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HOW DOES CREDIT RISK MANAGEMENT AFFECT PROFITABILITY OF DEPOSIT MONEY BANK IN NIGERIA?

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Abstract

Credit risk management is as important as profitability decisions for the success of Deposit Money banking system in Nigeria, as it enables banks to meet their financial obligations, grow their business, attract investors, and comply with regulatory requirements. One of the main problems of profitability in Deposit money bank (DMB) in Nigeria is the high level of non-performing loans and this is due to the weak credit risk management practices of banks, which results in many loans being given to customers who are unable to repay it. In view of this fact, this study investigates, how Credit risk management affect profitability of DMBs in Nigeria. The study adopted ex-post facto research design, using secondary data, the population of the study comprised twenty-four (24) DMBs registered by the Central Bank of Nigeria (CBN), out of which twelve (12) were purposefully selected covering a period of 11 years (2011- 2021). Data analysis adopted descriptive and inferential statistical technique using multiple regression. The result of the study indicated that Credit Risk Management has significant effect on Return on asset (ROA) (F-stat = 3.3942; p-value of 0.02015 < 0.05) and on Earnings Per Share (EPS) (F-Stat = 3.7399; p-value of .000035 < 0.05) of DMBs in Nigeria. The study concluded that Credit Risk Management has significant effect on profitability of DMBs in Nigeria (F-Stat = 2.5345, p-value of 0.0438). It recommended that management of DMBs should strengthen credit policies because a weak credit policy has a negative effect on profitability and that government should ensure building and widening the existing information on the credit policy management and profitability

Key words:
Profitability, Credit risk Management, return on Asset, Earnings Per-share, Non-Performing Loan and Loan Loss Provision

Introduction

Haralayya and Aithal (2021) claim that the deregulation of the banking industry resulted in significant changes to the way banks operate, the regulatory landscape, and the overall financial system. The introduction of prudential guidelines and accounting standards, the raising of the minimum paid-up capital, the creation of the Nigerian Deposit Insurance Corporation

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(NDIC), the relaxation of the requirement for sectoral credit allocation, the adoption of a new legal framework, increased autonomy, and supervisory responsibilities for the Central Bank of Nigeria (CBN) were a few of these changes. Other changes included the liberalisation of the foreign exchange and money markets, the adoption of a new legal framework, the adoption of enhanced autonomy, and others. The late 1980s and early 1990s, according to the author, were years of the financial boom due to a significant growth in the number of participants in the banking sector. According to Adeghe and Edobor (2019), the expansion of the banking industry put a strain on the existing human resource capacity of banks, leading to a variety of issues such subpar credit evaluation systems, financial crimes, and the buildup of subpar assets.

The idea and theory of credit risk management in banks has been studied by several academics in different countries. Masheta (2019), endorsed by Singh (2021), for example, defined credit risk as the risk associated with uncertainty around a counterparty's capacity to fulfil a commitment. It is the possibility of suffering a financial loss as a result of a debtor's credit-related default. Löw and Erkelenz (2022) also claimed that losses might be brought on by a decline in portfolio value brought on by a real or perceived decline in credit quality. According to Leo, Sharma and Maddulety (2019), managing credit risk entails recognising, assessing, keeping an eye on, and reducing risk related to the potential for loan repayment failure.

Due to its direct impact on economic growth and corporate development, credit administration has grown to be a crucial component of banking operations. The bank plays this crucial function of a financial intermediary by directing money from the surplus sector of the economy to the deficit sector, and even by allocating limited resources for the growth of the economy while maintaining a profit-oriented focus (Al-Breiki &Nobanee,2019). The research further found that in Nigeria, deposit money banks provide credit (loans) to various borrower categories for a wide range of uses. The primary source of debt financing for many customers is bank credit, and for banks, profitable loans are the most valuable risk assets.Numerous studies have looked at various aspects of credit risk management, but only a small number have focused on the factors used to proxy credit risk management in connection to profitability in Nigeria. Aduda and Gitonga (2020) conducted research on how Kenyan deposit money banks handle credit risk in relation to their profitability. The impact of credit risk on banks' performance is examined by Ekinci and Poyraz (2019).

Oziokoand Enya (2021) looked at how Nigerian commercial banks performed in relation to credit risk management. This research was motivated by the fact that there were few studies done in developing nations in the areas where gaps were found. Therefore, the purpose of this research is to evaluate how credit risk management affect deposit money banks' profitability in Nigeria.

Literature Review

Conceptual Review

Credit Risk Management

Many writers have attempted to define the word "credit risk," including Richard, Michael& Samuel (2019), who defined it as the possibility that a bank borrower or counterparty may not fulfil the obligations on the conditions agreed upon. Ramadhanti, MarlinaandHidayati (2019), who defined credit risk as losses from the reluctance or incapacity of credit customers to pay what is owing in whole and on schedule, were also mentioned by Richard & Samuel (2019).Credit risk is described in the work of Lei (2022) as the risk associated with default or delay in obligation repayment and

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impacts the majority of assets owned by credit institutions, including loans, marketable securities, and equity holdings. Credit risk, as defined by the Basel Committee on Banking Supervision in 2001, is the chance that the outstanding loan may be lost whole or substantially as a result of credit events. According to Chilukuri (2020), the Basel II Accord placed a strong focus on credit risk management procedures in response to the rising tide of non-performing loans. They said that adhering to the Accord signifies a prudent approach to managing credit risk, which ultimately enhances bank performance.

Credit Risk Management Strategies

To ensure they have adequate risk mitigation mechanisms and to lessen the effect of losses, all banks must adopt suitable ways to control their exposure to credit risk as part of credit risk management operations. Gallati (2022) claims that banks use credit risk management techniques to mitigate or minimize the negative impacts of credit risk. They said that establishing a clear structure, allocating responsibility, prioritizing and enforcing procedures, clearly communicating roles, and assigning accountability are the main elements in the credit risk management process. The researchers identified methods for hedging credit risk that include the following, further commenting on credit risk management strategies:

Credit Derivatives: According to the author, this gives banks a strategy without requiring them to modify their loan portfolio. Credit derivatives provide banks additional opportunities to earn fees and the chance to lower their regulatory capital, according to Ker & Biden (2021). Credit default swaps, in which a seller agrees to transfer the credit risk of a loan to the protection buyer, are the most popular kind of credit derivative. Credit derivatives, according to Hong, Lobo and Ryou (2019), incentivize banks to lend more money to riskier borrowers than they otherwise would at lower interest rates. Additionally, they made reference to the idea that recent developments in the credit derivatives market have enhanced lenders' capacity to shift credit risk to other institutions while preserving connections with borrowers.

Credit Securitization: Gallo and Park (2022) claim that it is the transfer of credit risk to a factor or insurance company, which frees the bank from keeping track of the borrower and the potentially dangerous implications of classified assets. By achieving regulatory arbitrage and liquidity benefits when selling securitization transactions, this strategy guarantees the lending operations of banks, diversifies concentrated credit risk exposures, and explores other sources of financing. A cash collateralized loan obligation is a kind of securitization, according to Gallo and Park (2022), in which assets (bank loans) are taken off a bank's balance sheet and packaged (trenched) into marketable securities that are offered to investors via a special purpose vehicle (SPV).

Compliance to Basel Accord: In order to maintain soundness and stability, Chen and Pan (2012) defined the Basel Accord as a set of international rules and principles governing bank operations. They claimed that the Accord was first made public in Switzerland in 1988. Compliance with the agreement entails being able to recognize, produce, monitor, and report risk-related data in an integrated way with complete auditability and transparency, which offers the chance to enhance the risk management procedures used by banks. Citing Chen and Pan (2012), they supported the idea that banks must implement solid internal credit risk management practices in order to meet the new Basel Capital Accord's capital adequacy standards.

The Federal Government of Nigeria established the Assets Management Corporation of Nigeria (AMCON) in July 2010 to provide a long-term solution to the recurrent problems of non-performing

loans that beset Nigeria. They further argued that the poor quality of the bank's loan assets hindered banks from extending more credit to the domestic economy, adversely affecting economic performance.

Other authors who supported the assertion that the environment has an impact on credit risk management from a global economic perspective include Hong & Ryou (2019), Gallo & Park (2022), and others. They all claimed that while the standards for lending and the characteristics of the borrower play important roles in determining loan quality, the entire process is frequently influenced by operational antecedents like the state of the economy, market conditions, or the industrial dynamics that characterized the business environment.

Credit Administration

All deposit money banks use lending as a method of investing their deposit liabilities in order to produce income and make a profit, which they then use to pay their debts' interest obligations, cover their own expenses, distribute dividends to shareholders, and increase their capital bases Mazur (2020). All banks' revenue is led by the credits issued in this way, which are also recorded as a risk asset in their financial accounts. Therefore, a sound credit administration system must be in place to ensure the deployment of appropriate credit policies and strict enforcement of policy compliance to minimize credit breaches, regulatory infractions, and the administration of sanctions against credit abuse. This is necessary to ensure adequate protection for their loans, enable prompt detection of warning signals, and prevent a higher rate of non-performing loans Mazur (2020).

The effectiveness of the credit administration system depends on loan monitoring. For instance, according to Osuji and Agbada (2020), loan monitoring—which is often handled by relationship managers—is essential for successful and efficient credit administration in the banking industry. The writers went on to say that the banker's expertise, familiarity with the client's industry, and, most importantly, trust in the customer may be a guide in determining how much the customer can be maintained before a loan is declared bad. They came to the conclusion that the client would sometimes need further assistance; in such cases, any or a combination of the following tactics can be used:

(a) Alteration or waiver of some of the terms and conditions of loan covenant in a way not to tamper with the bank's interest.
(b) Issue of additional collateral security, if available.
(c) Granting of additional funds, if borrower's circumstances and analysis require the need.
(d) Extension of loan repayment period supported by fresh cash flow statement.

When the idea of risk management was examined, it became clear that any actions taken to avoid, eliminate, or stop losses are included. Monnet (2018) argued further that risk avoidance is often impractical, particularly for commercial enterprises. As a result, methods are sought to lower the risk's dimension via pre-loss procedures that make it possible to prevent mistakes, fraud, and unauthorized lending. The Bank and Other Financial Institutions Act (BOFIA) of 1991 (and amendments), the Prudential Guidelines, the Bankers Guide, and various Circulars issued from time to time on a need-basis, among other instruments, regulate the Nigerian banking system. These two main institutions are the Central Bank of Nigeria (CBN) and the Nigerian Deposit Insurance Corporation (NDIC). The CBN, NDIC, the Prudential Guide, and pertinent circulars are the main

subjects of this research. The Banking and Other Financial Institutions Act (BOFIA), which was first published as the Banking Decree of 1969 and subsequently abolished by BOFIA Act No. 25 of 1991, was intended to control the banking sector in Nigeria. The CBN released the Prudential Guidelines for Deposit Money Banks in November 1990 with the intention of establishing a reliable, secure, and sound banking system and directing credit portfolios.

The World Bank Group (2019) states that regulatory oversight of banks is a crucial component of the system for guaranteeing safe and sound banking practice, and therefore, a stable economy in Nigeria. The CBN sits at the pinnacle of this regulatory and oversight structure. The author further said that the NDIC and CBN share oversight of insured banks, although with different duties. The coordinated development of supervisory strategies and surveillance of insured banks' activities, the elimination of supervisory overlap, and the establishment of a reliable data management and information sharing system, in his opinion, are examples of the active cooperation between these two agencies with regard to the focus and modality for regulation and supervision of insured banks.

Profitability

Arab, Masoumi, and Barati (2015) (cited in Afolabi (2018) defined profitability as the ability of a firm to sustain growth by earning enough income that will make it to survive in the short and long-run. Profit inability refers to the lack of ability of an enterprise to earn sufficient profit that will sustain its growth and survival in the short term and long-term perspectives. Profits are important and every stakeholder of a firm is interested in the company's financial soundness and profitability. Tulsian (2014) defined the word profitability as composed of two words, namely, profit and ability, profit being the net income while ability of a concern denotes its earning power or operating performance. Profitability, therefore, is defined as the ability of a given investment to earn a return from its use. Profitability is a relative concept while profit is an absolute connotation. Profitability analysis is used to measure operational efficiency and productivity of capital employed. It can be measured using return on capital employed, return on asset and return on equity. Gadoiu (2014) defined the profitability ratios as the rates showing the efficiency of a company as a ratio between the resulted effects, benefits and the efforts to achieve them. The study emphasized that corporate finance theory introduced two relative measures of profitability, the return on equity and the return on assets; their actual size and influence are used to analyze the profitability of a company.

Return on Assets (ROA)

A financial ratio called return on assets (ROA) gauges a company's profitability in proportion to its total assets. It is usually represented as a percentage and is computed by dividing net income by total assets (Oyon, 2015). Investors and analysts use ROA to assess how well a company's management uses its assets to produce profit.A research by Du, Liu, and Yang (2019) found that ROA is a frequently used measure of a business' performance and is seen as a crucial sign of profitability. According to the research, ROA and a company's stock return are positively correlated, and firms with high ROA often have larger stock returns than those with low ROA. This implies that investors should take ROA into account when assessing the prospective returns on their investments. The ease of ROA as a performance indicator for businesses is one of its benefits.

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In contrast to other financial ratios like return on equity (ROE) and return on capital employed (ROCE), return on assets (ROA) just needs two pieces of data: net income and total assets. This facilitates comparisons and calculations between businesses in various sectors. It's crucial to keep in mind, however, that ROA may not provide a whole picture of a company's success. Piotroski (2000) asserts that a variety of variables, including the degree of debt and the effectiveness of asset utilisation, may have an impact on ROA. As a result, it's crucial to take into account other financial measures and elements when assessing a company's success.

Furthermore, Oyon (2015) discovered that the degree of industry competitiveness might have an impact on ROA. Even if they are managing their assets well, businesses in highly competitive sectors may have lower ROAs than those in less competitive ones. This implies that the industry in which a firm works should be taken into account while evaluating ROA. An essential financial metric called return on assets (ROA) assesses a company's profitability in proportion to its total assets. Investors and analysts often use it to assess how well a company's management uses its resources to produce profit. When assessing a firm's performance, it's crucial to take into account other financial ratios and elements, as well as to put ROA within the context of the sector in which a company works (Du, Liu, & Yang, 2019).

Earnings per share (EPS)

Earnings per share (EPS) calculates a company's profitability by dividing its net income by the total number of Equity Share. Investors, analysts, and financial institutions use EPS, which is often presented on a per-share basis, to evaluate a company's overall health and make investment choices.JHuH (2013) emphasized that the requirement for companies in the United State of America to report their earnings every three months has brought immense pressure to bear on managers to ensure the achievement of acceptable EPS as performance measurement. Therefore, Managers are quite awareof the role and effect of EPS surprises on share prices which has resulted in consequence, a questionable over-emphasis onEPS which is an analysis of short term performance.EPS calculates the earnings that accrue to each ordinary share as a return on investment provided by the Shareholder. EPS is animportant ratio used for assessing a company's profitability. The level of increase or decrease in EPS may be a sign of financial prosperity or difficulties.

Rashidul. Tahsan, Tonmoy and Ashique (2014) opined that Cash EPS is operating cash flow divided by diluted shares outstanding. The study explained that there are other form of EPS which are proforma EPS, Headline EPS and cash EPS. It further emphasized that cash EPS is more important than other EPS numbers, because it is a "purer" number. Cash EPS is better because operating cash flow cannot be manipulated as easily as net income and represents real cash earned, calculated by including changes in key asset categories, such as receivables and inventories.

A company will be seen and classified as better that its peers in the industry if it has better EPS.It is a frequently used financial ratio and it is calculated asa measure of company's profitability and performance by dividing its net profit by the total number of Equity shares. It is an indicator and very important sign of its capacity to provide profits for its shareholders and increase the wealth of its equity owners.

Theoretical Framework

The study is anchored on Stakeholder theory because of its relevance to the study.

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Stakeholder Theory

The goal of stakeholder theory is to understand how multiple stakeholders, including shareholders, customers, workers, and the community, are impacted by the choices and activities of an organisation. Stakeholder theory may be utilised to comprehend the impact of credit risk management on the profitability of deposit money banks (DMBs) in Nigeria.

Stakeholder theory is advocated by R. Edward Freeman, who initially presented the idea in his 1984 book "Strategic Management: A Stakeholder Approach." Freeman asserts that firms must manage the interests of all stakeholders, not just shareholders, in accordance with the stakeholder theory (Barney & Harrison, 2020).

Freeman and Zyglidopoulos (2018), who contend that the stakeholder theory is a more thorough approach to understanding the function of organisations in society, are among the scholars who have also contributed to the development of the stakeholder theory. In a similar vein, Dirk Matten and Andrew Crane have said that the stakeholder theory offers a more moral approach to management since it considers the interests of all stakeholders.

The stakeholder theory is criticised for being very general and difficult to put into practise. They contend that companies may find it difficult to strike a balance between the interests of many stakeholders, and that this may cause them to lose sight of their primary objectives (Barney & Harrison, 2020). Additionally, some detractors claim that there is no actual data to back up the stakeholder idea.

Supporters of stakeholder theory contend that it offers a more thorough analysis of how organisations function in society. They contend that firms that adopt a stakeholder approach have a higher chance of long-term success because they can forge better ties with their clients, staff members, and the community. Supporters also claim that research demonstrating greater financial performance for firms that adopt a stakeholder approach provide empirical credence to the stakeholder theory (Barney & Harrison, 2020).

The stakeholder theory is clearly relevant to the discussion of credit risk management and profitability in DMBs in Nigeria. We may better understand how DMBs' choices and actions in Nigeria influence different stakeholders, including as shareholders, customers, workers, and the community by using the stakeholder theory. DMBs in Nigeria may balance the interests of many stakeholders by adopting a stakeholder-centred strategy, which can improve financial performance. Stakeholder theory may also be utilised to comprehend how DMBs in Nigeria might improve their financial performance by fostering closer ties with their clients, staff, and community members.

Empirical Review

Credit risk management and the return on asset (ROA)

The impact of credit risk on banks' performance is examined by Ekinci and Poyraz (2019). 26 commercial banks that were active in Turkey between 2005 and 2017 make up the dataset. The Banks Association of Turkey's statistics report was used to compile the secondary data. To evaluate banks based on ownership structures, three panels' worth of data are taken into consideration: data from state-controlled banks, data from privately held banks, and data from international banks. Non-performing loans (NPLs) were employed as credit risk indicators, while return on asset (ROA) and return on equity (ROE) were utilised as stand-ins for financial performance indicators. The estimate results demonstrated that there is a negative correlation between credit risk and

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both ROA and ROE. This finding reveals a connection between credit risk management and Turkish deposit banks' profitability between 2005 and 2017. Therefore, banks should place a greater emphasis on credit risk management, particularly the administration and oversight of non-performing loans. Managers should also pay greater attention to contemporary credit risk management strategies.

Using panel data for the years 2013 to 2019, Al-Zaidanin and Al Zaidanin (2021) assessed the impact of the independent variables—capital adequacy ratio, non-performing loans ratio, cost-income ratio, liquidity ratio, and loans-to-deposits ratio—on the financial performance of sixteen commercial banks operating in the United Arab Emirates. Banks provided the secondary data, which was then gathered and analysed using the random effect model for hypothesis testing and conventional descriptive statistics. It is concluded from the regression results that the non-performing loan ratio and cost-income ratio have a significant negative impact on the profitability of commercial banks in the United Arab Emirates, whereas the capital adequacy ratio, liquidity ratio, and loan-to-deposit ratio all have a very weakly positive relationship with the return on assets. Despite this, these ratios do not determine a bank's profitability because of their statistically insignificant impact.

Ali and Dhiman (2019). investigated empirical relationships between credit risk management and bank financial performance. For the years 2010 to 2017, an effort was made to ascertain the statistical impact of credit risk management indicators on the profitability of public sector commercial banks. The top 10 public-sector commercial banks chosen based on total assets are the subject of the study. The use of panel regression serves the objective of data analysis. Credit risk management (NPLR), ratio of performing loans (LLPR), capital adequacy ratio (CAR), asset quality ratio (AQ), management (M), earnings (E), and liquidity (L) are all independent variables in the panel model equation, whereas banks' variables measured by return on assets are dependent profitability (ROA). The study's conclusions state that banks in India's credit risk management sector public choose of performance financial the on impact substantial a have indicators. In contrast to CAR and liquidity, which are shown to be adversely connected to AQ, the empirical data show that ROA (profitability) represents managerial quality and earning ability.

Oziokoand Enya (2021) looked at how Nigerian commercial banks performed in relation to credit risk management. This is required as a result of mounting worries about how loans have put banks in the largest amount of danger. This study's focus is restricted to the following credit risk management variables: non-performing loans, loan loss provision, and liquidity ratio, and it spans the years 2012 to 2019. The research employed a panel data regression analytical model in the analysis of the acquired data and utilised secondary sources of data derived from published annual reports of selected commercial banks. The analysis's findings demonstrate that credit risk management significantly affects how well Nigeria's commercial banks function. According to the study's conclusions, deposit money bank management should thoroughly evaluate the risks associated with loan applications before approving them. In order to improve return on assets and boost their financial performance, the research advises banks to maintain a minimal level of non-performing loans, a consistent liquidity rate, and an adequate amount of loan loss provision.

Using the Ordinary Least Square (OLS) approach, Aduda and Gitonga (2020) conducted a research on the association between credit risk management and profitability among the deposit money banks in Kenya. The results show that credit management and profitability are related, with credit management having an impact on profitability.

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In a study on the profitability of a few Ghanaian banks, Boahene, Dasah, and Agyei (2021) used descriptive statistics and the ordinary least squares method to demonstrate that there is a positive and significant relationship between credit risk indicators and bank profitability, indicating that banks in Ghana benefit from high default risk because of (likely) prohibitively high lending and interest rates, fees, and commissions. The findings also show that factors like bank size, bank expansion, and bank debt capital have a favourable and substantial impact on bank profitability.

The impact of credit risk management on the performance of a few Ghanaianlisted commercial banks was studied by Akomeah, Agumehand Siaw in 2020. For ten (10) years, from 2007 to 2016, seven (7) banks registered on the Ghana Stock Exchange provided secondary data for the research, which included a total of seventy (70) observations. Non-performing loans, loan loss provision, and capital sufficiency were adoptedfor the credit risk management variables (independent variables), with bank size serving as the controlling variable. Return on assets (dependent variable) was used to proxy the financial performance of commercial banks. Standard descriptive statistics and a fixed effect model were used to analyse the data. This research discovered a substantial correlation between the credit risk management variables (NPL, CAR, and SIZE) and the profitability of Ghana's listed banks based on tests run on the data gathered and analysis of the findings. The report suggests that banks in Ghana should regulate and monitor non-performing loans (NPL) and maintain the amount of NPL as low as possible by placing greater attention on customers' capacity to repay before approving credit, a practise that would help banks perform better.

Credit risk management and earnings per share (EPS)

The impact of liquidity risk management on the Jordanian financial sector was studied by Kaddumiaand Al-Kilani (2020), as the success of any financial institution largely depends on how it forecasts its liquidity needs, which may be done by looking at the structure of deposits or the performance-related surplus. The liquidity and performance metrics of 13 listed Jordanian commercial banks were computed and examined to study this impact. Results showed that loans to total deposits had no effect on profits per share (EPS) but had a significant negative impact on operational cash flow per share (OCFS). The study concluded that since the impact of liquidity risk management indicators was greater on OCFS than on EPS, cash basis performance indicators should be used for liquidity risk management approach rather than accrual basis indicators.

The impact of liquidity risk management on the financial performance of consumer products firms was investigated by Effiong and Ejiabu (2020). In order to improve their financial performance, consumer products businesses were asked to assess how concerned they were with managing their liquid cash, cash defence intervals, long-term loans, and quick ratios. Data were translated to liquidity assessment characteristics and taken from the annual reports and accounts of the firms under study. Multiple regression analysis was used to conduct the study, and the results indicate that long-term debts, fast ratios, and cash defensive intervals significantly influence EPS and ROA, whereas cash ratios and long-term debts only have an impact on ROCE. The financial success of consumer products businesses and liquidity risk management have a substantial link, according to empirical research. Further research has shown that organisations' lack of concern for managing liquidity risk has a major impact on their financial success.

The goal of Safitri, Martha, Wirawati and Dewi (2020) is to ascertain how earnings per share, price-earnings ratios, and debt-to-equity ratios affect stock prices. The firms in the banking industry that were included in the InfoBank 15 index from 2014 to 2018 were the subject of this study. Purposive sampling was the method of sampling that was used in this investigation. As many as 30 financial statements from six different firms were sampled. The price earnings ratio and earnings per share have a positive and substantial influence on the price of shares, according to the findings of this research utilising multiple linear regression analysis approaches. An indication that a corporation may expand its worth by steadily raising the price of its shares is when the offer of its shares keeps

rising, which is correlated to a greater price-earning ratio. Additionally, a high profits per share may indicate that the business may boost its worth by paying out a significant dividend. The debt-to-equity ratio, on the other hand, has no impact on the price of shares.

Based on the risk-based bank rating approach at Buku IV, Thomas, Riyadi, Abidinand Iqbal (2020) investigates the impact of financial ratios on profits per share with the soundness level of banks as an intervening variable. Buku IV lays forth the guidelines that commercial banks must adhere to in order to do business lawfully in Indonesia for the years 2015 through 2019. These include criteria for obtaining a licence, capitalization, lending terms, and risk management.. This study employed quantitative methods and secondary data. Panel data regression by purposeful sampling was the method of data analysis employed. The findings demonstrated that NPL and GCG had a considerable adverse impact on banks' soundness levels, while NPL had a large adverse impact on EPS. The soundness level of banks was not found to have a significant negative impact on EPS, and the soundness level of banks did not mediate NPL, GCG, ROA, or CAR in affecting EPS. GCG had a significant negative influence against EPS, and ROA and CAR did not have a significant positive impact on the soundness level of banks and EPS.

Sebe-Yeboah and Mensah (2014) used the exploratory research method to conduct a critical analysis of the financial performance of the agricultural development bank in Ghana. They discovered that the aggressive lending practises in 2009 and 2010 were to blame for the bank's declining liquidity position in 2010. Iwedi and Onuegbu (2014) discovered that credit risk management significantly affects the profitability of Nigerian banks after conducting a research on the credit risk and performance of a few chosen deposit money institutions in Nigeria. It came to the conclusion that deposits, non-performing loans, and loan levels all have an adverse effect on a bank's profitability.

Junaidu and Sunusi (2014) discovered a substantial positive link between CRM and the profitability of Nigerian banks in their study on the impact of credit risk management (CRM) of Nigerian banks using descriptive research and generalised least squares regression approaches. Ogeisia, Musiega, and Manase (2014) used Pearson correlation and ordinary least squares to analyse the impact of borrower character on loan repayment in deposit money banks in Kakamega town. They discovered a significant and positive relationship between borrower character and loan repayment, which implied that how borrowers behaved when applying for credit or after receiving it from the banks greatly influenced the relationship that developed.

The objectives of Setyowati & Indratjahyo's (2020) study are to test and analyse the effects of non-performing loans (NPLs) and operating costs operating income (BOPO) on return on equity (ROE) at PT Bank Sahabat Sampoerna, to test and analyse the effects of non-performing loans (NPL) and operational costs operating income (BOPO) on earnings per share (EPS) at PT Bank, and to test and analyse the This research makes use of secondary data, namely information from the Bank Sahabat Sampoerna's annual reports from 2015 to 2018. includes a 48-person study sample, PT Bank Sahabat Sampoerna. The sampling process makes use of random sampling methods. Descriptive analysis and route analysis are used in the data analysis process. The findings indicated that: Non-Performance Loans (NPL) and Operational Income Operating Costs (BOPO) at PT Bank Sahabat Sampoerna had an impact on Return On Equity (ROE); Non-Performance Loans (NPL) and Operational Costs Operational (BOPO) had no impact on PT Bank Sahabat Sampoerna's Earning Per Share (EPS); Return on Equity (ROE) had no impact on

Research Methods and Procedure

Ex-post facto research approach, focused on credit risk and profitability of certain deposit money institutions in Nigeria, was employed in this study's panel data framework for the years 2011–2021. The time frame was deemed acceptable since it fell within Nigeria's banking industry's post-consolidation phase. The research concluded that the time frame was appropriate for accurately determining how credit risk management practises affected the profitability of deposit money

banks listed on the Nigerian Stock Exchange. The Central Bank of Nigeria (CBN, 2021) registered twenty-four (24) Deposit Money Banks (DMB) as the research's study population. On purpose, 12 banks were chosen to span an 11-year period (2011–2021). Utilising both descriptive and inferential statistical techniques, the data analysis was completed. While inferential statistics employed multiple regression among other tests, descriptive statistics utilised mean minimum, median, maximum, Jarque Bera, Standard Deviation, and Kurtosis.

Variable measurement

Table 1: Variable definition and Measurement

Variable	Measurement	Abbreviation
Return On Assets	Profit after tax / Total Assets X100	ROA
Earnings Per Share	Earing available to ordinary shares / Weight ordinary shares in issues X100	EPS

Source: *Researchers' computation (2022)*

Research Hypotheses

The following hypotheses were tested:

H_{01}: Credit risk management has no significant effect on the Return on Asset (ROA) of Deposit Money Bank (DMB) in Nigeria.

H_{02}: Credit risk management does not significantly affectEarning Per Share (EPS) of Deposit Money Bank (DMB) in Nigeria.

Researchers Conceptual Mod

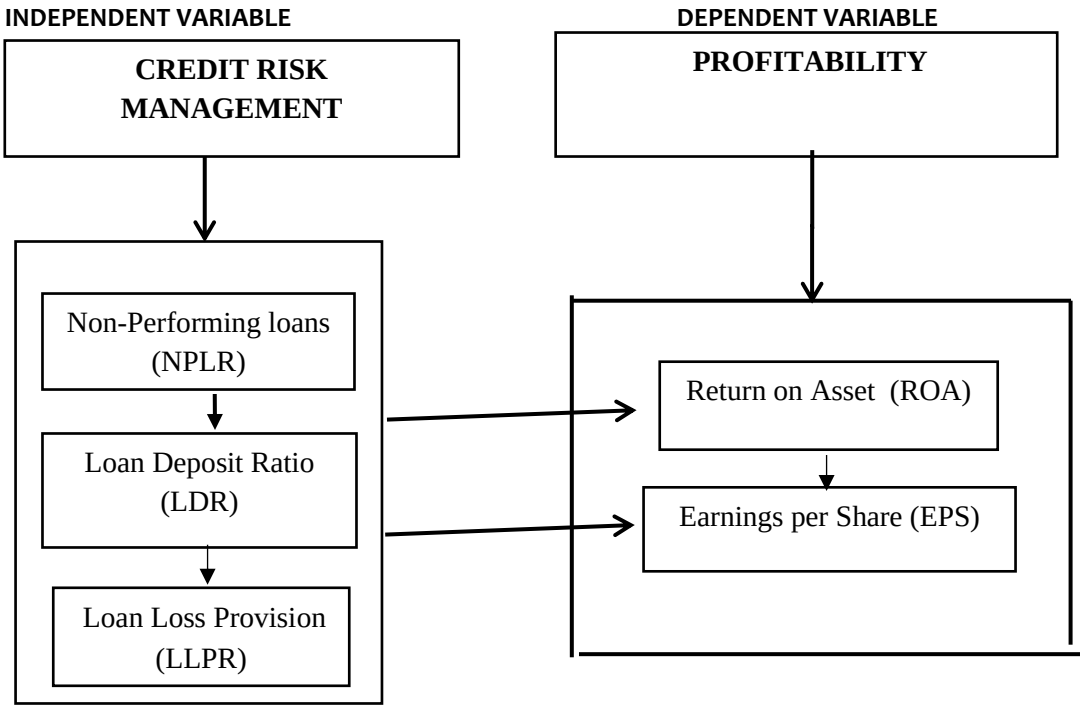


Fig 1: Researcher Conceptual Model, (2022).

Model Specification

The structural form of the model for the study is:

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Y= F(X)

Where:

Y = dependent variables = Profitability (PRF)

X= independent variable = Credit risk (CR)

$Y = f(y_1, y_2)$

$X = f(x_1, x_2, x_3)$

Where:

Y = Profitability of DMBs (PROFITABIITY):

y_1= Returns on Asset (ROA)

y_2= Earnings per Share (EPS)

X = Credit Risk (CR):

x_1= Non-Performing Loans Ratio (NPLR)

x_2 = Loan Loss Provision (LLPR)

x_3= Loan-Deposit Ratio (LDR)

The function representation of the study is shown below:

ROA = f (NPLR, LLPR, LDR) Function 1

EPS = f (NPLR, LLPR, LDR) Function 2

The regression model is show below

Model one

$$ROA_{i,t} = \beta_0 + \beta_1 NLPR_{i,t} + \beta_2 LLPR_{i,t} + \beta_2 LDR_{i,t} + \mu_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Model two

$$EPS_{i,t} = \theta_0 + \theta_1 NLPR_{i,t} + \theta_2 LLPR_{i,t} + \theta_2 LDR_{i,t} + \mu_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Model three: Overall Model Specification

$Y=\beta_o + \beta_{1i}*_i+\varepsilon$

$PRF_{it=} \beta_o + \beta_{1i}CR_{it} + \varepsilon$

Where:

Y= Dependent variables = Profitability of DMBs (PRF)

X=Independent variables = Credit risk (CR)

β_o=Value of the intercept

$B_1 – \beta_2$ =Coefficients of the explanting variable

ε=Errors term

i= Number of sampled companies

t= Period

The dependent variables are: ROA, ROE and EPS, while the independent variables are NLPR, LLPR and LDR.

***A Priori* Expectation**

These were the anticipated correlations between the several measurements of deposit money banks' credit risk (NPLR, LLPR, and LDR), which were the independent variables, and each of the

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composite profitability metrics (ROA and EPS), which were the dependent variables. These demonstrated the connections between the deposit money banks (DMBs) in Nigeria's study period's profitability and credit risk (CR) characteristics. Here is a summary of the pre-estimation expectations:

Table 2: *A Priori* Expectations

S/N	**Models**	Expected signs	Coefficient and the Expected Sign
1	ROA= $\beta_0 + \beta_1 NLPR + \beta_2 LLPR + \beta_3 LDR + \mu$	Negative (-)	$\beta_1 < 0; \beta_2, \beta_3 > 0$
3	EPS= $\beta_0 + \beta_1 NLPR + \beta_2 LLPR + \beta_3 LDR + \mu$	Positive (+)	$\beta_1 < 0; \beta_2, \beta_3 > 0$
4	PRF= $\beta_0 + \beta_1 CR + \mu$	Positive (+)	$\beta_1 < 0; \beta_2, \beta_3 > 0$

Source: Researcher's Compilation, 2022

Research Findings and Results

Descriptive and inferential statistics were adopted to analyse the data collected for the study.

Descriptive Analysis

This section gives a general overview of the data collection while attempting to define its key characteristics. The descriptive statistics in Table 3 were used to analyse the panel data in a descriptive manner. The profitability and credit risk management variables' mean, maximum, minimum, and standard deviation, as well as skewness, kurtosis, Jarque-Bera, and probability values, were employed as statistics.

Table 3: Descriptive Statistics

	ROA	EPS	LDR	LLPR	NPLR
Mean	2.105336	1.302353	0.745677	8.632139	4.568703
Median	1.516218	1.590000	0.738224	8.769196	3.200000
Maximum	8.675122	3.060000	1.093605	11.25984	17.23000
Minimum	0.223380	-0.2600	0.317987	6.504288	0.006429
Std. Dev.	2.021004	1.005420	0.205349	1.357320	5.245053
Skewness	2.249229	0.027805	-0.3802	-0.0197	1.462286
Kurtosis	7.817034	1.889106	2.501410	2.090663	3.806922
Jarque-Bera	30.76996	0.876335	0.585756	0.586827	6.519669
Probability	0.765494	0.645218	0.746113	0.745714	0.038395

Source: Researcher's Computation (2022)

Test for normality

We used the Jarque-Bera (JB) statistic to determine if the data set adopted a pattern of typical normal distribution. Given that all of the p-values were higher than the threshold of 0.05 and that all of the variables were right-tailed with skewness ranging from 2.25 to -0.38 and peakedness

(kurtosis) between 7.82 and 1.89, Table 3 demonstrated that all of the variables were normally distributed.

According to Table 3's findings, the mean values for ROA, EPS, LDR, LnLLPR, and NPLR, respectively, were 2.105336, 1.302353, 0.745677, 8.632139, and 4.568703. The data series' dispersion and spread were represented by the standard deviation values, which indicated that the larger the value, the more the series deviated from its mean. The variables in this study that showed the greatest degree of variance from the mean were NPLR (5.24), ROA (1.02), EPS (0.10), LDR (0.20), and LnLLPR (1.35), indicating that there were variations within the data set and that it had changed over time for the DMBs.

Results of Stationarity Tests

The majority of macroeconomic time series have been proven in econometric analyses to be non-stationary at certain levels (Engle & Granger, 1987). This suggests that the majority of ordinary least squares (OLS) regressions performed at these levels could not be trustworthy. With this understanding, checking for variable stationarity to get a more trustworthy result becomes crucial. The common unit root of the pooled data was identified using the Levin, Lin, and Chi (LL&C) test. The test showed that, through the LL&C text, at 5% critical values, all of the variables used in our models were stationary at level I(0) with probability values of 0.0013, 0.0000, 0.0000, and 0.0022 for EPS, LDR, NPLR, ROA, and LNLLPR, respectively. This invariably signalled that the panel least square could be used to estimate our model. 2analysis2techniques

Table 4: Unit Root Test Results

Variable	LL&C Statistic Values	Prob.`	Order of Integration
EPS	-3.00729	0.0013	I(0)
LDR	-5.60403	0.0000	I(0)
NPLR	-6.85479	0.0000	1(0)
ROA	-16.5635	0.0000	1(0)
LNLLPR	-2.85370	0.0022	1(0)

Researcher's Computation (2022)

Hausman Test Results

Results of the Hausman test are for models (1), (2) and (3) are presented in table 5, respectively.

Table 5: Hausman Test results

Correlated random effects-Hausman Test **Test period random effects**			
Model 1			
Test summary	Chi-square statistics	Chi-sq. DF	Probability
Cross-section random	1.948619	3	0.5831
Model 2			
Test summary	Chi-square statistics	Chi-sq. DF	Probability
Cross-section random	2.004369	3	0.5715
Model 3			
Test summary	Chi-square statistics	Chi-sq. DF	Probability

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Cross-section random	2.254334	3	0.5213

Researcher's Computation (2022)

The results presented in Table 5 shows that the probability value of the Hausman test is not significant at the 5% critical level (*p*-value = 0.58 > 0.05), (*p*-value = 0.57 > 0.05) and (*p*-value = 0.52 > 0.05) for model 1, 2 and 3. This shows that the random effect model is more appropriate than fixed effect model. Therefore, it is used for estimating both models 1, 2 and 3

Regression Analysis Results for Model 1

Results of the panel regression analysis of Model 1 is shown in Table 6

Table 6: Panel Regression Analysis Results for model 1

Variable	Coefficient	Std error	t-statistics	Prob.
C	1.245249	1.876792	0.663498	0.5082
NPLR	-0.073352	0.025271	-2.902612	0.0044
LNLLPR	-0.042867	0.144617	-0.296415	0.7674
LDR	1.252141	0.821823	1.523614	0.1301
$R^{2=}$ 0.632344 Adjusted R^2 = 0.585219 D-Watson = 2.392573 F-stat = 3.394217 Prob(F-stat) 0.020015				

***significant at p<0.05* ***Insignificant at p<0.01, p<0.05 and p<0.10 levels.*

Source: **Researcher's Computation (2022)**

The estimated panel regression for Model 1 was obtained by substituting the numerical values of the models' intercepts and coefficients for the credit risk management variables into the given models.

Estimated Model 1

$$ROA_{it} = 1.245 - 0.043LNLLPR_{it} + 1.252LDR_{it} - 0.073NPLR_{it} + \mu$$

Evaluation of Parameters of Panel Regression Models 1

For Model 1, the signs of the coefficients of the individual credit risk indicators do not comply fully with the signs expected *a priori*. Whilst NPLR and LDR conformed with the expected signs, LLPR did not complied to the expected signs. The values of the coefficients (β_1 = -0.043 < 0; β_2 = 1.252 > 0 and β_3 = -0.004 < 0) provided the evidence of the respective negative effects of the credit risk variables on return on asset (ROA) of the DMBs.

When the numbers for the models' intercepts and the coefficients of the credit risk management variables were put into the models, the estimated panel regression for Model 1 was as follows:

Test of Hypothesis One (H_o1): Evaluation of Model 1 for Statistical Significance

H_o1: Credit risk management had no significant effect on return on asset (ROA) of Deposit Money Banks in Nigeria.

From Table 6, the explanatory variable LNLLPR and NPLR have negative values, while LNLLPR is not statistically significant (0.76 > 0.05) , NPLR exerts an individual statistical significant (0.004 < 0.05) at 5% significant level on the ROA of the DMBs , with only LDR, exerting a positive but non-significant effect on ROA of Nigerian DMBs, the explanatory variable's positive coefficient value, and the t-statistic's associated probability value of 0.13, which was higher than the 5% critical threshold, all contributed to this explanation.

The summary metric that indicates how well the sample regression line fits the data is called the modified R2 (coefficient of determination). According to model 1, Adj R2 of 0.585 indicates that a change in the non-performing loan ratio (NPLR), loan deposit ratio (LDR), and logged value of loan loss provision ratio (LNLLPR) accounted for 58.5% of the variance in ROA, while factors not included in the model accounted for the remaining 41.5%. This meant that operational management mechanisms other than the credit risk management factors taken into consideration in this analysis accounted for a smaller fraction of the variability in the return on assets of the banks. The p-value of the F-statistics (0.02 0.05), which affirms that credit risk management has a substantial impact on the ROA of DMBs in Nigeria, confirms the overall regression's significance.

In this case, the alternative hypothesis is accepted and the null hypothesis is rejected. This suggests that the ROA of the chosen DMBs in Nigeria is significantly impacted by credit risk management..

Regression Analysis Results for Model 2

H_o2: Credit risk management has no significant effect on Earnings Per Share (EPS) of Deposit Money Banks in Nigeria.

Results of the panel regression analysis of Model 2 is shown in Table 7

Table 7: Panel Regression Analysis Results for model 2

Variable	Coefficient	Std error	t-statistics	Prob.
C	0.347266	1.968055	0.176451	0.8602
NPLR	-0.029757	0.026547	-1.120926	0.2644
LNLLPR	0.054600	0.151964	0.359297	0.7200
LDR	0.408709	0.859108	0.475736	0.6351
$R^{2=}$ 0.632800 Adjusted R^2 = 0.548213 D-Watson = 2.668614 F-Stat = 3.739879 Prob(F-stat) 0.000035				

**Significant at p<0.05 **Insignificant at p<0.01, p<0.05 and p<0.10 levels.*

Source: Researcher's Computation (2022)

The following models may be created by substituting the following numerical values for the models' intercepts and coefficients of the credit risk variables:

Estimated Model 2

$$EPS_{it} = 0.347 + 0.0546LNLLPR_{it} + 0.409LDR_{it} - 0.029NPLR_{it} + \mu$$

Evaluation of Parameters of Panel Regression Models 2

For Model 2, the signs of the coefficients of the individual credit risk indicators do not comply fully with the signs of expected *a priori*, as non-performing loan ratio (NPLR) was consistent with

expectations, loss provisioning ratio (LLPR) and loan deposit ratio (LDR) were contrary to the expected signs. The values of the coefficients (θ_1 = -0.0546 < 0; θ_2 = 0.409 > 0 and θ_3 = 0.0029 >0) provided the evidence of the respective positive and negative effects of the individual credit risk on earnings per share (EPS) of the DMBs.

Model 2 further explained that a percentage decrease in LNLLPR will bring about 0.00055 unit increase in EPS of the DMBS as the negative signs portrays an inverse relationship with the two variables. Meanwhile, as the loan deposit ratio (LDR) of these DMBs decreases by a unit, it leads to a decrease of 0.409 unit increase in the earning per share of the DMBs during the study periods. Finally, an 0.029 unit increase in earnings per share (EPS) of these DMBs was as a result of one unit decrease in the non-performing loan ratio (NPLR) of the DMBs.

Evaluation of Parameters of Panel Regression Model2

Hypothesis Two (H_02): The profits per share of deposits at Nigerian banks were unaffected by credit risk management.

According to Table 6, the study's explanatory variables LNLLPR, LDR, and NPLR had a positive value and a non-significant effect on the DMBS's earnings per share (EPS), which was greater than the 5% critical value. These values corresponded to 0.7200, 0.6351, and 0.264 of the t-statistics' probability value, respectively. How well the sample regression line fits the data is shown by the modified R^2. A change in NPLR, LDR, and LNLLPR accounted for only 54.8% of the variance in EPS, according to the equation above, while the remaining 45.2% of the variation in EPS was explained by factors not taken into account in the model, according to an adjusted R2 of 0.548.

As shown by the p-value of the F-statistic (0.000035), which is less than the 5% critical threshold, the regression is proven to be significant. There is a hint of negative serial autocorrelation, as shown by the Durbin-Watson-statistic estimated value of 2.66. In this case, the alternative hypothesis is accepted and the null hypothesis is rejected. This suggests that the EPS of the chosen DMBs in Nigeria is significantly impacted by credit risk management..

Regression Analysis Results for Model 3 (Overall Model)

H_03: Credit risk management has no significant effect on Profitability of Deposit Money Banks in Nigeria.

Results of the panel regression analysis of Model 3 is shown in Table 8

Table 8: Panel Regression Analysis Results for model 3 (Overall Model)

Variable	Coefficient	Std error	t-statistics	Prob.
C	-0.258535	1.083976	-0.238506	0.8119
NPLR	-0.035879	0.014520	-2.471076	0.0148
LNLLPR	0.020738	0.191253	0.108430	0.9138
LDR	0.540166	0.475600	1.135755	0.2582
$R^{2=}$ 0.586072 Adjusted R^2 =0.513949 D-Watson = 2.371901 F-stat = 2.5345443 Prob(F-stat) 0.043784				

**significant at p<0.05 **Insignificant at p<0.01, p<0.05 and p<0.10 levels.*

Source: Researcher's Computation (2022)

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The estimated panel regression for Model 3 was obtained by substituting the numerical values of the models' intercepts and coefficients for the credit risk management variables into the given models:

Estimated Model 3

PRF_{it}= - 0.259 -0.036NPLR + 0.021LNLLPR + 0.540LDR

Evaluation of Parameters of Panel Regression Models 3

For Model 3, the signs of the coefficients of the individual credit risk indicators do not comply fully with the signs of expected *a priori*, as non-performing loan ratio (NPLR) was consistent with expectations, loss provisioning ratio (LLPR) and loan deposit ratio (LDR) were contrary to the expected signs. Furthermore, Model 3 explained that Profitability (PRF) responded by 0.021 unit increase to any one unit increase in the loan loss provisioning ratio (LNLLPR) during the study period, meanwhile, as the loan deposit ratio (LDR) of these DMBs increases by one unit, it leads to an increase of 0.54 unit in Profitability (PRF) of the DMBs during the study periods. Finally, an 0.036 unit increase in Profitability of these DMBs was as a result of one unit decrease in the non-performing loan ratio (NPLR) of the DMBs.

Test of Hypothesis three (H_{03}): Evaluation of Model 3 for Statistical Significance

H_03: Credit risk management had no significant effect on Profitability of Deposit Money Banks in Nigeria.

From the Table 8, the explanatory variable NPLR have negative values, while LNLLPR is not statistically significant (0.91 > 0.05) , NPLR exerts an individual statistical significant (0.01 < 0.05) at 5% significant level on the profitability of the DMBs , while LDR, exerting a positive but non-significant effect on profitability of Nigerian DMBs, this was explained by the positive coefficient value of the explanatory variable and the corresponding probability value of the t-statistic p-value of 0.26, which was greater than the 5% critical value.

The adjusted R^2 (coefficient of determination) is the summary measure that tells us how well the sample regression line fits the data. From model 3, Adjusted R^2 of 0.514 means that 51.4% variation in Profitability was explained by a change in non-performing loan ratio (NPLR), loan deposit ratio (LDR) and logged value of loan loss provision ratio (LnLLPR), and the remaining 48.6% was explained by variables not included in the model. This implied that fewer proportions of the variations in profitability of the banks were accounted for by operational management mechanisms other than the credit risk management variables considered in this study. The overall regression is confirmed to be significance as indicated by the p-value of the F-statistics (0.04 < 0.05), asserting that credit risk management has a significant effect on profitability of DMBs in Nigeria. The null hypothesis is hereby rejected while the alternative hypothesis is accepted. This implies that credit risk management has significant effect on profitability of the selected DMBs in Nigeria.

Discussion of Findings

According to a number of studies, credit risk and the worldwide profitability of deposit-money institutions are correlated. Aduda and Gitonga (2011) claim to have used the Ordinary Least Squares (OLS) technique to conduct a research on the association between credit risk management and profitability among Kenya's deposit money banks. The results show that credit management and profitability are related, with credit management having an impact on profitability.

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According to a study by Boahene, Dasah, and Agyei (2012) on the profitability and credit risk of a few Ghanaian banks, credit risk indicators have a positive and significant relationship with bank profitability, indicating that banks in Ghana profit from high default risk because of (likely) prohibitively high lending and interest rates, fees, and commissions. The findings also show that factors like bank size, bank expansion, and bank debt capital have a favourable and substantial impact on bank profitability.

Felix and Claudine (2008) looked at the connection between credit risk management and bank performance. Their results suggested that the ratio of nonperforming loans to total loans of financial institutions, which measures profitability, was negatively connected to return on equity (ROE) and return on assets (ROA), leading to a drop in profitability. Similar research was conducted on the impact of non-performing loans on the performance of a few commercial banks in Nigeria from 2000 to 2013 by Ozurumba (2016). According to the study's findings, non-performing loans have a negative association with both return on assets and return on equity.

Conclusion and Recommendations

In conclusion, not all of the computed coefficients met the a priori predictions of the research. The failure to meet expectations may be explained by various moderating impacts brought about by regulatory policy thrusts present in the Nigerian deposit money institutions' operating environment. The results of this study thus shed light on the relationship between profitability, as measured by return on asset (ROA) and earnings per share (EPS) of selected deposit money banks (DMBs) in Nigeria for the period between 2011 and 2021, and credit risk, as measured by nonperforming loan (NPLR), loan loss provision (LLPR), and loan-deposit ratio (LDR). According to the study's findings, Deposit Money Bank in Nigeria's return on assets and profits per share are significantly impacted by credit risk management. The aggregate outcome also shown that Deposit Money Bank in Nigeria's profitability is significantly impacted by credit management.

The study's findings led to the following proposed suggestions being offered:

(a) In order to safeguard the investments of the shareholders and maintain strong profitability levels year after year, the management of deposit money banks in Nigeria should constantly assess their non-performing loan, loan loss provision, and loan deposit rates and the impact that these three crucial variables are having on return on asset and earnings per share. The management of DMBs is strongly advised to enhance credit standards since a lax credit policy has a detrimental impact on profitability.

(b) The report also urges policymakers and the government to consider the results important, particularly in enhancing and expanding the body of knowledge already available on the management and profitability of credit policy.

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