluating internal controls to prevent fraud (Jinadu et al., 2025). A primary attribute of an effective audit committee is independence, which refers to the presence of non-executive directors who are free from management influence (Adigwe & Ogoun, 2018). Furthermore, audit committee diligence, often proxied by meeting frequency, and gender diversity are increasingly recognized as essential attributes for curbing fraud. Frequent meetings allow the committee to identify and solve potential problems related to financial reporting quality in a timely manner, effectively narrowing the opportunity for management to engage in fraudulent practices (Saftiana et al., 2017). Simultaneously, the inclusion of female directors, or gender diversity brings diverse perspectives and expertise to the board, which has been found to improve the timeliness and integrity of audit reports in various Nigerian sectors (Aifuwa et al., 2020; Ojali et al., 2023).

The collective influence of these audit committee indicators, independence, meeting frequency, and gender diversity serves as a proxy for the overall effectiveness of corporate oversight in mitigating fraud risk. Effective monitoring roles performed by these committees are essential to reduce the log odds of financial statement fraud, particularly in the manufacturing sector where complex operations may provide more avenues for

misstatement (Subair et al., 2020). However, the relationship between these attributes and fraud deterrence is not always linear, as the practical impact of a committee's diligence or independence can be influenced by the specific structural characteristics of the firm they oversee (Gospel et al., 2019). This necessitates an examination of internal firm factors that might strengthen or weaken the committee's ability to perform its statutory functions.

Firm size is a critical moderating factor that can significantly alter the relationship between audit committee attributes and corporate fraud. There are competing views on how size influences fraud risk: larger firms may be more conservative due to intense public and regulatory scrutiny, yet they also possess more complex structures that can facilitate sophisticated earnings management. Conversely, smaller firms may face higher fraud risks due to weaker internal controls, but they are often more transparent due to simpler operational models (Saftiana et al., 2017).

Despite extensive research on audit committees and corporate fraud, limited studies have systematically examined how firm size moderates this relationship, particularly in emerging markets like Nigeria. While prior research acknowledges that AC effectiveness varies by firm size, few studies explicitly test this moderating effect (Kwamboka et al., 2025; Johnson et al., 2022; Laurent & van der Berg, 2024; Lee & Park, 2025; Sharma & Sharma, 2024; Thompson & Zhou, 2022).

Critical unanswered question is whether Nigeria should develop distinct AC guidelines for manufacturers based on size thresholds, and what specific adaptations would optimally balance governance quality with practical feasibility across different

firm scales (SEC Nigeria, 2024; Adegbite et al., 2024). This represents both a significant research gap and pressing policy need for Nigeria's manufacturing sector development.

The main objective of this study is to examine the moderating effect of firm size on the relationship between audit committee attributes and corporate fraud of listed manufacturing firms in Nigeria. The specific objectives of this study are to;

- i. Ascertain the effect of audit committee gender diversity on corporate fraud of listed manufacturing firms in Nigeria.
- ii. Determine the effect of audit committee meeting frequency on corporate fraud of listed manufacturing firms in Nigeria.
- iii. Examine the effect of audit committee independence on corporate fraud of listed manufacturing firms in Nigeria.
- iv. Investigate the moderating effect of firm size on the relationship between audit committee gender diversity and corporate fraud of listed manufacturing firms in Nigeria.
- v. Identify the effect of firm size as a moderator on the relationship between audit committee meeting frequency and corporate fraud of listed manufacturing firms in Nigeria.
- vi. Assess the moderating effect of firm size on the relationship between audit committee independence and corporate fraud of listed manufacturing firms in Nigeria.

The study examines the association between audit committee attributes and corporate fraud, moderated by firm size. It dwells on listed manufacturing firms in Nigeria and covers a period of eleven years (2014-2024). The study focuses on manufacturing sector

as its domain in view of its strategic importance to the Nigerian economy and the ever-increasing demand for information by investors and shareholders.

2. Literature Review

Corporate Fraud

Yu (2013) defined corporate fraud as a firm's or its manager's misconduct behaviour, which causes material value loss to shareholders or stakeholders (e.g., creditors, customers and suppliers) and which may trigger regulatory and/or legal enforcements. Corporate fraud refers to deliberate and deceptive practices conducted by individuals or organizations to secure unlawful financial or operational benefits (Free & Murphy, 2018).

Audit Committee Attributes

An audit committee is a sub-committee of the board that specializes in, and is responsible for, ensuring the accuracy and reliability of the financial statements provided by management. The audit committee serves as a liaison between the external auditor and the board of directors, and facilitates the monitoring process by reducing information asymmetry between the external auditor and the board (Nurliasari & Achmad, 2020).

Audit Committee Gender Diversity

Audit committee gender diversity refers to the inclusion of both male and female members in the audit committee, which has been shown to enhance governance and financial oversight. Research indicates that gender-diverse audit committees improve decision-making processes by incorporating varied perspectives, leading to more rigorous scrutiny of financial reports and reduced risks of fraud (Al-Shaer & Zaman, 2021).

Audit Committee Meeting Frequency

Audit committee meeting frequency is concern with the number of meetings held by the committee during the year. Frequency of Audit committee meetings mean the number of times audit committee members meet. It allows for better interaction between audit committee members and auditors. An audit committee that meets more frequently with internal auditors is better informed about issues relating to accounting and auditing (Aderemi et al., 2016).

Audit Committee Independence

The independence of audit committee has to do with the committee neutrality from those whose influences might put to jeopardy its assignment. The independence of the audit committee has been widely researched in a variety of prior studies. It has been widely argued as being one of the key characteristics associated with the effectiveness of the audit committee. The notion of being an independent director according to the Listing Requirement of Nigeria Exchange Group is referred to as the directors who are free from any relationship and independent from the company's management or having no shares in the company and having no relationship with any major shareholders, officers and executive directors.

Firm Size

Firm size is a fundamental organizational characteristic that significantly influences strategic decision-making and performance outcomes (Kim et al., 2019). Typically measured by total assets, revenue, or number of employees (Hitt et al., 2020), firm size serves as both a control variable and an

independent construct in management research. Firm size significantly moderates the relationship between audit committee (AC) effectiveness and corporate fraud, influencing both governance dynamics and fraud opportunities. Research indicates that larger firms tend to have more structured and independent ACs, which enhance oversight capabilities (Abbott et al., 2004).

Empirical Review

Audit Committee Gender Diversity and Corporate Fraud

Ofielu et al. (2024) examined the effect of audit committee attributes on corporate fraud of listed manufacturing companies in Nigeria. The panel regression model was used to analyze the data. The results showed that frequency of audit committee meetings, audit committee gender diversity and audit committee independence have significant negative effect on corporate fraud of listed manufacturing firms in Nigeria. Meanwhile, Ilogho et al. (2022) examined audit committee qualities, gender and ethnic diversity on abating corporate fraud in Nigeria. The study found a positive and insignificant relationship between the audit committee size and corporate fraud mitigation. The study also found that the audit committee meetings, gender and ethnic diversity did not correlate with corporate fraud mitigation. The study found that on average, firms met the statutory requirement for the size of the audit committee size and meetings, which is six (6) and four (4) respectively.

Mardessi (2022) investigated the relationship between the characteristics of audit committees and the likelihood of fraudulent financial reporting. According to the findings of the study, a lack of independence on the part of audit committees is positively associated with

fraudulent financial reporting. The committee's exposure to the risk of financial fraud increases inversely with the proportion of independent or outside directors that it contains, and vice versa. The findings also demonstrated that a high level of knowledge among members of the audit committee has an inverse relationship with the incidence of corporate fraud. On the other hand, the findings on the frequency of audit committee meetings, gender, and ethnicity all show that there was no relationship between these characteristics and corporate fraud.

Al-Shaer and Zaman (2019) examined the relationship between audit committee (AC) gender diversity and fraudulent financial reporting in S&P 1500 firms from 2012 to 2017, the study found that a 10% increase in female AC representation was associated with a 15% reduction in fraud risk, attributing this effect to enhanced professional skepticism and reduced earnings manipulation among gender-diverse committees. While, Zalata et al. (2018) investigated the impact of female AC representation on financial misreporting among FTSE 350 firms from 2010 to 2016, the study found that firms with at least one female AC member demonstrated 22% lower odds of financial misreporting, attributing this effect to gender-diverse ACs' greater risk aversion and enhanced ethical scrutiny in financial oversight.

Audit Committee Meeting Frequency and Corporate Fraud

Bertoni and Sacconi (2024) conducted a study on beyond meeting counts: The micro foundations of effective oversight. The study identifies three key markers of high-impact meetings: independent directors maintaining 55-65% of speaking time, a rhythm of 3-5 challenging questions per hour, and strict limitation of management presentation time

to under 30% of the session. Also, Kusumosari and Rahardjo (2023) examined the effect of audit committee effectiveness on financial statement fraud. The results showed that the effectiveness of the audit committee, proxied by financial expertise, accounting expertise, and the number of audit committee meetings had negative and significant effect on financial statement fraud.

Ilogho et al. (2022) examined audit committee in qualities, gender and ethnic diversity on corporate fraud in Nigeria. The study found a positive and insignificant relationship between the audit committee size and corporate fraud mitigation. The study also found that the audit committee meetings, gender and ethnic diversity did not correlate with corporate fraud mitigation. The study found that on average, firms met the statutory requirement for the size of the audit committee size and meetings, which is six and four respectively.

Hasnan et al. (2022) conducted a study on audit committee characteristics that lead to the occurrence of financial restatements in Malaysian public listed companies (PLCs). The results showed that there is a significant association between audit committee size and frequency of meetings as well as ethnicity and political connections of the audit committee members and the occurrence of financial restatements in Malaysian PLCs. The results showed that larger and more rigorous audit committees can strengthen the monitoring role and consequently reduce the occurrence of financial restatements.

Udin et al. (2021) examined audit committee effectiveness in ASEAN-5 publicly traded firms (2017-2020) through qualitative comparative analysis of 950 firm-years, innovatively coding meeting minutes for substantive content. The research identified

three distinct but equally effective governance configurations: a quality-focused approach combining 4-5 annual meetings with strong financial expertise, an intensive oversight model featuring 6-8 meetings led by an independent chair, and a tech-enhanced minimalism approach with just 3 meetings supported by real-time digital monitoring.

Audit Committee Independence and Corporate Fraud

Lee and Park (2025) employed comprehensive meta-analysis to investigate audit committee independence and fraud. The study synthesized evidence from 40 studies across 20 countries between 2016 and 2025. The study confirmed a robust negative relationship between audit committee independence and corporate fraud, with particularly strong effects in common-law jurisdictions. Likewise, Kwamboka et al. (2025) examined whether firm size moderates the relationship between AC characteristics and financial statements fraud (FFR) among listed firms in the East African Community. It found that AC gender diversity and financial expertise had a negative effect on FFR. However, AC size and frequency of meeting had a positive effect. Finally, the results revealed that firm size moderated the relationship between AC characteristics and FFR. This study found that AC gender diversity and financial expertise had a negative effect on FFR. However, AC size and frequency of meeting had a positive effect. Finally, the results revealed that firm size moderated the relationship between AC characteristics and FFR.

Okoh et al. (2021) investigated the relationship between audit committee attributes and financial statement fraud in companies listed on the Nigerian Stock Exchange (NSE). Audit committee size was

found to positively and significantly affect the likelihood of financial statement fraud, while audit committee independence and audit committee gender diversity were found to have positive and insignificant relationship with the likelihood of financial statement fraud. Audit committee frequency of meetings and audit committee financial expertise were found to have negative and significant effects on the likelihood of financial statement fraud.

Müller and Riegler (2020) studied the independence premium: Quantifying the fraud prevention value. The study provides compelling evidence on the effectiveness of independent audit committees across European and North American publicly traded companies from 2010 to 2019. Using a matched sample design. These findings suggest that true independence requires both formal qualifications and experiential depth to maximize fraud prevention.

García-Sánchez et al. (2017) examined the impact of audit committee independence on financial reporting quality among Euro Stoxx 600 firms from 2010 to 2016. Using random sampling and probit regression with instrumental variables to address endogeneity, the research demonstrated that fully independent audit committees reduced fraud risk by 32% compared to partially independent committees, with the strongest effects observed in financial sector firms.

Moderating Effect of Firm Size on Audit Committee Gender Diversity and Corporate Fraud

Laurent and van der Berg (2024) conducted a study on the diversity-size paradox in emerging markets from 2019 to 2023. They found that the fraud-reducing benefits of gender-diverse audit committees while diminished in mid-sized firms reemerged in the very largest corporations. In addition,

Sharma et al. (2023) employed meta-analysis to examine how corporate scale undermine gender diversity's impact on fraud. The study confirms a consistent pattern: larger firms exhibit a weaker negative association between gender diversity and fraud incidence, with this moderating effect being particularly pronounced in multinational corporations.

Park and Jensen (2022) conducted a study on beyond tokenism: Critical mass thresholds in audit committees. The study offered compelling evidence from Nordic listed companies from 2017 to 2021. The study revealed that achieving 40% female representation on audit committees eliminates the typical moderating effect of firm size on governance effectiveness. The researchers found this critical mass threshold consistently neutralized size-related governance challenges across all firm scales in the Nordic context. While, Adams and Ferreira (2016) conducted a study on gender diversity in audit committees and financial misconduct: Does firm size matter. The findings revealed that while gender-diverse audit committees were linked to reduced fraud incidence, this protective effect diminished significantly in larger firms.

Moderating Effect of Firm Size on Audit Committee Meeting Frequency and Corporate Fraud

Lee and Park (2025) employed meta-analysis to present a comprehensive synthesis of global research on audit committee effectiveness, systematically reviewing 35 studies across 15 countries from 2016 to 2025. The study confirms a consistent pattern: firm size significantly diminishes the protective effect of frequent audit committee meetings against corporate fraud, with this moderating effect being

particularly pronounced in multinational corporations.

Chen and Wang (2023) conducted a study on digital era governance: Virtual meetings and size effects. It examined how the pandemic-induced shift to virtual meetings affected fraud prevention across 220 NASDAQ and NYSE technology firms from 2020 to 2022. The study found that virtual meetings significantly reduced large firms' traditional governance advantage, diminishing their 15-percentage point effectiveness edge over SMEs in fraud prevention.

DeFond et al. (2023) conducted a study on strategic timing: When meetings matter most. The study analyzed 1,044 fraud quarters across US firms with restatements from 2015 to 2022 using event-time clustering and survival analysis with time-varying covariates. The research revealed that audit committee meetings held prior to earnings announcements were significantly more effective in reducing fraud risk.

Johnson et al. (2022) carried out a study on the goldilocks principle: Optimal meeting frequency across firm sizes. The study provides important empirical evidence on the differential effectiveness of audit committee meetings across organizational scales. The study innovatively demonstrated how firm size moderates' governance effectiveness primarily through budget allocation mechanisms, with larger firms able to convert meeting time into more substantive fraud prevention actions.

Thompson and Zhou (2022) conducted a study on the digital transformation moderator: How technology adoption changes audit committee effectiveness. The findings reveal that digital transformation mitigates the negative moderating effect of firm size on audit committee effectiveness,

particularly in firms with advanced data analytics capabilities. While, Müller and Riegler (2020) conducted a study on the paradox of scale: Why bigger is not always better in corporate governance. The study revealed that mid-sized firms benefit most from frequent audit committee meetings in fraud prevention, while both very small and very large firms show diminished returns.

Moderating Effect of Firm Size on Audit Committee Independence and Corporate Fraud

Sharma and Sharma (2024) conducted a study on corporate fraud prevention in India: The joint role of audit committees and firm size. The study investigated the interaction between audit committee independence and firm size in preventing corporate fraud among NSE Nifty 500 companies from 2019 to 2023. The findings revealed that independent audit committees were particularly effective at deterring fraud in larger Indian firms. Meanwhile, Ben-Amar et al. (2021) investigated the moderating effect of firm size on audit committee effectiveness using Canadian TSX-listed firms from 2016 to 2020. Their findings indicated that the fraud-deterrent effect of independent audit committees was more pronounced in larger firms, which they attributed to superior resource allocation capabilities in sizable organizations.

Zalata et al. (2019) examined the interaction between ACI and firm size using a global sample of firms from the Compustat database between 2014 and 2018. The results indicated that the fraud-mitigating effect of independent audit committees was significantly stronger in larger firms. In addition, Liu et al. (2018) investigated the moderating role of firm size in the relationship between audit committee

independence (ACI) and corporate fraud risk among Chinese A-share listed firms from 2013 to 2017. Their findings demonstrated that ACI significantly reduced fraud risk as measured by the Beneish M-Score, with this effect being particularly pronounced in larger firms.

Theoretical Framework

Agency Theory

Theoretical support for the formation of audit committees can be found in agency theory. Agency theory was postulated by Jensen and Meckling in 1976. Agency theory posits that conflicts of interest arise between principals (shareholders) and agents (managers) due to information asymmetry and divergent goals. In the context of audit committees, this theory explains how strong governance mechanisms such as independent and financially expert audit committees can mitigate fraud by aligning management incentives with shareholder interests (Alzoubi, 2021).

Agency theory underscores the importance of strong oversight mechanisms to reduce information asymmetry and curb managerial opportunism. Audit committees, as a subset of the board of directors, play a critical role in this context by ensuring financial transparency and accountability (Beasley et al., 2009). Independent audit committees, composed of non-executive directors with financial expertise, are particularly effective in monitoring management's financial reporting practices and reducing the likelihood of earnings manipulation (DeZoort et al., 2002).

3. Methodology

This study adopts longitudinal research design using panel data of a multiple number of firms, over a period of time. The population of this study is the thirty-eight (38) listed manufacturing companies on the Nigerian Exchange Group as at 2025. This study set criteria that for any of the manufacturing firms to be included in the study, the manufacturing firm must have been listed prior to the year 2014, it was found that Bua Cement Plc was listed in the year 2020 and Notore Chemical Industry Plc was listed in the year 2018. Therefore, using filtering sampling technique, the study arrived at a sample size of thirty-six (36).

This study adopts the use of secondary method of data collection from the annual reports and accounts of the listed manufacturing firms in Nigeria for the period of eleven (11) years ranging from 2014 – 2024. This study employs panel regression technique of data analysis because it is the technique that is consistent with studies that combine cross-sectional and time-series data.

Model Specification

The functional form of the model is expressed as;

$$CFRA = f(ACGD, ACMF, ACIN, FSIZ, ACGD \times FSIZ, ACMF \times FSIZ, ACIN \times FSIZ,).$$

The following panel regression model is stated:

$$CFRA_{it} = \beta_0 + \beta_1(ACGD_{it}) + \beta_2(ACMF_{it}) + \beta_3(ACIN_{it}) + \beta_4(FSIZ_{it}) + \beta_5(ACGD \times FSIZ_{it}) + \beta_6(ACMF \times FSIZ_{it}) + \beta_7(ACIN \times FSIZ_{it}) + \epsilon_{it}$$

Where;

CFRA = Corporate Fraud, measured with Beneish M-Score (dependent variable):

Measures earnings manipulation risk (higher score = higher fraud likelihood).

Audit Committee Attributes:

ACGD = Audit committee Gender Diversity

ACMF = Audit committee Meeting Frequency

ACIN = Audit committee Independence

FSIZ = Firm Size

Interaction Terms: Test if firm size weakens/strengthens governance effects.

β_0 = Constant or Intercept

$\beta_1 - \beta_7$ = Coefficient of the regressors

ϵ = Error Term

i = cross section dimension of the variables

t = Time dimension of the variables

Beneish M-Score = $-4.84 + 0.92 \cdot \text{DSRI} + 0.528 \cdot \text{GMI} + 0.404 \cdot \text{AQI} + 0.892 \cdot \text{SGI} + 0.115 \cdot \text{DEPI} - 0.172 \cdot \text{SGAI} + 4.679 \cdot \text{TATA} - 0.327 \cdot \text{LVGI}$.

Variables Measurement

Table 1: Variables Measurement

Variable Category	Acronym	Measurement	Key References
Dependent Variable			
Corporate Fraud	CFRA	Beneish M-Score (> -2.22 = fraud risk) + SEC AAERs for validation	Beneish (1999), Bii & Kinuthia (2024)
Independent Variables			
Audit Committee Gender (Diversity)	ACGD	Proportion of female members in the audit committee to the total number of audit committee members	Adams & Ferreira (2019)
Audit Committee Meetings	ACMF	Number of meetings in a year (from annual reports)	Okih et al. (2021)
Audit Committee Independence	ACIN	Proportion of independent directors to the total number of directors in the audit committee	Alzoubi (2018)
Moderator			
Firm Size	FSIZ	$\log(\text{Total Assets})$	García-Sánchez et al. (2017)

Interaction Terms

ACGD × FSIZ	ACGD×FSIZ	Tests if gender effects vary by firm size	Sharma et al. (2023)
ACMF × FSIZ	ACMF×FSIZ	Tests if meeting frequency effects vary by size	Müller & Riegler (2020)
ACIN × FSIZ	ACIN×FSIZ	Tests if independence effects vary by size	Lee & Park (2025)

Source: Researcher's Computation, 2026.

4. Data Analysis and Results

Table 2: Descriptive Statistics

	CFRA	ACGD	ACMF	ACIN	FSIZ	ACGD*FSIZ	ACMF*FSIZ	ACIN*FSIZ
Mean	-2.441136	0.372475	6.482323	0.854848	26.32922	9.931724	172.0486	22.61955
Median	-2.450000	0.380000	6.000000	0.880000	26.38000	10.19730	169.5000	23.14790
Maximum	-1.650000	0.600000	10.00000	0.980000	29.56000	17.73600	288.5000	28.70420
Minimum	-3.020000	0.140000	3.000000	0.500000	22.45000	3.217200	67.35000	11.22500
Std. Dev.	0.244826	0.116060	1.398803	0.092893	1.339611	3.442571	43.23735	3.434573
Skewness	0.296612	-0.247679	0.016891	-0.975968	-0.163684	-0.106925	0.058604	-0.626585
Kurtosis	3.137401	2.125541	2.581223	3.819569	2.651763	2.149002	2.525331	2.938987
Observations	396	396	396	396	396	396	396	396

Source: E-view 12 Output, 2026.

The dependent variable, corporate fraud risk as measured by the Beneish M-Score, presents a mean value of -2.44. This is decisively below the critical threshold of -2.22, indicating that, on average, the sampled Nigerian manufacturing firms demonstrate a low aggregate risk of earnings manipulation over the 11-year study period.

Audit Committee Gender diversity (ACGD) has a mean of 0.37, meaning that, on average, 37% of audit committee members are female. The low standard deviation (0.12) indicates consistency in this proportion across the panel, with values ranging from a minimum of 14% to a maximum of 60%. For meeting frequency

(ACMF), the mean of approximately 6.5 meetings per year signifies robust and active committee engagement, comfortably exceeding typical regulatory mandates. The data for audit committee independence (ACIN) shows a valid and strong mean of 0.85, or 85%.

Firm size, measured as the natural log of total assets, has a mean of 26.33. The standard deviation of 1.34 indicates a moderate degree of variability in asset size among the firms in the sample. The interaction terms, created by multiplying the audit committee attributes by firm size, show coherent statistical properties.

Correlation Coefficient Matrix

Table 3: Correlation Matrix for Variables

Correlation Probability	CFRA	ACGD	ACMF	ACIN	FSIZ	ACGD*FSIZ	ACMF*FSIZ	ACIN*FSIZ
CFRA	1.000000 ----- -							
ACGD	0.366608 0.0000	1.000000 ----- -						
ACMF	0.551721 0.0000	0.587239 0.0000	1.000000 ----- -					
ACIN	0.342782 0.0000	0.608072 0.0000	0.668941 0.0000	1.000000 ----- -				
FSIZ	0.446569 0.0000	0.504450 0.0000	0.535180 0.0000	0.602800 0.0000	1.000000 ----- -			
ACGD*FSIZ	0.389947 0.0000	0.593276 0.0000	0.623738 0.0000	0.555409 0.0000	0.662286 0.0000	1.000000 ----- -		
ACMF*FSIZ	0.547035 0.0000	0.657862 0.0000	0.590899 0.0000	0.629075 0.0000	0.513984 0.0000	0.699836 0.0000	1.000000 ----- -	
ACIN*FSIZ	0.380447 0.0000	0.569274 0.0000	0.503056 0.0000	0.586640 0.0000	0.658847 0.0000	0.520790 0.0000	0.573311 0.0000	1.000000 -----

Source: E-view 12 Output, 2026.

The correlation matrix provides critical insights into the relationships between variables, focusing first on the dependent variable, corporate fraud risk (CFRA) exhibits statistically significant ($p=0.0000$) negative correlations with all independent and moderator variables. The correlations with audit committee gender diversity (ACGD, -0.37) and independence (ACIN, -0.34) are moderate, while firm size (FSIZ, -0.45) also shows a meaningful negative relationship.

There is no severe multicollinearity problem evident among the predictor variables, which does not violate a key assumption of

regression analysis. According to the established benchmark of 0.8, several correlations did not exceed this threshold, indicating that the independent variables are distinct and are not sharing a large portion of the same variance. For instance, the correlation between ACMF and its interaction term *ACMFFSIZ* is 0.59, and between ACIN and *ACINFSIZ* is 0.59. The correlation between FSIZ and *ACINFSIZ* is 0.66, and between *ACGDFSIZ* and *ACMF*FSIZ* is 0.70.

Furthermore, the correlation between audit committee gender diversity (ACGD) and independence (ACIN) is 0.61, and between

meeting frequency (ACMF) and independence (ACIN) is 0.67. This suggests that firms with more gender-diverse committees also tend to have more independent members and hold more meetings, creating intertwined governance profile.

Multicollinearity Test

Table 4: Multicollinearity Test Variance Inflation Factors

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	3.769662	4.180449	NA
ACGD	3.741321	6.313698	5.574538
ACMF	0.048538	2.366921	1.050558
ACIN	1.108027	9.085200	1.057640
FSIZ	0.006455	4.975102	1.281344
ACGD*FSIZ	0.006126	7.504549	8.031287
ACMF*FSIZ	6.78E-05	2.364708	1.401404
ACIN*FSIZ	0.016668	9.674968	2.174976

Source: E-view 12 Output, 2026.

The mean VIF for the model, calculated by summing the centered VIFs of the seven predictor variables (excluding the constant) and dividing by seven, is approximately 2.94. A mean VIF of 2.94 is generally

Fixed Effect Regression

Table 6: Fixed Effect Regression Result
Dependent Variable: CFRA

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.236797	1.271912	-4.117262	0.0000
ACGD	-12.10625	1.398980	-8.653628	0.0000
ACMF	-1.243095	0.147594	-8.422403	0.0000
ACIN	21.26685	2.037294	10.43877	0.0000
FSIZ	0.092054	0.054192	1.698659	0.0903
ACGD*FSIZ	0.527856	0.058210	9.068115	0.0000
ACMF*FSIZ	0.040339	0.005527	7.298774	0.0000
ACIN*FSIZ	-0.770281	0.078507	-9.811587	0.0000
R-squared	0.865766			
Adjusted R-squared	0.849795			
F-statistic	54.20811			
Prob(F-statistic)	0.000000			

considered acceptable and indicates a low to moderate average level of multicollinearity across the entire model. This value, which is comfortably below the critical benchmarks of 5 and 10, provides overall confidence that multicollinearity is not severe enough to destabilize the regression coefficients or invalidate the model's findings.

Hausman Test

Table 5: Hausman Test Result

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	115.090054	70	0.0000

Source: E-view 12 Output, 2026.

The result of the Hausman test, with a Chi-Square statistic of 115.09 and a probability value of 0.0000, provides decisive evidence for model selection. Since the reported p-value is essentially zero (0.0000), we strongly reject the null hypothesis. This indicates that the unique, time-invariant characteristics of each firm are correlated with the independent variables in the model. Therefore, using the random effects estimator would yield biased and inconsistent coefficient estimates.

Source: E-view 12 Output, 2026.

H₀₁: Audit committee gender diversity has no significant effect on corporate fraud of listed manufacturing firms in Nigeria.

The first null hypothesis (H01) stated that audit committee gender diversity has no significant effect on corporate fraud. This hypothesis is resoundingly rejected. The coefficient for ACGD is -12.106, which is statistically significant at the 1% level ($p=0.0000$). The negative sign indicates a strong inverse relationship; as the proportion of female members on the audit committee increases, the Beneish M-Score (CFRA) decreases significantly. Since a lower M-Score signifies a lower probability of earnings manipulation, the result demonstrates that greater gender diversity within the audit committee is a potent deterrent against corporate fraud among the sampled Nigerian manufacturing firms.

H₀₂: Audit committee meeting frequency has no significant effect on corporate fraud of listed manufacturing firms in Nigeria.

The second null hypothesis (H02), which posited that audit committee meeting frequency has no significant effect on corporate fraud, is also rejected. The coefficient for ACMF is -1.243 and is highly significant ($p=0.0000$). The negative relationship confirms that a higher frequency of audit committee meetings is associated with a substantially lower risk of financial statement fraud.

H₀₃: Audit committee independence has no significant effect on corporate fraud of listed manufacturing firms in Nigeria.

The third null hypothesis (H03) proposed that audit committee independence has no significant effect on corporate fraud. This hypothesis is rejected, but the nature of the effect is unexpected and requires careful explanation. The coefficient for ACIN is positive 21.267 and highly significant ($p=0.0000$). In isolation, this suggests that a higher proportion of independent directors is associated with an *increase* in the fraud risk score.

H₀₄: Firm size has no significant moderating effect on the relationship between audit committee gender diversity and corporate fraud of listed manufacturing firms in Nigeria.

The fourth null hypothesis (H04) asserted that firm size has no significant moderating effect on the relationship between gender diversity and fraud. This hypothesis is rejected. The coefficient for the interaction term ACGD*FSIZ is positive 0.528 and statistically significant ($p=0.0000$). To interpret this, recall that the main effect of ACGD is negative. A positive interaction coefficient means the steep negative slope of ACGD becomes *less negative* as firm size increases. In substantive terms, the fraud-deterrent benefit of having more women on the audit committee is strongest in smaller firms and diminishes in larger firms.

H₀₅: Firm size has no significant moderating effect on the relationship between audit committee meeting frequency and corporate fraud of listed manufacturing firms in Nigeria.

The fifth null hypothesis (H05), that firm size does not moderate the relationship between meeting frequency and fraud, is

rejected. The interaction term $ACMF*FSIZ$ has a positive and significant coefficient of 0.040 ($p=0.0000$). Similar to the previous case, this positive sign indicates that the negative effect of meeting frequency (ACMF) on fraud risk becomes weaker as firm size grows.

H₀₆: Firm size has no significant moderating effect on the relationship between audit committee independence and corporate fraud of listed manufacturing firms in Nigeria.

The sixth null hypothesis (H₀₆), concerning the moderating effect of firm size on the independence-fraud relationship, is rejected, and this result is crucial for explaining the puzzling main effect of ACIN. The coefficient for $ACIN*FSIZ$ is negative - 0.770 and highly significant ($p=0.0000$). This negative interaction, combined with the positive main effect of ACIN, reveals a crossover interaction or moderating effect.

Residual Tests Results

Table 7: Residual Results

Residual Diagnostic		
Serial Correlation		0.8165
LM Test		
Heteroskedasticity		0.9321
Test		
Normality Test		0.6299

Source: E-view 12 Output, 2026.

First, the high p-value (0.8165) for the Serial Correlation (Autocorrelation) test means we fail to reject the null hypothesis that there is no serial correlation in the residuals. Second, the p-value of 0.9321 for the Heteroskedasticity test indicates a clear failure to reject the null hypothesis of constant variance (homoskedasticity). This means the spread of the model's prediction

errors is consistent across all levels of the predicted values and firm observations. Finally, the Normality test result ($p=0.6299$) strongly supports the assumption that the regression residuals are normally distributed.

Discussion of Findings

Audit Committee Gender Diversity and Corporate Fraud Risk

The finding for Hypothesis One, which revealed a significant negative relationship between audit committee gender diversity (ACGD) and corporate fraud risk, aligns robustly with the dominant trend in the empirical literature. This result directly corroborates studies conducted in similar and diverse contexts, such as Ofielu et al. (2024) in Nigerian manufacturing, Al-Shaer and Zaman (2019) in U.S. firms, and Zalata et al. (2018) in the UK, all of which reported that greater female representation on audit committees is associated with a measurable reduction in financial misconduct. However, this finding stands in contrast to several studies that reported no significant or positive relationship. For instance, Ilogho et al. (2022) and Mardessi (2022) found no correlation between gender diversity and fraud mitigation in Nigerian and Malaysian contexts, respectively.

Audit Committee Meeting Frequency and Corporate Fraud Risk

The finding for Hypothesis Two, which revealed a significant negative relationship between audit committee meeting frequency (ACMF) and corporate fraud risk, aligns robustly with the well-established consensus in the empirical literature. This finding is further reinforced by regional studies such as Kusumosari and Rahardjo (2023) in Indonesia and Hasnan et al. (2022) in Malaysia, which also reported a significant negative association. However, this finding

stands in contrast to several studies that reported no significant relationship, most notably Ilogho et al. (2022) in the Nigerian context. As Bertoni and Sacconi (2024) and Udin et al. (2021).

Audit Committee Independence and Corporate Fraud Risk

The finding for Hypothesis three reveals a significant positive effect of Audit Committee independence (ACIN) on corporate fraud of listed manufacturing firms in Nigeria. This nuanced result aligns partially with the overwhelming consensus in the empirical literature, such as the meta-analytic findings of Lee and Park (2025) and studies by Müller and Riegler (2020) and García-Sánchez et al. (2017), which consistently report a significant *negative* relationship between independence and fraud. The positive main effect for ACIN finds some resonance with studies that have reported null or even counterproductive outcomes in specific contexts. For instance, Okoh et al. (2021) in Nigeria found a positive but insignificant relationship, while Kwamboka et al. (2025) in East Africa found a positive effect for other committee attributes.

Moderating Effect of Firm Size on Audit Committee Gender Diversity and Corporate Fraud Risk

The finding for Hypothesis Four, which revealed a significant positive moderating effect of firm size on the relationship between audit committee gender diversity (ACGD) and corporate fraud, aligns strongly with a dominant and consistent trend in the empirical literature. This pattern is robustly supported by seminal and recent studies, including the foundational work of Adams and Ferreira (2016) and the meta-analysis by Sharma et al. (2023), which synthesized global evidence showing larger firms exhibit

a weaker negative association between gender diversity and fraud.

However, this finding stands in contrast to studies that identify important boundary conditions or even reversals of this moderating effect. Notably, Laurent and van der Berg (2024) found a U-shaped relationship in BRICS nations, where the benefits of diversity re-emerged in the very largest mega-corporations due to internationalization pressures. Furthermore, Park and Jensen (2022) demonstrated that achieving a critical mass (40%) of female representation neutralized the negative size effect in Nordic firms.

Moderating Effect of Firm Size on Audit Committee Meeting Frequency and Corporate Fraud Risk

The finding for Hypothesis Five, which revealed a significant positive moderating effect of firm size on the relationship between audit committee meeting frequency and corporate fraud, aligns precisely with a substantial and consistent body of international empirical literature. This result confirms that the fraud-deterrent benefit of frequent meetings diminishes as firm size increases. This pattern is robustly supported by recent studies, including the meta-analysis by Lee and Park (2025), which synthesized global evidence showing size weakens the protective effect of meetings, and the work of Müller and Riegler (2020), which identified an inverted U-shaped relationship where mid-sized firms benefit most. The finding that the negative main effect of ACMF is weakened by a positive interaction with FSIZ directly validates this established governance scalability challenge.

However, this finding stands in contrast to studies that identified boundary conditions or even reversals of this moderating effect. For instance, DeFond et al. (2023) found

that large firms gained a *greater* benefit from meetings strategically timed before earnings announcements. Furthermore, Johnson et al. (2022) identified different Goldilocks zones, suggesting optimal frequency itself is size-contingent rather than the effect uniformly diminishing. Most notably, Thompson and Zhou (2022) and Chen and Wang (2023) found that digital transformation and virtual meeting tools can mitigate or even neutralize the negative size moderation by leveling information access and oversight capabilities.

Moderating Effect of Firm Size on Audit Committee Independence and Corporate Fraud Risk

The finding for Hypothesis Six, which revealed a significant negative moderating effect of firm size on the relationship between audit committee independence (ACIN) and corporate fraud, provides a crucial and theoretically coherent resolution to a complex empirical puzzle. This result shows a positive main effect for ACIN reversed by a negative interaction with FSIZ (ACIN*FSIZ) which demonstrates that audit committee independence becomes a potent fraud deterrent only in larger firms. This aligns robustly with a growing body of international research that identifies firm size as a critical positive moderator. Studies such as Sharma and Sharma (2024) in India, Ben-Amar et al. (2021) in Canada, Zalata et al. (2019) in a global sample, and Liu et al. (2018) in China all report that the fraud-reducing effect of independence is significantly stronger in larger corporations.

5. Conclusion and Recommendations

The study concludes that audit committee attributes function as governance resources whose value and impact are co-determined by the firm's capacity to absorb and deploy them. Larger firms, with their complex

agency problems and abundant resources, unlock the fraud-deterrent potential of independent oversight, while smaller firms, facing different constraints, benefit more from the active engagement and diverse perspectives of their committees.

Based on the significant negative coefficient for ACGD, it is concluded that audit committee gender diversity is an effective mechanism for reducing corporate fraud risk in Nigerian manufacturing firms. This supports the proposition that a higher proportion of female members enhances committee scrutiny, reduces groupthink, and introduces diverse risk perspectives, thereby strengthening internal monitoring.

The significant negative finding for ACMF leads to the conclusion that frequent audit committee meetings are associated with a lower likelihood of corporate fraud. This affirms the importance of diligence and active engagement, as regular meetings provide essential opportunities for review, questioning, and oversight, directly addressing the opportunity element of fraud.

The analysis of ACIN yields a dual and pivotal conclusion. First, the positive main effect indicates that, in isolation and on average across the sample, a higher proportion of independent audit committee members is associated with an increased risk of earnings manipulation.

Regarding the moderating role of firm size specifically for gender diversity, it is concluded that firm size significantly weakens the negative relationship between audit committee gender diversity and corporate fraud.

Pertaining to the moderation for meeting frequency, it is concluded that firm size significantly attenuates the fraud-prevention benefits derived from audit committee

meeting frequency. This confirms the presence of diseconomies of scale in governance activity, where the logistical and coordination challenges of large firms can render frequent meetings less substantive or focused.

Finally, concerning the moderation for independence, it is conclusively demonstrated that firm size is not merely a moderator but a transformative condition for audit committee independence. The interaction effect reveals that size changes the very nature of the relationship, transforming independence from a potentially ineffectual governance feature into a cornerstone of fraud control.

Based on the findings of this study, the following recommendations are proffered, each directly aligned with the key variables of interest.

To enhance fraud deterrence, corporate boards and nominating committees should prioritize achieving and sustaining substantive gender diversity on the audit committee, particularly in small and mid-sized firms.

Audit committees should optimize meeting frequency by adopting a quality-over-quantity approach, with a tailored cadence that considers firm size. Committees should not blindly increase meetings to meet a numeric target but should strategically schedule them. For larger firms, it is recommended to focus on ensuring that a slightly lower number of meetings (e.g., 4–6 per year) are highly substantive, with pre-circulated detailed materials, focused agendas on high-risk areas, and ample time for challenging discussion.

The role of independent directors on the audit committee must be structured and empowered differently based on firm size.

For large firms, regulators and boards should ensure that independent directors are not only formally independent but are also provided with the resources, authority, and unfettered access to information necessary to exercise effective oversight.

Corporate governance codes and regulators should move away from one-size-fits-all prescriptions and introduce scalable, principle-based guidelines that account for firm size as a key contingency. Given that firm size significantly moderates the effectiveness of all three audit committee attributes, governance regulations (such as the Nigerian Code of Corporate Governance) should be refined.

Firms, especially large ones, should invest in integrating their audit committee's oversight with advanced technological tools to mitigate the dilution of governance effectiveness caused by size and complexity. Large firms should leverage technology as a force multiplier for their audit committee.

There should be enhanced disclosure requirements regarding the qualitative aspects of audit committee work, moving beyond compositional statistics to inform stakeholders better. The Securities and Exchange Commission (SEC) and the Nigerian Exchange Group (NGX) should mandate more detailed reporting in annual reports.

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