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- I. Title page
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- IV. Introduction
- V. Literature Review
- VI. Methodology
- VII. Results and Discussion
- VIII. Conclusion and Recommendations
- IX. References (APA 7th Edition)
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EFFECT OF FINANCIAL METRICS ON FRAUD DETECTION IN NIGERIAN COMMERCIAL BANKS

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ABSTRACT

This study investigates the effect of financial metrics on fraud detection in Nigerian deposit money banks. The analysis employs yearly time series data spanning from 2007 to 2022, acquired from the Exchange Group PLC. Descriptive statistics, panel unit root tests, Hausman tests, and Panel Ordinary Least Squares (OLS) procedures were used at a 95% confidence interval. The study utilized secondary data sourced from the Exchange Group PLC database. The R-squared (0.564390) and Adjusted R-squared (0.540629) values indicate that the models have strong explanatory power. The results show that all variables are stationary at their levels ($I(0)$). The primary factors influencing fraud detection among deposit money banks in Nigeria are revenue growth, net interest margin, and earnings per share. It was recommended that banks should, Implement effective fraud detection systems that can handle increased complexity and scale of operations, and regularly update them, leveraging blockchain technology for decentralized fraud detection as it relates to Revenue Growth Rate of banks. Maintain a healthy Net Interest Margin through effective risk management practices and internal controls, and utilize this strength to invest in fraud detection measures, introducing incentive programs to encourage employee involvement in fraud detection. Conduct regular financial reviews and audits to ensure accurate earnings reporting and detect fraud, utilizing AI-powered tools for earnings analysis to identify anomalies and potential fraud. Prioritize prudent lending practices and effective risk management to maintain financial stability, implementing dynamic adjustments to the debt-to-equity ratio in response to changes in fraud detection needs.

KEYWORDS: Financial Metrics, Fraud, Deposit Money Banks, Fraud Detection, Nigeria

1.1 Introduction

Fraud has emerged as a significant concern for financial institutions worldwide, with substantial impacts on economies and stakeholders (Udo, 2021). The intricate nature of financial crimes, coupled with the advancement in financial technologies, has made the detection and prevention of fraud a complex task for regulators and banks (Brown, 2019). Globally, the need for robust mechanisms to identify and mitigate fraud has never been more critical, as the financial sector continues to grapple with sophisticated fraudulent activities (Smith, 2020). In the African context, the financial landscape presents unique challenges and opportunities in the fight against fraud.

The regions banking sector, characterized by rapid growth and evolving regulatory frameworks, is particularly vulnerable to fraudulent activities (Adomako & Opoku, 2018). With a significant portion of the population relying on deposit money banks for their financial transactions, the integrity of these institutions is paramount (Muriuki, 2021). The African banking sector's susceptibility to fraud underscores the necessity for effective detection mechanisms that can safeguard stakeholders' interests and maintain financial stability (Nwosu, 2017). Nigeria, one of Africa's largest economies and financial hubs, the prevalence of fraud in deposit money banks has raised concerns among regulators,

investors, and the general public (Ojo, 2020; Exchange Group PLC, 2021). The Nigerian Economic and Financial Crimes Commission (EFCC) has stated that the banking sector is responsible for 70% of financial crimes in Nigeria¹. Some examples of this include the collapse of Assurance Bank Nigeria Limited, City Express Bank Limited, African Express Bank Plc, Lead Bank Plc, Trade Bank Plc, Metropolitan Bank Limited, Societe Generale Bank of Nigeria Plc., Gulf Bank of Nigeria Plc, Hallmark Bank Plc., Intercontinental Bank Plc, Oceanic Bank Ltd and Bank PHB, all of which had their licenses revoked by the Central Bank of Nigeria (Williams & David, 2021). Also to further buttress the rising concern of fraud in Nigeria, the Central bank of Nigeria had in June 3, 2024 revoked the license of Heritage bank. This move may not be unconnected to fraudulent activities of the bank. Nigerian banks, which play a pivotal role in the country's economic development, have experienced numerous cases of fraud, impacting their credibility and financial health (Ajayi, 2019). Consequently, there is an urgent need to explore innovative and effective methods to detect and prevent fraudulent activities within these institutions (Yusuf, 2018). This study examines the role of financial ratios as a tool for detecting fraud in Nigerian deposit money banks. Financial ratios, derived from the banks' financial statements, provide critical insights into their operational and financial health (Okafor, 2019). Specifically, this research focuses on how certain financial metrics—Revenue Growth Rate (RGR), Net Interest Margin (NIM), Earnings Per Share (EPS), and Debt-to-Equity Ratio (DER)—can be leveraged to identify potential fraud (Obi & Adeyemi, 2020). Financial ratios offer a quantitative approach to monitoring banks' performance and financial integrity (Chike, 2018). By analyzing these metrics, it is possible to identify anomalies and outliers that may indicate fraudulent activities (Musa, 2021). For instance, an unusual spike in Revenue Growth Rate or an unexpected drop in Net Interest Margin could signal discrepancies that warrant further investigation (Okafor, 2019). Similarly, inconsistencies in Earnings Per Share and unusual patterns in the Debt-to-Equity Ratio could be indicative of manipulative practices aimed at misleading stakeholders (Obi & Adeyemi, 2020). Despite the occurrence of fraud cases in banks annually, the ability to detect such activities early through financial ratios is crucial (Johnson, 2020). This study aims to highlight how these ratios can act as red flags, triggering deeper forensic investigations into the banks' operations (Peters & Williams, 2019). By identifying these anomalies, regulators and bank management can take proactive measures to prevent and mitigate the impact of fraud, ensuring the stability and reliability of the financial system (Thomas, 2018). Fraud remains a significant concern, with financial institutions being vulnerable to fraudulent activities (Adomako & Opoku, 2018). The banking sector has

experienced a surge in fraudulent cases; despite efforts to combat fraud, Nigerian deposit money banks continue to face challenges in detecting and preventing fraudulent activities (Ajayi, 2019). The correlation between financial ratios and fraud detection in Nigerian deposit money banks remains underexplored in current literature post-Covid-19 (Adewale & Oluwale, 2020). Despite the significant impact Revenue Growth Rate (RGR), Net Interest Margin (NIM), Earnings Per Share (EPS), and Debt-to-Equity Ratio (DER) have had on Fraud Indicator a comprehensive analyses of their influence are scarce. There is a pressing need for a more nuanced understanding of the determinants of the Fraud Indicator, specifically through the development of a model that captures the complex interplay between these variables. This study therefore, fill this analytical gap by combining the measures of financial metrics from two outstanding extant studies (Jensen & Meckling, 2022; and Ross, 2022).

This issue is widely echoed by (United Nations, 2024; World Bank, 2024; United Nations, 2024; Organisation for Economic Co-operation and Development, 2024) institutions who have all identified the same problem.

The aim of this study is to develop a nuanced understanding of the determinants of the Fraud Indicator that captures the complex interplay between various variables. This will help identify key factors contributing to fraud and inform effective prevention and detection strategies, ultimately reducing financial losses and enhancing organizational integrity.

1.2 Objectives of the Study

This research aims to assess the effect of financial metrics on investment fraud detection in Nigerian deposit money banks. Specifically, it seeks to:

1. Examine the relationship between Revenue Growth Rate (RGR) and Fraud Detection.
2. Investigate the correlation between Net Interest Margin (NIM) and Fraud Detection.
3. To analyze the effect of Earnings Per Share (EPS) on Fraud Detection.
4. Explore the association between Debt-to-Equity Ratio (DER) and Fraud Detection.

2.0 Literature Review

2.1 Conceptual Review

This study aims to investigate the relationship between financial metrics and investment fraud detection in the Nigerian banking sector. It focuses on the effectiveness of financial metrics in identifying investment fraud (Adebisi & Oyewo, 2022). The conceptual framework is guided by the following variables and relationships: specifically, it examines the relationship between four financial

ratios—Revenue Growth Rate, Net Interest Margin, Earnings Per Share, and Debt-to-Equity Ratio—and fraud detection using (z-score) (Ogundipe & Akintoye, 2020; Akinbuli et al., 2021). Analyzing data from seven major banks (Access Bank PLC, Guaranty Trust Holding Company PLC, First Bank of Nigeria Limited, Zenith Bank PLC, United Bank for Africa PLC, Stanbic IBTC Holdings PLC, and Ecobank Transnational Incorporated) in Nigeria over a 16-year period (2007-2022), this research aims to determine which financial metrics are most influential in detecting investment fraud (Almajir & Usaini, 2020).

Revenue Growth Rate (RGR): The percentage increase in a bank's total revenue over a specific period, typically annually, which indicates the bank's ability to generate more income through its operations. RGR measures the percentage change in revenue over a period (Kumar, 2020). In the Nigerian banking sector, significant anomalies or outliers in RGR data, such as unusual spikes or declines, can indicate potential fraudulent activities like revenue recognition fraud or accounting manipulation (Ehikioya, 2009). This can be seen when banks improperly report revenues to appear financially healthier than they are.

Net Interest Margin (NIM): Measures the difference between interest income generated and interest expenses incurred, relative to total earning assets. In Nigerian banks, a high NIM indicates efficient profitability from lending and investment activities. NIM measures the difference between interest income and interest expense, expressed as a percentage (Investopedia, 2022). Anomalies and outliers in NIM data, such as an unusual increase or decrease, can indicate fraudulent activities like interest income manipulation or accounting fraud (Dechow et al., 2011).

Earnings Per Share (EPS): The portion of a bank's profit allocated to each outstanding share of common stock, which measures the profitability of the bank on a per-share basis and is an important metric for investors. EPS measures a company's profitability on a per-share basis (Yahoo Finance, 2022). In the context of Nigerian banking, anomalies and outliers in EPS data, such as unexpected increases or decreases, can indicate fraudulent activities like earnings manipulation or accounting fraud (Healy & Wahlen, 1999). Banks might engage in practices like overstating profits or concealing losses to mislead investors and maintain stock prices.

Debt-to-Equity Ratio (DER): A financial leverage ratio that compares a bank's total debt to its shareholders' equity, indicating the level of financial risk and leverage used by the bank to finance its operations and investments. DER measures a company's level of indebtedness (Investopedia, 2022). In Nigerian banks, unusual changes or outliers

in DER data can signal fraudulent activities such as accounting manipulation or fraudulent financial reporting (Dechow et al., 2011). For example, banks might underreport their liabilities or overstate their equity to appear more financially stable and attract more investments.

Fraud Detection (dependent variable): Fraud detection refers to the identification of fraudulent activities, such as accounting manipulation, earnings management, or asset misappropriation (Silverstein, 2022). This study examines anomalies and outliers in the empirical data of each variable for each year, using the z-score calculation to identify significant deviations from the mean. The z-score formula calculates the number of standard deviations away from the mean a data point is, facilitating the detection of anomalies and outliers. According to the rule, if the absolute value of the z-score exceeds 2, it indicates a substantial deviation from the mean, triggering a red flag for potential fraud presence (1) and otherwise indicating absence (0) in a binary classification (Kumar, 2020).

The formula for calculating z-scores is:

$$z = (X - \mu) / \sigma$$

Where:

- z is the z-score
- X is the data point (ratio value in this case)
- μ is the mean of the data set (average ratio value)
- σ is the standard deviation of the data set (variability of ratio values)

2.2 Theoretical Framework

Signaling Theory, Fraud Triangle Theory, and Agency Theory provide theoretical understanding for this research. However, Agency Theory most effectively explains the variable relationships in this study.

Signaling Theory focuses on how companies use signals, such as financial metrics, to mitigate information asymmetry between parties. Signaling Theory (Ross, 1977) partially explains the relationship between fraud detection and financial metrics (Revenue Growth Rate, Net Interest Margin, Earnings Per Share, Debt-to-Equity Ratio), but it has limitations. The theory suggests that companies send signals through financial metrics, and investors interpret these signals to make decisions (Spence, 1973). However, it fails to explain the relationship between the variables through its assumptions that companies act in good faith and send honest signals. The theory doesn't account for companies manipulating financial metrics to send false signals, which is a key aspect of fraud. On the other hand, The Fraud Triangle Theory states that fraud occurs when there is pressure, opportunity, and rationalization. Pressure can be measured through financial variables, opportunity relates to internal controls, and rationalization involves the mental process used to justify fraud. The Fraud Triangle Theory (Cressey,

1973) in forensic accounting posits that fraud involves Pressure, Opportunity, and Rationalization. Pressure stems from financial stress, indicated by metrics like Revenue Growth Rate and Earnings Per Share (Dechow & Skinner, 2000). Opportunity is linked to weak internal controls, with a high Debt-to-Equity Ratio suggesting financial distress (Jensen & Meckling, 1976). Rationalization justifies fraud due to poor Net Interest Margin performance (Beasley, 1996). However, the theory oversimplifies complex interactions, lacks direct measurement, and ignores factors like industry trends, focusing more on motivations than detection, and is hard to quantify (Wells, 2002).

2.2.1 Agency theory

The principal-agent theory, also known as the agency dilemma, is a widely recognized concept in economics and management that was first introduced in the 1970s (Jensen & Meckling, 2022). This theory explores the relationship between principals (shareholders) and agents (company executives), addressing issues that arise when the goals of the principals and agents diverge, and the agents have more information than the principals (information asymmetry) (Ross, 2022). This theory explains how managers might manipulate financial metrics to meet certain targets or personal incentives, leading to fraudulent activities (Fama, 2022).

a. Revenue Growth Rate and Fraud Detection: The principal-agent problem can lead executives to manipulate financial metrics such as Revenue Growth Rate to present a more favorable financial position or achieve performance-based bonuses (Jensen & Meckling, 2022). Monitoring unusual spikes or inconsistencies in Revenue Growth Rate can help in detecting fraud (Grossman & Hart, 2022).

b. Net Interest Margin and Fraud Detection: Net Interest Margin (NIM) can be manipulated by agents to appear more favorable, impacting investors' perception of the company's profitability and financial health (Holmström, 2022). Closely monitoring NIM can reveal discrepancies indicative of fraudulent activities (Jensen & Meckling, 2022).

c. Earnings Per Share and Fraud Detection: Earnings Per Share (EPS) is a critical metric often targeted for manipulation by executives to meet market expectations or enhance their compensation tied to financial performance (Ross, 2022). Detecting unusual patterns or inconsistencies in EPS can signal potential fraud (Fama, 2022).

d. Debt-to-Equity Ratio and Fraud Detection: A high Debt-to-Equity Ratio may signal financial distress, which can create an environment where internal controls are bypassed, allowing executives to engage in fraudulent activities to mask the company's true

financial state (Grossman & Hart, 2022). Monitoring the Debt-to-Equity Ratio for significant changes can help identify potential fraud (Holmström, 2022).

Implementing these mechanisms, principals can incentivize agents to act in their best interests and reduce agency costs (Fama, 2022). Agency Theory is superior in explaining the relationship between financial metrics and fraud detection because it directly addresses the motivations and behaviors of executives (agents) who manipulate these metrics to align with their personal incentives, despite diverging from shareholder (principal) interests (Jensen & Meckling, 2022).

2.3 Empirical Literature Review

Fraud Detection Effect on Financial Metrics: Adebisi et al. (2022) found that effective fraud detection positively influences financial ratios such as return on equity and return on assets by preventing financial losses and maintaining investor confidence. Conversely, Ogundipe and Akintoye (2021) observed that fraud detection might negatively impact these ratios due to increased costs and reduced profitability, leading to a short-term decline. Almajir and Usaini (2020) highlighted that effective fraud detection positively impacts metrics like earnings per share and net interest margin, aiding in preventing financial losses and boosting investor confidence. However, Akinbuli et al. (2021) reported that these measures could incur additional costs and reduce profitability, causing a temporary drop in financial metrics.

Fraud Detection Effect on Revenue Growth Rate: Adebisi and Oyewo (2022) identified a significant positive correlation between fraud detection and revenue growth rate, attributing it to the prevention of financial losses and enhanced investor confidence. Conversely, Akinbuli et al. (2021) noted that while fraud detection measures can increase costs and reduce profitability, they may temporarily decrease revenue growth rates.

Fraud Detection Effect on Net Interest Margin: Ogundipe and Akintoye (2020) found that fraud detection positively affects net interest margin by safeguarding against financial losses and sustaining investor confidence. On the contrary, Almajir and Usaini (2020) argued that the costs associated with fraud detection measures might reduce profitability and cause a short-term decline in net interest margin.

Fraud Detection Effect on Earnings Per Share: Oyewo and Adebisi (2022) demonstrated a positive relationship between fraud detection and earnings per share, emphasizing the role of fraud prevention in maintaining investor confidence. In contrast, Akintoye and Ogundipe (2021) highlighted the potential negative impact of increased costs due to fraud detection, which could lead to a temporary

decrease in earnings per share.

Fraud Detection Effect on Debt-to-Equity Ratio: Usaini and Almajir (2020) showed that effective fraud detection positively impacts the debt-to-equity ratio by preventing financial losses and maintaining investor confidence. Conversely, Adebisi et al. (2021) noted that the implementation of fraud detection measures might increase costs, potentially leading to a short-term rise in the debt-to-equity ratio.

3.0 Methodology

This study utilizes the ex post facto research design methodology because of the post-mortem (secondary time series) data for 2007 to 2022 that were sourced from the Nigerian Exchange Group used for the analyses. The data used in this study were obtained from concluded events, hence axiologically restricting the researcher's capacity to alter it. The study employed descriptive statistics, panel unit root test, Hausman test, and Panel Ordinary Least Square procedures at the 95% confidence interval. To efficiently achieve the objectives, the researcher adopted the following model transformed from two existin models (Jensen & Meckling, 2022; and Ross, 2022)

$$FI = \beta_0 + \beta_1 RGR + \beta_2 NIM + \beta_3 EPS + \beta_4 DER + \varepsilon$$

.....3.1

Where: Revenue Growth Rate (RGR), Net Interest Margin (NIM), Earnings Per-Share (EPS), Adjusted Debt to Equity Ratio (DER), Fraud Indicator (FI) is a binary variable indicating the presence (1) or absence (0) of fraudulent activities using z-score calculations, ε is the error term, representing the random variation in the model. The coefficients ($\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$) represent the change in the Fraud Indicator for a one-unit change in the respective independent variable, while controlling for the other variables in the model. This study's model, $FI = \beta_0 + \beta_1 RGR + \beta_2 NIM + \beta_3 EPS + \beta_4 DER + \varepsilon$, was adapted by combining elements from two existing models. The first model, FraudIndicator (FI) = $\beta_0 + \beta_1 RGR + \beta_2 NIM + \varepsilon$ (Jensen & Meckling, 2022), examined the impact of Revenue Growth Rate (RGR) and Net Interest Margin (NIM) on fraud detection in the banking industry. The second model, FraudIndicator (FI) = $\beta_0 + \beta_1 EPS + \beta_2 DER + \varepsilon$ (Ross, 2022), investigated the role of Earnings Per Share (EPS) and Debt-to-Equity Ratio (DER) in identifying fraudulent activities in financial statements. By incorporating all these variables, our model aims to provide a more comprehensive approach to fraud detection, building on the insights from these two previous studies.

4.0 Results and Discussions

4.1 Data Analysis

Table 4.1: Descriptive Statistics

	FRD	RG	NIM	EPS	DER
Mean	0.250000	0.060536	0.328036	2.245536	0.117946
Median	0.000000	0.060000	0.325000	2.050000	0.100000
Maximum	1.000000	0.150000	0.420000	4.400000	1.400000
Minimum	0.000000	-0.020000	0.220000	0.950000	0.010000
Std. Dev.	0.434959	0.045675	0.052347	0.800072	0.133829
Skewness	1.154701	0.026195	-0.078653	0.716990	7.927810
Kurtosis	2.333333	1.911285	1.861259	2.859206	76.61770
Jarque-Bera	26.96296	5.544214	6.166889	9.688575	26464.51
Probability	0.000001	0.062530	0.045801	0.007873	0.000000
Sum	28.00000	6.780000	36.74000	251.5000	13.21000
Sum Sq. Dev.	21.00000	0.231568	0.304168	71.05277	1.988028
Observations	112	112	112	112	112

Source: E-views 10 Output

The yearly mean values for fraud detection, revenue growth, net interest margin, earnings per share, and debt-equity ratio are 0.250, 0.060536, 0.328036, 2.245536, and 0.117946 correspondingly. These selected commercial banks exhibit a mild level of fraud detection, as evidenced by their low revenue growth, low net interest margin, high level of earnings per share, and low risk exposure. The values, listed in ascending order, range from 0.0 to 1.0, -0.020 to 0.150, 0.220 to 0.420, 0.950 to 4.40, and 0.010 to 1.40. The standard deviations of fraud detection, revenue growth, net interest margin, earnings per share, and debt-equity ratio from their respective means are 0.434959%, 0.045675%, 0.052347%, 0.800072%, and 0.133829%. All variables, except for net interest margin, exhibit positive skewness. The skewness

values for the variables are as follows: 1.154701, 0.026195, 0.716990, and 7.927810. Net interest margin, on the other hand, is skewed to the left with a value of -0.078653. The kurtosis values for fraud detection, revenue growth, and net interest margin are below 3, making them platykurtic. The kurtosis value for earnings per share is approximately 3, classifying it as mesokurtic. The debt-equity ratio has a kurtosis value above 3, indicating that it is leptokurtic. The Jarque-Bera p-values for fraud detection, net interest margin, earnings per share, and debt-equity ratio are 0.000001, 0.045801, 0.007873, and 0.000000 respectively. This indicates that these variables are not normally distributed. On the other hand, revenue growth has a Jarque-Bera p-value of 0.062530, suggesting that it is normally distributed.

4.2 Stationary Test

Table 4.2: Levin, Lin & Chu (LLU) Stationarity Test

Variables	LLC Statistics	P-value	Remark
FRD	-5.26263	0.0000	I(0)
RG	-4.89488	0.0000	I(0)
NIM	-4.57178	0.0000	I(0)
EPS	-8.26811	0.0000	I(0)
DER	4.48079	0.0000	I(0)

Source: E-views10 output

Table 4.2 shows that all the variables were integrated at level I(0) with a 95% confidence interval. Therefore, we employ Panel Ordinary Least Square methods to examine the correlation between the

variables. Prior to proceeding, we employ the Hausman test to evaluate the appropriateness of using either Fixed or Random effect.

Table 4.3: Results of Hausman Test
Correlated Random Effects - Hausman Test
Equation: Untitled
Test period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	1.847240	4	0.7638

Period random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
RG	-9.356177	-9.662520	0.807947	0.7332
NIM	13.890147	13.827139	0.369822	0.9175
EPS	-0.476919	-0.456282	0.000373	0.2853
DER	-0.184511	-0.127815	0.010160	0.5738

Source: E-views 10 Output

According to the findings of the Hausman Test in Table 4.3, it can be inferred that the random effect model is more appropriate than the fixed effect model. This is due to the Chi-square p-value of 0.7638, which does not reach statistical

significance at the 0.05 level. Therefore, this study employs the random effect approach to analyse data, acquire results, and offer recommendations.

Table 4.4: Random Effect Panel OLS

Dependent Variable: FRD

Method: Panel EGLS (Period random effects)

Date: 06/23/24 Time: 22:51

Sample: 2007 2022

Periods included: 16

Cross-sections included: 7

Total panel (balanced) observations: 112

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RG	-9.662520	3.404383	-2.838259	0.0054
NIM	-13.82714	2.824741	-4.895010	0.0000
EPS	-0.456282	0.081414	-5.604439	0.0000
DER	-0.127815	0.268498	-0.476036	0.6350
C	-2.661196	0.741997	-3.586530	0.0005
Effects Specification				
			S.D.	Rho
Period random			0.000000	0.0000
Idiosyncratic random			0.371605	1.0000
Weighted Statistics				
R-squared	0.564390	Mean dependent var	0.250000	
Adjusted R-squared	0.540629	S.D. dependent var	0.434959	
S.E. of regression	0.353194	Sum squared resid	13.34781	
F-statistic	15.33555	Durbin-Watson stat	2.327058	
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.564390	Mean dependent var	0.250000	
Sum squared resid	13.34781	Durbin-Watson stat	2.327058	

Source: E-views 10 Output

Revenue growth is negative (-9.662520) and significant (0.0054) to fraud detection. This indicates that a 1% increase in revenue growth will result in a corresponding decline in fraud detection of 9.662520%. The impact of net interest margin on fraud detection is positive (13.82714) and significant (0.0000). This means that increasing the net interest margin by one unit will result in a corresponding increase of 13.82714 units in fraud detection of banks in Nigeria. The effect of earnings per share on fraud detection is negative (-0.456282) and significant (0.0000). This implies that a one-unit increase in the earnings per share of banks will result in a corresponding decrease of 0.456282 units in fraud detection among banks in Nigeria. Debt-equity ratio is negative (-0.127815) and insignificant (0.6350) to fraud detection in Nigeria. This implies that a one-unit increase in the debt-equity ratio of banks will result in a corresponding decrease of 0.127815 units in fraud detection among banks in Nigeria.

The Adjusted R-square value of 0.540629 indicates that the explanatory variables explained 54.1% of the variations in fraud detection, while the remaining 43.9% can be attributed to other factors not considered in this study. The F-statistic p-value of 0.000000 indicates that the model is of good fit. In addition, the Durbin-Watson statistic of 2.327058 indicates that the model does not exhibit first-order autocorrelation.

4.2 Discussion of Findings

The significant but negative relationship between revenue growth rate and fraud detection found by this study agrees with the findings of Ojo (2020) and Adeniyi (2017). This finding indicates that as banks' revenue grows, their ability to detect fraud diminishes. This could stem from the increased complexity and scale of operations, which can overwhelm existing fraud detection systems (Kolapo & Olaniyan, 2018). Larger banks with higher transaction volumes face more challenges in scrutinizing every transaction, leading to potential lapses in fraud detection (Adeyemi & Fagbemi, 2016).

The study also found a significant and positive relationship between Net Interest Margin (NIM) and fraud detection, in line with the findings of Akintunde & Oladipo (2017), and Olowe (2018); suggests that as the Net Interest Margin increases, the likelihood of fraud detection also increases. This could imply that banks with higher Net Interest Margins may be more likely to detect fraudulent activities, possibly due to their stronger financial position, better risk management practices, or more effective internal controls (Oke, 2015).

The study also found a significant but negative relationship between earnings per share and fraud detection. This finding tallies with that of Ojo & Oke

(2019). A decrease in earnings per share corresponds to an increase in the detection of fraud. This could be due to the fact that lower earnings might prompt more rigorous financial reviews and audits, uncovering fraudulent activities that might have otherwise gone unnoticed (Adeniyi & Fagbemi, 2018).

The debt-to-equity ratio does not have a significant impact on fraud detection in Nigerian banks (Kolapo & Olaniyan, 2018). This suggests that the level of debt relative to equity does not play a crucial role in the banks' ability to detect fraud. This could be due to the heavy reliance on debt in the Nigerian banking sector, where debt levels might be consistently high across the board, thus not providing a distinctive factor for fraud detection variations (Olowe, 2018).

5.0 Conclusion and Recommendations

The study concludes that financial metrics like revenue growth, net interest margin, and earnings per share influence fraud detection among deposit money banks in Nigeria. The study's findings lead to the following recommendations:

Deposit Money Banks (DMBs) should adopt an easier, less complex, but thorough technology-based mechanism for the recording and reporting of revenue growth, capable of detecting and responding to potential fraud faster and easily. Such mechanism could be a decentralized, blockchain-based fraud detection system that can handle increased complexity and scale of operations, and regularly review and update these systems to ensure they remain effective. Banks can also invest in advanced fraud detection software and hire experienced professionals to monitor and analyze transactions.

DMBs should maintain a healthy Net Interest Margin through effective risk management practices and internal controls, and utilize this strength to invest in fraud detection measures, including introducing a fraud detection incentive program tied to Net Interest Margin performance. By this, banks can prioritize risk assessment and management, allocate resources to enhance fraud detection capabilities, and develop a reward system that recognizes and incentivizes employees for their role in fraud detection.

DMBs should implement an artificial intelligence-powered earnings analysis tool to detect anomalies and potential fraud, regularly review financial statements, and perform thorough audits to ensure accurate earnings reporting. This will enable the banks to collaborate with AI experts to develop a machine learning algorithm that analyzes earnings data, identifying unusual patterns and alerting auditors to potential fraud. Banks can also establish a culture of transparency and accountability, conducting regular internal audits and engaging external auditors to ensure accurate financial

reporting and detect fraud.

The banks should maintain a healthy debt-to-equity ratio through prudent lending practices and effective risk management, and introduce a dynamic debt-to-equity ratio adjustment mechanism that responds to changes in fraud detection needs. Consequently, banks could focus on responsible lending, monitor debt levels, and maintain a balanced debt-to-equity ratio to ensure financial stability and resilience. They can also develop a system that periodically assesses fraud risks and adjusts the debt-to-equity ratio accordingly.

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