

ASSESSING THE IMPACT OF FORENSIC AUDITING ON THE PERFORMANCE OF QUOTED BANKS IN NIGERIA

KENECHUKWU K. EDE¹, CHINE SP LOGAN², OGOCHUKWU C. OKANYA³,
AFAMEFUNA J. NDUKA⁴, CHARLES O. MANASSEH^{5*},
CHUKWUNONSO F. ONOH⁶, CHINWE OLELEWE⁷, AMAKA OKEKE⁸ and
DEBORAH NGOZI UMAH⁹

¹Department of Economics, University of Nigeria, Nsukka, Enugu, Nigeria.

²Department of Public Policy, Liberty University, Lynchburg, VA 24502, US.

^{3,5,7,8}Department of Banking & Finance, Institute of Management and Technology, Nigeria.

⁴Department of Banking & Finance, Chukwuemeka Odumegwu Ojukwu University.

⁶Department of Economics, National Open University of Nigeria, Nigeria.

⁹Department of Accountancy, Federal University of Allied Health Science Enugu.

*Corresponding Author: charssille@gmail.com

Abstract

This study examines how forensic auditing influences bank performance in Nigeria, using annual data from 2013 to 2023. By applying the autoregressive distributed lag (ARDL) model and validating the results with fully modified ordinary least squares (FMOLS), the study provides a comprehensive analysis of forensic auditing's impact on the banking sector. The findings reveal that forensic auditing plays a crucial role in enhancing financial reporting accuracy, fraud detection, and risk management. By minimizing fraudulent activities and ensuring compliance with regulatory standards, forensic auditing fosters a more secure and efficient banking environment. Additionally, the study underscores its role in restoring stakeholder confidence, as greater transparency and accountability lead to increased trust in financial institutions. Banks that integrate forensic auditing are better positioned to detect irregularities early, mitigate risks, and improve overall operational efficiency and profitability. Given these insights, the study recommends that banks enhance their Anti-Money Laundering (AML) mechanisms by adopting stronger forensic auditing frameworks. This proactive approach can help identify and prevent money laundering activities, ultimately safeguarding the integrity of Nigeria's financial system.

Keywords: Forensic Auditing, Bank Performance, Quoted Banks.

1. INTRODUCTION

Bank performance plays a vital role in driving economic growth and stability, as it supports financial intermediation and fosters inclusive development (Olagunju & Folawewo, 2020). A strong banking sector enables businesses and individuals to access credit, fueling entrepreneurship, infrastructure development, and overall economic expansion (Agboare, 2021). Additionally, efficient banks channel savings into productive investments, boosting national output.

In Nigeria, well-performing banks are crucial for financial inclusion, as they extend services to underserved populations, empowering small businesses and low-income groups (Oluwatobi & Olalekan, 2022). This increased access to financial services helps reduce poverty and stimulates economic growth.

Furthermore, high-performing banks contribute to investment, employment creation, and improved risk management, reinforcing economic resilience. However, sustaining bank performance requires strong governance, transparency, and accountability. Forensic auditing plays a critical role in detecting fraud and financial mismanagement, ensuring operational efficiency.

Nigerian case studies, such as the Central Bank's forensic review of failed banks between 2009 and 2011, demonstrate how auditing interventions helped restore trust and financial stability. By identifying and addressing irregularities, forensic auditing strengthens banks, safeguarding their long-term performance. Ultimately, integrating forensic auditing practices is essential for maintaining a robust banking sector and supporting Nigeria's economic development.

Effective bank performance in Nigeria depends significantly on forensic auditing, which plays a crucial role in detecting, curbing, and preventing internal fraud and financial mismanagement (Adesina et al., 2020). Over the years, Nigerian banks have struggled with issues such as embezzlement, insider trading, and financial misreporting.

A notable example is the 2009 banking crisis, which led the Central Bank of Nigeria (CBN) to intervene after uncovering widespread insider abuse and reckless lending. Forensic auditors used advanced investigative tools to expose these irregularities, leading to the dismissal and prosecution of several top bank executives (Adams & Agbaje, 2021).

Beyond fraud detection, forensic auditing strengthens banks' internal controls, ensuring compliance with regulations set by institutions like the Nigerian Deposit Insurance Corporation (NDIC) and the Securities and Exchange Commission (SEC).

The 2016 forensic audit of Skye Bank, for instance, revealed serious breaches in corporate governance and financial reporting, leading to the bank's restructuring (Ojo & Adeoye, 2022). Similarly, weak internal controls have been identified in banks such as Heritage Bank and Union Bank, where operational risks stemmed from poor oversight in loan approvals and asset management (Okoroyibo & Omorepie, 2019). By identifying these weaknesses, forensic audits prompt corrective action, improving risk management and operational efficiency.

Moreover, forensic auditing helps restore public and investor confidence through independent verification of financial practices. The corporate governance reforms at First Bank of Nigeria in 2021, driven by CBN intervention, illustrate how forensic reviews helped rebuild investor trust (Adewale & Ogunleye, 2022). Ultimately, forensic auditing not only safeguards bank assets but also fosters profitability, sustainable growth, and long-term financial stability in Nigeria's banking sector. Forensic auditing in Nigeria faces several challenges despite its crucial role in enhancing financial integrity. Limited access to advanced technology, inadequate training for forensic auditors, and resistance from bank management in cooperating with investigations are among the key obstacles. Additionally, low public awareness, difficulties in gathering legally admissible evidence, lack of independence, globalization pressures, and the absence of a legal framework for forensic accounting further hinder its effectiveness (Akinadewo & Akinkoye, 2019; Oseni & Lawal, 2020; Grippo & Ibex, 2003; Degboro & Olofinsola, 2007; Ehioghiren & Atu, 2016).

Organizations also fear reputational damage, making them reluctant to disclose fraud cases. Despite these challenges, forensic auditing remains essential for improving bank performance in Nigeria. This study examines its impact, with a specific focus on fraud control mechanisms, including money laundering fraud control, point-of-sale fraud control, money transfer fraud control, and ATM fraud control. It also explores fraud case disclosures, compliance with anti-fraud agencies, whistleblowing mechanisms, and training programs, assessing their relationship with bank performance indicators like return on assets and return on equity.

To achieve this, the study seeks to answer key research questions: How do fraud control measures influence bank performance? What impact does compliance with anti-fraud regulations have? To what extent do whistleblowing mechanisms and fraud disclosures strengthen financial transparency? By addressing these questions, this research aims to highlight forensic auditing's role in fostering accountability, risk management, and overall banking sector stability in Nigeria.

To empirically investigate these research questions, we applied the panel autoregressive distributed lag (ARDL) model and validated our findings using fully modified ordinary least squares (FM-OLS) and dynamic ordinary least squares (DOLS).

Our study examines how forensic auditing measures—such as money laundering fraud control, point-of-sale fraud control, money transfer fraud control, ATM fraud control, fraud case disclosures, compliance with anti-fraud agencies, whistleblowing mechanisms, and training programs—impact bank performance, specifically through return on assets and return on equity.

Existing research on Nigerian bank performance has often overlooked the interactions between these critical factors (Dada et al., 2023; Chukwuma et al., 2022; Adesina et al., 2020; Taiya et al., 2021). While many studies focus on forensic auditing's role in uncovering financial irregularities, fraud reporting, and litigation (Agboare, 2021; Adesina et al., 2020; Okoroyibo & Omorepie, 2019), they rarely examine fraud within digital banking channels, which have grown exponentially in Nigeria's financial system.

Despite significant reforms—including BOFID (1991), SAP (1986), the Bank Consolidation Policy (2004), the Cashless Policy (2012), and Basel II/III Implementation (2013)—Nigeria's banking sector remains underdeveloped compared to other emerging economies (Sanusi, 2010).

This research seeks to bridge that gap by exploring the combined impact of forensic auditing indicators on bank performance, offering fresh insights into improving financial oversight, risk management, and regulatory compliance in Nigeria's evolving banking landscape.

This study contributes to the literature in several key ways. First, we examine how money laundering fraud control influences bank performance in Nigeria. Effective measures strengthen regulatory compliance, safeguard a bank's reputation, minimize financial risks, and attract foreign investment, fostering long-term stability and profitability. Second, we explore the role of point-of-sale (POS) fraud control. Fraudulent activities such as unauthorized

transactions and data breaches can lead to financial losses and erode customer trust. Strengthening fraud prevention systems improves operational efficiency, regulatory compliance, and overall financial performance. Third, we investigate money transfer fraud control, as scams like phishing, identity theft, and unauthorized fund transfers pose major security risks. Enhancing fraud control in money transfers is vital for maintaining profitability and customer confidence.

Fourth, we assess automated teller machine (ATM) fraud control. While ATMs improve banking access, they also attract fraud schemes such as card skimming and PIN theft. Implementing strong security measures protects customer assets and ensures smooth banking operations. Fifth, we evaluate fraud case disclosure. Transparency in reporting fraud incidents helps maintain public trust and financial stability.

Sixth, we examine compliance with anti-fraud agencies, as Nigerian banks must report fraud cases to bodies like the EFCC, CBN, and NFIU. Adhering to regulations fosters accountability. Seventh, we assess whistleblowing mechanisms, which encourage ethical reporting and reduce fraud risks. Eighth, we highlight the importance of training programs in fraud prevention.

Using a panel ARDL model with robustness checks via FM-OLS and DOLS, this study provides valuable insights into forensic auditing's impact on Nigerian banks. However, we arranged the remaining sections of the paper as follows. Section 2 discusses the review of related literature, Section 3 Material and Methods, Section 4 empirical results and discussions, while Section 5 contains conclusion and policy recommendations.

2. REVIEW OF RELATED LITERATURE

2.1. Conceptual Framework

Achieving strong bank performance in Nigeria requires effective forensic auditing to detect, prevent, and address fraud, ensuring long-term stability. Key measures include money laundering fraud control, point-of-sale fraud control, money transfer fraud control, ATM fraud control, fraud case disclosure, compliance with anti-fraud agencies, whistleblowing mechanisms, and training programs.

However, Nigerian banks face significant challenges such as macroeconomic instability, high non-performing loans, regulatory compliance difficulties, weak corporate governance, poor risk management, outdated technology, rising cybercrime, and competition from Fintech firms.

These factors hinder efficiency and profitability. In response, this study examines the impact of forensic auditing on bank performance in Nigeria. By analyzing how fraud control measures shape financial outcomes, we provide insights into improving operational efficiency and safeguarding bank stability. This necessitates conceptualizing forensic auditing's effects on bank performance, as outlined in Figure 1 below.

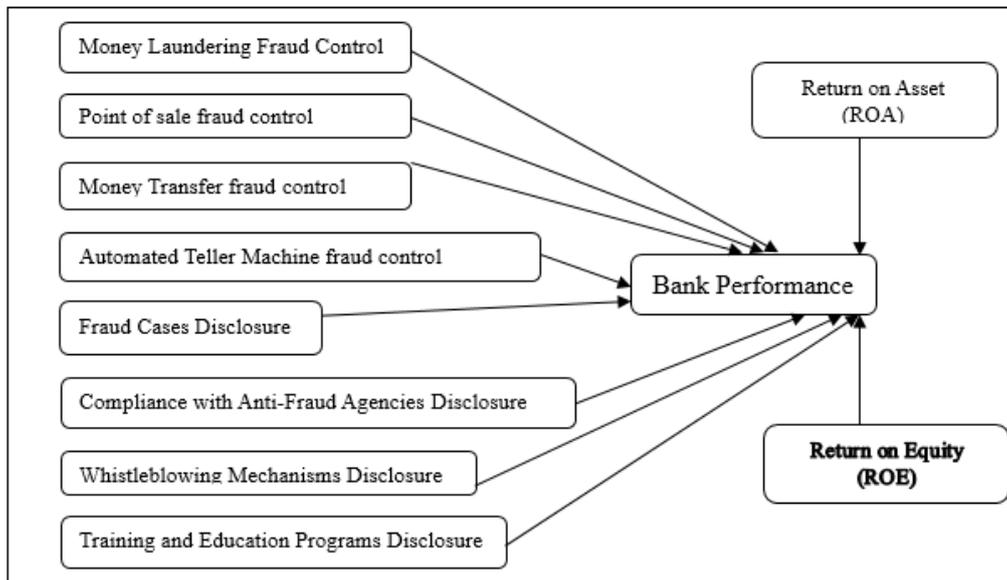


Figure 1: Conceptual Framework

Source: Authors' Concept

2.2. Theoretical Review

2.2.1. White-collar Crime Theory

White-collar crime theory was introduced in 1939 by sociologist Edwin Sutherland, who defined it as crimes committed by individuals of high social status in their professional roles, as well as offenses carried out by corporations (Sutherland, 1949). His theory gained prominence during an address at the American Sociological Society, where he highlighted the connection between crime and social status. Sutherland argued that white-collar criminals exhibit traits similar to street criminals but are often treated differently due to their privileged status. According to Sutherland, white-collar crimes include abuses of trust, fraud, corruption, intellectual property theft, forgery, financial misappropriation, tax evasion, investment fraud, insider trading, environmental violations, and public sector fraud. These crimes are often concealed through complex transactions, making detection and prosecution challenging. A key tool for exposing white-collar crime is whistleblowing. Recognizing its importance, the Nigerian government, through the Economic and Financial Crimes Commission (EFCC), has implemented whistleblowing mechanisms to uncover fraud. This initiative has led to several high-profile arrests and prosecutions.

2.2.2. The Fraud Triangle Theory

Criminologist Donald Cressey introduced the Fraud Triangle Theory in 1950, arguing that fraudulent behavior is driven by three key factors: opportunity, financial pressure, and rationalization. He believed that people engage in fraud due to specific motivations, much like fire requires oxygen, fuel, and heat to ignite (Albrecht, Hill, & Albrecht, 2006). If any of these

elements are absent, fraud is less likely to occur. The stronger each element, the greater the likelihood and severity of fraud. To prevent fraud, trained professionals like forensic auditors play a crucial role in identifying and mitigating these risks. However, the theory has faced criticism. Ngalyuka (2013) emphasized that the pressures, rationalizations, and opportunities involved are often perceived rather than real. Chiezey and Onu (2013) argued that both financial and non-financial pressures—such as debt, addiction, and workplace stress—often drive fraudulent behavior. Ngalyuka (2013) further noted that 95% of fraud cases stem from financial pressures. The second element, perceived opportunity, refers to an individual's belief that they can commit fraud without facing serious consequences (Wanyama, 2012). In banking, employee access to sensitive information and assets increases fraud risks (Chiezey & Onu, 2013). Weak internal controls, poor enforcement, and inadequate punishment further create opportunities for fraud (Kanu & Okorafor, 2013). The third factor, rationalization, allows fraudsters to justify their actions. Njenga and Osiemo (2013) explained that individuals often convince themselves that unethical behavior is not criminal. Ngalyuka (2013) reinforced this view, stating that rationalization normalizes fraud in certain situations. The Fraud Triangle Theory is relevant to this study as it provides forensic accountants with a framework to understand fraud's root causes and develop strategies to mitigate risks across different industries.

2.2.3. Fraud Scale Theory

The Fraud Scale Theory, developed by Albrecht, Howe, and Romney (1984), builds upon the Fraud Triangle Model by incorporating personal integrity as a key factor in occupational fraud. While the Fraud Triangle attributes fraud to opportunity, pressure, and rationalization, the Fraud Scale replaces rationalization with personal integrity. According to this theory, individuals with low personal integrity are more likely to commit fraud, especially when high pressure and significant opportunity are present. Unlike rationalization, which is an internal and subjective process unique to each person, personal integrity is observable through one's actions and decision-making process (Albrecht et al., 1984). This makes it easier to assess whether an individual might engage in fraudulent activities. Research supports the idea that a lack of personal integrity often leads to unethical behavior and fraud (Dorminey et al., 2010; Rae & Subramaniam, 2008). Organizations with weak ethical cultures, poor oversight, and lax controls create environments where fraud can thrive. To mitigate these risks, forensic auditors play a critical role in evaluating personal integrity and identifying red flags. Their expertise helps organizations strengthen fraud prevention strategies and maintain ethical standards. The Fraud Scale Theory offers valuable insights into why fraud occurs, emphasizing the importance of individual ethics alongside external pressures and opportunities. By understanding these factors, organizations can better assess fraud risks and implement stronger preventive measures.

2.3 Empirical Literature

Agboare (2021) explored how forensic accounting helps uncover financial irregularities in Nigerian deposit money banks (DMBs). The study focused on whether investigative procedures and reconstructing incomplete financial records can effectively expose fraud. Using

primary data collected through a structured Likert-scale questionnaire, the study applied descriptive statistics and regression analysis via SPSS 20.0. Findings revealed that forensic accounting methods—such as financial inquiries, record scrutiny, and reconstruction—play a significant role in detecting financial misstatements in Nigerian DMBs. However, the study only examined 10 internationally licensed DMBs, excluding those with national, regional, and local authorizations, limiting its generalizability. Similarly, Adesina et al. (2020) assessed the impact of forensic auditing on financial mismanagement in Nigerian banks. Using a survey design and ordinary least squares (OLS) regression, the study found that professional forensic investigators not only reduce financial misappropriation but also enhance banking stability. The study recommended that regulatory agencies mandate forensic audit departments in all DMBs. However, while the research considered various bank authorizations, it did not differentiate between regional and non-interest banking institutions. This study, however, focuses specifically on 10 listed DMBs in Nigeria. Ewa et al. (2020) examined forensic accounting techniques for fraud detection and prevention in Nigerian banks, assessing commercial data mining, ratio analysis, and trend analysis. The study sampled 170 senior management staff across 15 licensed banks in Rivers State. Using a 5-point Likert questionnaire and OLS analysis, results confirmed that forensic accounting significantly enhances fraud detection and prevention. However, the study's scope was limited to Rivers State, restricting its broader applicability. In contrast, this research examines 10 listed DMBs out of Nigeria's 21 listed banks, providing a more comprehensive perspective.

Okoroyibo and Omorepie (2019) examined how forensic accounting impacts the performance of Nigeria's banking sector, specifically focusing on its effects on net profit margin (NPM), profit after tax (PAT), and dividend per share (DPS). The study analyzed 12 years of financial reports (2007–2018) using multiple regression techniques. Forensic audit (misstatement) was used as a proxy for forensic accounting, while NPM, PAT, and DPS served as independent variables. The findings revealed that forensic audits significantly influence these financial indicators. However, the study was limited to financial performance, overlooking non-financial aspects such as customer satisfaction, employee welfare, and board performance, which could have provided a more comprehensive evaluation. Akinadewo et al. (2023) investigated how forensic accounting enhances financial statement quality within public sector Ministries, Departments, and Agencies (MDAs). Using a questionnaire distributed to 237 accountants across MDAs in Southwest Nigeria, the study employed descriptive and inferential statistical methods. Results indicated that forensic accountants' expertise in disruptive technologies such as cloud computing, Big Data, and business analytics plays a crucial role in improving financial reporting quality. Similarly, Chukwuma et al. (2023) conducted a quantitative study on the impact of forensic accounting on the financial performance of Nigerian deposit money banks. Using data from the Central Bank of Nigeria and the Nigerian Stock Exchange (2001–2020), the study applied fixed-effect regression and Pearson correlation analysis. Findings confirmed a strong positive link between forensic accounting tools and financial performance. Dada et al. (2023) explored the role of forensic accounting and corporate governance in financial performance among listed Nigerian banks. Using panel data from 2012 to 2022, the study analyzed reports from 15 banks, selecting 10 based on data availability. Results highlighted a

significant impact of forensic accounting and corporate governance on financial outcomes.

Chukwuma et al. (2022) emphasized the importance of fraud reporting, prevention measures, and litigation tools in forensic accounting, particularly in maintaining financial stability for Nigerian companies. Their study explored how forensic accounting could predict the future financial performance of MTN Nigeria. Using data from the World Bank, the Nigerian Stock Exchange Factbook, and the National Bureau of Statistics (1990–2021), the study applied ordinary least squares (OLS) regression, unit root tests, and cointegration analysis. The results revealed a significant correlation between forensic accounting tools and financial performance improvement. Similarly, Okoroyibo and Omoregie (2022) investigated forensic accounting's role in Nigeria's banking sector, focusing on First Bank and United Bank for Africa (UBA) over 12 years (2007–2018). Using multiple regression analysis in E-Views 9.0, the study examined the impact of forensic audits on net profit margin (NPM), profit after tax (PAT), and dividend per share (DPS). Findings showed a strong positive effect of forensic audits on financial performance, reinforcing their role in enhancing profitability and retained earnings in Nigerian banks. Ezekwesili (2021) conducted a survey-based study on forensic auditors' impact on corporate governance in Nigerian banks. Selecting branches from 11 major banks in Enugu State, the study used SPSS version 20.0 and Pearson correlation analysis. Results indicated that forensic auditors significantly strengthen corporate governance practices. Alaoubi and Almomani (2021) examined forensic accounting's influence on corporate governance and accounting information quality in Jordanian public shareholding companies. Analyzing data from 217 external certified accountants using multiple regression, they found a statistically significant impact of forensic accounting on governance standards. Taiya et al. (2021) explored how forensic accounting techniques mitigate revenue leakage in Nigerian federal universities. Surveying 238 participants and applying regression analysis, they concluded that forensic data analysis effectively reduces revenue losses, highlighting its potential for financial accountability.

Kaoje et al. (2020) explored how forensic accounting practices influence company performance by examining return on assets (ROA), return on equity (ROE), and net profit margin (NPM). The study focused on the Cement Company of Northern Nigeria, using a survey-based approach with purposive sampling to select administrative staff. Structured questionnaires were distributed, and 34 completed responses were analyzed using SPSS. The results from multiple regression analysis revealed a strong positive correlation between forensic accounting practices and financial performance, highlighting its role in improving profitability. Dada and Jimoh (2020) examined the relationship between forensic accounting and financial crime reduction in Nigeria's public sector. Using a survey research design, they gathered data through questionnaires and interviews, applying linear regression to test their hypotheses. Their findings, tested at a 5% significance level, showed that litigation support services played a crucial role in reducing financial crimes within the public sector. Ali and Fathyah (2020) integrated empirical research and literature to assess how forensic accounting enhances corporate governance in publicly traded firms. They identified two key roles of forensic accounting—preventive and detective—while incorporating agency theory, fraud triangle theory, and path dependence theory. Their study proposed that fraud risk assessment

acts as a mediator between forensic accounting and corporate governance maturity, strengthening governance practices. Ojo-Agboodu et al. (2022) investigated forensic accounting's role in detecting and preventing fraud in Nigeria's Deposit Money Banks (DMBs). Surveying 115 employees from top banks, including Access Bank, First Bank, GT Bank, UBA, and Zenith Bank, they found a significant correlation between forensic accounting and fraud detection. However, forensic accounting had a limited effect on fraud prevention in bank branch operations. The study recommended that regulatory bodies like the Central Bank of Nigeria revise guidelines to enhance fraud detection and irregularity mitigation in the banking sector.

3. MATERIAL AND METHODS

3.1 Nature of Data and Sources

This study examines the impact of forensic auditing on the performance of 10 publicly listed banks in Nigeria from 2013 to 2023. After a thorough review of theoretical and empirical literature, bank performance was measured using return on assets (ROA) and return on equity (ROE). Forensic auditing was assessed through several indicators, including money laundering fraud control (MLFC), point-of-sale fraud control (POSFC), money transfer fraud control (MTFC), and ATM fraud control (ATMFC). Additional measures included fraud case disclosure (FCD), compliance with anti-fraud agencies (CAFA), whistleblowing mechanisms (WBM), and training and education programs (TEPD). Financial deepening, measured as the ratio of broad money (M2) to GDP, and the exchange rate (EXR) served as control variables. Data for this study were sourced from the World Bank Development Indicators (WDI) and annual financial reports of the selected banks. This approach ensures a comprehensive analysis of how forensic auditing influences bank performance in Nigeria.

Table 1: Variable Definitions

Acronyms	Definition	Source
ROA	Bank Return on Assets	World Bank's Bank World Development Indicators (WDI)
ROE	Bank Return on Equity	World Bank's Bank World Development Indicators (WDI)
MLFC	Money Laundering Fraud Control	Annual Financial Fact Sheets and Reports of the Selected Firms
POSFC	Point of Sale Fraud Control	Annual Financial Fact Sheets and Reports of the Selected Firms
MTFC	Money Transfer Fraud Control	Annual Financial Fact Sheets and Reports of the Selected Firms
ATMFC	Automated Teller Machines Fraud Control	Annual Financial Fact Sheets and Reports of the Selected Firms
FCD	Fraud Cases Disclosure	Annual Financial Fact Sheets and Reports of the Selected Firms
CAFA	Compliance With Anti-Fraud Agencies Disclosure	Annual Financial Fact Sheets and Reports of the Selected Firms
WBM	Whistleblowing Mechanisms Disclosure	Annual Financial Fact Sheets and Reports of the Selected Firms

TEPD	Training and Education Programs Disclosure	Annual Financial Fact Sheets and Reports of the Selected Firms
M2/GDP	Financial Deepening – a ratio of broad money and gross domestic product (GDP)	World Bank’s Bank World Development Indicators (WDI)
EXR	Exchange Rate	World Bank’s Bank World Development Indicators (WDI)

Source: Authors’ Concept

3.2 Method of Data Analysis

3.2.1. Baseline Model – Panel ARDL (p... q)

We used the panel autoregressive distributed lag (ARDL) model as our baseline approach to examine how forensic auditing impacts bank performance in Nigeria, building on the exceptional study by Manasseh et al. (2024). The ARDL model stands out among econometric techniques due to its unique advantages over traditional cointegration methods. While various cointegration techniques—such as Johansen’s (1991) maximum likelihood approach, Engle and Granger’s (1987) residual-based method, and the Johansen and Juselius (1990) test—have been widely applied in econometric research, they come with notable limitations. To overcome these, researchers have increasingly turned to the panel ARDL model. This method offers greater flexibility by allowing variables to be integrated at different orders (Pesaran et al., 2001) and enabling the estimation of an error correction model (ECM) through linear transformation (Banerjee et al., 1993). Our choice of the ARDL model is based on several key advantages. First, it provides reliable estimates even with small or finite sample sizes (Ghatak and Siddiki, 2001). Second, it accommodates variables that are either I(0) or I(1), making it more versatile than other techniques. Third, as noted by Pesaran et al. (2001), ARDL models help address issues of serial correlation and endogeneity when the appropriate lag structure is applied. Lastly, they allow for the estimation of both short-run and long-run relationships with high accuracy. The empirical ARDL model used in this study is outlined below.

$$\Delta \ln BPM_{i,t} = \beta_0 + \sum_{i=1}^n \beta_1 \Delta \ln BPM_{i,t-1} + \sum_{i=1}^n \beta_2 \Delta \ln FAM_{i,t} + \sum_{i=1}^n \beta_3 \Delta \ln M2/GDP_{i,t} + \sum_{i=1}^n \beta_4 \Delta \ln EXR_{i,t} + \omega_1 \ln BPM_{i,t} + \omega_2 \ln FAM_{i,t} + \omega_3 \ln M2/GDP_{i,t} + \omega_4 \ln EXR_{i,t} + \varepsilon_{i,t} \quad (1)$$

In this study, bank performance (BPM) is measured using return on assets (ROA) and return on equity (ROE), which serve as the dependent variables. Forensic auditing (FAM) is captured through various fraud control measures, including money laundering fraud control (MLFC), point-of-sale fraud control (POSFC), money transfer fraud control (MTFC), automated teller machine fraud control (ATMFC), fraud case disclosure (FCD), compliance with anti-fraud agencies disclosure (CAFA), whistleblowing mechanisms disclosure (WBM), and training and education programs disclosure (TEPD). Additionally, financial deepening is represented by M2/GDP, while the exchange rate (EXR) is also included as a key variable. The model parameters include β_0 as the constant term, ω_1 to ω_4 representing the long-run coefficients, and another set of ω_1 to ω_4 capturing the short-run dynamics. The first difference operator is denoted by Δ , and the natural logarithm is represented by \ln , while $\varepsilon_{i,t}$ accounts for the white

noise error term. The presence of a long-run relationship is determined by the F-statistic test. If the F-statistic exceeds the upper-bound critical value at a given significance level, a long-run relationship with the dependent variable is confirmed. Conversely, if the F-statistic falls below the lower bound, no long-run relationship exists. If it lies between the two bounds, the result remains inconclusive. The null and alternative hypotheses for the F-statistic test are outlined as follows.

$$\left. \begin{aligned} H_0: \omega_1 = \omega_2 = \omega_3 = \omega_4 = 0 \\ H_0: \omega_1 = \omega_2 = \omega_3 = \omega_4 = 0 \end{aligned} \right\} \quad (2)$$

If the cointegration between variables is identified, then one can undertake further analysis of the long-run and short-run (error correction) relationship between the variables. The error correction representation of the series can be specified as follows:

$$\Delta \ln BPM_{i,t} = \beta_0 + \sum_{i=1}^n \beta_1 \Delta \ln BPM_{i,t-1} + \sum_{i=1}^n \beta_2 \Delta \ln FAM_{i,t} + \sum_{i=1}^n \beta_3 \Delta \ln M2/GDP_{i,t} + \sum_{i=1}^n \beta_4 \Delta \ln EXR_{i,t} + \vartheta ECT + \varepsilon_{i,t} \quad (3)$$

Where ϑ the speed of adjustment parameter and ECT is the error correction term (the residuals obtained from equation 1). The coefficient of the lagged error correction term ϑ is expected to be negative and statistically significant to further confirm the existence of a cointegrating relationship between the variables. Specifically, the hypotheses stated was further modelled in a log-linear equations below.

3.2.2. Robustness Check – FMOLS

To ensure the robustness of our ARDL model results, we conducted additional checks using the panel fully modified ordinary least squares (FMOLS) method, following Manasseh et al. (2024) and the works of McCoskey and Kao (1998), Chiang (2000), Phillips & Moon (1999), and Pedroni (2000). The FMOLS approach effectively addresses cross-sectional dependency, country-specific variations, and heterogeneity issues. It provides optimal estimates of cointegration parameters, even in small samples, while mitigating problems related to endogeneity, serial correlation, omitted variable bias, and measurement errors. Additionally, FMOLS accounts for heterogeneity in long-run parameters and corrects for the long-run correlation between the cointegrating equation and stochastic regressor innovations. The resulting estimator is asymptotically unbiased, offering efficient normal asymptotics that allow for standard Wald tests using Chi-square statistical inference. FMOLS relies on long-run covariance matrices of residuals, which can be estimated directly from difference regressions. The FMOLS specification is presented below.

$$\beta^*_{NT} - \beta_{FMOLS} = \left[\sum_{i=1}^N L_{22t}^{-1} \sum_{t=1}^T (x_{it} - x_{it})^2 \right] \sum_{t=1}^N L_{11t}^{-1} L_{22t}^{-1} \left[\left(\sum_{t=1}^T (x_{it} - x_{it}) \mu_{it}^* - T \hat{\gamma}_1 \right) \right] \quad (4)$$

4. EMPIRICAL RESULTS AND DISCUSSIONS

This study explores how forensic auditing impacts the performance of publicly listed banks in Nigeria. Specifically, it examines the influence of various fraud control measures—including money laundering fraud control, point-of-sale fraud control, money transfer fraud control, ATM fraud control, fraud case disclosures, compliance with anti-fraud agencies, whistleblowing

mechanisms, and training and education programs—on bank return on assets (ROA) and return on equity (ROE). To ensure data reliability, the study focuses on 10 banks listed on the Nigerian Stock Exchange (NSE), with data sourced from their annual financial reports and financial fact sheets. Covering a 10-year period from 2013 to 2023, this research employs regression analysis to assess the relationship between forensic auditing measures and bank performance. This chapter presents the analysis of the regression results based on the collected secondary data.

4.1. Descriptive Statistics

The researcher took his very first step by finding the general and specific behaviour of variables before carrying out the analysis and this was done using descriptive statistics. The researcher sampled a total of 10 banks with a total number of observations of 100, and the data covered a period of 10 years i.e. from 2013 to 2023. However, we carried out descriptive statistics, which measures the basic summary of statistics and quantitatively describes or summarizes features from a collection of information in the form of mean, median, minimum, maximum, standard deviation, skewness and Kurtosis. Thus, below in Table 2, are the results of the descriptive statistics.

Table 2: Descriptive Statistic Results

Variable	ROA	ROE	MLFC	POSFC	MTFC	ATMFC	FCD	CAFA	M2/GDP	EXR	WBM	TEPD
Mean	-0.144	-0.569	2.198	46.22	105.8	7.252	42.261	46.46	37.68	28.31	1.902	2.150
Median	-0.440	-0.727	1.924	16.60	0.737	6.466	45.35	30.35	16.16	15.55	3.242	1.198
Maximum	7.000	1.890	14.03	9.526	1.145	4.255	7.974	2.521	9.722	1.934	7.547	10.72
Minimum	-2.645	-2.606	-36.20	0.000	-2.226	0.764	1.362	4.366	0.000	0.402	-5.033	-0.267
Std. Dev.	1.432	0.973	6.344	80.73	3450.	4.462	11.71	42.18	65.44	32.27	2.912	2.713
Skewness	2.340	0.803	10.44	4.805	33.13	2.038	-0.378	2.197	7.136	2.304	-0.782	1.617
Kurtosis	10.36	3.029	219.0	37.244	1098.	11.38	3.559	8.548	79.31	8.811	2.273	4.571
Jarque-Bera	3501.	118.9	2167	58194	5530	3996.	40.75	2304.	27726	2531.	136.8	595.1
Probability	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Obs.	100	100	100	100	100	100	100	100	100	100	100	100

Source: Authors' Concept

The results in Table 3 indicate that the mean, median, standard deviation, skewness, and kurtosis values are fairly close, suggesting a well-behaved distribution. Additionally, the data range spans from a minimum value of -36.20 to a maximum of 9.722. Moreover, the probability values of the Jarque-Bera test are all below 0.05, confirming that the residuals follow a normal distribution. This ensures that the dataset is appropriate for estimating the impact of forensic auditing on the performance of publicly listed banks in Nigeria.

4.2. Correlation Test

To further analyze the data, we used Spearman's correlation test to determine whether there is a relationship between forensic auditing and bank performance in Nigeria. Spearman's correlation matrix measures the strength of the linear relationship between each pair of

variables in the model, with correlation values ranging from -1 to +1. A higher absolute value indicates a stronger relationship, while a lower absolute value suggests a weaker connection (Gujarati, 2003). Following Cohen's (1988) rule of thumb, correlation coefficients are classified as strong (± 0.5), moderate (± 0.3), or weak (± 0.1). The results of the Spearman's correlation test are presented in Table 4 below.

Table 4: Spearman's Correlation Results

Variable	ROA	ROE	MLFC	POSFC	MTFC	ATMFC	FCD	CAFA	WBM	TEPD	M2/GDP	EXR
ROA	1											
ROE	-0.545	1										
MLFC	-0.012	-0.017	1									
POSFC	0.065	0.152	-0.013	1								
MTFC	-0.057	0.043	0.763	-0.039	1							
ATMFC	-0.780	-0.037	-0.006	-0.239	0.182	1						
FCD	-0.674	-0.040	-0.011	-0.085	0.104	0.516	1					
CAFA	-0.609	-0.043	0.056	-0.193	0.129	0.739	0.469	1				
WBM	-0.547	0.125	-0.049	-0.211	-0.189	-0.112	-0.196	-0.018	1			
TEPD	-0.744	-0.077	0.702	0.105	0.076	-0.107	-0.2021	-0.073	-0.398	1		
M2/GDP	-0.838	0.013	-0.012	-0.108	-0.303	0.214	0.116	0.372	0.068	-0.102	1	
EXR	-0.411	0.828	-0.356	-0.216	0.182	0.503	0.285	0.639	0.511	-0.074	0.475	1

Source: Authors' Concept

The results in Table 4 show that, except for point-of-sale fraud control (POSFC), which has no correlation with bank performance, all other forensic auditing measures—money laundering fraud control (MLFC), money transfer fraud control (MTFC), ATM fraud control (ATMFC), fraud case disclosure (FCD), compliance with anti-fraud agencies disclosure (CAFA), whistleblowing mechanisms disclosure (WBM), and training and education programs disclosure (TEPD)—as well as financial deepening (M2/GDP) and exchange rate (EXR), exhibit negative correlations with bank performance in Nigeria. This suggests that forensic auditing, as measured in this study, is negatively associated with bank performance.

4.3. Unit Root Test

To further investigate the data, the researcher conducted unit root tests on a set of variables to assess their stationarity and integration order. The tests included the Levine, Lin, and Chu (2002) – LLC test, the Im, Pesaran, and Shin (2003) – IPS test, as well as the Fisher-ADF and Fisher-PP tests.

The LLC test assumes that panel data consists of homogeneous cross-sections and performs the test on pooled data, while the IPS test accounts for serial correlation in the error term, with correlation properties varying across cross-sections.

This combination of methods, including LLC, IPS, Fisher-ADF, and Fisher-PP tests, allows for a more robust examination of the data. The results of these unit root tests are presented in Table 4. The null hypothesis for the tests is "unit root," while the alternative hypothesis is "no

unit root," and the decision rule is to reject the null hypothesis if the probability value is less than 0.05.

Table 5: Unit Root Tests

Variable	LLC test by Lin et al. (2002)	IPS test by Im et al. (2003)	Fisher-ADF by Madala & Wu (1999)	Fisher-PP by Madala & Wu (1999)	Integration Order
ROA	8.296*** (0.000)	-6.995*** (0.000)	240.9*** (0.000)	237.8*** (0.000)	Level
ROE	-4.748*** (0.000)	-15.75*** (0.000)	489.2*** (0.000)	481.2*** (0.000)	Level
MLFC	5.747*** (0.000)	-4.943*** (0.000)	226.1*** (0.000)	216.5*** (0.000)	Level
POSFC	-7.463*** (0.000)	-5.402*** (0.000)	197.2*** (0.000)	189.9*** (0.000)	Level
MTFC	-8.893*** (0.000)	-8.636*** (0.000)	262.8*** (0.000)	253.4*** (0.000)	First Difference
ATMFC	-21.58*** (0.000)	-19.85*** (0.000)	521.9*** (0.000)	546.2*** (0.000)	Level
FCD	-18.73*** (0.000)	-22.47*** (0.000)	643.3*** (0.000)	600.1*** (0.000)	Level
CAFA	-10.90*** (0.000)	-18.60*** (0.000)	530.9*** (0.000)	517.9*** (0.000)	Level
WBM	-36.03*** (0.000)	-26.72*** (0.000)	859.5*** (0.000)	884.3*** (0.000)	First Difference
TEPD	-6.555*** (0.000)	-9.349*** (0.000)	285.6*** (0.000)	285.3*** (0.000)	Level
M2/GDP	-10.48*** (0.000)	-11.93*** (0.000)	315.7*** (0.000)	314.6*** (0.000)	Level
EXR	-26.88*** (0.000)	-15.96*** (0.000)	696.3*** (0.000)	555.0*** (0.000)	First Difference

Source: Authors' Concept. *** represents 1% level of significance. (.); represents probability values.

The findings in Table 5 indicate that the null hypothesis of "unit root" is rejected for all variables in both the LLC and IPS tests, as their probability values are all less than 0.05. This suggests that there is no evidence of a unit root in any of the variables, meaning they are stationary. Additionally, the results reveal that some variables are integrated at level (I(0)), meaning they are stationary without needing differencing, while others are integrated at first difference (I(1)), indicating that they become stationary after differencing once. These findings highlight the varying integration orders of the variables.

4.4. Cointegration Test

Next, we examined the cointegration between forensic auditing and bank performance in Nigeria using the Pedroni (2004) and Kao (1999) cointegration tests, applying both as the primary test and for robustness checks. Pedroni's cointegration test, proposed in 1999 and extended in 2004, includes seven test statistics with the null hypothesis of "no cointegration"

and a decision rule to "reject the null if the probability value is less than 0.05." These tests allow for heterogeneity in the panel, capturing variations in both short- and long-run dynamics, as well as in slope and intercept coefficients. The seven statistics are divided into group-mean statistics, which average individual country test results, and panel statistics, which pool results across the within-dimension for both parametric and nonparametric approaches. The results indicate that the null hypothesis of "no cointegration" is rejected at the 5% significance level, as most of the Pedroni test probabilities are less than 0.05. This was further confirmed by the Kao (1999) test, leading to the conclusion that there is cointegration between forensic auditing and bank performance in Nigeria.

Table 6: Pedroni Cointegration Results

Pedroni Cointegration Test	Tests	Dep. Var.: ROA	Dep. Var.: ROE
Between Dimension	Panel v-Statistic	-5.298*** (0.000)	-2.966*** (0.008)
	Panel rho-Statistic	7.082*** (0.000)	-6.260*** (0.000)
	Panel PP-Statistic	8.089*** (0.000)	-16.40*** (0.000)
	Panel ADF-Statistic	11.20*** (0.000)	-14.44*** (0.000)
Within Dimension	Group rho-Statistic	5.631*** (0.000)	5.377*** (0.000)
	Group PP-Statistic	-16.24*** (0.000)	-9.096*** (0.000)
	Group ADF-Statistic	2.176*** (0.005)	-4.885*** (0.000)
Robustness Check (Kao, 1999)	Test	Dep. Var.: ROA	Dep. Var.: ROE
	ADF-Statistic	-4.680*** (0.000)	4.151*** (0.000)

Source: Authors' Concept. *** represents 1% level of significance. (.); represents probability values.

4.5. ARDL Estimations – Baseline Model

In this section, we presented and analyzed the results from the ARDL baseline model. We began by conducting some essential econometric tests, including tests for normality, serial correlation, model specification, and heteroscedasticity. The results showed that the errors of the models were normally distributed, serially uncorrelated, and homoscedastic, and that the models were correctly specified. To ensure clarity, we organized our findings based on two measures of bank performance: return on assets (ROA) and return on equity (ROE). The Hausman test results indicated that fixed effects were independent of the explanatory variables. When examining Table 7, with ROA as the dependent variable, we found that past values of bank return on assets had a significant impact on current values. We also discovered that several forensic auditing measures, including money laundering fraud control, point of sale fraud control, money transfer fraud control, ATM fraud control, fraud cases disclosure, compliance with anti-fraud agencies

disclosure, whistleblowing mechanisms disclosure, and training and education programs disclosure, all had significant effects on ROA. Additionally, we accounted for the influence of financial deepening and exchange rates, finding that both factors significantly impacted bank performance in Nigeria.

In the short run, the error correction model (ECM) coefficients were all negative and statistically significant, indicating that the speed of adjustment varied across the models. These findings are consistent with those of previous studies, such as Agbiare (2021) and Dada & Jimoh et al. (2020), among others.

Table 7: Estimated ARDL Results - Return on Assets (ROA) as dependent variables

Variable	1	2	3	4	5	6	7	8
ROA (-1)	0.024*** (0.000)	2.165* (0.041)	0.016*** (0.009)	-5.316 (0.313)	0.763*** (0.000)	0.818*** (0.000)	0.064*** (0.000)	0.060 (0.192)
MLFC	0.018*** (0.000)							
POSFC		-0.042*** (0.000)						
MTFC			0.015*** (0.000)					
ATMFC				-0.302*** (0.000)				
FCD					0.228*** (0.000)			
CAFA						0.103*** (0.000)		
WBM							0.042*** (0.000)	
TEPD								0.025*** (0.000)
M2/GDP	-0.014*** (0.007)	0.013** (0.031)	0.0567*** (0.000)	0.064*** (0.000)	0.060 (0.192)	0.066*** (0.002)	0.015 (0.154)	0.028** (0.028)
EXR	-1.137 (0.904)	0.019*** (0.000)	0.029*** (0.000)	-0.103*** (0.000)	0.016*** (0.000)	0.036*** (0.000)	0.027*** (0.000)	0.012 (0.971)
No of Obs.	100	98	92	95	100	87	90	96
Hausman	16.95 (0.001)	95.63 (0.000)	45.20 (0.000)	874.5 (0.000)	81.36 (0.000)	693.1 (0.000)	78.36 (0.000)	56.63 (0.000)
ECM	-0.258*** (0.000)	-0.987*** (0.005)	-0.552** (0.019)	-0.361*** (0.000)	-0.478** (0.028)	-0.881** (0.036)	-0.945*** (0.000)	-0.693** (0.033)
Normality	111.3 (0.000)	971.4 (0.000)	876.1 (0.000)	10.09 (0.000)	111.3 (0.000)	971.4 (0.000)	876.1 (0.000)	10.09 (0.000)
Serial Correlation	1.243 (0.887)	1.422 (0.876)	1.497 (0.098)	4.999 (0.876)	1.243 (0.887)	1.422 (0.876)	1.497 (0.098)	4.999 (0.876)
Ramsey	-0.084 (0.000)	-0.085 (0.000)	-0.910 (0.000)	-0.075 (0.000)	-0.084 (0.000)	-0.085 (0.000)	-0.910 (0.000)	-0.075 (0.000)
Heteroscedasticity	2.212 (0.098)	0.251 (0.258)	2.676 (0.458)	3.010 (0.667)	2.212 (0.098)	0.251 (0.258)	2.676 (0.458)	3.010 (0.667)

Source: Authors' Concept. ***, **, & * represent 1%, 5% & 10% level of significance. (.) represents proby values.

We then examined the models using bank return on equity (ROE) as the dependent variable, with the results presented in Table 8 below. After performing some basic econometric tests, we found that the errors were normally distributed, uncorrelated, and homoscedastic, confirming

that the models were correctly specified. The Hausman test results showed that the fixed effects model was the best fit for the analysis, as all probability values were below 0.05. Our analysis revealed that past values of ROE significantly impact current ROE. Additionally, forensic auditing measures—such as money laundering fraud control, point of sale fraud control, money transfer fraud control, ATM fraud control, fraud cases disclosure, compliance with anti-fraud agencies disclosure, whistleblowing mechanisms disclosure, and training and education programs disclosure—were all found to have a significant influence on bank performance in Nigeria. We also found that financial deepening and exchange rates significantly affect bank performance in the long run. In the short run, the errors were statistically significant and had negative signs, indicating how the model adjusts from long-run equilibrium. These results are consistent with findings from previous studies, including those by Akindewo et al. (2023), Chukwuma et al. (2022), and Ezekwesili (2021).

Table 8: Estimated ARDL Results - Return on Equity (ROE) as dependent variable

Variable	1	2	3	4	5	6	7	8
ROE (-1)	0.864*** (0.000)	0.796*** (0.000)	0.846*** (0.000)	0.803*** (0.000)	0.056*** (0.000)	0.804*** (0.000)	Value	Value
MLFC	-0.046*** (0.000)							
POSFC		0.347*** (0.000)						
MTFC			-0.028 (0.052)					
ATMFC				0.016*** (0.000)				
FCD					0.030*** (0.000)			
CAFA						0.282*** (0.001)		
WBM							0.024*** (0.000)	
TEPD								0.701*** (0.001)
M2/GDP	-0.045*** (0.000)	0.056** (0.040)	-0.402*** (0.006)	0.013*** (0.000)	0.051*** (0.000)	0.017*** (0.006)	0.019*** (0.001)	0.026*** (0.000)
EXR	0.027*** (0.000)	0.018*** (0.000)	0.387*** (0.006)	0.368 (0.979)	0.022 (0.394)	-0.023 (0.429)	0.012 (0.247)	0.016*** (0.000)
No of Obs.	96	98	85	100	100	74	86	96
Hausman	36.58 (0.000)	85.36 (0.000)	55.69 (0.000)	876.5 (0.000)	68.54 (0.000)	36.84 (0.005)	87.56 (0.000)	98.05 (0.036)
ECM	-0.698 (0.025)	-0.987 (0.000)	-0.336 (0.000)	-0.914 (0.035)	0.587 (0.005)	-1.369 (0.002)	-0.736 (0.000)	-0.658 (0.000)
Normality	110.4 (0.000)	943.8 (0.000)	978.1 (0.000)	101.2 (0.000)	110.4 (0.000)	943.8 (0.000)	978.1 (0.000)	101.2 (0.000)
Serial Correlation	8.139 (0.730)	1.362 (0.321)	1.419 (0.359)	1.283 (0.776)	8.139 (0.730)	1.362 (0.321)	1.419 (0.359)	1.283 (0.776)
Ramsey	-0.045 (0.000)	-0.068 (0.000)	-0.058 (0.000)	-0.526 (0.000)	-0.045 (0.000)	-0.068 (0.000)	-0.058 (0.000)	-0.052 (0.000)
Heteroscedasticity	1.405 (0.662)	11.77 (0.588)	0.130 (0.188)	1.087 (0.655)	1.405 (0.662)	11.77 (0.588)	0.130 (0.188)	1.087 (0.655)

Source: Authors' Concept. ***, **, & * represent 1%, 5% & 10% level of significance. (.) represents proby values.

4.6. Robustness Checks – FMOLS

To further explore the connection between forensic auditing and bank performance in Nigeria, we re-estimated the effects using the panel fully modified ordinary least squares (FMOLS) method. FMOLS is particularly useful as it accounts for cross-sectional dependence and bank-specific effects that arise from spatial influences or unobserved shocks, which the ARDL model could not fully capture. The results showed that past values of bank return on assets (ROA) significantly impacted current bank return on equity (ROE) in Nigeria. Additionally, forensic auditing demonstrated a significant influence on bank performance, with its indicators—such as money laundering fraud control, point of sale fraud control, money transfer fraud control, ATM fraud control, fraud cases disclosure, compliance with anti-fraud agencies disclosure, whistleblowing mechanisms disclosure, and training and education programs disclosure—each playing an important role. Our control variables, financial deepening (M2/GDP) and exchange rates, also showed significant effects on bank performance. Moreover, the R-squared results indicate that the explanatory variables have a strong impact on the dependent variables, explaining over 50% of the variation. These findings align with previous studies by scholars like Ojo-Agbotu et al. (2022), Taiya et al. (2021), and Kaoje et al. (2020).

Table 9: FMOLS Estimated Results: Dependent Variable – ROA

Variable	1	2	3	4	5	6	7	8
ROA (-1)	0.726*** (0.000)	0.903*** (0.000)	1.202*** (0.000)	0.669*** (0.000)	0.838*** (0.000)	0.880*** (0.000)	0.697*** (0.000)	0.840*** (0.000)
MLFC	-0.846** (0.019)							
POSFC		0.827*** (0.000)						
MTFC			-0.596*** (0.000)					
ATMFC				0.745*** (0.000)				
FCD					0.510*** (0.000)			
CAFA						-0.123 (0.577)		
WBM							0.034*** (0.000)	
TEPD								0.029*** (0.000)
M2/GDP	7.938*** (0.000)	5.764*** (0.004)	3.239*** (0.000)	2.528*** (0.000)	0.258*** (0.000)	0.768*** (0.000)	0.597*** (0.001)	-0.505*** (0.002)
EXR	-7.737*** (0.000)	1.117** (0.023)	1.798*** (0.000)	-1.186*** (0.000)	1.847*** (0.002)	8.056*** (0.000)	0.128*** (0.004)	-0.212*** (0.002)
No of Obs.	Value	Value	Value	Value	Value	Value	Value	Value
R-squared	0.857	0.541	0.735	0.622	0.788	0.728	0.7655	0.863

Source: Authors' Concept. ***, **, & * represent 1%, 5% & 10% level of significance. (.) represents proby values.

Table 10 presents the FMOLS results examining the relationship between forensic auditing and bank performance in Nigeria, with bank return on equity (ROE) as the dependent variable. The findings reveal that past values of ROE significantly influence its current values. Additionally,

forensic auditing has a notable long-term impact on bank performance, with key indicators such as money laundering fraud control, point of sale fraud control, money transfer fraud control, ATM fraud control, fraud cases disclosure, compliance with anti-fraud agencies disclosure, whistleblowing mechanisms disclosure, and training and education programs disclosure all showing statistical significance. This suggests that forensic auditing plays a critical role in shaping bank performance over time in Nigeria. The R-squared results further indicate that the explanatory variables have a substantial influence on the variation in bank return on equity. These findings align with previous research by scholars such as Fathyah (2020) and Dada et al. (2023), among others.

Table 10: FMOLS Estimated Results: Dependent Variable – ROE

Variable	1	2	3	4	5	6	7	8
ROE (-1)	0.651*** (0.000)	0.874*** (0.000)	0.840*** (0.000)	0.731*** (0.000)	0.386*** (0.000)	0.629*** (0.000)	0.543*** (0.000)	0.464*** (0.000)
MLFC	0.031*** (0.000)							
POSFC		0.017*** (0.002)						
MTFC			0.022*** (0.004)					
ATMFC				0.024*** (0.000)				
FCD					0.049*** (0.000)			
CAFA						0.029*** (0.000)		
WBM							0.046*** (0.000)	
TEPD								0.404*** (0.000)
M2/GDP	0.039 (0.161)	0.188*** (0.007)	0.187*** (0.000)	-0.464*** (0.000)	-0.492*** (0.000)	0.023 (0.934)	-0.440*** (0.000)	0.599*** (0.000)
EXR	0.181*** (0.000)	3.157** (0.016)	0.065 (0.245)	0.087*** (0.000)	0.011*** (0.000)	-0.272** (0.039)	0.018*** (0.000)	-0.008*** (0.000)
No of Obs.	Value	Value	Value	Value	Value	Value	Value	Value
R-squared	0.530	0.883	0.758	0.677	0.713	0.851	0.646	0.823

Source: Authors' Concept. ***, **, & * represent 1%, 5% & 10% level of significance. (.); represents proby values.

4.7. Discussion of Findings

This study explores the impact of forensic auditing on bank performance in Nigeria, emphasizing that well-executed audits enhance a bank's performance, which in turn contributes to the broader economic growth and development of the country. The research utilized annual time series data from 10 publicly listed banks in Nigeria, covering the period from 2013 to 2023. After conducting a thorough theoretical and empirical review of the literature, we selected key performance indicators, such as the bank's return on assets (ROA) and return on equity (ROE), to measure bank performance. Forensic auditing was assessed using several indicators, including money laundering fraud control, point of sale fraud control, money transfer fraud control, automated teller machine (ATM) fraud control, fraud cases disclosure,

compliance with anti-fraud agencies disclosure, whistleblowing mechanisms disclosure, and training and education programs disclosure. To control for other factors, financial deepening, represented by the ratio of broad money (M2) to GDP, and exchange rates were also included as control variables.

The results from the ARDL model revealed that forensic auditing indicators—such as fraud control measures and transparency through disclosures—have a statistically significant impact on both ROA and ROE. In addressing the study's research questions, we found that each forensic auditing indicator plays a crucial role in improving bank performance. Specifically, the study sought to determine whether money laundering fraud control, point of sale fraud control, money transfer fraud control, ATM fraud control, fraud cases disclosure, compliance with anti-fraud agencies disclosure, whistleblowing mechanisms disclosure, and training and education programs disclosure significantly influenced bank performance. The findings confirmed that these indicators had a substantial positive effect, thus answering all the research questions affirmatively. Based on the results, the study proposes several policy recommendations that could further improve bank performance in Nigeria. First, the regulatory authorities, including the Central Bank of Nigeria (CBN) and other bodies like the Nigerian Deposit Insurance Corporation (NDIC), should strengthen the regulatory framework for financial oversight by incorporating forensic auditing as a mandatory practice in their supervision. This would enable early detection of fraud and financial irregularities, ultimately improving the financial health of the banking sector. Furthermore, it is recommended that periodic forensic audits be conducted alongside traditional audits, especially for listed banks. This approach could reduce instances of financial malpractice and restore public confidence in the banking system.

In addition to strengthening regulations, the study suggests that banks establish dedicated forensic audit units to monitor and investigate internal financial crimes. These units would not only enhance internal controls but also act as a deterrent against fraudulent activities. The CBN should mandate the creation of internal forensic audit departments within banks, particularly to target high-risk areas like money laundering, fraud detection, and financial misreporting. Such units should collaborate closely with external auditors and regulatory authorities to ensure that fraudulent activities are detected early, contributing to improved operational efficiency and profitability. The study also emphasizes the importance of mandatory forensic audits for high-risk transactions, such as large loans, foreign exchange dealings, and asset acquisitions. By focusing on these areas, banks can prevent financial irregularities and reduce potential losses, thus boosting investor confidence. Regulatory bodies should enforce policies that require banks to conduct forensic audits on transactions that exceed specific thresholds or present higher financial risks. This would allow for early identification of anomalies and prevent financial losses due to fraudulent activities or weak internal controls.

Effective forensic auditing requires strong collaboration between financial regulators, law enforcement agencies, and the judiciary to ensure that detected fraud cases are appropriately prosecuted and sanctions enforced. The CBN should foster partnerships with law enforcement bodies, such as the Economic and Financial Crimes Commission (EFCC), to ensure that

forensic audit findings are promptly acted upon. Swift legal actions would serve as a deterrent to fraudsters, improve accountability in the banking sector, and restore public trust in the financial system. Moreover, forensic auditing can expose weaknesses in corporate governance, which could lead to improved governance practices within the banking sector. Nigerian banks must adopt stronger governance structures to prevent fraud and mismanagement. Forensic audits can help evaluate the effectiveness of governance practices by ensuring that transparency and accountability are maintained in financial reporting and decision-making. Banks should also be required to implement stricter corporate governance practices, including periodic reviews of boards and senior management, to ensure that they comply with best practices in financial management and accountability.

The findings of this study highlight several key policy implications that could significantly enhance bank performance, safeguard stakeholders' interests, and fortify the overall financial system in Nigeria. One important recommendation is to build the capacity of auditors and bank employees in forensic auditing techniques. This will enhance their ability to detect and prevent fraud in a more efficient manner. The CBN, along with other financial regulatory bodies, should collaborate with professional auditing associations to provide comprehensive forensic auditing training for internal auditors in banks. This will improve the quality of forensic audits and ensure that auditors are equipped to deal with increasingly sophisticated fraud schemes. Additionally, creating certification programs for forensic auditors could further elevate professional standards within the industry, making auditors more adept at handling complex financial issues. In conclusion, the study underscores the significant role that forensic auditing can play in improving bank performance in Nigeria. The findings suggest that implementing stronger regulatory frameworks, establishing forensic audit units within banks, and enforcing mandatory forensic audits for high-risk transactions can contribute to improved bank performance, reduced financial irregularities, and enhanced public trust in the banking system. By investing in forensic auditing training and certification programs for auditors, Nigeria's financial sector can better equip itself to detect and prevent fraud, ultimately boosting the country's economic stability and growth. The collaboration between regulators, law enforcement agencies, and banks will be vital in ensuring that forensic audit findings are acted upon, promoting a more secure and transparent financial environment.

5. CONCLUSION AND POLICY RECOMMENDATIONS

This study focuses on examining the impact of forensic auditing on the performance of banks in Nigeria from 2013 to 2023, utilizing a variety of econometric models, including the panel autoregressive distributed lag (ARDL) model and panel fully modified ordinary least squares (FMOLS) model for robustness checks. These models were chosen due to their ability to address common econometric challenges such as endogeneity, cross-sectional dependence, country-specific effects, heterogeneity, and serial correlation. The research considered various factors affecting bank performance, such as return on assets (ROA) and return on equity (ROE) as the dependent variables, with forensic auditing variables like point of sale fraud control (POSFC), money laundering fraud control (MLFC), money transfer fraud control (MTFC), automated teller machine fraud control (ATMFC), fraud cases disclosure (FCD), compliance

with anti-fraud agencies disclosure (CAFA), whistleblowing mechanisms disclosure (WBM), and training and education programs disclosure (TEPD). In addition, the study accounted for the financial deepening variable (M2/GDP ratio) and exchange rate (EXR) as control variables. The findings from the basic econometric tests revealed that the mean, median, standard deviation, skewness, and kurtosis of the variables did not show significant deviations, indicating normal distribution of the data. The results of the Spearman's correlation test also highlighted the existence of significant relationships between forensic auditing and bank performance. The analysis further revealed that none of the variables had unit roots, meaning they were integrated of I(0) and I(1), but not I(2). The cointegration tests, including those by Pedroni (2004) and Kao (1999), confirmed the existence of a long-term relationship between forensic auditing practices and bank performance in Nigeria. The ARDL model results demonstrated that forensic auditing has a significant impact on the performance of Nigerian banks, and these results were reinforced by the FMOLS model. This finding is consistent with previous studies such as Agboare (2021), Adesina et al. (2020), Ewa et al. (2020), Akinadewo et al. (2023), Taiya et al. (2021), and Ali & Fathyah (2020), who also emphasized the importance of forensic auditing in improving financial performance.

The study offers critical insights into the role of forensic auditing in enhancing bank performance, emphasizing that forensic auditing plays a vital role in improving financial transparency, reducing fraud, and strengthening risk management practices within the Nigerian banking sector. It was found that forensic auditing contributes significantly to the accuracy of financial reporting, enhances the detection of fraudulent activities, and ensures adherence to regulatory standards. By curbing fraudulent activities, forensic auditing fosters a safer and more efficient banking environment, which ultimately enhances operational efficiency and profitability. Moreover, forensic auditing helps restore stakeholder confidence in the banking sector, promoting greater accountability and trust. Banks that adopt forensic auditing practices are better positioned to identify irregularities, mitigate risks, and improve overall performance. The study's conclusions point to several policy recommendations aimed at improving the performance of banks through enhanced forensic auditing practices. First, banks should strengthen their Anti-Money Laundering (AML) mechanisms by adopting more robust forensic auditing practices. This includes leveraging advanced data analytics and artificial intelligence (AI) tools to detect suspicious transactions and promptly report them to regulatory bodies. Banks should also collaborate with forensic auditors and AML agencies to ensure real-time monitoring of high-risk transactions and information sharing. Second, the Point of Sale (POS) fraud control systems should be enhanced. By integrating forensic auditing into POS systems, banks can monitor transactions in real time and flag any irregularities. The use of advanced fraud detection software will enable quick responses and investigations of suspicious POS transactions.

Third, banks should work on improving money transfer fraud controls by integrating forensic auditing techniques into digital money transfer platforms. This will help detect and prevent fraudulent activities in online transfers. To further strengthen security, banks should adopt multi-layered authentication methods and conduct regular audits of their transfer systems to identify vulnerabilities. Policies should mandate regular audits of online and mobile money

transfer systems and ensure timely reporting of fraud incidents to relevant authorities. Fourth, the study recommends reinforcing Automated Teller Machine (ATM) fraud prevention mechanisms. This could be achieved through periodic forensic audits of ATM systems to identify security loopholes. Banks should implement biometric authentication and encrypted transaction systems to enhance security. The Central Bank of Nigeria (CBN) and other regulatory bodies should create policies mandating regular forensic audits of ATM networks to identify transaction anomalies and ensure the systems' integrity. Fifth, the study stresses the need for Nigerian banks to disclose fraud cases and comply with anti-fraud regulations. Banks should be required to disclose details of fraud cases detected through forensic audits to ensure transparency and maintain public trust. A standardized reporting framework should be established to facilitate clear and consistent fraud disclosures. Furthermore, banks should be held accountable for complying with anti-fraud agencies like the Economic and Financial Crimes Commission (EFCC) and the Financial Reporting Council of Nigeria (FRCN), with penalties for non-compliance. Sixth, banks should institutionalize whistleblowing mechanisms to encourage employees and customers to report suspicious activities without fear of retaliation. Strengthening whistleblower protection laws and ensuring that banks disclose actions taken on whistleblower reports will enhance the effectiveness of forensic auditing.

Seventh, comprehensive training and education programs for bank staff are essential to improving the security of funds, increasing fraud detection capabilities, and boosting bank performance. Banks should invest in continuous training for their staff on forensic auditing techniques, fraud detection, money laundering prevention, and the use of forensic auditing software. Specialized training for auditors and employees will help them recognize and respond to fraud more effectively. Finally, the study highlights the importance of collaboration between banks and regulatory bodies to enhance the impact of forensic auditing. Stronger partnerships between banks, auditors, and regulatory agencies will facilitate the sharing of information on emerging risks and successful auditing techniques. By working together, these stakeholders can promote a more coordinated approach to fraud prevention and risk management, improving the overall integrity of Nigeria's banking sector.

In conclusion, the study underscores the crucial role that forensic auditing plays in improving the performance and integrity of banks in Nigeria. The evidence suggests that forensic auditing is instrumental in improving financial transparency, fraud detection, and risk management, thereby enhancing the stability and growth of the banking sector. By adopting the recommended policies, Nigerian banks and regulatory authorities can foster a more secure, efficient, and sustainable banking environment, ultimately contributing to the broader economic development of the country.

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