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CREDIT RISK MANAGEMENT AND SHAREHOLDERS RETURN OF DEPOSIT MONEY BANKS IN NIGERIA

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Abstract

Shareholders' Return and wealth maximisation should be of paramount importance to Deposit Money Banks (DMBs) in Nigeria and anywhere in the world. To achieve this very important object, there is need for prudent and efficient credit risk management. as it enables banks to meet their financial obligations, grow their business, attract investors, and comply with regulatory requirements and to achieve this there is need to pay attention to weak credit risk management practices of banks, which results in many loans being given to customers who are unable to repay them. In view of this fact, the study examined the effects of credit risk management on Shareholders return. Ex-post facto research design, was adopted for the study; the population of the study comprised of twenty-four (24) Deposit Money Banks (CBN, 2021). Twelve (12) banks were selected using judgmental sampling technique. Secondary data was applied for the study covering a period of 11 years (2011- 2021), The study employed empirical statistical 2analysis,which comprised of descriptive and inferential analysis.The result indicated that the estimated explanatory variables had negative values and individual effect on the return on equity (ROE) of the DMBS, with only NPLR and LDR exerting individual statistical significant on the ROE corresponding to 0.0243 and 0.0302 p-value, respectively, which are lesser than the 5% critical value.. Overall regression showed F-stat = 3.158845 with p-value of 0.027 < 5% critical value hence, the study concluded that null hypothesis is rejected, while the alternate hypothesis is accepted. This implies that credit risk management has significant effect on ROE of the selected DMBs in Nigeria. The study recommended that DMBs should strengthen their credit policies, because an inefficient credit policy will have a negative and adverse effect on Shareholders' Return which may lead to investors pulling out of the industry.

Key Words: *Credit Risk Management, Return on Equity, Non-performing Loan, Loan-Deposit Rate, Loan Loss Provision, Deposit Money Bank*

Introduction

The majority of failures encountered within the industry prior to the consolidation periods were clearly the consequence of giving loan recklessly which ultimately resulted in bad debt and some other unethical causes, according to the history of the development of the Nigerian banking sector. The development and profitability of deposit money institutions are

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highly dependent on risk asset management, as shown by Ekinci and Poyraz (2019). The target markets, credit extensions, credit monitoring, and profits are all identified by a credit management policy, which is a thorough procedure. The processes, criteria, and guidelines that direct bank employees while approving loans and managing the loan portfolio are referred to as credit management policy. As a result, credit policy is described as a set of rules intended to decrease the costs of credit while increasing its advantages (Mburu, Mwangi & Muathe, 2020).

Due to the unpredictable nature of the economy, changes in rules, and growing rivalry among banks and financial institutions, the financial sector is experiencing a wind of change that is causing many liquidity issues and distress instances. Consequently, it is becoming more difficult, if not impossible, to progress or manage credits. The circumstance necessitates a reorientation of loan offers based on the fundamental methods of selecting reliable clients using credit analysis, ratio analysis, balance sheet projection, and future performance forecasting to assess clients' performance (Palepu, Healy, Wrighty, Bradbury & Coulton, 2020). Banks in particular, who are financial institutions, are particularly important in this system since profitability is usually correlated with productivity and performance. Accordingly, pure profit is the rise in wealth that an investor experiences as a result of making an investment after deducting any related expenses, including as the capital's opportunity cost (Palepu & Coulton, 2020). As a result, the company has to be lucrative in order to survive. The integrity of a loan facility is immediately weakened when any of the lending and credit analysis standards are violated. If such a facility does not finally fail, it will be a welcome surprise (Burkhanov, 2020).

Ihenetu (2021) stated that although institutional, macroeconomic, and political factors can be linked to bank distress and failure in Nigeria, institutional factors such as poor credit administration, poor loan recovery, fraud, insider abuses, and shareholder interference are the primary causes in the majority of cases. Ihenetu (2021) noted that available statistics from the liquidated banks showed that the inability to collect loans and advances extended to customers and directors or companies related to directors or managers was a significant contributor to the distress in 1995, when 60 out of 115 operating banks were distressed with a non-performing loans ratio of 67%. This was a problem for risk management in Nigerian banks in the post-consolidation era. They claimed that the ratio worsened to 79% in 1996 and 82% in 1997, and that by December 2002, 35 troubled banks had had their licences removed. In 2006, 14 additional banks had their licences revoked.

Ehiedu and Obi (2022) pointed out that the Nigerian Stock Exchange had lost nearly 65% of its value since March 2008 and that bank equities, which made up two-thirds of the market capitalisation, had been wiped out for an estimated N8 trillion ($54 billion). The authors emphasised that throughout the boom cycle most banks had over-leveraged their balance sheets and were hit with bad loans totalling Naira without reporting it to investors. These issues are mostly attributable to the poor credit administration's failure to recognise early warning signs. Financial institution managers confirmed that the majority of their problems were caused by bad loans and advances, according to Naili & Lahrichi (2022).

According to Gayer and Das-Munshi (2020), the Nigerian banking sector has experienced hard times that have affected other sectors of the Nigerian economy, such as manufacturing and telecommunications, and that have sent 13,272 Nigerians back to the labour market from the banking sector alone between December 2009 and March 2010. He cited a manufacturing company that fired 400 employees on April 30, 2010, across all cadres, and said that, regrettably, this could

have been avoided if only the systems had been open and proactive and had adhered to best practises in credit administration and control. This is especially true in cases where a bank's credit administration structure, process, and procedure are lax, as is the case with many deposit money banks in Nigeria.

Numerous studies have looked at different facets of credit risk management, but few of them have embraced the factors that are utilised to compare credit risk management to shareholder returns in Nigeria. Nelson (2020) investigated how credit risk management affected BGFI Bank Congo's profitability. De-Leon (2020) examines how credit risk and macroeconomic variables, notably those from Indonesia, Malaysia, Thailand, and the Philippines, affect the profitability of 20 Asean banks from 2012 to 2017. The goal of Siddique, Khan & Khan (2021) is to understand how credit risk management and bank-specific variables affect the financial performance (FP) of South Asian commercial banks. Given this, it is clear that there are gaps in the field of credit risk management. As a result, this study was motivated by the dearth of research in the indicated areas in developing nations. As a result, this research looked at how Nigerian deposit money banks' shareholder returns were affected by credit risk management.

Literature Review

Conceptual Review

Credit Management

Implementing techniques to reduce loss incidents resulting from exposure to credit risk and maintain an ideal balance between credit risk and underlying returns are also part of credit risk management. Gallati (2022) noted that credit risk management maximizes banks' risk-adjusted rate of return by keeping credit risk exposures that are reasonably priced and diversified to preserve an ideal portfolio equilibrium and an acceptable risk-return trade-off. This finding is supported by the literature.

According to Oni (2019), a bank's credit risk is the potential for loss due to failure to make interest and principal payments, or both, or failure to realize the value of assets securing the loans. Credit risk was also described by Coyle (2000) as losses resulting from a credit customer's reluctance or incapacity to pay their debts in full and on time. Claessens (2019) went on to list the primary causes of policies, including: fluctuating interest rates, poor management, inappropriate laws, low capital and liquidity levels, directed lending, widespread bank licensure, poor loan underwriting, reckless lending, poor credit assessment, lack of non-executive directors, lax credit assessment, poor lending practices, government interference, and insufficient central bank supervision.

Gallati (2022), citing Ker & Biden (2021), went on to say that managing credit risk involves a dual approach that takes into account both the realization that once losses have occurred, they are impossible to recover from, as well as the growth of non-bank competition in the areas of financing commercial paper, securitization, and other non-bank lending, which forced banks to find viable loan borrowers. The authors also asserted that credit risk is an internal factor that affects bank performance; the more a bank's exposure to credit risk, the greater its propensity to go through a financial crisis, and vice versa. Menberu (2021), in her contribution, expanded on the idea of credit risk management by observing that it begins with the identification of the current and potential risks involved in a bank's lending activities as well as the creation of effective policies to control them. She continued by arguing that in the Nigerian banking system, each individual bank management creates a credit risk management system that includes restricting or reducing credit

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risk to specific industries, markets, or individuals (over-concentration), ensuring the sufficiency of asset classification (assets classification rule), ensuring the sufficiency of loan loss provisioning (prudential codes), stipulating borrowers' key performance indexes (conditionality rule), and performing pre-lensing inspections.

Types of Credit Facilities

Through the provision of financial services, banks play significant roles in the economic life of a country, especially in a growing country like Nigeria. They act as development agents by making loans and advances, which have an impact on a range of contingent facilities that may be either short-term or long-term. This is why the government's monetary circulars' credit rules include sectoral allocations for banks and other financial institutions to follow throughout a fiscal year as well as an overall cap on the amount of credit that may be created in a given year. The ability of a bank to create credit will depend on the kind of bank (deposit money, merchant, or development), the deposit, and the current credit regulations (Menhrling, 2020). In general, banks provide the following services, according to Cammarota and Gasbarrini (2019):

(a) Short-Term Finance: The most often utilised kind of short-term financing is a bank overdraft. In specifically, it is used to provide temporary working capital to get through the manufacturing cycle. It is also sometimes given to people in advance of salary payments or, in certain situations, contract payments. According to the method, a client is permitted to withdraw funds from his current account up to a certain limit, with the requirement that they be repaid immediately upon request or within a short-term window, often between one and twelve months.

(b) Medium-Term Finance: Finance that must be repaid in three to five years is referred to as medium-term financing. This sort of financing is used by businesses to purchase assets with a matching medium-term life, such as equipment and plants, to provide general operating capital, or to pay for significant overdrafts. Medium-term financing may be repaid in whole on a certain date or, more often, in instalments over a specified length of time. Before making this kind of loan, a bank will try to ascertain for itself the project's economic feasibility, managerial skills, and cash flow potentials to ensure that loan payback can be made. The borrower is contractually guaranteed financial stability with regard to period and amount with medium-term financing. The benefit of medium-term financing with a fixed rate of interest is that it allows the borrower to predict his future cash flow with confidence and certainty.

(c) Long-Term Finance: This kind of financing is often used for significant, expensive projects that need loans that last longer than five years. This kind of credit is often offered by merchant and development banks, and it accounts for a significant amount of their lending portfolio. It may be used to buy long-lasting fixed assets like large plants and equipment as well as to pay for the acquisition of structures. Long-term borrowers often have to provide thorough analyses of their project, their prior accomplishments, and their expected future outcomes. Such loans are often secured by an existing fixed asset of the company when they are given.

(d) Building/Mortgage Loans: This makes it eligible for long-term financing, especially those for residential structures. According to the Fourth National Development Plan (1981–1985), the Federal Government's policy, housing loans for the low-income group are given precedence in order to support the goals of shelter for the majority of people. The monetary circulars often require that a minimum portion of a bank's loans and advances (7% for 1995) be given to

residential structures at a preferential rate of interest of 9% per year in order to accomplish the goals. Due to the social character of these loans, repayment is sometimes stretched out over a lengthy period of time, and the financial proposal may occasionally get insufficient good deposit money attention.

(e) Advance: An advance is really a particular kind of financing issued to fund a project. The primary difference is that repayment must come from the funded project in accordance with the terms agreed upon. "Advance against Produce" is a typical form of this kind of credit that is often given to farmers. Nigeria is primarily an agricultural nation, which helps to explain the many initiatives and financial incentives devoted to agricultural enterprises. Farmers may be given financial aid to satisfy their operational needs since they are engaged in providing primary inputs for industrial processing, such as cocoa and cotton tobacco, and the interest rate is often preferential in accordance with the government's incentives to farmers.

(f) Contingent Facilities: Customers sometimes ask for contingent non-cash facilities to help with their operations. Additionally, overseas correspondent banks could urge banks to assume a risk on behalf of their own clients. In recent years, contingent facilities have made up a fair amount of a bank's portfolio, and because to the fee that may be charged, banks have been able to make a profit on these transactions.

Credit Administration and Control

It is impossible to overstate the importance of technology in credit risk management and credit administration. Banks may use more complex measurement approaches for addressing risk management challenges, according to Mazur (2020). He added that technological advancements, particularly the expansion of low-cost computing power and communications, have been crucial in enabling the adoption of stricter credit risk standards, though some banks still have a ways to go in putting these new strategies into practice. The research came to the conclusion that the type and relative quantities of the implicit internal subsidies would unavoidably become more visible as banks enhance their capacity to analyze risk and rewards associated with their diverse operations. Setting the credit policy is a control function, claim Liu, Wang and Cai (2019). According to the authors, a sound credit policy would enhance prudential oversight of asset quality, establish a set of minimum requirements, and use a common language and methodology (assessment of risk, pricing, documentation, securities authorization, and ethics) for measuring and reporting non-performing assets, loan classification, and provisioning. Other scholars, such as Odawo, Mokokha and Namusonge (2019), contend that the bank's lending philosophy as well as particular methods and ways to monitor the lending activity should be laid out in the credit policy.

Under the Central Bank of Nigeria (CBN) Act of 1999, the Nigerian Deposit Insurance Corporation (NDIC) Act of 1988, and the Bank and Other Financial Institutions Act (BOFIA) of 1991 (and their amendments), the Central Bank of Nigeria (CBN) and the Nigerian Deposit Insurance Corporation (NDIC) are the two government organizations that regulate the financial institutions in Nigeria. The CBN and NDIC sometimes release different circulars, the Bankers Guide, and prudential guidelines. The Prudential Guidelines for Deposit Money Banks were released by the CBN in 1990 to maintain a stable, secure, and sound banking system, while the Banking and Other Financial Institutions Act (BOFIA) of 1991 was formed to govern the banking sector in Nigeria. be sure to use a more conservative approach when classifying their credit portfolio, accounting for non-performing loans, disclosing their credit portfolio, and accruing interest on non-performing assets.

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World Bank Group (2019) while identifying the differences between regulation and supervision emphasized that the term "bank regulation" refers to giving input on the formulation and interpretation of laws and rules, the issuance of guidelines, and the approval of requests from regulated financial institutions. On the other hand, bank supervision comprises both off-site monitoring and on-site inspection of the banks' books (analysis of regularly submitted prudential returns), when exceptions are noted and suggestions are offered for how the found flaws might be fixed. Through prearranged post-examination visits to the impacted banks, the execution of such suggestions is monitored.

Shareholders Return

Return on equity (ROE)

A company's profitability is determined by calculating its return on equity (ROE), which measures net income as a proportion of shareholders' equity. It offers information on how well a firm earns profits from the money supplied by its shareholders, making it often used to assess a company's financial success (Du, Fan, & Gao, 2019).

By dividing a company's net income by the sum of its shareholders' equity, ROE is computed. After all costs, such as taxes and interest, have been deducted from revenues, the remaining profit is known as net income. The amount of money that would remain for shareholders if a corporation sold all of its assets and settled all of its debts is known as shareholders' equity (Brigham & Houston, 2021). ROE may show how successfully a firm is utilising its shareholders' money to create profits by comparing a company's net income to its shareholders' equity.

Gadoiu (2014) (cited in Afolabi, 2018) defined the rate of return on equity (ROE) as a measurement in relative terms of the returns on the investment of the shareholders that bear the risk associated with the capital investment known as equity who entrusted the respective capitals to the company management. It is the amount of net income returned as a percentage of shareholders equity. Tugas (2012) (cited in Afolabi, 2018) disclosed that return on equity and return on total assets are two ratios that measure the overall efficiency of the enterprise in generating returns to the shareholders and in managing its total investment in assets. Return on total asset indicate the amount of profit earned in proportion to the investment in total assets. Frase and Ormiston (2004) emphasized that return on equity measures the return to common shareholders.

The ability to shed light on a company's internal operations and management is one benefit of utilising ROE as a financial metric (Du et al., 2019). A corporation with a high ROE, for instance, could be employing its resources more effectively than one with a lower ROE. Since ROE offers a consistent way to quantify profitability, it may also be used to compare the performance of businesses operating in the same sector (Du et al., 2019). It is crucial to remember that ROE has its limits. For instance, it disregards the amount of debt a business has or the impact inflation has on its financial performance (Brigham & Houston, 2021). Furthermore, a high ROE does not always mean a firm is a good investment, since it may be heavily leveraged or be at high risk of experiencing financial crisis (Du et al., 2019). A useful financial metric for assessing a company's profitability and managerial effectiveness is return on equity (ROE). It may be used to compare the performance of businesses in the same sector and gives insight into how well a firm is utilising the money from its shareholders to make profits. To acquire a thorough view of a company's financial performance, it is crucial to take into account the limits of ROE and utilise it in combination with other financial metrics.

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Theoretical Framework

Credit scoring model is the theory to which the study was anchored.

Credit scoring models

Credit scoring models utilise statistical analysis to determine how likely a borrower would default. The leading model is FICO scores. These models provide a score that calculate the borrower's creditworthiness by using a number of variables, including the borrower's credit history, income, and work status. Financial Institutions used credit scoring algorithms to evaluate prospective borrowers' credit risks and monitor current borrowers. In order to control credit risk, the model has become a common package for use in many countries including Nigeria.

Fair, Isaac and Company (FICO) introduced the concept of credit scoring models in the late 1950s. for the first time. The business created a credit scoring algorithm that made use of data from credit bureau records to forecast a borrower's chance of defaulting. The model was built on the assumption that in the past it has exhibited to be a reliable predictor of credit behaviour. FICO score is still in use today. According to FICO (2023), Fico Score is used by lenders and financial institutions to help make unbiased, reliable, accurate, and fast credit risk decisions during customers lifecycle. It rank consumers according to how they are likely to offset their debt obligations as agreed. FICO Score plays an important role in billions of decisions annually across the credit ecosystem. It is an industry standard in credit scoring with expertise in developing credit scores for over 30 countries, supporting financial inclusion.

The algorithm estimated a borrower's chance of default using data from credit agency records. The model, according to FICO, was created to be impartial and to solve the problem of subjectivity that was often connected to credit judgements. The FICO credit scoring algorithm has been broadly embraced and is still in use by financial organisations. The efficiency of credit scoring algorithms in forecasting default has been extensively researched and found to be accurate default forecast for borrowers and beneficial for managing credit risk. Critics of credit scoring algorithms contend that they may be biased against certain demographics, such as low-income borrowers and members of minorities. They further observed that critical issues like the borrower's capacity to repay the loan are not taken into consideration by credit scoring programmes. Supporters of credit scoring models debunk the claim and emphasized that they are unbiased and effective tools for managing credit risk.

Credit scoring model is an essential tool for financial institutions prior to granting credit to applicants (Chen and Chiou 1999), cited in Pranith and Krishmendu (2021) which opined that In the financial sector, credit may be defined as granting some form of financial resources to individuals or organizations with agreed terms and conditions for the two parties involved the credit agreement. Credit scoring enables financial institutions to classify and ensure borrowers' ability to repay loans on time. It is a relatively complex task with numerous risks that may result in the failure of a loan recipient in meeting payment obligations when due (Zhang et al. 2016). The entire process necessitates careful scrutiny, and even minor mistakes can have serious consequences (Lando 2004). Financial institutions often choose the safer side and deny credit to risky firms to avoid pecuniary loss (Zhang et al. 2016). Even a small improvement in the credit scoring model could significantly facilitate earnings (Zhang et al. 2019).

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The model assist the DMBs to achieve a fast and simple method to assess the credit risk of its customers. Therefore, credit scoring models are clearly relevant in anchoring a study on investigation of how credit risk management affects the profitability of DMBs in Nigeria.

Empirical Review

Credit risk management and the return on equity (ROE)

Islam & Hossain (2019) looked at the effects of credit risk management for 23 traditional commercial banks in Bangladesh that are listed on the Dhaka Stock Exchange from 2006 to 2015. Five credit risk metrics and two control variables are taken into account in the study to determine their effects on three different aspects of bank performance. The fixed effect model with Driscoll-Kraay standard error has been chosen as the best model for all three performance metrics after executing the necessary diagnostic tests. The findings indicated that while non-performing loan ratio (NPLR) exhibits an inverse relationship with each of the three performance indicators of banks, return on assets (ROA), return on equity (ROE), and market-to-book value ratio (MBR), capital adequacy ratio (CAR) has a significant positive association with each of them. According to the study, there is a link between loan-to-ratio (LTDR) and ROA and ROE. On the other hand, MBR is positively impacted by the loan-loss provision ratio (LLPR), yet there is a strong negative correlation with both ROA and ROE. The research shows that the Geographic Focus Index (GFI) significantly improves MBR. Based on the study's findings, certain policy recommendations have been made.

Asia is the most significant region in the world, contributing 60% of global growth, but it also has a high rate of nonperforming loans (NPLs), which is a problem. In order to understand how credit risk management and bank-specific factors affect the financial performance (FP) of South Asian commercial banks, Siddique, Khan and Khan (2021) set out to collect this data. NPLs and the capital adequacy ratio (CAR) were the credit risk measures employed in this study. As bank-specific characteristics, the cost-efficiency ratio (CER), average lending rate (ALR), and liquidity ratio (LR) were included. As metrics of FP, on the other hand, return on equity (ROE) and return on assets (ROA) were used. Design, methodology, and approach Over the course of ten years, from 2009 to 2018, secondary data from nineteen (19) commercial banks in the nation; ten (10) from Pakistan and nine (9) from India were gathered. For coefficient estimation, the generalised method of moments (GMM) is employed to mitigate the impacts of particular endogenous variables. The findings showed that whereas NPLs, CER, and LR are strongly inversely correlated with FP (ROA and ROE) for Asian commercial banks, CAR and ALR are considerably inversely correlated with FP According to the study's findings, policymakers in Asian nations should implement monetary policy that stimulates interest rates in a way that naturally lowers the high ratio of non-performing loans (tied monitoring system), in order to establish a robust financial environment. In order for the commercial banks to survive even in a highly competitive climate, the liquidity position should be kept in good shape.

By selecting credit risk indicators and profitability measurement ratios for the years 2010–2019, Nelson (2020) investigated the impact of credit risk management on the profitability of BGFI Bank Congo. According to the results and its credit risk management indicators, profitability is somewhat impacted by credit risk management. A negative correlation exists between ROE and the non-performing loan ratio (NPLR), capital assets ratio (CAR), and loan loss provision ratio (LLPR). These three measures all affect return on assets (ROA) and the ratio of client loans and

short-term financing (RCLSTF) to return on equity (ROE) negatively, but the CAR affects both of these ratios favourably. Consequently, credit risk management has a big impact on profitability. The study also demonstrates that other well chosen credit risk management metrics, such as the loan provision ratio (LLPR) and the clean capital adequacy ratio, significantly impact the profitability of the bank.

De-Leon (2020) examines the impact of macroeconomic and credit risk indicators on the profitability of 20 ASEAN banks, focusing on those from Indonesia, Malaysia, Thailand, and the Philippines from 2012 to 2017. The heterogeneity and normality of the unbalanced panel data were examined. Following simple ordinary least squares (OLS) regression, a fixed effects model and a random effects model were applied. At the 5% level of significance, the results indicate that GDP growth and credit risk have a negative impact on return on equity (ROE). ROE is raised by 0.323% as a result of inflation. In terms of impact, GDP growth, credit risk, and inflation all have greater effects on ROE. At the 5% level of significance, there is a negative relationship between GDP growth and return on assets (ROA). The rate of inflation rising also had an impact on ROA. This study will therefore aid governments, policymakers, investors, depositors, banks, and bank management in identifying variables affecting bank profitability.

Okang, Edward, and Ekpo (2016) used the ordinary least squares method to investigate how lending rates in Nigeria affected the performance of deposit money institutions. Using return on equity (ROE) as a proxy, the study's findings demonstrate that non-performing loans had a detrimental impact on banks' performance. Additionally, all of the factors had a favourable impact on bank performance, whereas non-performing loans had a negative impact. The association between bank performance and credit risk management was examined by Felix and Claudine (2018). Their results suggested that the ratio of nonperforming loans to total loans of financial institutions was inversely connected to return on equity (ROE) and return on assets (ROA), both assessing profitability, resulting in a drop in profitability. Similar to this, Ozurumba (2016) conducted research on the impact of non-performing loans on the performance of a subset of Nigerian commercial banks between 2000 and 2013. According to the study's findings, non-performing loans and returns on assets and equity are inversely related.

Research Methods and Procedure

This study used an ex-post facto research design in the context of a panel data structure. Secondary data was adopted for the study covering a period of 11 years from 2011 to 2021. The time frame was deemed relevant because it fell within Nigeria's banking industry's post-consolidation phase. In light of this, the study considered the time frame to be appropriate for accurately assessing the effect of credit risk management on the Shareholders Return of deposit money banks listed on the Nigerian Stock Exchange. The population of the study is twenty-four (24) Deposit Money Banks (CBN, 2021). Twelve (12) banks were selected using judgmental sampling technique. The study employed empirical statistical 2analysis,which comprised of descriptive and inferential statistics.

Variable measurement

Table 1: Variable definition and Measurement

Variable	Measurement	Abbreviation
Return on equity	$\frac{\text{net income}}{\text{total shareholders' equity}} \times 100$	ROE

Source: Researchers' computation (2022)

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Research Hypotheses

The following hypothesis was tested:

H_0: Credit risk management has no significant effect on Return on Equity (ROE) of Deposit Money Banks (DMB) in Nigeria.

H_a: Credit risk management has significant effect on Return on Equity (ROE) of Deposit Money Banks (DMB) in Nigeria.

Researchers Conceptual Model

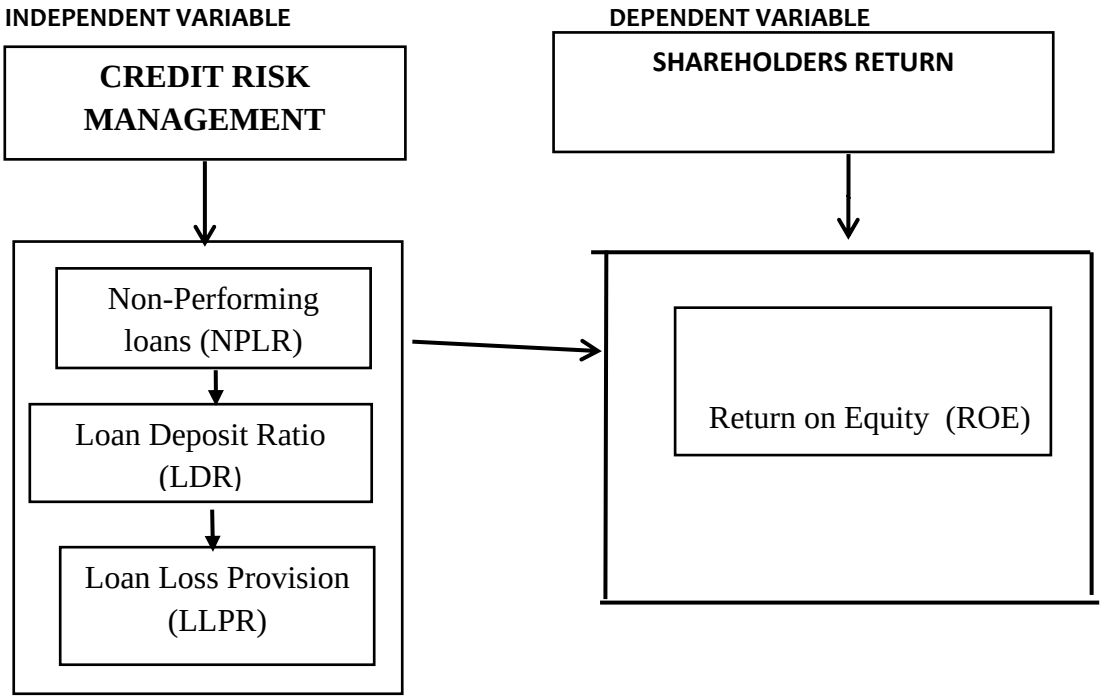

Fig 1: Researcher Conceptual Model, (2022).

Model Specification

The general model for the study is:

Y= F(X)

Where:

Y = dependent variables = Shareholders' Return (SHR)

X= independent variable = Credit risk Management (CRM)

$Y = f(y_1)$

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

Where:

Y = Shareholders Return:

y_1= Return on Equity (ROE)

X = Credit Risk Management (CRM):

x_1= Non-Performing Loans Ratio (NPLR)

x_2 = Loan Loss Provision (LLPR)

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x_3= Loan-Deposit Ratio (LDR)

The functional representation of the study is shown below:

ROE = f (NPLR, LLPR, LDR)

The regression model is show below

Functional Model

$$ROE_{i,t} = \lambda_0 + \lambda_1 NLPR_{i,t} + \lambda_2 LLPR_{i,t} + \lambda_2 LDR_{i,t} + \mu_t$$

Where:

Y= Dependent variables = Shareholders' Return of DMBs (SHR)

X=Independent variables = Credit risk Management (CRM)

β_0=Value of the intercept

$\beta_0 - \beta_3$ =Coefficients of the explanting variable

ε=Errors term

i= Number of sampled companies

t= Period

Shareholders Return (SHR), the dependent variable, is proxied by ROE, and NLPR, LLPR, and LDR are used to represent the independent variables.

***A Priori* Expectation**

The link between the dependent variable, shareholder's return (SHR), proxied by the ROE of the deposit money banks (DMBs) in Nigeria throughout the study period, and the independent variable, credit risk management (CRM), represented by NPLR, LLPR, and LDR, was predicted a priori. The pre-estimation expectation observed is summarised as follow in Table 2.

Table 2: *A Priori* Expectations

S/N	**Models**	Expected signs	Coefficient and the Expected Sign
2	ROE= $\beta_0 + \beta_1$NLPR + β_2LLPR+ β_3LDR + μ	Positive (+)	$\beta_1 < 0$; β_2, $\beta_3 > 0$

Source: Researcher's Compilation, 2022

Research Findings and Results

The data gathered for the investigation were analyzed using multiple regression and descriptive statistics, respectively. Given that the Hausman test is not statistically significant, random effect regression is deemed appropriate. The Hausman test, random effect, and fixed effect were all utilized.

Descriptive Analysis

This section gives a general overview of the data set while attempting to describe its key characteristics. The descriptive statistics in Table 2 were used to analyse the panel data in a descriptive manner. The credit risk management variables' mean, maximum, minimum, standard deviation, skewness, kurtosis, Jarque-Bera, and probability values were all employed as statistics. Variable shareholder return

Table 3: Descriptive Statistics

	ROE	LDR	LLPR	NPLR
Mean	17.04088	0.745677	8.632139	4.568703
Median	10.98439	0.738224	8.769196	3.200000
Maximum	110.6938	1.093605	11.25984	17.23000
Minimum	1.246052	0.317987	6.504288	0.006429
Std. Dev.	25.24373	0.205349	1.357320	5.245053
Skewness	3.239425	-0.3802	-0.0197	1.462286
Kurtosis	12.61845	2.501410	2.090663	3.806922
Jarque-Bera	95.26380	0.585756	0.586827	6.519669
Probability	0.865400	0.746113	0.745714	0.038395

Source: Researcher's Computation (2022)

Test for normality

In order to know whether or not the data set follow a pattern of standard normal distribution, Jarque-Bera (JB) statistic was used. Table 2 showed that all the variables were normally distributed because the *p*-values were greater than the critical value of 0.05 and all right tailed with Skewness that ranged from 3.24 to -0.38 and peak (kurtosis) of between 12.62 and 2.09. Table 3 results also showed that the mean values were 17.04088, 0.745677, 8.632139 and 4.568703 for ROE, LDR, LNLLPR, and NPLR, respectively. The values of the standard deviation represented the spread and dispersion in the data series, indicating that the larger the value, the further the series deviates from its mean. While the standard deviations of the other variables in this study were 0.20, 1.35, and 5.24 for LDR, LNLLPR, and NPLR, respectively, indicating variations within the data set and that there had been fluctuation over the years for the DMBs, ROE had the highest degree of dispersion from the mean, as indicated by a value of 25.24.

Results of Stationary Tests

Most macroeconomic time series in econometric research are non-stationary at levels, according to Engle and Granger (1987), which suggests that most ordinary least squares (OLS) regressions performed at levels may not be accurate. This suggests that it becomes imperative to assess the stationarity of variables in order to produce a more trustworthy result. 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 0.0000, 0.0000, 0.0000, and 0.0022 for LDR, NPLR, ROE, 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
LDR	-5.60403	0.0000	I(0)
NPLR	-6.85479	0.0000	1(0)
ROE	-10.0052	0.0000	1(0)
LNLLPR	-2.85370	0.0022	1(0)

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Hausman Test Results

Results of the Hausman test are for the functional model is presented in table 5, respectively.

Table 5: Hausman Test results

Correlated random effects-Hausman Test **Test period random effects**			
Test summary	Chi-square statistics	Chi-sq. DF	Probability
Cross-section random	2.831550	3	0.4183

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 = 0.42 > 0.05). This shows that the random effect model is preferred and more appropriate for the estimation than fixed effect model.

Regression Analysis

Test of Hypothesis

H_0: Credit Risk Management has no significant effect on Return on Equity of Deposit Money Banks in Nigeria.

H_a: Credit Risk Management has significant effect on Return on Equity of Deposit Money Banks in Nigeria.

Results of the panel regression analysis for the functional Model is shown in Table 6:

Table 6. Panel regression Analysis

Variable	Coefficient	Std error	t-statistics	Prob.
C	16.97443	47.74942	0.355490	0.7228
NPLR	-1.465733	0.643113	-2.279121	0.0243
LNLLPR	-2.747024	3.696318	-0.743178	0.4587
LDR	-41.37985	18.88424	-2.191237	0.0302
$R^{2=}$ 0.680932 Adjusted R^2 =-0.6 17459 D-Watson = 1.888633 F-stat = 3.158845 Prob(F-stat) 0.027021				

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

Source: Researcher's Computation (2022)

If the numerical values of the intercepts of the model and coefficients of the credit risk management variables is substituted into the functional models, It provided the following estimated panel regression Model :

$$ROE_{it} = 16.974 - 2.747LNLLPR_{it} - 41.379LDR_{it} - 1.466NPLR_{it} + \mu$$

Evaluation of Parameters of Panel Regression Model

The result of the functional model in Table 6 indicated that all the signs of the coefficients of the individual credit risk indicators complied with the signs of expected *a priori*, as loan loss

provisioning ratio (LNLLPR) and non-performing loan ratio (NPLR) were consistent with expectations, also loan deposit ratio (LDR) also align to the expected signs. The values of the coefficients (λ_1 = -2.747 < 0; λ_2 = -41.379 < 0 and λ_3 = -1.466 < 0) provided the evidence of the respective negative effects of the credit risk management on return on equity (ROE) of the DMBs. The model went on to say that for every percentage decrease in the loan loss provision ratio (LNLLPR) during the study period, the return on equity (ROE) increased by 0.02747 units, while for every unit decrease in the loan deposit ratio (LDR) of these deposit money banks (DMBs), the increase in return on equity (ROE) of the DMBs was 41.379 units. Finally, a unit decrease in the non-performing loan ratio (NPLR) of the Deposit Money Banks (DMBs) led to an increase in return on equity (ROE) of these DMBs of 1.466 units.

Evaluation of Functional Model for Statistical Significance

Table 6 further showed that the estimated explanatory variables had negative values and individual effects on the return on equity (ROE) of the DMBS, with only NPLR and LDR exerting individual statistical significance on the ROE, corresponding to respective p-values of 0.0243 and 0.0302, which are below the 5% critical value.

How well the sample regression line fits the data is indicated by the modified R^2. With an R2 of 0.617, it can be seen from table 6 above that only 61.7% of variations in return on equity (ROE) were explained by changes in the non-performing loan ratio (NPLR), the loan deposit ratio (LDR), and the logged value of the loan loss provision ratio (LLPR), while the remaining 38.3% of variations and cumulative deviations were explained by variables not included in the model. This may be rationalised by the fact that stock market conditions, which had nothing to do with the banks' credit risk policies, exogenously influenced the equity earnings of the financial institutions.

The p-value of the F-statistic (0.027), which is smaller than the 5% critical value, shows that the overall regression is confirmed to be significant. The null hypothesis is rejected and the alternate hypothesis is adopted in light of the relevance of the probability value of the F-statistics. This suggests that the ROE of the chosen DMBs in Nigeria is significantly impacted by credit risk management.

Discussion of Findings

According to the report, deposit money banks (DMBs) in Nigeria's return on equity (ROE) is significantly affect credit risk management. The alternative hypothesis was accepted, while the null hypothesis which state that credit risk management has no discernible effect on DMBs' ROE in Nigeria was rejected. The study backs up earlier studies, such as that by Felix and Claudine (2008), who discovered that return on equity (ROE) and return on assets (ROA) were inversely related to the proportion of nonperforming loans to total loans of financial institutions, resulting in a fall in profitability.

There are several studies on managing credit risk and the profitability of DMBs, but few on managing credit risk and shareholder returns. According to a number of studies, credit risk and the worldwide profitability of deposit-money institutions are correlated. Using the Ordinary Least Square (OLS) approach, Aduda and Gitonga (2020) conducted a study on the link between credit risk and profitability among the deposit money banks in Kenya. They discovered that credit management and profitability generally have a link, with credit management having an impact on 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.

Kargi (2011) also examined the impact of credit risk on the financial performance of Nigerian banks. The annual reports and accounts of the sampled banks were used to collect financial ratios as indicators of bank performance and credit risk, which were then examined using descriptive, correlational, and regression methods. The results showed that credit risk significantly impacts Nigerian banks' profitability. It came to the conclusion that the ratios of deposits, non-performing loans, and loans is inversely correlated with banks' profitability, placing them at a high risk of illiquidity and distress.

Conclusion and Recommendations

This study looked at how credit risk management affected shareholders' returns of Nigerian Deposit Money Banks (DMBs). To illustrate the change in values and identify the variations of each independent variable, a numerical description of all the variables under consideration was recorded. The study's findings shed light on the relationship between shareholders' returns measured with return on equity (ROE) of selected deposit money banks (DMBs) in Nigeria for the years 2011 to 2021; and credit risk management, as measured by nonperforming loans (NPLR), loan-deposit ratios (LDR), and loan loss provisions (LLPR). Additionally, it confirmed the degree to which the independent factors taken into account in the models were responsible for variations in the dependent variables, as shown by the coefficient of multiple determination. In light of the findings, it can be said that credit risk had a considerable effect on shareholders' returns of the Nigerian deposit money banks (DBMs).

The following suggestions were made in light of the study's results and conclusions:

(a) Deposit Money Bank performs a considerable portion of its business by extending credit, and the findings of this study confirm that credit risk has a sizable effect on shareholder returns. As a result, management of Deposit Money Banks should make sure that credit policies relating to non-performing loans (NPLR), loan-deposit ratios (LDR), and loan loss provisions (LLPR) are carefully examined to minimise the negative effects of non-performing loans in order to prevent massive bad debt that could destroy the going concern and survival of the banks. They should bring in improvements to their credit policies since ineffective credit policies will negatively and adversely affect shareholders' returns and may drive investors to leave the sector.

(b) When examining the CBN credit policy for deposit money banks in Nigeria, government officials and the Central Bank of Nigeria (CBN) should make sure that credit policies on banks are closely monitored, reviewed from time to time and that shareholders' returns should be taken into account.

(c) To implement the debt collection policy that will prevent the buildup of non-performing loans and loan losses, staff members should get adequate training and motivation.

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