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EFFECT OF BOARD CHARACTERISTICS ON FRAUD DETECTION IN SELECTED DEPOSIT MONEY BANKS IN NIGERIA

Bako Tokpobeya Miracle[1, *], Mohammed Habibu Sabari[2], Mohammed Mustapha Bagudo[3]
[1] Department of Accounting, Ahmadu Bello University, Zaria Kaduna State, Nigeria

[2] Department of Accounting, Ahmadu Bello University, Zaria, Nigeria

[3]Department of Accounting, Ahmadu Bello University, Zaria Kaduna State, Nigeria

***Corresponding author**: tokpobeya@gmail.com; +2349031177878; ORCID: 0009-0005-9491-5125
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ABSTRACT

Fraud remains one of the most persistent and costly challenges confronting deposit money banks in Nigeria despite ongoing corporate governance reforms introduced by the Central Bank of Nigeria (CBN) and the Nigerian Code of Corporate Governance (2018). Anchored on Agency Theory and Resource Dependence Theory, this study examined the effect of board gender diversity, board nationality diversity, board independence, board financial expertise, and board size on fraud detection among six deposit money banks listed on the Nigerian Exchange Ltd (NGX) that complied with the mandatory disclosure of fraud cases under Section 5.1.2(L) of the CBN Code of Corporate Governance, over the period 2012–2023. A correlational research design was adopted, and panel data analysis using Robust Pooled Ordinary Least Squares (OLS) regression showed that board gender diversity, board independence, and board size had positive and significant effects on fraud detection, board nationality diversity had a significant negative effect, while board financial expertise had a negative but insignificant effect. Poisson and negative binomial robustness checks, better suited to the count nature of the fraud-detection measure, confirm the gender diversity, board size, and profitability findings, but do not support the statistical significance of the board nationality diversity or board independence effects. The study contributes a twelve-year panel that uses a direct fraud-case measure rather than a probabilistic proxy such as the Beneish M-Score, and jointly applies Agency Theory and Resource Dependence Theory to fraud detection in an emerging-market banking context, including a directionally negative, though not robustly significant, association between board nationality diversity and fraud detection. Consistent with the robust

effects found for gender diversity and board size, the study recommends that the CBN and FRC strengthen policies on gender representation, and that banks pair director financial expertise with structured fraud-awareness training given the weak, insignificant effect of expertise on its own.

1. INTRODUCTION

Fraud costs the global banking sector staggering sums each year, and board oversight failures sit at the centre of its most damaging cases. The collapse of Wirecard AG in Germany (2020, a €1.9 billion accounting fraud enabled by inadequate board oversight; Financial Times, 2020) and the Malaysian 1MDB scandal (over USD 4.5 billion in fraudulent diversions facilitated by major international banks; Financial Crime Academy, 2026) share a common thread: boards that failed, for different reasons, to detect or check fraudulent conduct in time. Nigeria's deposit money banks (DMBs) face the same structural exposure, and it is against this backdrop that the present study examines the extent to which board composition makes a measurable difference to fraud detection in the Nigerian context.

The Nigerian banking sector has undergone significant transformation since the 2004 banking consolidation exercise, which reduced the number of banks from 89 to 25 and reshaped the ownership and governance structure of the surviving institutions. Despite this consolidation and a succession of CBN corporate governance codes (2006, 2014, 2023) intended to strengthen board oversight, fraud cases have persisted and, on some measures, intensified. DMBs are structurally exposed to fraud in ways many non-financial firms are not: they intermediate large volumes of liquid assets, maintain extensive branch and digital-channel networks that widen the attack surface for insider and third-party fraud, and depend on public confidence in ways that make even contained incidents costly to reputation and financial stability. Fraud in this context takes forms such as embezzlement, money laundering, identity theft, and manipulation of financial statements.

Despite the deployment of fraud detection instruments including data analytics, internal auditing, whistleblower hotlines, and robust internal control systems, fraud continues to plague the Nigerian banking sector with alarming frequency. The Nigerian Deposit Insurance Corporation (NDIC) reported 26,182 fraud cases amounting to NGN 26.58 billion between 2019 and 2021 (NDIC, 2022). Fidelity Bank alone recorded a 279.6% surge in fraud losses from N1 billion in 2022 to N3.82 billion in 2023, with cases rising 22.2% from 2,518 to 3,079 within the same period (Information Nigeria, 2024). The NDIC further corroborates this trend, reporting a 44.8% increase in sector-wide fraud cases, rising from 146,183 incidences in 2020 to 211,713 in 2021 (Emejo, 2023). These figures point to a persistent governance gap that demands more effective board-level oversight.

One mechanism with demonstrated relevance to fraud mitigation is the institution of an effective board of directors. Board characteristics encompassing diversity in gender, nationality, independence, and financial expertise have been theoretically and empirically linked to boards' enhanced ability to identify and address potential fraud risks (Okafor et al., 2024). Gender-diverse boards are associated with stronger ethical oversight (Wang et al., 2022); nationality diversity introduces global governance perspectives (Wen & Yang, 2024); board independence reduces managerial opportunism (Jensen & Meckling, 1976); and financial expertise improves the capacity to identify irregularities and reinforce internal controls (Mousavi et al., 2022).

However, the composition of boards in listed deposit money banks in Nigeria often falls short of the gender-balance, independence, and nationality-diversity benchmarks set out in the Nigerian Code of Corporate Governance (FRC, 2018) and the CBN Code of Corporate Governance (2023), and these governance gaps have been associated with rising fraud incidence in the sector (Orjiude, 2022; Emejo, 2023; Tunji, 2023).

While existing literature has explored the impact of board characteristics on various organizational outcomes, financial performance, board effectiveness, and fraud-related outcomes among them (Akram et al., 2020; Blanco-Oliver et al., 2018), five critical gaps persist. First, most prior studies rely on cross-sectional data, which limits causal inference. Second, the Beneish M-Score, a widely used fraud-likelihood proxy, was calibrated on non-financial firms and is ill-suited to banks specifically because it does not account for banks' distinctive balance-sheet structure, notably high leverage and fair-value financial instruments, which produces unreliable, often false-positive, results when applied to banking data (Dahlan & Andesto, 2022). Third, board nationality diversity remains under-researched in African banking contexts specifically. Fourth, no study has examined these relationships over a twelve-year panel in Nigerian banking. Fifth, theoretical integration of Agency Theory and Resource Dependence Theory has been limited in the fraud-detection literature specifically, as opposed to the broader governance literature. This study addresses each of these gaps directly, using the number of reported fraud cases as a direct proxy for fraud detection: unlike the Beneish M-Score, this measure draws on disclosure mandated under Section 5.1.2(L) of the CBN Code of Corporate Governance rather than a modelled estimate, giving a directly observed governance-relevant outcome rather than an inferred one (Tade, 2022).

To address these gaps, this study answers the following research questions: (i) What is the effect of board gender diversity on fraud detection in Nigerian deposit money banks? (ii) How does board nationality diversity influence fraud detection? (iii) To what extent does board independence affect fraud detection? (iv) What is the relationship between board financial expertise and fraud detection? (v) How does board size influence fraud detection?

Accordingly, this study examines the effect of board characteristics, proxied by board gender diversity (BGD), board nationality diversity (BNAT), board independence (BIN), board financial expertise (BFE), and board size (BZ), on fraud detection (FRD) among six selected deposit money banks in Nigeria. These five characteristics were selected on three grounds: (1) their theoretical relevance under Agency Theory and Resource Dependence Theory, (2) their empirical prominence in prior governance-and-fraud studies, and (3) the availability and measurability of consistent data from published annual reports across the full panel period. Board tenure and CEO duality, while conceptually relevant, were excluded on data-availability grounds and are flagged as priorities for future research.

2. DATA SOURCES AND RESEARCH METHODOLOGY

2.1 Research Design, Population and Sample

A correlational, non-experimental design was used to examine the effect of board characteristics on fraud detection, guided by Agency Theory and Resource Dependence Theory (Creswell & Creswell, 2018). The population was all fourteen deposit money banks listed on the NGX as of 2022. Applying three inclusion criteria, namely, at least 12 consecutive years of listing (2012–2023), complete public financial statements, and compliance with Section 5.1.2(L) of the CBN Code (mandatory fraud disclosure), narrowed the sample to six banks: Access, Fidelity, GTBank, Sterling, Wema, and Zenith.

Though six of fourteen is only 43% by count, the sample is asset-weighted rather than arbitrary. It includes Access and Zenith (consistently the two largest Nigerian banks by assets) and GTBank (a top-five bank), alongside mid-tier banks Fidelity, Sterling, and Wema, providing variation across governance configurations and ownership structures rather than concentrating on the largest players alone. Also, two limitations are acknowledged. First, six banks over twelve years yield only 72 firm-year observations, which constrains statistical power and limits generalization beyond the sampled banks. Second, using CBN disclosure compliance as an inclusion criterion risks selection bias because disclosing banks may simply have stronger governance overall, so the results may not generalize to non-disclosing banks. A comparison of included versus excluded banks on observable traits (board size, ownership, and listing tenure) found no systematic difference beyond the disclosure criterion itself, although unobserved differences cannot be ruled out.

2.2 Variables and Measurement

Table 2 presents the operationalization of variables employed in the study.

Table 2

Operationalization of Variables

Variable	ACRM	Measurement	Sign	Justification	Source
Fraud Detection (Dependent)	FRD	Number of reported fraud incidents disclosed in annual reports	+	Directly observed, regulator-mandated disclosure rather than a modelled proxy; captures the study's core outcome of interest	Tade (2022)
Board Gender Diversity	BGD	Proportion of female directors to total board members	+	Standard demographic proxy for gender diversity used consistently across the governance literature	Kaituko et al. (2023); Chebbi & Ammer (2022)
Board Nationality Diversity	BNAT	Proportion of foreign directors to total board members	+	Proxies' international exposure and network access theorised under RDT	Alshabibi et al. (2022); Wen & Yang (2024)
Board Independence	BIN	Proportion of independent non-executive directors to total board members	+	Standard Agency Theory proxy for objective, management-free oversight capacity	Mousavi et al. (2022)
Board Financial Expertise	BFE	Proportion of directors with financial qualifications (ACA, ACCA, CPA, CFA or equivalent executive experience) to total board members	+	Captures the technical capacity theorised to improve identification of financial irregularities	Mousavi et al. (2022); Essien & Akpan (2024)
Board Size (Control)	BZ	Total count of directors on the board during the financial year	+	Proxies' breadth of monitoring capacity and human capital under RDT	Qian et al. (2021)
Firm Size (Control)	FZ	Natural logarithm of total assets	+	Larger banks may have more resources for fraud detection systems	Pasko et al. (2022)
Firm Age (Control)	FAG	Number of years since the firm was incorporated	+	Older banks may have more established internal control systems	Al Farooque et al. (2019)

Variable	ACRM	Measurement	Sign	Justification	Source
Return on Assets (Control)	ROA	Net income divided by total assets	+	More profitable banks may invest more in governance infrastructure	Chen et al. (2020)

Source: Author's Compilation (2026)

FRD, as operationalised in this study, counts the full population of fraud and forgery incidents that banks are required to disclose under CBN mandatory returns rather than a narrower category restricted to material financial-statement fraud; this spans everything from minor card, ATM, and cheque fraud attempts through to major insider schemes, which is why annual bank-level counts can run into the thousands or tens of thousands (Tade, 2022; NDIC, 2023).

2.3 Model Specification

To examine the effect of board characteristics on fraud detection, the study specified the following panel data regression model:

$$\mathbf{FRD_{it} = \alpha + \beta_1 BGD_{it} + \beta_2 BNAT_{it} + \beta_3 BIN_{it} + \beta_4 BFE_{it} + \beta_5 BZ_{it} + \beta_6 FZ_{it} + \beta_7 ROA_{it} + \beta_8 FAG_{it} + \varepsilon_{it}}$$

Where FRDit is the fraud detection measure (number of reported fraud cases) for bank i in period t; α is the intercept; BGD is board gender diversity; BNAT is board nationality diversity; BIN is board independence; BFE is board financial expertise; BZ is board size; FZ is firm size; ROA is return on assets; FAG is firm age; and ε is the error term. Because raw FRD is a strictly positive, heavily right-skewed count (Table 3; Shapiro-Wilk W = 0.5773, p < 0.001), the dependent variable entering the Robust Pooled OLS model in Equation 1 and reported in Table 6 is the natural logarithm, ln (FRD), rather than FRD in levels; the Poisson and negative binomial models reported in Table 7 as a robustness check are estimated on FRD in its original count form, consistent with the count-data specification of those estimators. Readers should therefore interpret the Table 6 coefficients as (approximate) proportional effects on FRD rather than unit effects on the raw fraud-case count reported in Table 3.

2.4 Data Analysis Technique

The study employed panel data regression analysis, with model selection guided by the Hausman Specification Test and the Breusch-Pagan Lagrangian Multiplier (LM) Test. The Hausman test yielded a Chi-square statistic of 3.49 (p = 0.7454), indicating that the random effects model was preferred over fixed effects. The subsequent LM test produced a chibar² of 0.00 (p = 1.0000), failing to reject the null hypothesis of no individual effects, thus indicating that Pooled OLS was the most appropriate estimator. Given the detection of heteroskedasticity (Breusch-Pagan χ^2 = 8.75; p = 0.0031), robust standard errors were employed in all estimations to ensure valid statistical inference. Additional diagnostic tests included the Shapiro-Wilk normality test, the VIF multicollinearity test, and the Linktest for model specification.

The Hausman and Breusch-Pagan LM tests establish the appropriate cross-sectional specification (random effects vs. pooled) but do not, on their own, rule out serial correlation within each bank's time series or cross-sectional dependence across banks in the same year, both plausible in a panel of six banks operating in the same regulatory and macroeconomic environment. Two further diagnostics were therefore run. A Wooldridge test for serial correlation in panel data returned F (1, 5) = 2.548 (p = 0.1713), failing to reject the null of no first-order autocorrelation; a Pesaran CD test for cross-sectional dependence returned a statistic of −1.155 (p = 0.2481), failing to reject the null of cross-sectional independence. Neither diagnostic gives cause for concern about the standard errors used in Table 6. An outlier/influence check using Cook's

distance was also run against the conventional 4/N cutoff (4/72 = 0.0556): two bank-years exceed this threshold, Sterling Bank (2012), with Cook's D = 0.110, and Sterling Bank (2023), with Cook's D = 0.697.

3. RESULTS AND DISCUSSION

3.1 Descriptive Statistics

Table 3 presents the descriptive statistics for the study variables.

Table 3
Descriptive Statistics of Study Variables

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
FRD (Fraud Detection)	72	4,421.00	7,039.00	18.00	27,725.00
BGD (Board Gender Diversity)	72	0.2372	0.1026	0.0000	0.5833
BNAT (Board Nationality)	72	0.0307	0.0538	0.0000	0.2000
BIN (Board Independence)	72	0.1996	0.0693	0.0625	0.3571
BFE (Board Financial Expertise)	72	0.3000	0.1103	0.1429	0.8571
BZ (Board Size)	72	13.64	2.0781	7.00	17.00
ROA (Return on Assets)	72	0.0474	0.0366	0.0015	0.1193
FAG (Firm Age, years)	72	45.67	35.77	22.00	130.00
FZ (Firm Size)	72	20.99	1.4089	16.08	23.55

Source: STATA 14 Output (2026).

Table 3 reveals substantial variation in fraud detection (FRD) across the sample, with a mean of 4,421 reported cases but a standard deviation (7,039) exceeding the mean, ranging from 18 (Sterling Bank, 2023) to 27,725 (Guaranty Trust Bank, 2022); this spread suggests differences in reporting rigor and underlying control effectiveness across banks rather than a uniform exposure to fraud. Among the board characteristics, gender diversity (BGD) averages 23.7% (max 58.3%, min 0.0%), independence (BIN) averages a modest 20.0% well below the OECD's recommended one-third threshold and nationality diversity (BNAT) averages just 3.1%, reflecting a largely domestically homogenous boardroom composition. Financial expertise (BFE) averages 30.0%, and board size (BZ) averages roughly 14 directors (range 7–17), both falling within OECD (2015)-recommended ranges.

Regarding the control variables, firm size (FZ) averages 20.99 (natural logarithm of total assets), profitability (ROA) averages 4.74%, and firm age (FAG) averages 45.7 years, with a wide range (22–130 years) reflecting the co-existence of long-established and comparatively younger institutions in the sample. Collectively, these descriptive patterns indicate a sample of Nigerian deposit money banks with

considerable heterogeneity in fraud exposure but structurally similar, and generally sub-optimal, board governance characteristics a pattern that motivates the regression analysis that follows.

3.2 Correlation Analysis

Table 4 presents the Pearson Product Moment correlation matrix among the study variables.

Table 4

Pairwise Correlation Matrix (N = 72)

Variables	FRD	BGD	BIN	BNAT	BFE	BZ	FZ	ROA	FAG
FRD	1.000								
BGD	0.476***	1.000							
BIN	0.099	−0.072	1.000						
BNAT	0.053	0.019	−0.088	1.000					
BFE	−0.048	0.138	0.283**	−0.325***	1.000				
BZ	0.266**	0.290**	−0.218	−0.014	−0.076	1.000			
FZ	−0.220	−0.412***	0.116	−0.171	−0.012	−0.050	1.000		
ROA	0.283**	0.059	−0.086	0.197*	−0.087	−0.129	−0.187	1.000	
FAG	−0.182	0.040	−0.159	−0.290**	0.062	0.216*	0.092	−0.271**	1.000

Source: STATA 14 Output (2026).

The correlation results indicate that BGD ($r = 0.476$, $p < 0.01$) and BZ ($r = 0.266$, $p < 0.05$) are positively and significantly associated with FRD. BIN ($r = 0.099$), BNAT ($r = 0.053$), and BFE ($r = −0.048$) exhibit weak and insignificant bivariate relationships with FRD. A significant positive relationship between BFE and BIN ($r = 0.283$, $p < 0.05$) suggests that financially expert and independent directors are complementary governance attributes. The significant negative correlation between BFE and BNAT ($r = −0.325$, $p < 0.01$) suggests that banks in this sample tend to prioritise either technical financial expertise or international diversity, but rarely both simultaneously, a possible strategic trade-off between technical competence and internationalisation goals rather than a random pattern. The weak negative correlation between BIN and BZ ($r = −0.218$) suggests that larger boards in this sample are not necessarily more independent, consistent with the view that board size increases can reflect symbolic rather than substantive governance enhancement (Yermack, 1996). Notably, no correlation among independent variables exceeds 0.48, well below the 0.80 multicollinearity threshold (Pallant, 2001), which is corroborated by VIF values all below 1.40 (Mean VIF = 1.23). With ROA and FAG now included in Table 4, this 0.48 ceiling holds across all pairwise correlations among the independent variables, the largest involving these two control variables being the BNAT-FAG correlation ($r = −0.290$, $p < 0.05$).

3.3 Diagnostic Tests

Table 5

Summary of Diagnostic Test Results

Test	Statistic	Value	Prob.	Decision
Shapiro-Wilk	W (FRD)	0.5773	0.000	Non-normal → robust SE applied
	W (BGD)	0.9665	0.052	Normal
	W (BNAT)	0.8424	0.000	Non-normal
	W (BIN)	0.9729	0.122	Normal
	W (BFE)	0.8693	0.000	Non-normal
	W (BZ)	0.9717	0.104	Normal
	W (FZ)	0.8985	0.000	Non-normal
VIF / Tolerance	Mean VIF	1.23	—	No multicollinearity (max VIF = 1.36 < 10)
Breusch-Pagan / Cook-Weisberg	$\chi^2(1)$	8.75	0.003	Heteroskedastic → robust SE applied
Hausman Specification Test	$\chi^2(6)$	3.49	0.745	Favour Random Effects
Breusch-Pagan LM Test	chibar²(01)	0.00	1.000	Favour Pooled OLS
Wooldridge Test	F(1, 5)	2.548	0.171	Fail to reject H0 → no first-order autocorrelation
Pesaran CD Test	CD	−1.155	0.248	Fail to reject H0 → no cross-sectional dependence
Cook's Distance	Cutoff 4/N = 0.056	2 obs. exceed cutoff	—	Sterling Bank 2012 (0.110) and 2023 (0.697) flagged

Source: STATA 14 Output (2026).

A comprehensive set of diagnostic tests confirms the validity of the regression estimates (Table 5). The Shapiro-Wilk test found FRD, BNAT, BFE, and FZ non-normally distributed, so heteroskedasticity-robust standard errors were applied throughout (White, 1980); the Breusch-Pagan/Cook-Weisberg test confirmed heteroskedasticity ($\chi^2 = 8.75$, $p = 0.003$), while the Hausman test ($\chi^2 = 3.49$, $p = 0.745$) and Breusch-Pagan LM test (chibar² = 0.00, $p = 1.000$) jointly favoured Pooled OLS over random or fixed effects. The Linktest found no evidence of functional-form misspecification, and VIF values (mean 1.23, max 1.36) confirmed the absence of multicollinearity. Neither the Wooldridge test for serial correlation ($F(1,5) = 2.548$, $p = 0.171$) nor the Pesaran CD test for cross-sectional dependence (−1.155, $p = 0.248$) rejected their respective null hypotheses, supporting the validity of the robust standard errors used in Table 6. An outlier check using Cook's distance (Figure 2, cutoff 4/N = 0.056) flagged two observations Sterling Bank in 2012 (D = 0.110) and, more substantially, 2023 (D = 0.697), the latter combining the sample's lowest fraud count with its highest financial-expertise ratio and smallest total assets.

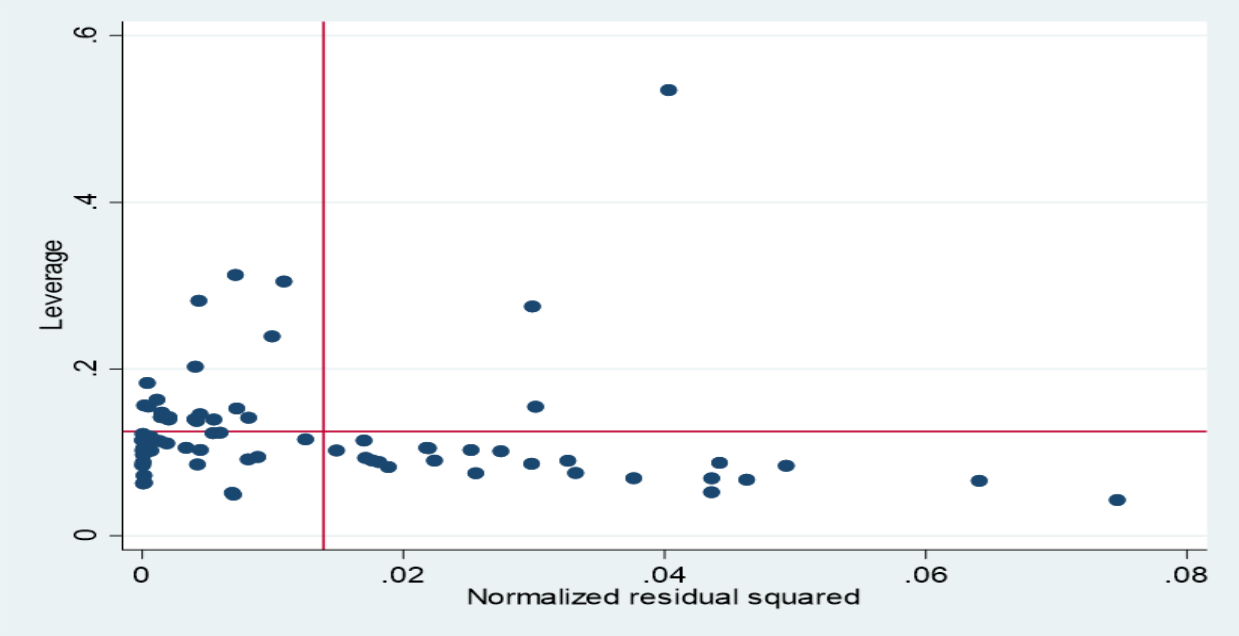


Figure 2

Leverage-versus-normalized-residual-squared plot for outlier diagnosis

3.4 Regression Results

Table 6

Robust OLS Regression Results: Effect of Board Characteristics on Fraud Detection

Variable	Coefficient	Std. Error (Robust)	t-Statistic	p-Value	Standardized β
Constant	1.786	3.488	0.51	0.610	—
BGD	7.864	1.597	4.92	0.000 ***	0.427
BNAT	−11.178	4.315	−2.59	0.012 **	−0.318
BIN	4.129	2.183	1.89	0.064 *	0.151
BFE	−2.406	2.252	−1.07	0.288	−0.140
BZ	0.243	0.088	2.75	0.008 **	0.267
FZ	−0.033	0.136	−0.24	0.811	−0.025
ROA	15.510	5.103	3.04	0.003 **	0.300
FAG	0.003	0.003	0.84	0.404	0.056
R-squared	0.4543				
F-statistic (8, 63)	8.96	Prob > F	0.000 ***		
Observations	72	Root MSE	1.4838		

*Source: STATA 14 Output (2026).

The R-squared of 0.4543 indicates that approximately 45% of the variation in fraud detection among the sampled banks is explained by the model, a level of explanatory power considered acceptable in social science and corporate governance research. The F-statistic of 8.96 ($p < 0.0000$) confirms that the independent variables are jointly statistically significant in explaining fraud detection, providing strong empirical justification for the model as a whole.

3.5 Robustness Check: Poisson and Negative Binomial Regression

FRD is a non-negative count variable, and Robust Pooled OLS on its logarithm is a simplification of its true distribution. Poisson and negative binomial regressions, both count-data models and both estimated with robust standard errors, were therefore run as a robustness check against the main OLS results in Table 6. Table 7 reports both.

Table 7

Poisson and Negative Binomial Regression Results (Robustness Check)

Variable	Poisson Coef.	Robust SE	p-Value	NB Coef.	Robust SE	p-Value
Constant	0.809	2.820	0.774	1.711	2.603	0.511
BGD	9.684	1.450	0.000 ***	8.388	1.111	0.000 ***
BNAT	−2.922	3.130	0.351	−5.609	4.362	0.198
BIN	0.067	2.164	0.975	1.167	2.266	0.607
BFE	−4.309	1.849	0.020 **	−2.557	2.390	0.285
BZ	0.253	0.060	0.000 ***	0.301	0.097	0.002 ***
FZ	0.111	0.117	0.344	0.003	0.097	0.977
ROA	13.167	4.216	0.002 ***	15.795	4.681	0.001 ***
FAG	−0.010	0.003	0.000 ***	−0.005	0.004	0.170
Pseudo R^2	0.5406			0.0449		
Wald $\chi^2(8)$	261.82	Prob > χ^2	0.000	280.64	Prob > χ^2	0.000
Overdispersion (α)	—			1.303	0.156	95% CI [1.030, 1.648]
Observations	72			72		

Source: STATA 14 Output (2026).

****, **, * indicate significance at 1%, 5%, and 10% levels respectively. Robust standard errors used throughout.*

A likelihood-ratio test for overdispersion, reported automatically alongside the negative binomial estimates (LR test of $\alpha = 0$: χ^2 (01) $\approx 2.9 \times 10^5$, $p < 0.000$), confirms that FRD is severely overdispersed relative to the Poisson model's assumption that its variance equals its mean; the overdispersion parameter itself ($\alpha = 1.303$, 95% CI [1.030, 1.648]) is large and its confidence interval excludes zero. The negative binomial model, which explicitly accounts for overdispersion, is therefore the more appropriate of the two count specifications for this dataset, and is treated as the more credible of the two robustness checks where it disagrees with the Poisson results.

Comparing Table 7 against the main Robust Pooled OLS results in Table 6 shows an uneven picture rather than a uniform confirmation. Three findings are robust across all three specifications: board gender diversity remains positive and highly significant in both the Poisson ($p < 0.001$) and negative binomial ($p < 0.001$) models; board size remains positive and significant in both ($p < 0.001$ and $p = 0.002$ respectively); and return on assets remains positive and significant in both ($p = 0.002$ and $p = 0.001$). These three results can be treated with a correspondingly higher degree of confidence than a single-model result would warrant.

Two findings are markedly less robust than the OLS results in Table 6 suggested on their own. Board nationality diversity remains negative in sign under both the Poisson (coefficient = −2.922) and negative binomial (coefficient = −5.609) specifications, consistent with the direction of the OLS finding, but loses statistical significance in both ($p = 0.351$ and $p = 0.198$ respectively, against $p = 0.012$ in the OLS model). Board independence, which was only marginally significant in the OLS model to begin with ($p = 0.064$, significant only at the 10% level), is not significant in either count-model specification ($p = 0.975$ in Poisson; $p = 0.607$ in negative binomial), and its coefficient is close to zero in the Poisson model

specifically. Board financial expertise, negative and insignificant in both OLS and negative binomial models, appears negative and significant in the Poisson model alone (p = 0.020); because the Poisson model is the less appropriate specification for this overdispersed data, and because the OLS and negative binomial results agree with each other on this variable, this single Poisson result is treated as the less credible of the three and does not overturn the OLS conclusion that financial expertise's effect is not reliably distinguishable from zero.

3.6 Discussion of Findings

Given that FRD is drawn from CBN-mandated disclosures rather than voluntary reporting, and given the theoretical direction of each hypothesis below, we interpret positive coefficients as evidence of stronger detection capacity rather than higher underlying fraud incidence.

The standardized coefficients in Table 6 also allow the five board characteristics to be ranked on a common scale, independent of their different measurement units. Board gender diversity has the largest standardized effect (β = 0.427), followed by board nationality diversity (β = −0.318), board size (β = 0.267), board independence (β = 0.151), and board financial expertise (β = −0.140). This ordering is consistent with the pattern of statistical significance in the unstandardized results and reinforces gender diversity and nationality diversity as the two board characteristics with the most substantial association with fraud detection in this sample, in either direction.

3.6.1 Board Gender Diversity and Fraud Detection (H_{01}: Rejected)

Board gender diversity (BGD) exhibits a positive and highly significant effect on fraud detection (β = 7.864, p = 0.000). The positive coefficient signifies that higher levels of board gender diversity are associated with increased effectiveness or probability of fraud detection. This result is consistent with the study's a priori expectation and aligns with Agency Theory, which holds that gender-diverse boards exercise stronger monitoring behaviour and greater ethical sensitivity, and with Resource Dependence Theory, which frames female directors as contributors of distinct social capital and stakeholder orientation. This is directionally consistent with Wang et al. (2022), Yami and Poletti-Hughes (2022), Julianti and Fuad (2023), and Githaiga (2023), each of whom found that gender-diverse boards are associated with *less* fraud occurring; because those studies measure occurrence while this study measures detection, a stronger governance effect is expected to point in opposite directions across the two measures, and both findings are consistent with gender-diverse boards exercising more effective oversight. The result diverges from Rathnasiri et al. (2021) and Olade and Godwin (2017), whose insignificant results likely reflect contextual, sectoral, and methodological differences. The null hypothesis H_{01} is rejected.

3.6.2 Board Nationality Diversity and Fraud Detection (H_{02}: Rejected in primary model; not robust to count-model specification)

Contrary to theoretical expectations, board nationality diversity (BNAT) demonstrates a negative and statistically significant effect on fraud detection in the primary model (β = −11.178, p = 0.012), though as the qualification below makes clear this significance does not survive either count-model robustness check, so the contextual account that follows should be read as speculative rather than an explanation of a firmly established effect. This paradoxical result challenges the assumption, grounded in Resource Dependence Theory, that internationally diverse boards strengthen fraud oversight through exposure to global best practice. Plausible contextual factors include cultural and communication barriers that limit foreign directors' meaningful engagement in board deliberations, limited familiarity with local regulatory

frameworks and institutional norms, and reduced day-to-day operational involvement given their predominantly non-executive status. Social Identity Theory (Tajfel & Turner, 1979) offers a complementary lens: foreign directors may be positioned as an out-group within a predominantly Nigerian boardroom, restricting the informal trust and information flow through which fraud-relevant concerns typically surface, independent of any individual director's competence. These contextual patterns resonate with Wen and Yang (2024), who found that directors' foreign experience is positively associated with financial statement fraud in Chinese listed firms, and with Umar and Garba (2020) and Kwon et al. (2023), who reported comparable governance trade-offs associated with board internationalisation in Nigerian and Korean banks respectively.

This finding carries an important qualification, however. The null hypothesis H_{02} is therefore rejected in the primary OLS model but cannot be confidently rejected once the count-data specifications are taken into account; a larger sample, particularly with more banks with meaningful foreign board representation, would be needed to determine whether this direction of effect holds up with greater statistical power.

3.6.3 Board Independence and Fraud Detection (H_{03}: Marginally rejected in primary model; not supported by count-model specification)

Board independence (BIN) has a positive effect on fraud detection that is significant only at the 10% level in the primary model ($\beta = 4.129$, $p = 0.064$), consistent with the study's hypothesis and Agency Theory's prediction that independent directors reduce agency problems through enhanced managerial oversight. Higher levels of board independence are associated with increased effectiveness or probability of fraud detection in this reading, consistent with independent directors exercising objective monitoring free from executive influence. This finding aligns with the conclusions of Ekpulu and Iyoha (2021), Tran et al. (2020), Nasir et al. (2019), Caroline and Guclu (2018), Okonkwo et al. (2023), and Ali and Salleh (2021), all of whom found positive relationships between board independence and governance quality or fraud deterrence.

This finding is considerably weaker than the primary model alone suggests, however: it is not significant under either the Poisson ($p = 0.975$) or negative binomial ($p = 0.607$) robustness checks, so the null hypothesis H_{03} should be regarded as not convincingly rejected once the count-model specifications are given appropriate weight, notwithstanding the marginal significance in the primary OLS model.

3.6.4 Board Financial Expertise and Fraud Detection (H_{04}: Not Rejected)

Board financial expertise (BFE) exhibits a negative and statistically insignificant effect on fraud detection ($\beta = -2.406$, $p = 0.288$), suggesting that financially qualified directors do not automatically translate into stronger fraud detection in this context. A plausible explanation is that financial experts may prioritise financial performance and technical compliance over subtler behavioural or operational fraud signals, and where drawn from within the institution may be more closely aligned with executive management consistent with the significant positive BFE–BIN correlation reported earlier, which suggests the two attributes travel together rather than substitute for one another. This finding resonates with Ashafoke et al. (2023), Essien and Akpan (2024), Johl, Kaur and Cooper (2023), and Mousavi et al. (2022), and diverges from Kaituko et al. (2023) and Tran et al. (2020), who documented positive relationships in East African and Vietnamese contexts respectively. Financial expertise therefore appears necessary but not sufficient without complementary independence and structured ethics/forensic-accounting training. The null hypothesis H_{04} cannot be rejected.

3.6.5 Board Size and Fraud Detection (H_{05}: Rejected)

Board size (BZ) exhibits a positive and statistically significant effect on fraud detection (β = 0.243, p = 0.008). Higher board size is associated with increased effectiveness or probability of fraud detection, consistent with the view that larger boards enhance monitoring capacity and bring broader oversight expertise. This is consistent with Resource Dependence Theory's prediction that larger boards provide access to wider human capital, diverse expertise, and external networks that strengthen fraud-related oversight, though it should be read alongside the weak negative BIN–BZ correlation noted earlier, which suggests that in this sample, larger boards have not necessarily come with more independence. The sampled banks' average board size of approximately 14 members, and the sample maximum of 17 (Access Bank, 2023), fall within the board-size range implied by the CBN Code of Corporate Governance for banks and discount houses, which does not fix a single number but requires board size to be justified by the scale, complexity and risk profile of the institution's operations (CBN, 2023; FRC, 2018). This finding aligns with Tunji et al. (2019) and Qian et al. (2021) but contrasts with Salleh and Othman (2016) and Dahlan and Andesto (2022), differences likely attributable to Nigeria's distinct banking regulatory environment and institutional context.

Among the control variables, return on assets (ROA) was significant (β = 15.510, p = 0.003), suggesting that more profitable banks invest more effectively in fraud detection systems, consistent with the justification given for its inclusion in Table 2. Firm size (FZ) (β = −0.033, p = 0.811) and firm age (FAG) (β = 0.003, p = 0.404) were both statistically insignificant, indicating that, within this sample, neither a bank's overall scale nor its years of operation is a reliable predictor of fraud detection once board characteristics and profitability are accounted for; this suggests board composition and profitability, not sheer size or longevity, are the more relevant levers for fraud detection in this panel. The null hypothesis H_{05} is rejected.

4. CONCLUSION AND RECOMMENDATIONS

The study concludes that board gender diversity, board size, and profitability (ROA) have positive and statistically significant effects on fraud detection among the six Nigerian deposit money banks studied between 2012 and 2023. These findings remained consistent across the primary Robust Pooled OLS model and the Poisson and negative binomial robustness checks, providing relatively strong support for the roles of gender-diverse and adequately sized boards in strengthening fraud detection. These conclusions should, however, be generalised with caution: the 72-observation panel is drawn from only six of Nigeria's fourteen listed DMBs, selected partly on voluntary compliance with CBN fraud-disclosure requirements, a criterion the authors' own comparison of included versus excluded banks could not fully rule out as a source of selection bias favouring better-governed institutions. The findings are therefore best read as evidence from this specific, disclosure-compliant subset of Nigerian banks rather than as representative of the sector as a whole; extending the analysis to a matched sample of non-disclosing banks, or applying an explicit selection-correction model, would be a valuable next step for establishing how far these results travel.

Based on the evidence, the study recommends strengthening board governance through several measures. The CBN is encouraged to promote at least 30% female board representation by 2030, while regulators should strengthen enforcement of board independence requirements. Banks should also provide structured induction and regulatory training for foreign directors, broaden financial expertise to include fraud awareness and forensic accounting knowledge, and adopt evidence-based board-size guidance, with the study broadly supporting boards of 8–15 members. These measures are intended to ensure that board

composition translates into effective monitoring and fraud-detection capacity rather than merely satisfying formal governance requirements.

REFERENCES

Akram, F., Abrar ul Haq, M., Natarajan, V. K., & Chellakan, R. S. (2020). Board heterogeneity and corporate performance: An insight beyond agency issues. *Cogent Business & Management, 7*(1), 1809299.

Ali, M., & Salleh, N. M. Z. N. (2021). Audit committee and board characteristics in fraud prevention. *Managerial Auditing Journal, 36*(4).

Al Farooque, O., Buachoom, W., & Sun, L. (2019). Board, audit committee, ownership and financial performance: Emerging trends from Thailand. *Pacific Accounting Review, 32*(1), 54–81.

Alshabibi, B., Pria, S., & Hussainey, K. (2022). Audit committee, board diversity and firm performance in emerging markets. *Journal of Risk and Financial Management, 15*(11), 528.

Ashafoke, T. O., Dabor, E. L., & Kehinde, F. (2023). Director's characteristics and fraudulent financial reporting in Nigeria. *Journal of Academic Research in Economics, 15*(1), 187–205.

Association of Certified Fraud Examiners. (2024). *Report to the nations on occupational fraud and abuse.* ACFE.

Blanco-Oliver, A., Veronesi, G., & Kirkpatrick, I. (2018). Board heterogeneity and organisational performance: The mediating effects of line managers and staff satisfaction. *Journal of Business Ethics, 152*(2), 393–407.

Caroline, F., & Guclu, A. (2018). The impact of board characteristics on the occurrence of fraud. *Journal of Financial Crime, 25*(4), 1198–1215.

Central Bank of Nigeria. (2023). *CBN code of corporate governance for banks and discount houses in Nigeria.* CBN.

Chebbi, K., & Ammer, M. A. (2022). Board composition and ESG disclosure in Saudi Arabia. *Sustainability, 14*(19), 12173.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE.

Dahlan, M., & Andesto, R. (2022). Detecting fraudulent financial statements using the Beneish M-Score model. *Journal of Accounting and Finance Research, 10*(2).

Ekpulu, G. A., & Iyoha, F. O. (2021). Board independence and financial statement fraud risk in Nigeria. *International Journal of Accounting Research, 9*(1).

Emejo, J. (2023). NDIC reports 44.8% rise in bank fraud cases. *This Day Live*, March 15, 2023. https://www.thisdaylive.com/index.php/2023/03/15/ndic-banks-lost-n7-19bn-to-fraud-n4-97bn-to-digital-banking-in-2021/ (accessed September 5, 2026).

Essien, M. E., & Akpan, D. C. (2024). Board financial expertise and loan loss provisions in Nigerian deposit money banks. *Journal of Banking and Finance Research, 12*(1).

Financial Crime Academy. (2026). *The 1MDB money laundering scandal and corrupt politicians.* Financial Crime Academy. https://financialcrimeacademy.org/the-1mdb-money-laundering-scandal-and-corrupt-politicians/ (accessed September 5, 2026).

Financial Times. (2020, August 25). Wirecard: The frantic final months of a fraudulent operation (O. Storbeck, reporting). *Financial Times*. https://www.ft.com/content/6a660a5f-4e8c-41d5-b129-ad5bf9782256 (accessed September 5, 2026).

Financial Reporting Council of Nigeria. (2018). *Nigerian Code of Corporate Governance.* FRC.

Githaiga, P. N. (2023). Board gender diversity and earnings management in East Africa. *Journal of African Business, 24*(2).

Information Nigeria. (2024, April 24). Fidelity Bank customers lost N2.1bn as fraud cases surge by 22.3%. https://www.informationng.com/2024/04/fidelity-bank-customers-lost-n2-1bn-as-fraud-cases-surge-by-22-3.html

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305–360.

Johl, S. K., Kaur, S., & Cooper, B. J. (2023). Board characteristics and fraud: A meta-analysis. *Accounting & Finance, 63*(2).

Julianti, I. F., & Fuad, F. (2023). Gender diversity, audit committee, and financial statement fraud: Evidence from Indonesia. *Journal of Accounting and Investment, 24*(1).

Kaituko, L. R., Chege, A. N., & Kariuki, S. N. (2023). Board characteristics and financial statement fraud in East African manufacturing firms. *East African Journal of Business and Economics, 6*(1).

Kwon, S., Lee, J., & Shin, H. (2023). Foreign directors and corporate governance: Evidence from Korean firms. *Pacific-Basin Finance Journal, 78*, 101958.

Mousavi, M., Alfen, H. W., & Ranjbar, A. (2022). Board financial expertise and fraudulent financial reporting in Iranian listed firms. *Journal of Financial Reporting and Accounting, 20*(3).

Nasir, N. A. M., Ali, M. J., & Ahmed, K. (2019). Board ethnicity and fraud risk in Malaysian firms. *Asian Review of Accounting, 27*(3).

Nigerian Deposit Insurance Corporation. (2022). *Annual report 2022.* NDIC.

Nigerian Deposit Insurance Corporation. (2023). *Annual report 2023.* NDIC.

OECD. (2015). *G20/OECD principles of corporate governance.* OECD Publishing.

Okafor, C., Ezeokoli, N., & Ihejirika, P. (2024). Board characteristics and fraud detection in Nigerian deposit money banks. *Journal of Accounting and Taxation, 16*(1), 1–14.

Okonkwo, B. S., Aernan, J. E., & Emengini, S. E. (2023). Corporate board independence and financial fraud. *International Journal of Finance and Banking Research, 9*(3), 41–52.

Olade, M., & Godwin, A. (2017). Gender diversity and financial statement fraud in Nigerian listed firms. *Nigerian Journal of Management Sciences, 6*(2).

Orjiude, A. (2022). Corporate governance and fraud incidence in the Nigerian banking sector. *Journal of Financial Regulation and Compliance, 30*(4).

Pallant, J. (2001). *SPSS survival manual.* Open University Press.

Pasko, O., Zhang, Y., & Chen, X. (2022). Firm size and corporate governance quality. *Journal of Applied Accounting Research, 23*(2).

Pfeffer, J., & Salancik, G. R. (1978). *The external control of organizations: A resource dependence perspective.* Harper & Row.

Qian, D., Zhang, L., & Chen, H. (2021). Board size and corporate misconduct detection in China. *China Journal of Accounting Research, 14*(3).

Rathnasiri, U. A. H. A., Karunarathna, N., & Perera, K. (2021). Board gender diversity and financial statement fraud in Sri Lanka. *South Asian Journal of Business Studies, 10*(2).

Salleh, N. M. Z. N., & Othman, R. (2016). Board size and corporate fraud deterrence in Malaysia. *Malaysian Accounting Review, 15*(1).

Tade, O. (2022). Fraud disclosure practices among Nigerian deposit money banks. *Journal of Financial Crime, 29*(3).

Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33–47). Brooks/Cole.

Tran, D. V., Hoang, K., & Nguyen, C. (2020). Board independence and fraud in Vietnamese listed firms. *Journal of Southeast Asian Economies, 37*(2).

Tunji, S. T. (2023). Fraud control measures in Nigeria's banking sector. *African Journal of Business Management, 17*(2), 56–66.

Tunji, S. T., Ogundajo, G. O., & Enyi, P. E. (2019). Board size and earnings quality in Nigerian deposit money banks. *Journal of Accounting and Finance, 19*(4).

Umar, H., & Garba, R. (2020). Corporate governance and fraud in Nigerian banks. *Journal of Banking Regulation, 21*(3).

Wang, M., Liu, X., & Chen, Y. (2022). Gender diversity and financial statement fraud in Chinese listed firms. *China Accounting and Finance Review, 24*(2).

Wen, X., & Yang, S. (2024). Directors' foreign experience and financial statement fraud in Chinese listed firms. *Journal of Corporate Finance, 84*.

White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica, 48*(4), 817–838.

Yami, N., & Poletti-Hughes, J. (2022). Independent female directors and financial fraud in US listed firms. *British Journal of Management, 33*(1).

Yermack, D. (1996). Higher market valuation of companies with a small board of directors. *Journal of Financial Economics, 40*(2), 185–211.