

Risk Management Impact on Deposit Money Banks' (DMBs') Performance in Nigeria

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DOI: 10.56201/ijbfr.v10.no4.2024.pg98.116

Abstract

This study analysis Risk Management Impact on Deposit Money Banks' (DMBs') Performance in Nigeria. Specifically, the study is an effort to analyse, ascertain, evaluate and explore the effects of credit risk, liquidity risk, operational risk, and capital risk respectively on return on equity of DMBs in Nigeria. Data were sourced from Central Bank of Nigeria (CBN) Annual Reports and Accounts and the Nigeria Deposit Insurance Corporation (NDIC) Annual Reports. Econometric techniques of Augmented Dickey Fuller Tests for Unit Roots and Ordinary Least Square (OLS) were used for the analysis. From the unit root test, it was discovered that the variables showed stationarity at level and first difference which necessitated the use of Autoregressive distribution lag (ARDL) the analysis. It was revealed that risk management has insignificant effect on the performance of DMBs within the study scope. Consequently, this study recommends that as the principal regulator for banks, the CBN should strengthen its regulatory framework to provide a best in practice approach to risk management. The DMBs are equally advised to equip their credit and risk management officers with risk management skills and competences. The CBN should equally carryout comprehensive and regular risk assessments while promoting risk awareness culture through their on-site and off-site supervisions.

Key Words: Risk Management, Bank Performance, Deposit Money Bank, Basel 11

Introduction

Banks are financial intermediaries licenced by the CBN governor under the Banks and other Financial Institutions Act (BOFIA) to carryout the business of Banking which includes collection of funds from the surplus units of the economy and channeling of such funds to deficit units at a profit for needed economic development. The economic growth and development of every economy depends on the activities of financial institutions principally banks. Banks are also pivotal in the implementation of government monetary policies (Abubakar, Nmanda & Kambai, 2023). The financial intermediary roles of banks comes with some elements of vulnerability in the financial system. The inherent dangers of the banks' performing these intermediary functions can be construed as the risks inherent in intermediation. The risks taken by the banks could result in unanticipated losses or in a happy outcome in the form of more income (Qudat & Alli, 2021).

Risk management is essential to the financial performance of banks since it aims to reduce financial losses brought on by the intermediate functions that banks play in the economy. Banks

are subject to many risks while conducting their business practices, such as credit risk, operating risk, interest rate risk, regulatory risk, market risk, liquidity risk, insolvency risk, and foreign exchange risk. This is due to the possibility of banks' collapse with losses to shareholders, depositors, and the economy should there be any failure to mitigate risks related to the banks' functions (Okeke, Okwo & Inyama, 2022). Banking is about taking and handling the risk, rather than preventing it (Chukwunulu, Ezebasili & Igbodika, 2019). Though risk taking is an integral part of banking, albeit, bank management should balance its risk and return to make adequate profit and remain a going concern, else, the bank, financial system and the economy at large may be adversely impacted; as was the case of the Asian Financial Crisis of 1997-1998 (Mohammed, Agbo & Yabagi, 2021).

Banks are susceptible to two categories of risks: financial and non-financial risks. Financial risks are a result of the business operations/transactions of the bank and can be further categorized into credit risk, market and liquidity risk. Non-financial risk on the other hand impact negatively on performance as a result of management failure, competitions, external factors etc. Non-financial risks mainly include operational risk, strategic risk and compliance risks (Fadun & Oye, 2020). **Credit risk** is a risk resulting from the consumers' failure to pay back their loans or the money they owe to the bank on time and in full (Adegbe & David, 2020). **Operating risk** is the risk of loss arising from entities, insufficient or ineffective internal processes, programs, or external actions. Many high-ranking losses in the financial industry have been attributed to operating risk. Operational failures have contributed to every catastrophic loss since 1990, including the 2007/8 crisis. Most often, however, fraud involves actions carried out independently by third parties, external to the institution but fraud detection systems have been used to great effect in the mitigation of operational risk (Fadun & Oye, 2020). **Liquidity risk** occurs when a bank is unable to match reductions in liabilities or funds capital increases, because of the growing liabilities, an illiquid bank cannot get sufficient reserves. Liquidity problem has played a crucial role in the world's financial crisis in the current scenario (Babarinde, 2021). In the banking industry, high liquidity risk exists when clients unnecessarily withdraw the deposits from banks. Besides, liquidity analysis is calculated from the positions in the balance sheet. Banks continue to keep the positive amount of their loans as critical funds in a central bank account that is used solely to collectively satisfy inter-bank commitments as co-contributor security (Ojalere, Aminul, Yusoff & Shamsuddin, 2018).

Market risks are risks outside the control of the banks and are determined by factors that affect the overall economy. In other words, market risks are external factors that affect internal operations of banks. Market risk generally comprises three lesser risks: stock price risk, interest rate risk and foreign exchange risk. Market risk in this study is measured using net interest margin (NIM) i.e. the difference between interests income and interest expense (Abubakar, Garba and Sulaiman, 2020). While Capital adequacy ratio refers to the amount of equity and other reserves against its risky assets and the reserve is kept to protect depositor from any unexpected loss (Babarinde, 2021). The financial performance (DMBs) plays a pivotal role in the growth and development of the economy of any country. This is because they have to manage huge volume of transactions. Accordingly, investors, capital market participants and other stakeholders need to understand the

financial performance of DMBs. The ability of DMBs to meet their existing financial obligations and operate efficiently, come with some associated financial risks. Financial performance evaluation tools like profitability, return on assets and economic value added are considered appropriate for Deposit Money Banks for the stakeholders' interest (Nataraja, Nataraja & Ganesh, 2018). According to Mashyekh, and Fallah (2021) financial risk threatens the financial stability and performance of the financial sector. Financial risk is defined as all risks which would generate volatility in a bank's reserves, expenses and the value of its business. If financial risk is not addressed systematically it can result into inconsistent performance and earnings for the stakeholders and impact banks' revenues and net worth sometimes with disastrous systemic consequences (Olalere, Aminul, Yusoff & Shamsuddin, 2018)

Returns on Equity (ROE) and the Returns on Assets (ROA) are used to assess bank performance and are very important to every stakeholder in DMBs. The returns are threatened by inherent risks faced by banks in their intermediation functions. It is therefore against this backdrop, that this researcher attempts to evaluate Risk Management Impact DMBs Performance in Nigeria.

Statement of the Problem

Effective risk management system has been a source of constant and unavoidable challenge to DMBs considering that financial intermediation is a risky business. This is a major concern to stakeholders including the regulatory authorities. It is sacrosanct that a strong and sustainable system for identifying, measuring, monitoring and controlling the spectrum of risks faced by DMBs is emplaced and continuously reviewed for value addition.

There are studies on banking sectors performance and associated risks. (Kanu & Isu, 2016), illustrated the effects of financial risks on the financial performance. Ugwu (2020) opined that most DMBs operating in Nigeria in an effort to perform got involved in multiple risks such as credit risk, liquidity risk and underfunding which made them to operate with capitalization of less than \$10 million. In spite of these studies, the performance and sustainability of DMBs profitability continue to nosedive to a point that the Nigerian DMBs reported losses recently at an alarming rate (Kanu & Isu, 2021). Problems of inconsistencies and financial risks and the level of non-performing loans in DMBs in Nigeria are unprecedented. Unfortunately, bank managers seem not bothered so long as their sub-optimality syndrome and personal interests are met. Some of these managers consistently engage in shady ventures at the expense of the shareholders, and possible adverse effects on the banks (Enofe, Ekpule, Onobun & Onyekweni, 2022).

Also, the problem of financial risks and the financial performance of DMBs is quite complex and unresolved, ranging from the problems of poor and inadequate profitability, problem of unsustainability, inability to create economic value for the shareholders' and meagre returns on assets due to poor utilization of the banks' available assets (Kanu & Isu, 2021). Lending credence to this, Olalere, Aminu, Yusoff and Shamsuddin (2018) opined that financial risks in DMBs is actually somewhat challenging and different from other risks facing banks, as it is not only systemic in nature, but asymmetric, reducing banks' financial and nonfinancial performances

resulting to losses, erosion of confidence of both investors and depositors alike. DMBs are riddled with problems of huge nonperforming loans, in-house fraudulent activities and high level of disposition of unprofessionalism among managers, coupled with inadequate board monitoring in line with best corporate governance among the executive and non-executive directors (Oyerogba, Ogungbade & Idode, 2022).

This study in recognition of the identified problems and challenges of DMBs over risks issues, will attempt to contribute to several discuss on the extant topic in order to expand knowledge by using the identified explanatory variables of financial risks such as credit risks, liquidity risks, operational risk, market risks and capital risks as they affect banks performance. Furthermore, the study is necessary to enrich researches on risk management and performance of deposit money banks since the wake of the banking sector consolidation in 2005 and the adoption of Basel II and III in Nigeria considering the roles of DMBs. Basel 111 provides global liquidity requirements to ensure banks can survive in acute stress situation with adequate, high quality liquid capital.

Review of Related Literature

Conceptual Review

Risk Management

Risk management is a process by which an organization identifies and analyses threats, examines alternatives, and accepts or mitigates those threats even before they begin to impede the activities of the organization (Abubakar, Nmanda & Kambai, 2023). In the CBN 2008 Supervisory Framework for Banks and other Financial Institutions in Nigeria, risk management is expressed as an independent function responsible for planning, directing and controlling the impact on the institutions of risks arising from their operations. This function may address certain areas including, identification of risks, development of measurement systems for risks, establishment of policies and procedures to manage risks, development of risk tolerance limits, monitoring positions against approved risk tolerance limits, and reporting of results of risk monitoring to senior management and the board (Okeke, Okwo & Inyama, 2022).

In risk management, the objective is not to eliminate risk, but to identify and estimate the costs. Risk management in itself is meaningless, because it is a metric that influences other conditions such as profit and efficiency (CBN, 2008). Banks' major role is intermediation between the funds owners and funds users by consolidating deposits from funds owners and converting them into loans for the use of funds seekers. It is in the process of performing this role that they get exposed to risks that threaten their liquidity, earnings and long term survival. Mohammed, Agbo, and Yabagi, (2021) reported that the commitment of banks to lend exposes them to unpredicted liquidity demands and the risk of not being able to adequately meet the cash needs of their customers. Adequacy of credit risk management is pertinent to the survival of any firm in the financial industry.

It is only an ideal risk management procedure that can help to reduce spending as well as the adverse effects of risks. For the financial institutions, risk management allows them to isolate and stop the dangers to which they are exposed (Fadun & Oye, 2020).

Credit risk

Bank credit is meant to be repaid at an agreed date. The prudential guidelines categorises credits as either performing or non performing. Non performing credits are the negative realities of credit risks which occurs due to customers' failure to service bank borrowed fund as well as interest charged on the loan. When customers are unable to settle their debts, these defaults result in losses that erodes a bank's capital. According to the Basel Committee on Banking Supervision (2001, p. 10), credit risk is the "risk of loss arising from default by a creditor or counterparty. Whenever a bank provides credit facility it is susceptible to credit risk (Ojalere, Aminul, Yusoff & Shamsuddin, 2018). The risks taken by banks could result in unanticipated losses or in a happy outcome in the form of more income (Qudat & Alli, 2021). Other types of risks include operating risk, interest rate risks, exchange rate risks, crime risk.

Credit risks are reflected on losses occasioned by the failure of a bank customer to effect the payment of interest and principal amount owed on time and in full. Mamari, Ghassani and Ahmed, (2022) asserts that credit risk is the probability that loan contracted to a customer could deviate from that which was expected in terms of fulfilling payment obligations. Basel committee on banking supervision-BCBS (1999) sees credit risk as a future threat to the financial strength of the financial sector. The deposit money banks are mandated to maintain certain minimum capital requirement as well as maintain proper leverage ratios to avoid or mitigate potential credit crisis. BCBS (1999) sees credit risk as the likelihood that counterparty (a bank borrower) will fail to meet its obligations in accordance with agreed terms. And that bank is gradually exposed to counterparty risk in several financial instruments such as loans, settlement of transaction, financial futures, options, swaps, interbank transactions and foreign exchange transactions.

Liquidity Risk

Banks owe depositors a duty to pay cleared or credit balances on their accounts on demand or as at when due in case of tenured deposits. The probability of a bank lacking operational cash for banking activities and settle the credit request of customers is seen as liquidity risk. Banks liquidity is measured by the liquidity ratio set by the CBN as part of its monetary policy and currently stands at 30%. Inability to have access to cash timely may lead to loss of customers and reduced earnings. If a banks illiquidity perseveres, such bank may end in ultimate collapse and liquidation by the NDIC. The ability of the bank to fulfill its obligations, primarily to depositors, is referred to as liquidity (Onsongo, et al 2020). Deposit money banks' liquidity risk is the possibility that they won't be able to pay their debts to depositors or fund asset growth when it becomes necessary without suffering unacceptable expenses or losses (Ismail et al., 2018). A bank may not have enough liquidity to cover its short-term financial needs when necessary (Mashyekh & Fallah, 2021). The inability to satisfy current cash obligations in a timely and cost-effective manner could have adverse impacts on the interests of shareholders, clients, and other stakeholders of the financial institution, which is known as liquidity risk (Mamari, et al 2022). It typically occurs when a company finds itself unable to convert its short-term assets or securities into liquid cash without suffering a loss of capital or income in the process. When an asset can be quickly and reliably turned into cash or income whenever the asset holder wants it, such asset is said to be

liquid (Enekwe et al., 2017). The main cause of liquidity risk is management's inability to properly foresee and plan for changes in funding sources and cash requirements (Awojobi, 2018; Iyinomen, et al., 2019). Liquidity risk is thought to be a reliable indicator of any severe market crisis (Acerbi & Scandolo, 2018). A bank that struggles with liquidity suffers some business possibilities loss. This will put a bank at a disadvantage relative to competition. Liquidity risk, which results from a bank's potential incapacity to absorb drops in liabilities or to finance growth on the assets side of the balance sheet, is therefore thought to be a significant internal factor influencing bank profitability (Okeke, Okwo & Inyiama, 2022).

Operational Risk

Operational risk is better understood using Basel 11. Basel II defines operational risk as 'the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events.' The Basel Committee addressed operational risk in its Core Principles for Effective Banking Supervision by requiring supervisors to ensure that banks have risk management policies and processes to identify, assess, monitor, and control or mitigate operational risk. In 2013, the Committee further provided guidance to banks for managing operational risk, in anticipation of the implementation of the Basel III Accord, which requires a standard and common measure for operational risks. However, application of gap analysis, action plan and strategies monitoring can help to address operational risk

Malfunctions of the information systems, reporting systems, internal monitoring rules and internal procedures designed to take timely corrective actions, or the compliance with the internal risk policy rules result in operational risks (Okeke, Okwo & Inyiama, 2022). Operational risk is an event risk: without an efficient tracking and reporting of risks, some important risks will be ignored, there will be no desire for corrective action and this can result in disastrous consequences. Changes in modern banking environment, such as increased reliance on sophisticated technology, expanding retail operations, growing e-commerce, outsourcing of functions and activities, and greater use of structured finance techniques that claim to reduce credit and market risk have contributed to higher levels of operational risk in banks (Bourse, Alia & Mohammad, 2020). Operational risk can also be classified as a variety of unsystematic risk, which is unique to a specific company or industry.

Operational risk is the risk of loss as a result of ineffective or failed internal processes, people, systems, or external events which can disrupt the flow of business operations. These operational losses can be directly or indirectly financial. For example, a poorly trained employee may directly lose the company a sales opportunity, or a company's reputation can suffer indirectly from poor customer service (Osadume & Ibenta, 2018).

Capital Adequacy Ratio

Capital adequacy ratio sometimes referred to as Capital to Risk Asset Ratio, is the ratio of a bank's capital to its risk assets. The capital adequacy ratio is calculated by dividing a bank's capital by its risk-weighted assets. Currently, the minimum ratio of capital to risk-weighted assets is 8% under

Basel II and 10.5% (which includes a 2.5% conservation buffer) under **Basel III**. High capital adequacy ratios are those that are higher than the minimum requirements under **Basel II** and **Basel III**.

A minimum capital adequacy ratio is critical in ensuring that banks have enough cushion to absorb a reasonable amount of losses before they become insolvent. The capital used to calculate the capital adequacy ratio is divided into two tiers. The two capital tiers are added together and divided by risk-weighted assets to calculate a bank's capital adequacy ratio. **Risk-weighted assets** are calculated by looking at a bank's loans, evaluating the risk and then assigning a weight. When measuring **credit exposures**, adjustments are made to the value of assets listed on a lender's balance sheet. All of the loans the bank has issued are weighted based on their degree of **credit risk**. For example, loans issued to the government are weighted at 0.0% because they are gilt edged, while those given to individuals are assigned a weighted score of 100.0%.

Theoretical Framework

The study is anchored on the shift ability idea as developed by Harold Moulton in 1915. The idea suggests that banks may defend themselves from large-scale deposit withdrawals by keeping credit instruments with a ready secondary market as a sort of liquidity reserve. The shiftability, marketability, or transferability of a bank's assets is a basis for assuring liquidity, according to this theory, which also makes that claim. This argument goes on to claim that a bank's holdings of highly marketable securities are a great source of liquidity. According to Dodds (2012), such assets must satisfy three requirements to ensure convertibility without delay and appreciable loss. The approach is predicated on the idea that holding assets that can be transferred or sold to other lenders or investors for cash helps a bank preserve its liquidity. Additionally, rather than relying on maturities to address their liquidity issues, these assets might be transferred to the Central Bank for cash in an emergency without suffering a significant loss (Ngwu, 2016). According to this theory, a bank's liquidity is preserved if it owns assets that may be transferred or sold to other lenders or investors in exchange for cash. This theory further explains that a bank's liquidity could be improved if it constantly had quality assets to sell and the Central Bank and discount market were willing to buy the asset being sold at a discount.

Dodds (2012) claims that the operations involved in getting funds from depositors and other creditors, as well as choosing the best mix of funds for a certain bank, are all included in the liquidity management theory. Several authors have critically analyzed the liquidity theory. The general assumption is that a bank may find it challenging to secure the needed liquidity during a period of distress as the market's confidence may have been substantially impacted and creditworthiness would unavoidably be missing. However, liabilities are a significant source of liquidity for a sound bank. The liquidity shift ability theory provides an explicit understanding of how liquidity risk affects financial performance using liquidity coverage and net stable funding ratios as stated by the new **Basel III** framework. The analysis of this study provides information as to whether liquidity maintained by commercial banks affects the returns to the shareholders.

Empirical Review

Catherine (2020) examined the influence of credit risk management on the Bank of Africa in Uganda using correlation and regression analysis. The return on assets and equity were used as proxy for profitability while the diversification of risks, control of credit risk, as well as appraisal of credit, form part of the independent variables in the study. The result from the study showed a positive and significant relationship between credit risk management components and financial performance in the Bank of Africa in Uganda.

Candy (2021) adopted survey research method to examined the role of enterprise risk management on rural banks' performance in Riau Island Provinces. Samples of 63 respondents were selected for the study. Questionnaires were administrated to the respondents for purpose of primary data gathering. Cho-square and regression analysis were used to analyze the data collected from respondents. The result showed that enterprise risk management enhances the rural banks' financial and non-financial performance and that the practice of enterprise risk management does well when the rural bank is well established.

Bourse, et al (2020) investigated financial risk and financial performance in listed Commercial and Investment Banks in Bahrain during 2014-2018 periods. The research covers 11 of the 18 banks in Bahrain from 2014 to 2018. The proxy for performance was return on assets. Regression analysis revealed that the relationship between exchange rate risk, liquidity risk, operating risk and banks' performance were non- significant. Findings also indicated a strong positive relationship exists between bank performance and capital risk.

Tassew and Hailu (2019) examined the effect of risk management on financial performance of commercial banks in Ethiopia from 2013 to 2017. A sample of 17 Commercial Banks listed on Addis-Ababa Stock Exchange was selected for the study. Quantitative research approach was applied using secondary data for the sample period covered from 2013 to 2017. The collected data were analyzed using panel random effect regression model. Results indicated that credit risk, liquidity risk, operating risk and market risks have significant negative impact on financial performance of commercial banks in Ethiopia.

Babarinde, et al (2021) examined the impact of liquidity risk management on financial performance of selected Deposit Money Banks in Nigeria from 2011 to 2017. The sample consist of ten (10) topmost deposit money banks listed on Nigerian Stock Exchange during the period. These banks were rated as the ten topmost Nigerian banks based on the credit score rating by Fitch rating and Bankers' magazine as at January 2017. Annual time series data was obtained from the annual reports and accounts of 10 banks and analyzed using panel data regression analysis. Findings showed that funding risk has negative and significant relationship with ROA. However, financing cost reported an insignificant positive relationship with ROA. Interest coverage ratio has a negative and significant relationship with ROA. However, capital adequacy ratio has a positive and significant relationship with ROA but loan loss provision showed a negative and insignificant relationship with ROA. Similarly, non-performing loan has a negative effect on banks' ROA.

Mamari, et al (2022) studied the relationship between risk management practices and a bank's financial performance in Oman in 2020. The study was conducted using time series data obtained from the annual reports of eight (8) banks listed on Muscat Stock Exchange during the period. Structural Equation Modelling and Partial Least Square PLS regression analysis were used to examine the data. Findings show that risk management has a significant relationship with the return of assets, but no significant relation to return of equity. This result indicated that management has a significant influence on banks performance.

Enesik and Micah (2021) studied the relationship between audit quality indicators and market price per share of listed deposit money banks in Nigeria from 2006 to 2019. Audit quality was measured with audit fees, audit tenure and audit firm size while market price per shares was measured with Tobin's Q. Fourteen (14) deposit money banks listed in Nigeria during the period constituted the population of the study. Twelve (12) of these banks were selected using Judgmental sampling techniques. The data collected from the banks were analyzed using descriptive statistics, panel least squares regression. Findings suggest that audit fees have negative and insignificant impact on Tobin's Q, audit tenure had negative and significant impact on Tobin's Q while firm size had positive and significant impact on Tobin's Q.

Mashyekh, and Fallah (2021) used various statistical analysis, including, descriptive statistics, - correlation and regression analysis to examine the effect of audit fees on the relationship between auditor time pressure and profit quality of firms listed in Tehran Stock Exchange. Secondary data were obtained from a sample of 125 firms covering the period from 2016 to 2019. Findings from the study indicated that the auditor time pressure has a negative and significant relationship with the quality of companies' profits while audit fee has a positive and significant effect on the relationship between auditor time pressure and profit quality.

Alqisie (2018) conducted a study to ascertain if profitability of Jordanian commercial banks as it affected by risk management practices in the banks. The sample consists of thirteen (13) Jordanian commercial banks listed on the Stock Exchange during the period from 2010 to 2015. Return on assets represents the profitability of banks, while risks management practices consist of liquidity, operational, credit and market risks. Data were collected from the annual financial statements of the selected banks. Ordinary least square regression method (Fixed effect and Random effect) was used to test the hypothesis. Findings showed that, risk management practices as a whole explains a significant part of the variation in banks profitability. The results also showed that, only operational risk management practices significantly affect the profitability, while liquidity, credit and market risks have insignificant effect.

Akinsulure and Akinola (2019), investigated the impact of credit risk management on the profitability of selected deposit money banks in Nigeria for the period 2003 - 2018 using multiple regression models wherein ROA and ROE are profitability proxies while loan losses ratio was proxy for credit management. Their study found that credit risk management had significant direct relationship with profitability.

Louai and Nadia (2021), investigated the effectiveness of risk management system in the European context, especially with regard to the risk management committee, the uncertainty of the environment and company performance of European companies listed on the stock exchange in France, Germany and the United Kingdom. The study determined how risk management systems influence financial firm' performance. The empirical evidence is based on an international quantitative analysis, using a data set involving 320 firms over a ten-year period from 2005 to 2014. The results indicated that the establishment of a risk management and control system by a company positively influences its performance level and firm value. Findings further showed a significant strengthening of the role of the risk management committee in the three countries. The surveillance function is reinforced, and in particular, the internal control system is accentuated.

Fadun and Oye (2020) used secondary data extracted from audited financial statements of selected commercial banks in Nigeria to examine the impact of operational risk management practices on the financial performance of commercial banks in Nigeria from 2008 to 2017. The Linear Multiple Regression Model was used to analyze the data, and the results revealed that there is a positive relationship between operational risk management and bank financial performance.

Simamora and Oswari (2019) examined the effects of credit risk, operational risk and liquidity risk on the financial performance of banks listed in Indonesian stock exchange using secondary data extracted from the financial reports of five (5) sampled banks out of the 43 licensed banks in Ethiopia from 2009-2017.

Abubakar, Garba and Sulaiman (2020) investigated the effect of financial risk on the financial performance, using panel data from the annual reports and financial statements of 8 listed deposit money banks in Nigeria over a 10-year period from 2010 to 2019. The study was conducted using ex-post factor and longitudinal research designs. Descriptive analytical tools such as mean, median, minimum and maximum values among others were used in data presentation, while fixed effects model with robust heteroskedasticity and autocorrelation (HAC) standard errors was applied in analyzing the effect of financial risk management proxies as credit risk, operational risk and market risk on the financial performance measured by return on equity (ROE). Results indicated that credit risk proxy by capital adequacy ratio (CAR) and market risk measured by net interest margin (NIM) have significant and positive effects on the financial performance; while operational risk gauged by cost-to-income ratio (CIR) did not have any significant effect on the ROE as an indicator of the financial performance. The study concludes that listed deposit money banks (DMBs) in Nigeria are highly capitalized to withstand the danger posed by risk weighted assets and recommended that banks should improve their capital base as banks with high capital adequacy ratio are more likely to witness improvement in shareholder's wealth.

Gap in Literature

The review had pointed out a strong disagreement on the effects of risk management variables on bank performance in Nigeria. This disagreement comes in the form of the direction of relationship as well as the level of significance of the relationship. These shortcomings have contributed to the

knowledge gap in the literature. Another gap in literature is the coverage of risk management variables employed in the investigation of effects of risk management variables on bank performance in Nigeria. The present study included all the core risk management variables such as credit risk, liquidity risk, operational risk and capital adequacy risk to determine the actual effect of risk management variables on bank performance in Nigeria.

Methodology

Research Design

This study adopted *ex post facto* design and data was gathered from Nigeria Deposit Insurance Corporation (NDIC) Annual Reports and CBN Annual Reports and Accounts.

Model Specifications

The model used for the study was the adaptation and modifications from the work of Isedu and Erhabor (2021). They studied risk management and bank performance in Nigeria

Their model is stated as follows:

$$ROE = f(CR, LR, CAR,)$$

Where:

ROE= Return on Equity

CR= Credit Risk

LR = Liquidity Risk

CAR= Capital Adequacy Risk

Their model was adapted and modified in this study as follows:

$$ROE = f(CR, LR, CAR, OPR)$$

The estimation equation:

$$ROE = \beta_0 + \beta_1X (CR) + \beta_2X (LR) + \beta_3X (CAR) + \beta_4X (OPR) + \mu \dots \dots \dots 1$$

Where:

ROE= Return on Equity

CR = Credit Risk

LR = Liquidity Risk,

OPR = Operational Risk

CAR= Capital Adequacy Risk

β_0 and μ are the coefficient of risk management on performance of deposit money banks in Nigeria.

Data Analysis and Results

Unit Root Test

Table 4: Summary Unit Root test for Stationarity

Variables	At Level 1(0)	At First Difference 1(1)	At Second Difference	Order of Integration	Probability
ROE	-4.561864			1(0)	0.0012
CR	3.718454			1(0)	0.0037
LR	-3.907281			1(0)	0.0053
OPR	-4.968378			1(0)	0.0085

CAR	-5.045210			1(0)	0.0003
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Source: Eviews 9.0

The variables used in the analysis were subjected to Augmented Dickey Fuller (ADF) Tests, to determine whether they are stationary series or non-stationary series. The result revealed that at level, under the “intercept only”, return on equity credit risk, liquidity risk, operational risk and capital adequacy risk, were stationary at level [1(0)]

The Ordinary Least Square Regressions

In this section, we provide the benchmark test of the significance of the independent variables in explaining the effect of risk management on the performance of deposit money banks in Nigeria.

The Ordinary Least Square

Dependent Variable: ROE

Method: Least Squares

Date: 19/06/24 Time: 16:32

Sample: 1987 2022

Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.045556	0.414446	2.348503	0.0010
CR	1.324803	0.027139	3.407683	0.0342
LR	0.004398	0.013946	3.315386	0.0049
OPR	2.035757	0.013555	2.637984	0.0137
CAR	1.324435	0.130702	3.186949	0.0041
R-squared	0.766467	Mean dependent var	8.857538	
Adjusted R-squared	0.725813	S.D. dependent var	2.090952	
S.E. of regression	0.135299	Akaike info criterion	-0.999695	
Sum squared resid	0.494256	Schwarz criterion	-0.727603	
Log likelihood	22.49497	Hannan-Quinn criter.	-0.908144	
F-statistic	15.23150	Durbin-Watson stat	2.976966	
Prob(F-statistic)	0.000031			

Source: Eviews 9.0

Credit Risk (CR): The coefficient of credit risk and performance of deposit money banks is positive at 1.324803 with t-Statistic of 3.407683 and probability value of 0.0342 which means that credit risk has positive and significant effect on performance of deposit money banks in Nigeria.

Liquidity Risk (LR): The coefficient of liquidity risk is positive at 0.004398 with t-Statistic of 3.315386 and probability value of 0.0049 which means that liquidity risk has significant effect on performance of deposit money banks in Nigeria

Operational Risk (OPR): The results revealed that the coefficient of operational risk is positive at 2.035757 with t-Statistic of 2.637984 and probability value of 0.0137 which suggests that operational risk has positive and significant effect on performance of deposit money banks in Nigeria.

Capital Adequacy Risk (CAR): The coefficient of capital adequacy risk is positive at 1.324435 with t-Statistic of 3.186949 and probability value of 0.004 showing that capital adequacy risk has significant effect on performance of deposit money banks in Nigeria

The R2 of 76.645% and adjusted R2 of 72.58 indicate that the explanatory variables could exert a joint influence of 76.64% on the dependent variable, thus capable of coursing variations in the dependent variable.

Test of Hypothesis

To test the hypotheses, the statistical significance of the individual parameters was used to test the hypotheses. These test were conducted at 5% level of significance

Test of Hypothesis One

Stage One: Restatement of Hypothesis in Null and Alternate Form - Credit Risk

Ho₁: There is no significant effect of credit risk on the performance of deposit money banks in Nigeria.

Hi: There is significant effect of credit risk on the performance of deposit money banks in Nigeria.

Stage Two: Analysis of the Regression Results

Table 3: OLS on the Effect of risk management on the performance of deposit money banks in Nigeria.

Variable	Coefficient	t-Statistic	Probability	Conclusion
CR	1.324803	3.407683	0.0342	Statistically Positive and Significance
LR	0.004398	3.315386	0.0049	Statistically Positive and Significance
OPR	2.035757	2.637984	0.0137	Statistically Positive and Significance
CAR	1.324435	3.186949	0.0041	Statistically Positive and Significance

Source: E- view 9.0

Stage Three: Decision

From table 3 above, since the probability value is less than 5% ($0.0342 < 0.05$) with coefficient value of 1.324803 and t-Statistic of 3.407683, the study therefore rejects the null hypothesis and accepts the alternative hypothesis: which states that there is significant effect of credit risk on the performance of deposit money banks in Nigeria.

Test of Hypothesis Two

Stage One: Restatement of Hypothesis in Null and Alternate Form - Liquidity Risk

Ho₁: There is no significant effect of liquidity risk on the performance of deposit money banks in Nigeria.

Hi: There is significant effect of liquidity risk on the performance of deposit money banks in Nigeria.

Stage Two: Decision

From table 4 above, since the probability value is greater than 5% ($0.7549 > 0.05$) with coefficient value of -0.004398 and t-Statistic of -1.315386 , the study therefore accepts the null hypothesis and rejects the alternative hypothesis: which implies that there is significant effect of liquidity risk on the performance of deposit money banks in Nigeria.

Test of Hypothesis Three - Operational Risk

Stage One: Restatement of Hypothesis in Null and Alternate Form

Ho₁: There is no significant effect of operational risk on the performance of deposit money banks in Nigeria.

Hi: There is significant effect of operational risk on the performance of deposit money banks in Nigeria.

Stage Two: Decision

From table 3 above, since the probability value is less than 5% ($0.0137 < 0.05$) with coefficient value of 2.035757 and t-Statistic of 2.637984 , we reject the null hypothesis and accept the alternative hypothesis: which state that there is significant effect of operational risk on the performance of deposit money banks in Nigeria.

Test of Hypothesis Four - Capital Adequacy Ratio

Stage One: Restatement of Hypothesis in Null and Alternate Form

Ho₁: There is no significant effect of capital adequacy risk on the performance of deposit money banks in Nigeria.

Hi: There is significant effect of capital adequacy risk on the performance of deposit money banks in Nigeria.

Stage Two: Analysis of the Regression Results

Decision

From table 3 above, since the probability value is less than 5% ($0.0041 < 0.05$) with coefficient value of 1.324435 and t-Statistic of 3.186949 , the studies therefore reject the null hypothesis and accept the alternative hypothesis: which imply that there is significant effect of capital adequacy risk on the performance of deposit money banks in Nigeria.

Conclusion

This study examined the effect of risk management on the performance of deposit money banks in Nigeria. The result of the analysis revealed that credit risk has positive and significant effect on the performance of deposit money banks in Nigeria. The study concludes that risk management has improved the performance of deposit money banks in Nigeria.

Recommendations

This study recommends that as the principal regulator for DMBs, the CBN should strengthen its regulation framework in line with global best practices and approach to risk management, to enhance financial stability. The CBN should carry out comprehensive and regular risk assessments while promoting risk awareness culture through their on-site and off-site supervisions. Boards and management of DMBs are equally advised to equip their credit and risk management officers with risk management skills and competences. Boards and managements of DMBs are equally advised to always estimate likelihood of operational loss event occurring and its potential effect on banks' performance for corrective actions. DMBs should ensure that their credit policy is in line with best practices.

Contribution to Knowledge

The study modified the models used by the previous authors for investigating risk management and bank performance in Nigeria. The specific model for this study is $ROE = f(CR, CR, LR, CAR)$, with return on equity as the dependent variable while the independent variable of bank performance is proxied by credit risk, liquidity risk, operational risk and capital adequacy risk. The study further contributed in terms of geographical proximity to knowledge by providing evidence on the effect of risk management on bank performance in Nigeria.

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