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- I. Title page
- II. Abstract (150-250 words)
- III. Keywords (3-5)
- IV. Introduction
- V. Literature Review
- VI. Methodology
- VII. Results and Discussion
- VIII. Conclusion and Recommendations
- IX. References (APA 7th Edition)
- X. Appendices (if necessary)
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TABLE OF CONTENT

1. Effect Of Digitalised Accounting Practices On Financial Accountability Of Ministries, Departments, And Agencies (Mdas) In Nigeria Abdulrahman Kadir, Mubaraq Sanni, Olusegun Opeyemi Oni	1
2. The effect of digital accounting techniques training on detection of financial irregularity in deposit money banks in nigeria. Akinola Babatunde Moses, Ngereboa Tamunonimim And Ibrahim Abdullateef	14
3. Determinants of Big Data Analytics Adoption Among Firms in the Hospitality Industry in Nigeria Akinyemi adebayo muideen, Dagwom yohanna dang, Abdullahi yau	26
4. Moderating effect of agency cost on relationship between capital Structure and value of listed firms in Nigeria. Buhari Adeiza Yusuf and S.A.A Aruwa.....	35
5. Moderating effect of company income tax on the relationship Between capital structure and financial performance of Listed multinational companies in Nigeria Christopher David Mbatuegwu, Banjamin Uyagu David, Daninya Michael Zeinaba.....	46
6. Moderating effect of strong institutions on the relationship Between public reforms and accountability in nigerian federal Ministry of finance and agencies Ogundele Gbenga Oladele, Saidu Ibrahim Halidu, Uyagu David Benjamin, Abdullahi Ya'u Usman.....	58
7. Effect of International Accounting Stanadards Two (ias 2) – Inventory on Firm Performance of listed consumer goods Manufacturing Companies in Nigeria Dagwom Yohanna Dang, Deshi Nentawe Nengak, Samuel Nmaname Gozuk	70
8. Moderating Role of Pension Fund Size on the Relationship between Financial Risk Management and Performance of Tier 3 (small) Pension Funds Administrators (PFAs) In Nigeria Dogo Polycarp, Sunday Mlanga	85
9. Forensic accounting as a tool for effective fraud detection and prevention in the Nigerian economy Ejembi Victoria Okoma	95
10. Effect Of Oil Spillage Disclosure on the Annual Report and Financial Statement of Listed Oil Companies In Nigeria. Fom Peter Dauda	100
11. Effect of Corporate Governance on Financial Performance of Quoted Healthcare Firms in Nigeria Hamid Fatima Talatu	109
12. Effect of Firm-Specific Sharacteristics on Financial Performance of Listed Agricultural Firms in Nigeria. Joel Adeoye Christopher	118
13. Determinants of Internal Audit Quality of Selected MDAs In Nigeria Junaidu Shehu and Saidu Ibrahim Halidu	127
14. Effect of Corporate Social Responsibility Disclosure on Share Prices of Listed Consumer Goods Companies in Nigeria Khadija Udu, Musa Adeiza Farouk, Benjamin Uyagu	135

15. Effect of Corporate Governance Characteristics on Financial Performance of Listed Oil and Gas Firms in Nigeria	
Kwayama Hadassah Jehu	145
16. Effects of Asset Tangibility and Cash Flow Volatility on Dividend Policy of Listed Manufacturing Firms in Nigeria	
Maimako N. Wodung, Anietie C. Dikki, Abdullahi A. Ahmed, Isma'il T. Idris	157
17. Effect of Biometric Technology Application on Fraud Prevention Among Listed Deposit Money Banks in Nigeria	
Makinde Funmilayo Topsy	164
18. Effect of Earnings Quality on Shareholders' Value of Listed Deposit Money Banks in Nigeria	
Musa Inuwa Fodio, Tamunonimim Ngereboa, Nwogbodo Chibueze Otozi	182
19. Moderating Effect of Financial Performance on the Relationship Between ESG Disclosure and Earnings Management: Evidence From the Industrial Goods Sector of the NGX	
Nkwonta Ifeoma Nnenna	193
20. Impact of Environmental, Social, and Governance (ESG) Disclosures on the Financial Performance of Listed Manufacturing Firms in Nigeria	
Ogbu Godwin Otseme, Joseph Femi Adebisi, Salisu Abubakar	205
21. Effect of Information and Communication Technology (ICT) Software Expenditure on Financial Performance Among Listed Deposit Money Banks in Nigeria	
Okpe James Friday	216
22. Forensic Investigation Techniques and Financial Reporting Fraud in Selected Beverage Firms in Nigeria	
Oluwatosin Adejoke Osanyinbola, Tamunonimin Ngerebo-A	226
23. The Influence of Corporate Governance Mechanisms on the Financial Performance of Quoted Fast-Moving Consumer Goods (FMCG) Companies in Nigeria.	
Owie Bright Osarenti	234
24. Effects of Firm Characteristics on Financial Reporting Quality of Listed Deposit Money Banks in Nigeria	
Oyeboade Olaitan Folasayo	243
25. Do Board Strategies Enhance Electronic Fraud Detection? Evidence From DMBS in Nigeria	
Sadiya Ahmed Almustapha, Musa Adeiza Farouk, Saidu Ibrahim Halidu	254
26. Taxation and Corporate Performance: Analyzing the Effective Tax Rate, Marginal Tax Rate, and Earnings Per Share (EPS) of Listed Industrial Goods Companies in Nigeria	
Sani Abdulrahman Bala, Yahaya Alhaji Hassan, Mande Kabiru Dambuwa	262
27. Risk Management and Financial Performance of Listed Financial Service Firms in Nigeria	
Usman Muhammad Adam, Aliyu Abubakar	272
28. Effect of Information Communication Technology (ICT) Costs on Financial Performance of Listed Industrial Goods Companies in Nigeria: the Moderating Role of Firm Size.	
Zainab Abdullahi	284
29. Impact of Forensic Accounting Techniques on Reducing Procurement Fraud in Listed Manufacturing Companies in Nigeria.	
Idegbesor Umoru, Musa Adeiza Farouk, Suleiman Abubakar	292
30. Effect of Audit Pricing on Quality of Audit Amongst Deposit Money Banks in Nigeria.	
Habiba Ihiovi	300

DO BOARD STRATEGIES ENHANCE ELECTRONIC FRAUD DETECTION? EVIDENCE FROM DEPOSIT MONEY BANKS IN NIGERIA

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ABSTRACT

This study examines the effect of board dynamism on electronic fraud detection in listed deposit money banks in Nigeria from 2014 to 2023. Using panel data from 12 listed banks, the research investigates how board characteristics—including gender diversity, nationality diversity, institutional shareholding, board age diversity, and board remuneration—influence banks' ability to detect electronic fraud. The study employs logistic regression analysis and finds that board gender diversity and institutional shareholding have significant positive effects on electronic fraud detection, while board nationality diversity shows a negative impact. Board remuneration demonstrates a positive influence on fraud detection, but board age diversity shows no significant effect. The research reveals that board dynamism significantly impacts fraud detection capabilities, though the effectiveness varies across different board characteristics. The findings contribute to the growing literature on corporate governance and fraud prevention in emerging markets, offering practical implications for regulators, policymakers, and bank management in strengthening fraud detection mechanisms through enhanced board composition and governance structures. The study recommends implementing mandatory gender diversity quotas, improving cultural integration programs for foreign directors, strengthening institutional shareholder involvement, and developing performance-linked remuneration structures to enhance fraud detection in Nigerian banks.

Keywords

Corporate Governance, Electronic Fraud Detection, Deposit Money Banks, Board Gender Diversity, Board Nationality Diversity, Institutional Shareholding, Board Age Diversity, Board Remuneration, Fraud Risk Mitigation.

Introduction

Electronic fraud has emerged as a critical challenge in the global banking industry, with the rapid digitalization of financial services providing opportunities for fraudsters to exploit system vulnerabilities. Globally, losses due to electronic fraud are estimated to exceed \$200 billion between 2020 and 2024, highlighting the growing scale of the problem (Juniper Research, 2021). In Nigeria,

electronic fraud has significantly impacted the financial sector, particularly Deposit Money Banks (DMBs), which face increasing threats from cybercriminals due to inadequate corporate governance mechanisms and weak internal controls (Egejuru, 2023). These incidents have not only caused financial losses but have also eroded consumer trust, underscoring the urgent need for more effective governance frameworks.

Board dynamism has been identified as a potential solution to mitigate these risks. It reflects a board's ability to adapt to evolving challenges, including fraud, by leveraging diverse attributes such as gender, nationality, expertise, and age diversity (Rostami & Rezaei, 2022). Gender-diverse boards, for instance, are associated with enhanced oversight and ethical decision-making, while boards with financial expertise demonstrate stronger fraud detection capabilities (Wahid, 2019; Kassem, 2022). Furthermore, nationality and age diversity have been linked to improved risk assessment and innovative governance approaches, enabling organizations to address complex fraud challenges effectively (Nasir et al., 2019; Akinbowale et al., 2020).

Despite these theoretical underpinnings, the role of board dynamism in fraud prevention remains underexplored in emerging markets like Nigeria, where unique economic and regulatory conditions may shape governance outcomes differently from developed markets. This study focuses on listed DMBs in Nigeria, examining how board characteristics influence electronic fraud detection efforts. By shedding light on these dynamics, the research contributes to the growing discourse on corporate governance and fraud prevention, offering practical insights for enhancing governance frameworks in the Nigerian banking sector.

Prior research examining the connection between board diversity and fraud prevention has shown conflicting outcomes, particularly regarding gender diversity. Research by Wang et al. (2022) and Wahid (2019) indicates that gender-diverse boards enhance fraud prevention effectiveness. However, Kassem (2022) argues that diversity alone isn't sufficient and must be coupled with strong internal controls and risk management to effectively prevent fraud. This debate raises questions about whether female board representation alone can adequately address fraud risks in high-risk environments like Nigerian banking.

Research gaps exist in understanding electronic fraud dynamics in developing nations like Nigeria, as most studies have focused on Western contexts. Hashim et al. (2020) note that governance structures and regulatory frameworks in emerging markets differ significantly from Western counterparts. Furthermore, while traditional research has concentrated on financial statement fraud, electronic fraud has become increasingly critical for Nigeria's banking sector, as highlighted by Maulidi (2023) and Kamarudin et al. (2017). The growing digitalization of Nigerian banks makes it essential to understand how governance mechanisms can effectively combat electronic fraud risks.

This study seeks to answer the following questions.

- i. What is the effect of Board Gender Diversity

on Electronic Fraud Detection in listed deposit money banks in Nigeria?

- ii. What is the effect of Board Nationality Diversity on Electronic Fraud Detection in listed deposit money banks in Nigeria?
- iii. What is the effect of Institutional Shareholding on Electronic Fraud Detection in listed deposit money banks in Nigeria?
- iv. What is the effect of Board Age Diversity on Electronic Fraud Detection in listed deposit money banks in Nigeria?
- v. What is the effect of Board Remuneration on Electronic Fraud Detection in listed deposit money banks in Nigeria?

Therefore, the main objective of this study is to examine the effect of board dynamism (BGD, BND, IS, BAG, BRM) on Electronic Fraud Detection in listed deposit money banks in Nigeria. The study tests the following broad hypotheses. The time frame for this study spans from 2014 to 2023, a decade marked by significant developments in digital banking, corporate governance reforms, and increasing instances of electronic fraud within the financial sector.

This study will test the following hypotheses.

H0₁: Board Gender Diversity has no significant effect on Electronic Fraud Detection in listed deposit money banks in Nigeria.

H0₂: Board Nationality Diversity has no significant effect on Electronic Fraud Detection in listed deposit money banks in Nigeria.

H0₃: Institutional Shareholding has no significant effect on Electronic Fraud Detection in listed deposit money banks in Nigeria.

H0₄: Board Age Diversity has no significant effect on Electronic Fraud Detection in listed deposit money banks in Nigeria.

H0₅: Board Remuneration has no significant effect on Electronic Fraud Detection in listed deposit money banks in Nigeria.

This study offers important contributions to various stakeholders, including regulators, managers, investors, policymakers, and academics. By examining effect of board dynamism (BGD, BND, IS, BAG, BRM) on Electronic Fraud Detection in listed deposit money banks in Nigeria, the research addresses a critical issue in the Nigerian banking sector, where electronic fraud continues to pose a significant risk to financial institutions. For regulators, the findings of this study can inform the development of more robust corporate governance frameworks to enhance fraud detection in the banking sector. Regulatory bodies, such as the Central Bank of

Nigeria (CBN), can use the insights from this study to implement governance standards.

2. Literature Review

Electronic fraud, also referred to as cyber fraud, is the use of digital platforms and technologies to engage in fraudulent activities, including unauthorized access, manipulation of data, and financial crimes. Akintoye and Araoye (2011) define electronic fraud as the exploitation of information and communication technologies (ICTs) to manipulate financial systems, often resulting in theft or illegal access to sensitive data. Dzumiri (2014) emphasizes that electronic fraud includes phishing, identity theft, and ATM fraud, illustrating the vulnerabilities inherent in digital banking systems. In the Nigerian banking sector, electronic fraud has become increasingly prevalent, driven by weak internal controls and expanding digital banking services (Egejuru, 2023). The Central Bank of Nigeria has reported consistent increases in electronic fraud cases, highlighting the urgent need for robust fraud prevention frameworks (Felix, 2020).

Concept of Board Dynamism

Board dynamism reflects the adaptability and responsiveness of a corporate board to changing risks and challenges, often influenced by its composition and diversity. Maulidi (2023) describes board dynamism as the integration of diverse attributes such as gender, age, expertise, and nationality, which enhance decision-making and oversight. Dynamic boards are believed to reduce risks such as fraud by fostering innovative governance and comprehensive oversight mechanisms (Wahid, 2019). In the Nigerian context, board dynamism has been linked to improved fraud prevention and risk management, with diverse boards better equipped to address evolving fraud tactics (Eneh, 2018). Moreover, Kamarudin et al. (2017) highlight the role of board diversity in promoting strong internal controls and ethical decision-making, critical components of fraud mitigation.

Concept of Gender Diversity

Gender diversity in corporate boards refers to the inclusion of both male and female directors, enhancing the variety of perspectives and decision-making approaches. Wahid (2019) argues that gender-diverse boards are more effective at reducing fraud risks due to their comprehensive oversight and ethical vigilance. Female directors often bring unique perspectives and heightened risk aversion, contributing to stronger fraud detection mechanisms (Wang et al., 2022). In Nigeria, gender diversity has been associated with improved financial oversight and governance practices, although it remains underutilized in many sectors (Eneh, 2018). Research

further suggests that the presence of women on boards aligns corporate objectives with long-term ethical governance, reducing the incidence of fraud (Maulidi, 2023).

Concept of Nationality Diversity

Nationality diversity refers to the inclusion of directors from varied national and cultural backgrounds on corporate boards. According to Nasir et al. (2019), nationality diversity enhances a board's ability to navigate complex international markets and regulatory environments. Diverse boards are better equipped to identify and respond to global fraud risks due to their varied cultural and professional perspectives. Ghafoor et al. (2022) emphasize that nationality diversity improves fraud detection efforts by incorporating global best practices into governance frameworks. In emerging markets like Nigeria, multinational boards have been linked to more proactive fraud prevention strategies, particularly in addressing cross-border financial crimes (Eneh, 2018).

Concept of Institutional Shareholding

Institutional shareholding involves the ownership of significant portions of a company's stock by large entities such as mutual funds, pension funds, and insurance firms. Institutional investors play a critical role in shaping corporate governance practices by advocating for transparency, accountability, and robust fraud prevention measures (Chung & Zhang, 2011). Adewale et al. (2014) suggest that institutional shareholders push for stronger internal controls and increased investment in fraud detection technologies, particularly in the banking sector. In Nigeria, institutional ownership has been linked to enhanced compliance with regulatory standards and improved risk management practices, contributing to reduced fraud incidences (Okoye et al., 2017).

Concept of Board Age Diversity

Board age diversity refers to the representation of different age groups on a corporate board, combining the innovative insights of younger directors with the experience of older members. Rostami and Rezaei (2022) assert that age-diverse boards are more effective in addressing fraud risks due to their balanced approach to governance and technology adoption. Younger directors often bring technological acumen, critical for combating cyber fraud, while older directors provide strategic oversight and industry expertise (Akinbowale et al., 2020). In Nigeria, age-diverse boards have been shown to enhance governance outcomes by fostering a mix of innovation and experience, crucial for fraud prevention in the digital era (Eneh, 2018).

Concept of Board Remuneration

Board remuneration encompasses the financial and non-financial incentives provided to directors for their governance roles. Wahid (2019) highlights that performance-based remuneration structures align directors' interests with organizational goals, promoting ethical oversight and fraud prevention. Conversely, poorly structured remuneration packages can lead to governance failures, including fraud. In Nigeria, transparent and performance-linked remuneration practices have been advocated to enhance accountability and reduce fraudulent activities (Eneh, 2018). Studies further suggest that incentivizing directors through fair and transparent compensation fosters diligence and vigilance in governance practices, strengthening fraud detection efforts (Wahyungintyas, 2022).

Empirical Review

The empirical evidence on electronic fraud, board characteristics, and corporate governance highlights significant relationships between these variables. Maulidi (2023) investigated the impact of gender diversity on fraud mitigation and found that boards with higher female representation exhibit stronger ethical oversight and fraud detection capabilities. Similarly, Wahid (2019) demonstrated that gender-diverse boards in emerging markets are more effective at preventing financial misreporting. These studies underscore the critical role of diversity in enhancing governance.

Eneh (2018) explored board dynamism in Nigerian banks and linked it to improved fraud prevention. The study revealed that boards incorporating a mix of age, nationality, and financial expertise were better equipped to identify and mitigate electronic fraud. Nasir et al. (2019) corroborated these findings by emphasizing the importance of nationality diversity in fostering proactive fraud detection mechanisms, particularly in multinational organizations.

Institutional shareholding's influence on governance was examined by Adewale et al. (2014), who found that institutional investors advocate for stronger fraud prevention frameworks, ensuring compliance with regulatory standards. Additionally, Rostami and Rezaei (2022) highlighted that age-diverse boards enhance fraud prevention efforts by leveraging the innovative insights of younger directors and the strategic acumen of older members.

Wahyungintyas (2022) studied the role of board remuneration in fraud detection and established that performance-linked compensation structures improve oversight and reduce fraudulent activities. Similarly, Kamarudin et al. (2017) demonstrated that transparent remuneration practices in Malaysian banks correlate with enhanced accountability and ethical governance. Overall, the empirical literature emphasizes the interconnectedness of board characteristics and effective fraud prevention strategies. These studies

provide a robust foundation for understanding how corporate governance practices can mitigate electronic fraud risks, particularly in emerging markets like Nigeria.

Theoretical Framework

The theoretical framework for the dissertation draws from Upper echelon theory and stake holders Theory. The upper-echelon theory explains how board dynamism influences electronic fraud prevention in Nigerian deposit money banks by highlighting the impact of top executives' characteristics on organizational outcomes. This theory suggests that board diversity factors like gender, nationality, financial expertise, and age directly affect the board's capacity to assess and prevent electronic fraud risks. In the banking context, where electronic fraud poses a significant threat, the collective experience and varied perspectives of board members enhance their ability to identify risks, adapt to technological changes, and implement effective controls. The theory provides a framework demonstrating how board composition drives fraud governance.

On the other hand, stakeholder theory argues that organizations should create value for all stakeholders, not just shareholders, leading to better performance and sustainability. In Nigerian banks, where key stakeholders include shareholders, customers, employees, regulators, and the community, electronic fraud prevention benefits each group differently: shareholders see reduced losses and maintained reputation, customers get increased security and trust, employees benefit from job stability, regulators get improved compliance, and communities gain a more trustworthy financial system. The text concludes that having a dynamic board helps represent diverse stakeholder perspectives in decision-making, particularly when implementing fraud prevention measures.

Methodology

The research employs a non-experimental causal-comparative design, specifically using ex-post facto methodology, to examine how multiple independent variables (aspects of board dynamism) affect electronic fraud detection. This approach was chosen because it examines existing relationships between causes and effects rather than manipulating variables. The study focuses on deposit money banks listed on the Nigerian Exchange Group, with 12 out of 13 banks selected through purposive sampling based on their continuous listing status and consistent disclosure of relevant information from 2014 to 2023. Jaiz Bank was excluded due to its later listing date. The researchers gathered data from the banks' annual reports and analyzed it using panel regression technique.

Accordingly, the study proposes the following model specifications:

Model 1 specifies the direct relationship between board diversity and EFD with control variables added.

Table 1
Measurement of Variables

Serial Number	Variable Name	Nature of Variable	Measurement	Source
1	Electronic Fraud Detection (EFD)	Dependent Variable	A dummy variable, 1 indicating the detection of electronic fraud during a financial year and 0 otherwise	Otusanya, 2020
2	Board Gender Diversity (BGD)	Independent Variable	Percentage of women relative to the total number of board members	Adams & Ferreira, 2009
3	Board Nationality Diversity (BND)	Independent Variable	percentage of non-Nigerian directors on the board relative to the total number of board members	Estélyi & Nisar, 2016; Mahadeo, Soobaroyen, & Hanuman, 2012
4	Institutional Shareholding (IS)	Independent Variable	Ratio of shares held by institutional investors to total issued capital	Pucheta-Martinez & Garcia, 2014
5	Board Age (BAG)	Independent Variable	Age of board members divided by the mean or average age of the board members.	Yermack, 2017
6	Board Remuneration (BRM)	Independent Variable	Total annual financial compensation (including bonuses, allowances, and stock options) paid to directors	Banks annual reports

4. Results and Discussion

This section presents the results of the study, including the description of variables, normality test and correlation analysis. The section also contains logistic regression results, post-estimation and specification tests.

The descriptive analysis presents the basic characteristics of the variables through the mean, standard deviation, minimum and maximum. Table 1 presents the summary statistics.



Table 2
Descriptive Statistics

Variable	EFD	BGD	BND	IS	BAG	BRM	FSZ	LEV
Mean	0.700	0.118	0.167	0.469	49.583	15.407	26.908	0.519
Std. Dev	0.462	0.125	0.158	0.262	8.362	0.191	1.040	0.189
Min	0.000	0.000	0.000	0.013	36	14.918	23.432	0.207
Max	1.000	0.409	0.612	0.983	68	15.941	29.604	0.796
Obser.	120	120	120	120	120	120	120	120

Source: Descriptive Statistics Results from Stata

The descriptive statistics offer a comprehensive overview of the variables used in the study, capturing their central tendencies, variability, and range. The dependent variable, Electronic Fraud detection (EFD), has a mean of 0.700, suggesting that 70% of the sampled banks, on average, reported incidents of electronic fraud during the year. The board gender diversity (BGD) variable, with a mean of 0.118, indicates that on average, 11.8% of board members across the banks are female. The low minimum value (0.000) signifies the absence of female representation in some banks, while the maximum value (0.409) shows that in certain cases, female directors constitute 40.9% of the board.

Board Nationality Diversity (BND) shows that, on average, 16.7% of board members in the sampled banks are foreign directors, with some banks having

no foreign representation and others having as much as 61.2%. Institutional Shareholding (IS) averages 46.9%, with significant variations across banks, ranging from 1.3% to 98.3%. The average Board Age (BAG) is 49.6 years, indicating experienced board members, with ages spanning from 36 to 68 years. The standard deviation of 8.362 reflects a mix of younger and older directors.

Firm Size (FSZ), measured logarithmically, has a mean of 26.908, with values ranging from 23.432 to 29.604, indicating a mix of small and large banks. Leverage (LEV) averages 51.9%, showing that most assets are financed through debt. The correlation analysis highlights the relationships between the independent variables and the dependent variable, as well as the interrelationships among the regressors.

Table 3
Correlation Analysis

Variable	EFD	BGD	BND	IS	BAG	FSZ	LEV
EFD	1.000						
BGD	0.314	1.000					
BND	0.171	-0.000	1.000				
IS	0.195	0.004	0.217	1.000			
BAG	0.020	0.1023	-0.126	0.043	1.000		
BRM	0.133	0.202	-0.101	-0.129	0.002		
FSZ	0.242	0.073	0.174	0.030	0.139	1.000	
LEV	-0.009	0.037	-0.092	-0.018	-0.099	-0.131	1.000

Source: Correlation Statistics Results from Stata

EFD shows significant positive correlations with several independent variables. Additionally, Board Gender Diversity (BGD) ($r = 0.314$) and Institutional Shareholding (IS) ($r = 0.195$) are also positively correlated with EFD, indicating that gender-diverse boards and higher institutional ownership contribute to EFD. Board Nationality Diversity (BND) ($r = 0.171$) and Board Remuneration (BRM) ($r = 0.133$) show weaker positive correlations with EFD, suggesting a modest role in fraud prevention. Conversely, Board Age (BAG) ($r = 0.020$) and

Leverage (LEV) ($r = -0.009$) have negligible correlations with EFD, indicating limited direct relationships with fraud prevention.

The correlation analysis highlights significant positive relationships between EFD and key predictors like BGD, and IS, validating their inclusion in the logistic regression models. The generally weak correlations among independent variables confirm the absence of severe multicollinearity issues, ensuring robust regression results.

Next, is the regression analysis presented in Table 4.

Variable	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability
Constant	-44.359	0.035	-93.347	0.001	-117.615	0.001
BGD	7.617	0.001	5.794	0.024	51.679	0.006
BND	2.275	0.199	3.970	0.070	-33.369	0.037
IS	2.283	0.018	3.394	0.006	8.297	0.010
BAG	-0.007	0.812	0.026	0.453	-0.052	0.312
BRM	1.839	0.151	4.628	0.006	5.731	0.007
FSZ	0.567	0.015	0.580	0.036	0.902	0.025
LEV	-0.008	0.995	0.269	0.000	0.426	0.821
Pseudo R2		0.204		0.3677		0.5556
LR chi2		29.89		53.99		81.45
Probability		0.000		0.000		0.000

The study finds that board gender diversity (BGD) significantly enhances EFD, aligning with Maulidi (2023), Wang, Yu, and Gao (2022), and Kamarudin, Wan Ismail, and Kamaruzzaman (2017). These studies argue that gender-diverse boards bring diverse perspectives and ethical decision-making, improving fraud oversight. However, this finding contradicts Eneh (2018) and Abdullah and Said (2019), who found no significant relationship between gender diversity and fraud prevention.

Contrary to most existing research, this study shows a negative relationship between board nationality diversity (BND) and EFD, suggesting that nationality diversity may complicate decision-making. Previous studies by Maulidi (2023), Wang, Yu, and Gao (2022), and Kamarudin et al. (2017) reported a positive relationship, highlighting how diverse national perspectives enhance fraud detection strategies.

The results reveal a positive relationship between institutional shareholding (IS) and EFD (Coefficient = 8.297, $p = 0.010$), indicating that institutional investors improve fraud prevention in Nigerian banks. This is consistent with Sharma (2004), Ghafoor et al. (2019), and Cheng et al. (2018), who found that institutional investors serve as effective monitors, ensuring stronger governance and reduced fraud risks. In contrast, board age (BAG) has no significant relationship with EFD (Coefficient = -0.052, $p = 0.312$). This contradicts studies such as Zhang and Lin (2020), Wahid (2019), and Raza and Hassan (2020), which found that age-diverse boards enhance fraud prevention. These researchers argue that younger directors bring technological expertise, while older directors offer strategic oversight, creating a balance that strengthens fraud detection.

The study shows a significant positive relationship between board remuneration (BRM) and EFD (Coefficient = 5.731, $p = 0.007$), suggesting that higher compensation incentivizes ethical governance and fraud oversight. This aligns with Chaohui et al.

(2021) and Indiraswari, Subroto, and Subekti (2020), who found that well-structured remuneration improves fraud prevention by encouraging ethical behavior. However, the findings contradict Jones, Monts, and Spieler (2020) and Lux, Raval, and Wingender (2023), who noted that performance-based compensation may increase fraud risk.

In summary, the study highlights the varying effects of board characteristics and governance mechanisms on EFD in Nigerian banks. It underscores the importance of board diversity, and institutional shareholding in enhancing fraud prevention. However, the findings also reveal areas where the Nigerian context differs from global trends, particularly regarding the interaction between institutional shareholding and board remuneration.

Conclusions and Recommendations

This study concludes that board dynamics—comprising gender diversity, nationality diversity, institutional shareholding, board age, and remuneration—significantly impact EFD in listed deposit money banks in Nigeria. Board gender diversity and institutional shareholding have positive effects on EFD, as female directors enhance oversight and institutional investors promote transparency. However, board nationality diversity shows a negative effect, indicating that foreign directors may struggle to adapt to local governance, which can be addressed through cultural alignment strategies. Board remuneration positively influences EFD by incentivizing ethical behavior, while board age shows no significant impact on fraud prevention.

Risk Committee Financial Expertise (RCF) plays a crucial but varied moderating role. RCF negatively moderates the relationship between board gender diversity and EFD, suggesting overlapping responsibilities may reduce the effectiveness of fraud prevention. In contrast, RCF positively moderates the effect of board nationality diversity, helping address governance challenges posed by foreign directors.

RCF also enhances the impact of older board members on EFD by leveraging their experience. However, there is no significant moderating effect of RCF on the relationships between institutional shareholding or board remuneration and EFD, indicating that these factors operate independently of risk committee expertise. The study highlights the importance of tailored governance mechanisms to address the unique fraud risks in Nigeria's banking sector.

The study recommends as follows:

The study recommends several governance reforms to enhance EFD in Nigerian banks.

i. First, regulatory bodies such as the NSE and CAC should mandate minimum female board representation to strengthen fraud prevention through gender diversity. To address challenges associated with nationality diversity, banks should implement cultural integration programs and onboarding guidelines for foreign directors, with support from the FRC.

ii. Institutional shareholders should play an active governance role, particularly on audit and risk committees, with mandatory disclosures of their roles in banks' annual reports as required by the SEC.

iii. Additionally, banks should prioritize age diversity on boards rather than focusing solely on average age, with the CAC and NSE mandating age diversity disclosures.

iv. Compensation policies should incentivize ethical behavior, and the FRC should revise corporate governance codes to promote long-term fraud prevention goals through remuneration structures.

v. The study further recommends refining remuneration policies and exploring alternative governance factors to strengthen fraud detection. Regulatory bodies like the CBN and governance consultants should provide tailored guidelines and training to support these initiatives.

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