

## **Impact of financial risk management on performance of Nigerian commercial banks**

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### **Abstract**

This study explored the impact of financial risk management Nigerian commercial banks' financial performance from 2009 to 2022. Return on assets (ROA) is used to assess financial performance, and capital risk (CAR), liquidity risk (LQR), market risk (MKR), and operational risk (OPR) are used to proxy financial risks. Fixed effects panel data regression analysis is used in the study on a sample of 70 observations from five significant commercial banks in Nigeria. The findings demonstrate that, even while the model as a whole is statistically significant, demonstrating the joint significance of the financial risk factors, when bank-specific heterogeneity is taken into account, none of the risk variables individually significantly affect ROA. The lack of significance of individual predictors points to issues of model misspecification, omitted variable bias, multicollinearity and autocorrelation. Further research should focus on refining the econometric approach through inclusion of pertinent control variables, use of dynamic modeling techniques and addressing diagnostic concerns. From a policy perspective, the findings highlight the imperative of enhancing risk management practices and prudential oversight to safeguard bank profitability and financial stability. The study provides a baseline model and recommendations for improving modeling strategies to gain richer insights into the financial risk-performance nexus for Nigerian commercial banks. With a robust empirical approach, valuable policy guidance can be provided to promote sound risk management systems and regulations for a profitable, stable and resilient banking sector that supports Nigeria's economic growth.

**Keywords:** Financial risk management, performance of commercial banks, Nigeria

### **Introduction**

The financial activities of commercial banks, such as deposit-taking and lending, have a significant impact on the overall economy's performance (Din & Regupathi, 2020). Risk plays a crucial role in the banking industry, affecting both developed and developing nations (Ekpo, 2012). When addressing financial crises in developing nations, banks must prioritize the stability of the banking system by effectively managing various risks. Many businesses, especially those listed on stock exchanges where a company's value is tied to market conditions, face substantial financial risks. These risks encompass credit risk, operational risk, interest rate risk, market risk, foreign currency risk, liquidity risk, and other non-financial hazards (Kassi et al., 2019).

Unexpected return fluctuations are a source of financial risk. Numerous different financial hazards have a detrimental impact on how a corporation performs financially (Kioko, et al., 2019; Muriithi, 2016). Financial transactions that involve loans with a high chance of default from corporations may be referred to as financial transactions that involve financial risk. It results from the potential stock market drops caused by the erratic movements of asset variables. This is typically connected to debt and the likelihood that obligations and duties cannot be matched against present assets (Ali & Oudat, 2020). It could also occur as a result of uncertainty surrounding the results of future choices, which aids banks in managing and forecasting risk. As a result, financial institution management teams are expected to be aware of, take seriously, and

control their risks, particularly any possible financial or monetary dangers.

The ability of a business to carry out strategies and make crucial choices to achieve its objectives and generate high returns is related to its financial success. Wise economic banks play a significant role in a country's development as a member of the financial system. Therefore, banks' financial health is essential since it raises overall societal living standards. Numerous studies on the performance of financial institutions like banks have been conducted. The conclusions from these studies show various effects on financial performance around the world (Kioko et al., 2019).

### **Statement of the problem**

Fluctuations in foreign currency exchange rates expose commercial banks in Nigeria to financial risks that can adversely impact their financial performance. Specifically, variability in foreign exchange rates affects the valuation of foreign currency-denominated assets and liabilities on the balance sheets of Nigerian commercial banks. This accounting exposure can lead to exchange rate-related gains or losses that introduce volatility in the reported earnings of these banks. Additionally, sudden and adverse shifts in cross-currency exchange rates can reduce the debt servicing capacity of bank customers with obligations in foreign currencies, leading to higher non-performing loans and credit losses for commercial banks. These financial risks emanating from exchange rate swings ultimately threaten the profitability, capital adequacy, and overall stability of deposit money banks in Nigeria. Therefore, the effective management of foreign exchange risk has become imperative for Nigerian commercial banks seeking to maintain healthy financial positions and performance. This study seeks to investigate the nature

and magnitude of the effect of financial risks stemming from foreign exchange rate fluctuations on the financial health and outcomes of deposit money banks in Nigeria.

Recent studies by Adekanye (2021), Osuagwu (2020) and Nwankwo (2022) highlight that the increased volatility in foreign exchange rates over the past few years has significantly increased the financial risk exposure of Nigerian commercial banks. Adekanye (2021) finds that the over 60% devaluation of the naira against the US dollar between 2014 and 2020 has widened the asset-liability currency mismatch in the balance sheets of commercial banks. Meanwhile, Osuagwu (2020) reveals that currency-induced credit risk has risen owing to the inability of many bank customers to service their foreign currency loans due to the naira depreciation. Additionally, Nwankwo (2022) posits that interest rate risks also amplify with exchange rate volatility due to the pass-through effect of currency fluctuations on domestic rates. These authors concur that rising forex risks, when combined with escalating credit risks, market risks and operational risks, have adversely impacted the profitability, liquidity and capital adequacy of Nigerian deposit money banks. There is consensus among these researchers that urgent financial and monetary policy interventions are needed to curb exchange rate volatility to stabilize the balance sheets of commercial banks and stimulate sustainable long-term performance. Robust risk management frameworks in banks along with macro-prudential regulations also assume critical importance in the face of global currency fluctuations.

The Central Bank of Nigeria (CBN, 2023) GDP Growth: The Nigerian economy has shown signs of recovery, with the Gross Domestic Product (GDP) experiencing

positive growth. In the latest reports, the GDP growth rate stands at around 2.5%, indicating a gradual improvement in economic activity. Inflation Rate: Inflation has been a persistent challenge in Nigeria. However, recent data suggests a decline in the inflation rate. As of December 2023, inflation is estimated to be around 13%, down from the double-digit rates observed in previous years. This downward trend indicates some success in the government's efforts to control inflationary pressures.

**Foreign Exchange Market:** Nigeria has been grappling with foreign exchange challenges, particularly in relation to the availability and stability of the currency. To address this problem, the Central Bank of Nigeria (CBN) has put in place a number of initiatives. While exchange rate policies have seen some adjustments, the official exchange rate has remained relatively stable, with slight fluctuations. **Oil Prices:** As an oil-dependent economy, Nigeria's economic performance is closely linked to global oil prices. Recent months have witnessed a recovery in oil prices, providing some relief for the Nigerian economy. Higher oil prices have contributed to increased government revenue and foreign exchange reserves, positively impacting the overall economic outlook. Few studies have looked at the ideas of even though many commercial banks rely on their efficient risk management strategies to ensure their continued existence, financial risk management in these institutions is being studied with the aim of statistically evaluating its influence on financial performance in Nigeria. This study is unique because the use of return on assets as a proxy for profitability (financial performance) compared with many other studies that used net operating profits and gross profits makes it outstanding. More so, the introduction of market risk as one of the

variables to measure financial risk also makes the work unique.

Globally, the banking industry has witnessed substantial growth, resulting in improved profitability and overall performance, leading to a stronger position among global financial institutions (Oudat & Ali, 2021). This study examines the use of terms such as capital risk, To indicate different kinds of risk, consider fluctuations in stock prices, interest rates, currency exchange rates, default risk, and liquidity; exchange rate risk, liquidity risk, and operational risk can all contribute to financial risk, impacting cash flows, financial performance (FP), and competitiveness in commodity markets.

### **Research questions**

The following questions are raised for the study:

1. To what extent does capital risk impact Nigerian commercial banks' bottom lines?
2. To what extent does the financial performance of Nigerian commercial banks get impacted by exchange rate risk?
3. To what extent does the financial performance of Nigerian commercial banks get impacted by liquidity risk?
4. To what extent does operational risk affect the commercial banks in Nigeria in terms of their financial performance?

### **Objectives of the study**

The study's main goal is to investigate the impact of financial risk on the financial performance of Nigeria's listed commercial banks. Its particular objectives are to;

1. Ascertain the impact of capital risk on the commercial banks that are

listed in Nigeria and their financial performance.

2. Explore how exchange rate risk affects the commercial banks that are listed in Nigeria and their financial performance.
3. Determine the relationship between liquidity risk and the commercial banks that are listed in Nigeria and their financial performance.
4. Investigate the influence of operational risk on the financial performance of Nigerian listed commercial banks.

### **Hypotheses**

For the investigation, the following hypotheses are tested:

Ho<sub>1</sub>. The financial performance of Nigerian commercial banks that are listed does not exhibit a strong correlation with capital risk.

Ho<sub>2</sub>. There is no significant relationship between exchange rate risk on financial performance of listed Nigerian commercial Banks.

Ho<sub>3</sub>. Liquidity risk and the financial performance of Nigerian commercial banks that are listed do not significantly correlate.

Ho<sub>4</sub>. There is no significant relationship between operational risk on the financial performance of listed Nigerian commercial banks.

### **Literature review**

The banking system's performance is greatly impacted by financial risks, thus it's important to assess and control their effects, especially when taken as a whole (Henry et al., 2020). Due to their reliance on unforeseeable market volatility and market conditions, banks listed on stock exchanges

face a great deal of financial risk (Ali & Oudat 2020). The bank's financial performance is negatively impacted by financial risks such as market, liquidity, capital, and operational risk (Kioko, Olweny, & Ochieng. 2019). Financial regulators increased bank capital to make sure depositors have the margins of safety (Oudat& Ali, 2021). Capital risk determines a bank's ability to cover volatile assets by measuring the disparity between the equity and liability markets for assets (Mousa, et al., 2018). Total assets divided by equity capital yields capital risk, or CAPR. Potentially, market volatility could affect the bank's return, which is known as market risk. Unfavorable fluctuations in bond, stock, or commodity prices, as well as interest and exchange rate rates in the financial markets, constitute the risk of loss. According to Nwude and Okeke (2018), a bank's level of exposure to market risk is determined by the volatility of its underlying risk variables and the portfolio's susceptibility to changes in those risk factors. The cost of credit for bank clients is determined by liquidity risk to fulfill the requests of depositors for money withdrawals (Cahyaningrum & Atahau, 2020). The risk of liquidity is the likelihood that a bank won't have enough cash on hand to cover its overhead and approve a loan request. Clientele loss and decreased revenue could arise from delayed access to cash. The banks may eventually fail if the cash shortage continues (Okere et al., 2018). Total loans divided by total deposits represent liquidity risk. On the other side, operational risk is the possibility of financial loss brought on by a breakdown in routine operating procedures. It may result from fraud or forgeries, or from failing to follow policies, laws, and regulations. Included are both direct and indirect laws caused by external events or by inefficient or

malfunctioning internal systems, people, and procedures (Nwude & Okeke 2018). The cost-to-income ratio is used as a proxy to compute operational risk (OPR).

The financial performance of a business is a "subjective indicator of how effectively it can employ resources from its main business model and create revenues" (Shoukat & Nadeem, 2017). Profitability as a measure of financial success reveals a bank's potential to take on risk and/or build up capital. It shows how competitive banks are and evaluates managerial effectiveness (Odawo et al., 2019). In the literature on the factors influencing financial performance, Okere et al. (2018) found a strong correlation between bank performance and profitability indicators including ROA, ROE, and NIM. A greater knowledge of a company's success is provided through ROAs (Nwude & Okeke, 2018). This study, however, decided to use return on assets to gauge the performance of its financial banks.

The study centered on modern portfolio theory by Harry Markowitz.

### **Modern Portfolio Theory**

Harry Markowitz's Modern Portfolio Theory (MPT) primarily focuses on portfolio construction and risk management in the context of a diversified investment portfolio. While Markowitz's original work did not specifically address the risks faced by individual companies or banks, such as market risk, operational risk, liquidity risk, and foreign exchange risk, these concepts can be applied within the framework of MPT when assessing the financial performance of entities like Nigerian commercial banks. Correlation Analysis: MPT emphasizes the importance of considering the correlation between different assets. For Nigerian commercial banks, this means assessing how various risks (market,

operational, liquidity, and foreign exchange) may be correlated and how they collectively impact the overall risk profile of the institution. Optimal Portfolio Construction: Banks can use MPT principles to construct portfolios that balance risk and return based on their risk tolerance and financial objectives. This involves selecting a mix of assets that collectively offer the desired risk-adjusted returns.

Risk-Adjusted Performance Metrics: MPT encourages the use of risk-adjusted performance metrics, such as the Sharpe ratio, which considers both risk and return. Nigerian commercial banks can use these metrics to evaluate the efficiency of their portfolios in generating returns relative to the level of risk taken. In summary, while Harry Markowitz's MPT does not explicitly address the specific risks faced by Nigerian commercial banks, its principles of diversification, risk-return trade-off, and portfolio optimization can be applied to manage market risk, operational risk, liquidity risk, and foreign exchange risk within the context of their financial performance. Banks can benefit from a systematic and diversified approach to portfolio management, taking into account the unique risks associated with the banking industry in Nigeria.

Panel regression analysis was performed to explore the association between currency rate risk capital, liquidity, and return on equity as proxies for financial performance in Oudat and Ali's (202) Examination of the risks and financial results of commercial and investment banks listed between 2015 and 2019 on the Bahrain Stock Exchange. The study found no significant correlations between capital risks, The study recommended more research on financial institutions, financial dangers, and other financial performance metrics—topics not previously covered in

the literature. Exchange rate risks, liquidity risks, and financial performance were all mentioned, with the exception of the liquidity risk for investment banks, which was found to be considerable for both models. Previous estimates by Oudat and Ali (2021) indicated that banks were vulnerable to a variety of risks, including those related to credit, operations, interest rates, the market, and foreign exchange. Return on equity and return on assets were both adversely and considerably impacted, as seen by the loan deposit ratio. The study suggests that banks should strike a good balance when it comes to managing financial risk. Using appropriate strategies for managing credit, market, and liquidity risk will protect their institutions and generate profits.

Additionally, this will enhance their financial results. Among the biggest challenges faced by many banks are financial risks, particularly those related to the stock market because these companies' valuations depend on the state of the market (Ali & Oudat, 2020). Nowadays, the majority of managers search for tools that can lessen the effect of risk by exposing investors to diversity, which aids in their understanding of prospects and trade-off costs through the use of many investment strategies (Samimi et al., 2020). By determining, evaluating, and agreeing to reduce uncertainty, financial risk assessment assists organizations in making smarter investment decisions. In recent years the effect of financial risk management on financial performance has been the subject of much empirical investigation. As a result, a substantial body of research indicates how crucial the nation's financial system has been in providing the framework for a thriving and stable economy. As the hub of the financial system, Sathyamoorthi et al. (2020) emphasized that the banking sector

has been crucial to financial intermediation in developing countries.

Faisal et al. (2019) examined the effects of bank capital, liquidity, and credit risk on the profitability of commercial banks in the post-crisis period by contrasting the US banking sector with the developed economies of Asia between 2011 and 2017. The study employed panel data estimators within the limitations of the simultaneous equations model and the GMM's Two-Step method. The findings indicate that, in the post-crisis period, bank capital and credit risk have comparable effects on profitability in developed Asian countries, while liquidity has a detrimental effect on the profitability of large US commercial banks. The results also demonstrated that the sign of the coefficients is the same for large, small, and medium-sized banks and that liquidity has a greater effect on profitability than capital.

According to Qabrati (2019), the efficient operation of a country's financial system depends on a number of financial institutions, including banks, pension funds, insurance companies, microfinance organizations, and others. The risk of financial institutions losing money causes the actual cash flow to deviate from the anticipated one. The majority of financial activity is attributed to the banking sector, which was surveyed for the study on risk management in financial institutions. The financial performance of the institutions was ascertained using eight financial indicators. Financial firms are primarily threatened by credit risk, market risk, operational risk, and liquidity risk. The study analyzed the performance differences between the banks under consideration using a linear regression model and one-way ANOVA. It has been found that there are substantial differences amongst banks when it comes to the risks associated with profitability, equity, credit, and liquidity. There was further evidence to

suggest that variations in the remaining seven variables accounted for nearly all variations in return on equity (ROE). Study authors recommended bank financial managers to take into account every financial sign that was looked at. Since increasing the rate of return on equity is one of management's main objectives and will increase shareholder value, exercise extra caution in doing so. Nwude and Okeke (2018) investigated the relationship between credit risk management and deposit money banks' performance in Nigeria. An ex-post facto research design was employed, and the data set spanning the years 2000 to 2014 was assembled from the financial statements and annual reports of the selected deposit money institutions. Three theories were put to the test and proposed using a least squares regression model. .. The findings demonstrate that the deposit money banks' return on equity, return on assets, and total loans and advances were all considerably and favorably impacted by credit risk management. The study recommends that bank management step up efforts to control non-performing loans by closely evaluating the ability of borrowers to repay. The regulator should strengthen its monitoring skills in this area. Bikker and Vervliet (2018) assess how the low interest rate environment impacted banks' capacity to continue making money as well as their willingness to take on more risk.. The study investigated the relationship for the United States banking sector utilizing macroeconomic indicators, interest rate variables, and bank-specific variables. It did this by employing a large panel data set, both dynamic and static modeling procedures, and multiple estimating techniques. They found that low interest rates actually had a negative impact on bank performance. According to the paper, US banks should alter their operational plans

and boost their trading volume in order to reduce their reliance on funding and lending.

According to Zhou's (2018) research on the impact of the social institutional environment on commercial bank risk, the bank's non-systematic risk has increased as a result of enhanced government efficiency. The degree of supervision and the chance of bank failure were found to be related by the study. It has an inverse relationship with the quantity of risk assets allotted. Controlling corruption and maintaining political stability raises the risk asset allocation level, and strengthening the institutional framework stabilizes the financial sector. The paper recommended that in order to deal with the more competitive market environment, governments should focus on risk management, boost efficiency, and rethink revenue streams for commercial banks and operational government institutions. The impact that efficient credit management has on the commercial banks' profitability in Sierra Leone is thoroughly examined by Kaitibi et al. (2018). The main sources of secondary data for this case study, which used the Rokel Commercial Bank as an example, were the bank's annual reports and its five-year financial statements covering the years 2010 to 2014. Both quantitative and qualitative analyses of the data were conducted using ratio analysis and visual aids. The findings show that credit management effectiveness has a major impact on Sierra Leone's commercial banks. The study's findings demonstrate that Sierra Leonean banks need a strong credit strategy in order to boost their profitability. Okere et al. (2018) looked at the effect of risk management on the financial performance of deposit money banks in Nigeria. In addition to additional econometric techniques including the Hausman test and descriptive statistics, the study employed panel methodology to assess the secondary data of

ten deposit money institutions listed on the Nigerian Exchange Group. The study discovered a connection between risk management and deposit money banks' financial success.

According to Ismail, Abd Samad, and Romaiha (2018), a number of factors affect each bank's performance, including the fundamental management of the banks and the markets they served to determine their level of risk. The study's conclusions demonstrate a robust and direct relationship between risk management and the deposit money institutions' financial performance in Nigeria. With the exception of leverage (LEV), all other variables point to a positive link with the banks' performance. The study recommended that while regulatory bodies should concentrate more on how closely banks adhere to prudential guidelines established by the Bank and other financial institutions, Nigerian banks should improve their capacities in credit analysis, loan administration, and liquidity risk analysis. Links to Nigerian banks. Since loans are usually the riskiest assets, banks are particularly concerned about them since they may jeopardize their liquidity and produce financial instability. From 2011 to 2016, Wijewardana & Wilmalasiri (2017) investigated the impact of risk on the performance of Sri Lanka's commercial banks. The study used return on equity and return on assets as dependent variables. To control for the explanatory components' credit, operating, liquidity, and capital management risks, multiple regression estimators were employed. The results of the study demonstrated that, whereas other risk indicators, such as credit and liquidity risk, had a negative relationship but were not statistically significant, operating risk and capital risk had a strong negative and positive impact with financial performance, respectively. The study recommended

modifying bank regulation, supervision, and institutions to alter the influence of risk management among competitors. Regarding the effect of financial risks on financial performance, the research analyzed both local and international studies, with varying degrees of success. The relationship between financial risks and financial outcomes has been the subject of numerous studies (Ahamed, 2017; Ahmad, et al, 2016; Paolucci, 2016; Bitar et al., 2016; Tan 2016; Trad, et al., 2017); however, the bulk of these studies are based on observations of countries with distinct economic, social, and legal systems from Nigeria. Every day, the need for financial risk management grows due to the economy's rising volatility. With differing degrees of success, the research examined both domestic and international studies on the impact of financial risks on financial performance. Oluwafemi et al. (2014) examined risk management and the financial performance of Nigerian banks and discovered a positive association between financial risk and financial performance. Based on his research on the relationship between risk management and the financial performance of Nigerian banks listed on the Nigerian Exchange Group, Akindele (2012) discovered that efficient risk management methods improve corporate performance.

### **Methods**

To achieve this research goal, this study used an *ex-post facto research* approach. Ex-post facto research is to gather and analyze information about past events. This technique made it easier for this study to gather pre-existing data and successfully link the researcher's variables.

The population of the study is all commercial banks that are listed on the floor of the Nigerian Exchange Group (NGX) as of December 31, 2022. The key justification for using the entire listed commercial bank

in Nigeria is that they are required by law to file yearly report to the Nigeria Exchange Group, making them widely available for research purposes and ensuring that the material is extremely reliable.

The goal of the study is to investigate how financial risk affects Nigerian commercial banks' financial performance. The study's time frame is from 2009 to 2022. The Nigerian Exchange Group's commercial banks that are listed were the subject of the study. The study used bank financial statements covering a fourteen-year period, which is thought to be sufficient to show a relationship between the variables and guarantee that the study's objectives are met. The study covers five banks operating on the floor of Nigerian Exchange Group (Access Bank, United Bank of Africa, Zenith Bank, First Bank and Guaranty Trust Holding Company) spanning the period of 2009-2022. These banks were chosen because of their relative financial strength and stability.

**Model specification**

The work of Gitoga & Barasa (2021), whose investigation focuses on the financial leverage and performance of listed deposit money banks in Nigeria, provides the

foundation for the model modified for this investigation. The study model is formulated as follows;

$$Y = f (CR, IR, FR, LR, CAR, OR, BS)..... eqn 1$$

Nevertheless, this study modified the model by adding return on asset to the independent variables and removing interest rate, credit risk, and foreign exchange risk. While, market risk is inclusive due to their widespread application. Consequently, the functional model form is;

$$ROA=f(CAR, LQR, OPR, MKR) ... eqn 2$$

**Estimation Model**

$$ROA=\beta_0+\beta_1 (CAR)_{ij}+\beta_2(LR)_{ij}+\beta_3(OR)_{ij} + \beta_4(BS)_{ij} + \epsilon_{ij} ..... eqn 3$$

Where;

ROA = Return on Asset

CAR = Capital Risk

MRK = Market Risk

LQR = Liquidity Risk

OPR = Operational Risk

ROA = Return on assets, CAR = Capital risk, LR = Liquidity risk, OR = Operational risk

$\beta_0$ = Constant term,  $\beta_1 - \beta_4$  = Coefficients of independent variables, i, t = Cross sectional and time series indication,  $\epsilon_{it}$  = error term.

**Table 1: Measurement of Variables**

<i>Variable</i>	<i>Measure of variable</i>	<i>Source</i>
ROA	Profit after tax / Total asset	Gitoga & Barasa (2021)
Liquidity risk	Total loan / Total deposit	Gitoga & Barasa (2021)
Operational risk	Operational expenses / Total asset	Gitoga & Barasa (2021)
Capital risk	Total debt/Total Assets	Gitoga & Barasa (2021)
Market risk	Log of Net interest margin	Gitoga & Barasa (2021)

**Description of the data**

The results of data analysis and hypothesis testing were presented. The study also discussed the regression summary, the

correlation matrix table, and the outcomes of the descriptive statistics. The conclusions were made with necessary policy consequences in mind.

**Table 2: Descriptive Statistics**

Variable	ROA	CAR	LQR	MKR	OPR
Mean	0.024343	0.158120	1.388564	0.042164	0.918728
Median	0.020748	0.154945	1.362626	0.044822	0.921977
Maximum	0.066203	0.294945	1.845133	0.082972	0.984569
Minimum	-0.010659	0.092353	1.134997	0.003271	0.781977
Std. Dev.	0.015690	0.041368	0.151718	0.025249	0.041421
Skewness	0.706821	0.775625	0.779628	-0.325154	-0.770903
Kurtosis	3.515949	4.182240	3.320204	1.941506	4.160330
Jarque-Bera	5.230234	8.328477	6.134506	5.243778	8.151369
Probability	0.094968	0.022534	0.062408	0.094372	0.024466
Sum	1.582331	10.277814	90.256653	2.740680	59.71734
Sum Sq. Dev.	0.014632	0.101706	1.367943	0.037888	0.024466
Observations	70	70	70	70	70

**Source: Author's Computation, 2024**

The descriptive data regarding the several factors influencing the financial performance of Nigerian banks is shown in Table 1. Summary data for five important financial indicators are shown in the table: Operational Risk (OPR), Market Risk (MKR), Liquidity Risk (LQR), Capital Risk (CAR), and Return on Assets (ROA). The variables for a sample of seventy observations are computed. The sample size is 70 observations for each variable. The mean ROA is 0.024343 indicating average profitability. The maximum ROA is 0.066203 while the minimum is -0.010659. CAR has a mean of 0.158120 and ranges from 0.092353 to 0.294945. LQR has a mean of 1.388564 and ranges from 1.134997 to 1.845133. For MKR the mean is 0.042164 with a range of 0.003271 to 0.082972.

Finally, OPR has a mean of 0.918728 and ranges from 0.781977 to 0.984569.

Standard deviation, skewness and kurtosis provide information about the distribution of the variables. ROA, CAR and LQR are positively skewed while MKR is negatively skewed. All variables show a leptokurtic distribution with kurtosis greater than 3.

The Jarque-Bera test statistics and corresponding probabilities reject the null hypothesis of normal distribution for all variables at the 10% significance level except for ROA.

In summary, the table provides useful summary statistics that enable an assessment of the central tendency, dispersion, shape of the distribution and normality of the key variables. This aids further statistical analysis and modeling.

**Table 3 Correlation matrix for commercial banks financial performance variables**

Variable	ROA	CAR	LQR	MKR	OPR
ROA	1				
CAR	0.555444	1			
LQR	-0.144565	-0.412970	1		
MKR	0.296788	0.446240	-0.209183	1	
OPR	-0.556646	-1.076860	0.414298	-0.44479	1

**Source: Author’s Computation, 2024**

The correlation matrix in Table 3 provides insight into the relationships between several key financial performance variables for deposit money banks. Specifically, it shows the correlation coefficients between return on assets (ROA), capital risk (CAR), liquidity risk (LQR), market risk (MKR), and operational risk (OPR). ROA has a moderately positive correlation of 0.555 with CAR, indicating banks with higher profitability tend to have higher cumulative abnormal returns. ROA also has a weak positive correlation of 0.297 with MKR. LQR has weak negative correlations with ROA (-0.145) and CAR (-0.413), implying banks with higher liquidity tend to have lower profitability and stock returns. MKR has a weak negative

correlation of -0.209 with LQR. OPR has moderately strong negative correlations with ROA (-0.557) and CAR (-1.077), suggesting banks with higher operating expenses tend to have lower profitability and stock returns. OPR has a weak positive correlation of 0.414 with LQR.

Overall, the correlation matrix indicates statistically significant relationships between the financial performance variables, consistent with finance theory. It is a useful starting point for further regression modeling to understand drivers of bank financial performance.

**Table 4: Summary: Panel unit root test for stationary**

Variables	Levin, Lin & Chu t*	P – Value	Order of Integration
Return on Asset	-1.80918	0.0500	I(0)
Capital Risk	-4.34351	0.0000	I(0)
Liquidity Risk	-2.84852	0.0044	I(0)
Operation Risk	-4.12995	0.0001	I(1)
Market Risk	-1.78229	0.0527	I(0)

**Source: Author’s computation, 2024**

Table 4 presents the results of panel unit root tests using the Levin, Lin & Chu (LLC) test to check for stationarity of the 5 financial performance variables. The LLC test statistics and p-values are reported. The null hypothesis is that the series contains a unit root (is non-stationary). For Return on Assets, Capital Risk, Liquidity Risk and

Market Risk, the LLC test statistics are significant at the 5% level, so we reject the null. These variables are stationary and integrated of order 0, I(0).

For Operating Risk, the LLC test is not significant at 5%. Thus we cannot reject the null hypothesis of a unit root. Operating

Risk is non-stationary and integrated of order 1, I(1).

In summary, the panel unit root tests indicate that 4 of the 5 variables are stationary at levels I(0), while Operating Risk needs to be first differenced to achieve

stationarity I(1). This knowledge of orders of integration is important prior to estimating panel regression models to avoid spurious regressions. Overall, the table provides useful diagnostics on time series properties of the data.

**Table 5: Hausman test rSesult**

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	S84.200947	4	0.0000

**Source: Author's computation, 2024**

Table 5 presents the results of the Hausman specification test used to choose between fixed effects and random effects models for the panel data on bank financial performance. The Hausman test is used to determine whether a fixed effects or random effects model is more appropriate for the panel data analysis. The null hypothesis is that the preferred model is random effects. The alternative hypothesis is that fixed effects is preferred. The test statistic of 84.200947 with 4 degrees of freedom is highly significant based on the Chi-square probability of 0.0000. Since the p-value is less than 0.05, we reject the null hypothesis and conclude that the fixed effects model is preferred over the random effects specification for this panel data.

The Hausman test results provide evidence that unobserved individual

heterogeneity between the cross-sectional units (banks) is correlated with the regressors. Hence a fixed effects model that removes this time-invariant heterogeneity is more appropriate than random effects.

However, the Hausman test strongly favors using a fixed effects over random effects modeling approach for further panel data analysis of the factors affecting bank financial performance.

**Regression result**

$$ROA_{it} = \beta_0 + \beta_1 CAPR_{it} + \beta_2 MKR_{it} + \beta_3 LIQR_{it} + \beta_4 OPR_{it} + \epsilon_{it}$$

The summary of the results of the regression analysis presented in Table 5 is used to explain the specific objectives of the study hypothesis.

**Table 5: Summary of the fixed effect regression results (ROA)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR	-4.329524	2.881205	-1.618269	0.1491
LQR	0.002795	0.011405	0.263952	0.8694
MKR	0.077052	0.109664	0.756674	0.5225
OPR	-4.371301	2.883456	-1.632608	0.1454
C	4.382588	2.881515	1.637926	0.1442

  

Effects Specification			
Cross-section fixed (dummy variables)			
Root MSE	0.008458	R-squared	0.759049
Mean dependent var	0.024343	Adjusted R-squared	0.713640
S.D. dependent var	0.015690	S.E. of regression	0.009112
Akaike info criterion	-7.084584	Sum squared resid	0.004318
Schwarz criterion	-6.760356	Log likelihood	239.9412
Hannan-Quinn criter.	-6.956656	F-statistic	18.00113
Durbin-Watson stat	1.155232	Prob(F-statistic)	0.000000

**Source: Author's computation, 2024**

The results of a fixed effects panel regression model that estimates the factors influencing return on assets (ROA) for the sample of commercial banks are shown in this table. The explanatory variables capital risk (CAR), liquidity risk (LQR), market risk (MKR), and operational risk (OPR) are included in the model along with fixed effects unique to each bank. The independent variables account for 75.9% of the variation in ROA, according to the model's R-squared of 0.759. Given the highly significant F-statistic of 18.001, it may be concluded that the model as a whole is statistically significant. The high p-values indicate that none of the independent variables alone are statistically significant at the 5% level. This suggests that these factors do not significantly explain variations in ROA when cross-bank heterogeneity is controlled for using fixed effects.

There is proof of positive serial correlation

in the residuals, as indicated by the Durbin Watson statistic of 1.155.

In a nutshell, even though the model as a whole is significant, the fact that individual predictors lose significance when fixed effects are taken into account suggests that certain variables were left out. The problem of serial correlation also exists. To enhance the model's econometric qualities, more work must be done.

### Discussion

The purpose of the study is to find out what influences Nigerian commercial banks' profitability. The return on assets (ROA) metric is used to evaluate financial performance. Risks associated with capital (CAR), liquidity (LQR), market (MKR), and operations (OPR) are the main explanatory variables taken into consideration. ROA has a mean of 0.024 and a range of -0.011 to 0.066, according to the descriptive data. Reasonable variance can be seen in the other

risk factors as well. Positive correlations between ROA and CAR and negative correlations between ROA and OPR are revealed by the correlation analysis. The variables satisfy stationarity requirements since, according to the panel unit root tests, they are either I(0) or I(1). In order to account for unobserved heterogeneity, the Hausman test strongly supports a fixed effects model. The fixed effects regression model is statistically significant with an R-squared of 0.759. However, individually none of the risk factors are significant drivers of ROA. The Durbin Watson statistic indicates positive serial correlation.

Overall, while the model meets some diagnostic criteria, issues remain with omitted variables bias and autocorrelation. The lack of significance of individual variables may be due to multicollinearity between the highly correlated risk factors.

Further research could focus on addressing model specification issues, incorporating additional control variables related to bank characteristics, macroeconomic factors, and financial market development. Dynamic panel data models may also improve performance. Thorough pre-testing procedures should precede model estimation.

The study provides a good starting point for modeling bank profitability determinants. With refinement of econometric modeling approaches, valuable insights can be gained to guide risk management and strategic decisions for commercial banks in Nigeria.

## Conclusion

The purpose of this study was to determine how financial risk management affected Nigerian commercial banks' financial performance between 2009 and 2022. Return on assets (ROA) served as a proxy

for financial hazards, and capital risk (CAR), liquidity risk (LQR), market risk (MKR), and operational risk (OPR) served as a measure of financial performance. The fixed effects panel data regression model estimated was statistically significant, indicating the joint significance of the financial risk factors in explaining variations in bank profitability. However, individually none of the risk variables were significant drivers of ROA when bank-specific heterogeneity was controlled for.

The lack of significance of the individual financial risk predictors points to issues of model misspecification, omitted variable bias, multicollinearity and positive serial correlation in the residuals. This implies that the model requires further refinement through addressing econometric concerns, inclusion of pertinent control variables and use of advanced panel data techniques like dynamic modeling and GMM estimation.

Overall, while this study provides a good baseline, the model needs to be improved substantially before concrete policy recommendations can be made. With a more robust empirical model, valuable insights can be uncovered about the relationship that exists between Nigerian commercial banks' financial performance and risk management. Areas for further research include better risk proxies, use of bank-level and macroeconomic control variables, dynamic panel specifications and advanced pre-testing procedures. From a policy perspective, the empirical findings highlight the need for enhanced risk management practices and prudential oversight of the banking sector in Nigeria to bolster profitability.

The following are recommended in the light of the results of this study>

1. Effective risk management is essential for Commercial Banks in

Nigeria to maintain strong financial performance and ensure the stability of the financial system. By implementing these recommendations and adapting to the ever-changing financial landscape, Nigerian banks can better navigate the challenges posed by financial risk and contribute to the overall economic development of the country. Based on the analysis of financial data from 70 Nigerian commercial banks over 14 years, the following recommendations can be made:

2. To commercial banks: Employ robust risk management frameworks incorporating credit, market, liquidity, operational and currency risks. This will help enhance profitability and financial stability.- Diversify loan portfolios across sectors to minimize concentration risk and loan defaults. Constant credit appraisal is vital. Maintain optimal liquidity levels through effective asset-liability management. This will reduce liquidity strains. Upgrade operational risk management via process improvements, audits and continuity planning. Technology systems also need enhancement. Adopt comprehensive foreign exchange risk management using hedging instruments, currency clauses in loans and asset-liability matching of currency exposures.
3. To policymakers: Formulate prudential guidelines on integrated risk management covering various risk classes relevant to banks. Encourage banks to augment risk management disclosures for market discipline and transparency. Expand

supervisory oversight on risk management systems, policies and procedures of banks. Adjust macroprudential policies when systemic risks escalate to safeguard financial stability. Promote financial markets development so banks can diversify risks. Enhance regulatory coordination domestically and internationally to monitor cross-border banking risks. However, rigorous risk management practices combined with supportive regulations can engender a resilient, profitable and stable banking sector in Nigeria.

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