

CREDIT RISK MANAGEMENT, CAPITAL ADEQUACY RATIO AND THE FINANCIAL PERFORMANCE OF LISTED DEPOSIT MONEY BANKS IN NIGERIA

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Abstract

The effect of credit risk management and capital adequacy on the profitability of Money Deposit Bank had been a subject of hot debates among the professionals and academic scholars. This study examines the impacts of credit risk management and capital adequacy on the performance of money deposit banks in Nigeria using panel data regression analysis conducted on E-view 7 data analysis software. Secondary data in the form of time series and cross-sectional data were obtained from the bank's reports. Credit risk variables and capital adequacy ratio were extracted from 12 banks annual reports for the period 2015 to 2021. The independent variables are credit risk and capital adequacy ratio, while the independent variable is bank performance proxied on Return on Asset (ROA) and Return on Equity (ROE). This study found that loans and advances (LA) has negative and significant relationship with return on asset (ROA) ($\beta=0.04$; $t=4$). Loans and advances (LA) have positive and significant relationship with banks financial performance as proxied by return on equity (ROE) ($\alpha=0.01$; $t=2$). The study also found that capital adequacy ratio (CAR) has positive and significant relationship with banks financial performance as proxied by return on equity (ROE) ($\alpha=-0.04$; $t=2$). Loans and advances have negative and significant relationship with return on asset (ROA) ($\beta=-0.19$; $t=-2$). Non-performing loan has negative and significant relationship with return on equity (ROE) ($\alpha=-0.057$; $t=2$). It is therefore recommended that banks management should constantly review their credit policy guidelines from time to time in consonance with the dynamics of business environment. Nigerian banks must constantly enhance their capital to serve as buffer to cushion the adverse effect of loan capital erosion arising from non-performing loans.

Keywords: *Credit; Risk, Capital adequacy, Management, Financial performance*

1. Introduction

Credit risk and capital adequacy are critical topics that had been receiving attention from researchers in both business and corporate finance. The reason for this attention is not far-fetched, credit risk management and bank capital adequacy are essential factors that determine the performance of money deposit banks in Nigeria. Capital inadequacy and lopsided in credit management are considered as the major threats to the profitability of money deposit banks not only in Nigeria but all over the world. Credit creation is the main income generating activity of banks (Kargi, 2011). According to Alexandra (2020) bank credit is the amount of credit available to a business or individual from a banking institution in the form of loans.

Credit risk represented by the nonperforming loan ratio is a banking risk situation caused by failure of a loan obligor to meet up with repayment obligation as they fall due. Credit risk has been the major cause of bank crisis around the world (World Bank, 2022).

Nigerian Banks total non-performing loans reached N1.21 trillion in February 2021 from N1.1 trillion recorded in February 2020. CBN (2022) forecasts banks total non-performing loans to reach N1.5 trillion in 2023. CBN (2022) also reported that Nigerian banks total credit reached N25.25 trillion in February 2022 from N23.1 trillion recorded in 2021. The above statistics showed that Nigerian banks total non-performing loans to total credit is 5% in the two consecutive years. These statistics have been a source of concern to bank professionals and various regulatory authorities. Nigerian banks non-performing loans have surpassed that of other African countries such as South Africa, Ghana, Rwanda amongst others both in absolute terms and dollar benchmark. For example, Ghana's ratio of non-performing loans to total credit is 4.5%. (World Bank). Worried by increasing trend of non-performing loans, the Central Bank of Nigeria has continued to dwell on the need for Nigerian banks to adopt robust risk mitigation strategies in their lending functions. Credit risk management has continued to dominate economic discourse among practitioners and regulators alike, perhaps due to the strategic importance of banks in economic survival of any nation (Ramazan & Gulden, 2019). According to the theory of anticipation income, bank is expected to give long term loan to borrowers and anticipated the loan repayment from the income of the borrower's future business transaction. The biggest risk in banking is credit risk, credit risk is represented by Non Performing Loan Ratio (NPLR) . Basel (2001) defined Non-Performing Loan (NPL) as the loans that are in existence for more than a period of 90 days and whose borrower failed to repay both the principal and the interest on loan. The risk of default is un avoidable, therefore bank is expected to prepare for any likely shocks that can emanated from credit by making provision for loan losses. Incessant bank failures are as result of poor bank credit risk management . Banks credit risk management enhance banks performance when appropriate risk mitigation strategies are adopted especially during loan underwriting process (Ogboi & Unuaefe, 2013). Bhattarai (2019) noted that banks adherence to credit policy will mitigate credit default, while Nifon & Ubana (2014) found that Board and management of banks apparent lack of knowledge in credit risk management has been the major cause of banks crisis.

Although, several research findings prove credit default to be the common cause of banks distress, appropriate credit risk management strategies are still a subject of debate. Several previous studies have suggested various credit management strategies, but which among these bests mitigate credit risk has remained an open debate among banking practitioners. In search of the most suitable credit risk mitigation strategies in Nigeria, Harcourt (2017); Kajola et al (2018); Adegbe and Otitolaiye (2020); Ayodele et al (2021) examined the impact of credit risk management and banks performance and produced conflicting results.

Capital adequacy which serves as safety net is proxied by Capital Adequacy Ratio and measure the financial strength of the bank in using its capital and assets , It is used for protecting depositors and promote stability in the financial system . The importance of capital adequacy ratio to the management of credit risk has been a subject of hot debate among scholars especially at the time of economic depression with the high rate of depreciation of the Naira currency with its economic impact on the bank capital. While some scholars such as Ogboi and Unuaefe (2013) found that adequate capital provides

shock absorber to capital erosion caused by loan loss provisioning. Others researchers such Kajola et al (2018) observed that capital erosion caused by loan loss provisioning can attract regulatory intervention. The 2008 global financial crisis is a case in point.

Following the banking crisis of 2008, there are emergencies of strict banking regulatory and supervisory controls to enforce compliance with prudential guidelines designed by both world banking supervision committees through the revised Basel Accords (I, II and II) and Central Bank of Nigeria . However, the recent increasing trend of nonperformance loan and erosion of bank capital with subsequent financial crisis and bank failures become source of worry for bank professionals and academics researchers. The effectiveness of the credit policy and extent of compliance with the regulatory requirements for capital adequacy by DMB has call for questioning the transparency in management of credit portfolio of money deposit bank in Nigeria . There has been diverse opinions on the impacts of credit management and capital adequacy on the performance of DMB . Bhattarai (2019); Ramazan and Gulden (2019) examined the joint impact of credit risk and capital adequacy in a unified framework, it has been argued recently that poor credit risk management and capital inadequacy are recipe for bank crisis and failure (Helen & Ikupolati, 2017). While the views of Bhattarai (2019); Ramazan and Gulden (2019) are tenable in developed banking system, the apparent lack of extensive study on the impact of credit risk management and capital adequacy ratio in developing economy like Nigeria especially in wake of increasing trend of Non-Performing loans and the catapulted effects of the economic depression on the bank performance has necessitated the need for this research work.

1.2 Objectives of the study

The broad objective of this study is to empirically examine the joint impact of credit risk management and capital adequacy on the financial performance of listed money deposit banks in Nigeria, while the specific objectives are to:

- i. Examine the relationship between banks loans and advances on the performance of listed money deposit banks in Nigeria
 - ii. Investigate relationship between loan loss provisions on the financial performance of listed money deposit banks in Nigeria
 - iii. Determine the relationship between non-performing loans and the financial performance of listed money deposit banks in Nigeria
 - iv. Determine the relationship between capital adequacy on the financial performance of listed money deposit banks in Nigeria

1.3 Research Questions

The following questions are answered in this study:

- i. What is the relationship between banks loans and advances on the financial performance of listed deposit money banks in Nigeria?
- ii. What is the nature of relationship existing between capital adequacy and financial performance of listed deposit money banks in Nigeria?
- iii. What is the nature of relationship between loan loss provisioning on the financial performance of listed deposit money banks in Nigeria?

- iv. What is the relationship between the non-performing loans on the financial performance of listed deposit money banks in Nigeria?

1.4 Research Hypothesis

The following hypotheses are tested in the study:

- H₀₁: There is no significant relationship between loans and advances and financial performance of listed deposit money banks in Nigeria
- H₀₂: There is no significant relationship between capital adequacy and financial performance of listed deposit money banks in Nigeria
- H₀₃: There is no significant relationship between loan loss provisioning and financial performance of listed deposit money banks in Nigeria
- H₀₄: There is no significant relationship between non-performing loans and financial performance of listed deposit money banks in Nigeria

2.0 Literature Review

In this section of the study, conceptual, theoretical and empirical review of related literatures on credit risk management, capital adequacy and bank performance will be carried out.

2.1 Conceptual Review

2.1.1 Conceptual relationship between credit, capital, and banks financial Performance

Below depicts the conceptual model of the relationship between banks credit risk management and financial performance.

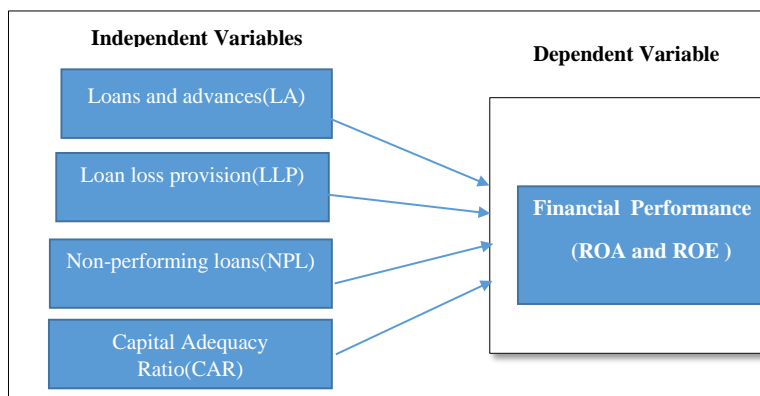


Figure 1: Conceptual Relationship Between Credit Risk, Capital Adequacy and Banks Financial Performance

2.1.2 Loans and advances: According to Ogboi and Unuafefe (2013), banks loans and advances can impact banks financial performance in two ways. Firstly, loans and advances to customers is the major source of income to banks. Banks charge fee and interest to borrowers as compensation for risk taken in the transaction. Meanwhile, the ability of the borrower to repay is dependent on several factors. Some factors are within the control of the borrower, some are outside the control of the customer. Factors that

are within the control of the borrower customer are character, management quality, prudence and the nature of the business. The exogenous factors that could influence the capacity of the borrower are natural occurrence, competition, technological advancement. Repayment of loan principal and interest as and when due provides the banks opportunity to earn income and free up funds to lend to the customer or another borrower. But if the loans are not repaid, then bank will lose the principal and interest thereby constraining the banks financial performance.

2.1.3 Capital adequacy: Apart from providing funds for business expansion, banks tier 1 and tier 2 capital serves as shock absorber to loan losses. Regulatory authorities and Basel Committee of Banks Supervision have continued to emphasize the need for banks to be adequately capitalized because its strategic importance to banks sustainability. Banks capital determines the amount of loan a bank can grant individual and corporate customers. According to Central Bank of Nigeria (CBN), banks are not allowed to lend more than 5% and 10% of its shareholders funds to individual and corporate customers respectively. A bank that has adequate capital can lend to big ticket transaction that can enhance profitability.

2.1.4 Loan Loss Provision: Bank regulators demand that banks make provision for loan loss depending on the category of the loan. In Nigeria, Central bank of Nigeria prudential guidelines for deposit money banks loans are classified as follows;

Category

Provision

Substandard- where the unpaid principal and interest is up to 90 days but less than 180 days. 10 %

Doubtful-where the outstanding principal and interest is up to 180 days but not more than 360 days 50%

Lost-where the unpaid principal amount and interest is more than 360 days. 100%

Source: CBN prudential guidelines for deposit money banks, 2010

Provisioning for loan losses constrain the performance of banks especially those in the loss category because IFRS16 require that loan loss be taken into consideration before profit is calculated. In an extreme case, loan loss diminish capital where the profit is not enough to absorb the lost amount of the loans.

Prudential Guidelines: The Central Bank of Nigeria CBN prudential guidelines addresses several regulatory requirements ranges from the regulatory supervisory framework of the apex bank , management of bank corporate governance and regulatory capital and liquidity requirements of the deposit money bank in Nigeria . The DMB Prudential Guidelines comply significantly with the Basel (I, II and III) accord framework, but adjust certain sections of the framework to better reflect the distinctive features of the Nigerian economy. Under the DMB Prudential Guidelines, a DMB with a national banking license must maintain a minimum of 10 per cent of the total risk-weighted assets as capital funds on an ongoing basis. DMBs that have been authorised by the CBN to carry out banking activities outside Nigeria must maintain a higher CAR of 15 per cent. On the liquidity regulation requirement, the CBN requires all banks operating in Nigeria to ensure that their level of cash flow is matched by expected

receipts, so that banks always have enough cash to meet the requests of their depositors. This is to ensure that each bank's cash balance plus assets, when compared to the total liabilities owed by each bank, is high enough for the bank to meet its obligations as they fall due. The CBN under its current Monetary, Credit, Foreign Trade and Exchange MCFT Policy Guidelines requires that banks to maintain minimum liquidity ratios as of 30 per cent. The CBN guideline also requires DMBS to manage credit risk effectively, by putting in place a risk management framework which will involve the institution of a process for computing financial ratio and soundness for checking the financial health of each bank. It also set standard for classification of bank credit facilities. The prudential guidelines provide that loan shall be classified as performing, watchlist or non-performing. Performing credit facilities is the one that the principal and interest payments have been settled or if not past due by more than 30 days, on other hand watchlist facility is where principal and/or interest is past due by 31 to 90 days. A Loan is said to be non performing if the interest or principal is past due for more than 90 days or interest past due for 91 days or more have been capitalized, rescheduled or rolled over into a new loan and or where the off balance sheet obligations crystallized. The guidelines provide that the NPL in relation to the gross loan should not exceed five percent. MDBs are required to make specific and general provisions for perceived losses based on the credit portfolio. Specific provisions are to be made based on risk of default on credit facilities while general provisions are made in recognition of the fact that a performing credit facility may be inherently risky.

2.1.5 Financial Performance: Financial performance is a term that is commonly used to measure of a firm's overall financial health over a given period of time. It is a subjective measure of how well a firm can use it assets from its primary mode of business and generate revenue. It is also a measurement of the result of a firm's policies and operation monetary terms.

Different parameters for measuring the company's financial performance are adopted by existing literatures, however the measures are around the concept of outcomes and determinants. Stern Value Management a consulting firm devised Economic Value Added (EVA) otherwise known as "economic profit" to measure company's financial performance based on the residual wealth generated, financial performance is calculated by deducting the cost of capital from the operating profit after adjusting for taxes on cash basis .

2.1.6 Bank performance could be determined based on the financial and Non-financial measurements. While financial measurement focuses on the financial result, the non - financial measurements uses yardsticks such as quality of its assets and liabilities, management flexibility, efficiency in the use of its resources to generate revenue and technology innovations. Many studies on bank performance used such criteria as profitability ratios (return on assets (ROA); return on equity (ROE)), share price, cost-efficiency, and employees performances per capital employed for measuring bank performance.

2.2 Theoretical Framework

These following theories formed the theoretical base for this study.

2.2.1 The Credit Risk Theory: Credit risk can be defined as 'the potential that a contractual party will fail to meet his /her obligations in accordance with the agreed

terms. Credit risk is also referred to as default risk, performance risk or counterparty risk. Fundamentally, there are three characteristics that define credit risk namely; Exposure (to a party that may possibly default or suffer an adverse change in its ability to perform), the likelihood that this party will default on its obligations (the default probability), the recovery rate (that is, how much can be retrieved if a default takes place). It is otherwise referring to the risk of suffering a financial loss due to the decline in the creditworthiness of counterparty in a financial transaction (Liu, Mirzaei & Vandoros, 2014). That the source of credit risk is the default risk, that is the risk that a counterparty will not fulfill the contractual obligations. The risk is primarily that of the lender and includes lost of principal and interest, disrupt loss may be complete or partial and can arise in such circumstances, that an insolvent bank is unable to return funds to a depositor. Credit risk theory was introduced in 1974 by Robert Merton in his theory of default or default model which is the basic theory of credit risk. Robert proposed a model for assessing the credit risk of a company by characterizing the company's equity as a call option on its assets. There are two main methods of modeling credit risk which include the structural approach and the intensity-based approach (also known as reduced form approach). Leveraging on Merton model, three important approaches to measuring credit risk was derived by Clifford V. Rossi. These include the concept of credit spreads, credit portfolio management and loss distribution generated through Monte Carlo simulation. To reduce the lenders risk, the lender may perform a credit check on the prospective borrower, may require the borrower to take appropriate insurance, such as mortgage insurance or seek security or guarantees of third parties.

2.2.1 Anticipated Income Theory

Anticipated Theory of income developed by H.V. Prochnow in 1945. In his theory, Prochov stated that bank maintaining cash and near cash assets even though increases liquidity forgoes income opportunity, therefore bank must give long term loan from which the fund be recollected in due time. By his theory, it means that irrespective of the nature and feature of a borrower's business, the bank plans the liquidation of the term-loan from the expected income of the borrower.

2.2.1 Buffer Theory of Capital Adequacy: Calem and Rob(1996) asserted that a bank approaching the regulatory minimum capital ratio may have an incentive in boosting capital and reduce risk in order to avoid the regulatory costs triggered by a bank breach of capital requirement. The Apex institution (CBN) does not meddle into the internal activities of commercial bank, however it has statutory role of supervising the operations of banks. The capital requirement in term Capital Adequacy Ratio(CAR) is one of the main banking supervisory instrument for ensuring that banks maintain the minimum capital that will enable the money deposit banks as financial intermediaries to confidently sustain their roles in meeting up with their financial obligations to both the depositors and the borrowers. The inability of the banks to meet up with the stipulated capital requirement is construed as a breach of the banking legislation which is sanctionable by the Central Bank of Nigeria. Lower capital adequacy affects bank operations, bank that fails to maintain the minimum capital stands the risk of failure, Therefore to avoid the risk of failure and breach of the legal requirements of minimum

capital, banks prefer to hold a buffer of excess capital especially in circumstance of a volatile capital ratio during economic depression.

2.2.2 Expenses Theory: Otherwise known as the theory of managerial discretion hypothesized by Oliver William (1964). According to William, managers can use their ‘discretion’ to frame and execute policies which would maximize their own utilities rather than maximizing the shareholders’ utilities. Such utilities include the satisfactions which managers derive from certain types of expenditures, managers prestige, power and status are to some extent reflected in the amount of slack they receive in the form of expenses account, luxurious offices and building, company cars and other office perquisites. Operating efficiency attempts to capture this aspect of bank behavior. Operating expenses is derived from the use of resources and have positive or negative implication on the dependent variables.

2.3 Empirical Literature Review

There are debates and controversies surrounding the actual relationship between credit risk management and financial performance of banks on one hand and the joint impact of credit risk management and capital adequacy ratio on banks financial performance in both developed and developing economies. Several authors have tried to put the issue to rest but recent developments like COVID-19 pandemic, economic depression with its consequences on the currency devaluation all over the world has brought the issue to the front burner in business and corporate finance literatures. Ogboi and Unuaefe (2013) used time series and cross-sectional data obtained from Nigerian banks annual reports to examine the impact of credit risk and capital adequacy on financial performance of deposit money banks. The dependent variable used for the study are return on asset (ROA) and return on equity (ROE), while the independent variables as used in the study are loan loss provisioning, loans and advances, capital adequacy, non-performing loans, and liquidity ratio as control variable. Empirical result from the panel data regression analysis showed that credit risk and capital adequacy impact negatively on the financial performance of listed deposit money banks in Nigeria.

Nifon and Ubana (2014) examined the effect of capital adequacy on the profitability of banks in Nigeria using panel data from 1981 to 2011. According to the authors, data for the study were obtained from annual reports of the banks and Central Banks Statistical Bulletin. Using Engle and Granger two steps procedure in a cointegration framework, results showed the existence of a significant positive relationship between capital adequacy ratio and profitability of listed deposit money banks.

Harcourt (2017) examined the effect of credit risk management on the performance of listed banks in Nigeria using dynamic Error Correction Mechanism (ECM) and granger causality to analyse data obtained from Central Bank of Nigeria statistical bulletin, stock exchange fact book and world development indicator for the period 1989 to 2014. The dependent variables used are return on asset return on equity, while the explanatory variables as used in their study are ratio of total loans and advances to total deposit, non-performing loan ratio to total loan ratio, total loans and advances to total asset ratio. In the final analysis, empirical findings revealed that; credit risk management variables exert significant negative impact on return on asset (ROA), credit risk exert negative but

insignificant impact on return on equity (ROE), The granger causality result showed a unidirectional relationship between credit risk and banks performance.

Helen and Ikupolati (2017) examined whether credit risk management affect commercial banks financial performance in Nigeria for the period 2006 to 2016. Using multiple regression technique of data analysis on data obtained from the selected banks annual reports and Central Bank of Nigeria statistical bulletin. Result showed a significant positive relationship between return on asset (ROA) and loans and advances, between return on asset (ROA) and capital adequacy ratio (CAR). The authors therefore recommended that Nigerian banks exercise caution in granting loans and advances to borrowers.

Tade and Negera, (2017) assessed the effect of credit risk management on the performance of private commercial banks in Ethiopia for the period 2000 to 2013 from data of 14 selected banks in Ethiopia. The dependent variables used for the study are return on asset (ROA) and return on equity (ROE). Findings from the study showed that; capital adequacy ratio has positive and significant relationship with return on asset (ROA); capital adequacy has negative and significant relationship with return on equity (ROE); total loans has positive and significant impact on return on asset (ROA); total loans has positive and significant relationship with return on equity (ROE); non - performing loans significant negative impact on return on asset (ROA); non-performing loans has significant negative impact on return on equity (ROE).

Mendoza and Rivera (2017) studied the effect of credit risk and capital adequacy on the profitability of rural banks in the Philippines using a sample of 567 rural banks. The dependent variable used for the study was return on asset (ROA) and return on equity (ROA). Findings from the study showed that credit risk has negative and significant impact on (ROA) and (ROE).; capital adequacy ratio has positive and significant impact on return on asset but negative and significant impact on return on equity (ROE).

Sun and Chang (2018) assessed the extent to which credit risk affect profitability of 83 commercial banks in America. The dependent variables are return on asset (ROA) and return on equity (ROE), while the non-performing loan was the proxy for credit risk management. Empirical findings from the study revealed that non-performing loan decreases return on asset by 0.0881 per cent and return on equity by 0,141 per cent.

Kajola, et al (2018) adopted random effect generalized least square (GLS) regression analysis to examine the impact of credit risk management on the financial performance of listed commercial banks in Nigeria for the period 2005 to 2016. The dependent variables are ROA and ROE, while the proxy for independent variables are ratio of non-performing loans to total loan ratio, non-performing loan to total deposit ratio, and non-performing loan to capital adequacy ratio (CAR). Result of their study showed that credit risk variables exert significant relationship with banks financial performance at 5% level.

Pantha (2019) adopted the random effect technique of data analysis to investigate the impact of credit risk management on 9 selected banks for the period 2009/10 to 2016/17. Result showed that capital adequacy and credit risk management has negative and significant impact on banks performance.

Innocent ,et al (2019), examined the effect of capital adequacy , credit and operation efficiency on the performance of commercial bank in Nigeria using the secondary panel data sourced from CBN and published Banks Annual reports an adopted Panel random effect regression method for the data analysis .They concluded that capital adequacy stimulates, improve and grow the financial performance of the banks in Nigeria, on the other and risk and operating efficiency have negative effect on performance of the bank.

Bhattarai (2019) noted the strategic role of banks in economic growth and development of banks. The authors therefore examined the impact of credit risk management on financial performance of commercial banks in Nepal using cross-sectional and time series data obtained from 10 banks. Empirical analysis of the regression result indicates that capital adequacy ratio (CAR), non-performing loan and management quality ratio exert significant negative relationship on return on asset, while management quality exert significant positive relationship on ROA at 1% level.

Ramazan and Gulden (2019) noted that banks are faced with multiplicities of risks such as credit risk, legal risk, liquidity risk, market risk, operational risk, which impact on their operational performance. The authors posited that credit risk is the most fatal to banks survival and therefore examined the effect of credit risk on the financial performance of deposit banks. Using data set from 26 commercial banks from 2005 to 2017 in Turkey. Empirical findings from the study suggests that significant negative relationship exist between credit risk and banks financial performance proxied as return on asset (ROA).

Adegbie and Otitolaiye (2020) used ex post facto research design to assess the impact of credit risk on financial performance of 13 deposit money banks in Nigeria. The dependent variables are return on equity (ROE) and return on asset (ROA), while the explanatory variables are credit risk, non -performing loans (NPL), loan loss provision (LLP), loan to deposit ratio (LDR), and bank size. Result from the study showed that credit risk exerts positive and significant impact on banks financial performance. However, it was discovered that; credit risk has a negative and significant relationship with banks financial performance proxied by return on asset (ROA), credit risk has negative but insignificant impact on return on equity (ROE). The granger causality result showed a unidirectional relationship between lending ratio and return on asset, running from lending ratio to return on asset (ROA).

In a recent study by Ayodele, Olaoye and Afolabi (2021), examined how credit risk can impact on banks financial performance in Nigeria using classical Ordinary Least Square (OLS) and panel co-integration technique of data analysis. The authors used ROA as dependent variable, while the independent variables are ratio of non- performing loan to total loans, total loans to total asset, total deposit interest rate, and banks' lending rate.

3. 0 Methodology

3.1 Sources of Data

Secondary data used for this study were sourced from the individual bank's annual reports and accounts. The population of this study consist of 12 listed money deposit banks, these sources of data have proven to be reliable and valid since the reports have

been subjected to audit by reputable audit firms and found to the true and fair view of financial transactions of the banks in the period under review.

3.2 Model Specification

This study will adopt modified version of Ogboi & Unuafefe (2013) model. In their study, the authors modeled banks performance proxied by return on asset (ROA) to be impacted by the credit risk management variables and capital adequacy ratio with the inclusion of liquidity ratio as control variables. However, this study will modify their model by looking at the impact of credit risk management on return on equity (ROE) and exclude liquidity ratio among the control variables.

$$ROA_{it} = \beta_{1i} + \beta_2 LA_{it} + \beta_3 CAR_{it} + \beta_4 LLP_{it} + \beta_5 NPL_{it} + \mu_{it} \text{-----}(1)$$

$$ROE_{it} = \alpha_{1i} + \alpha_2 LA_{it} + \alpha_3 CAR_{it} + \alpha_4 LLP_{it} + \alpha_5 NPL_{it} + \mu_{it} \text{-----}(2)$$

Where,

ROA = return on asset (dependent variable)

ROE = return on equity (dependent variable)

LA = loans and advances (independent variable)

CAR = capital adequacy ratio (independent variable)

LLP = loan loss provisioning (independent variable)

NPL = non-performing loan (independent variable)

$\beta_1, \beta_2, \beta_3, \beta_4$ = slope of the coefficients of model 1

$\alpha_1, \alpha_2, \alpha_3, \alpha_4$ = slope of the coefficients of model 2

μ = error term

i = individual banks

t = time periods

Table 1: Measurement of the variables and a’priori Expectations

Variables	Definition	Measurement	apriori Expectation
Return on asset (ROA)	This variable is defined as money earned by the selected banks from the use its asset in the operation of the company.	It measured by the ratio of profit after tax to total asset. $ROA = \frac{PAT}{TA}$	Not applicable
Return on equity (ROE)	This represent the proportion of return made by the shareholders of the company for every unit of share invested in the company	This is measured as the ratio of profit available to shareholders to total shareholders’ equity. $ROE = \frac{PAT}{TE}$	Not applicable
Loans and advances (LA)	This is the amount of credit facilities granted by banks to their customers for repayment of principal and interest on reducing balance basis	Loans and advances is measured in this study as the ratio of loans and advances to total deposit by customers. $LA = \frac{LA}{TD}$	Positive
Capital adequacy ratio (CAR)	This is the regulatory reserve capital that could serve as buffer during unfavorable business times	This variable is measured by the ratio of equity capital to risk weighted asset $CAR = \frac{EQ}{RWA}$	Positive

Loan loss provisioning (LLP)	This the amount of banks capital reserved for cushioning the adverse effect of loan default by borrowers	This is measured by the ratio of loan loss provisioned to classified loans $LLP = \frac{LLP}{CL}$	Negative
Non-performing loans (NPL)	This is the amount of loans granted by banks to borrowers but not repaid at maturity	Non-performing loan is measured in this study by the ratio of non-performing loan to total loans and advances granted to borrowers $NPL = \frac{NPL}{LA}$	Negative

Source: Authors compilation, 2022

3.3. Estimation Technique

The fixed effect model of panel estimation technique is used to examine the nexus between credit risk management and capital adequacy on the performance of deposit taking banks in Nigeria. Fixed effect model assume that each banks intercept is time invariant. **Panel data** regression analysis is best suited for this study because of its inherent advantages over other techniques such as time series and cross-sectional data. Particularly, panel data regression considers the heterogeneity nature of individual banks, the dynamics of time, less collinearity, more efficiency and degree of freedom (Gujarati & Porter, 2009).

4.0 Results

Table two below shows the correlation matrix of the association between return on asset and the explanatory variables, loans and advances, capital adequacy ratio, loan loss provisions and non-performing loans.

Table 2: Correlation Matrix of model 1

	ROA	LA	CAR	LLP	NPL
ROA	1.000000				
LA	0.341880	1.000000			
CAR	0.164334	-0.038281	1.000000		
LLP	-0.119989	0.067915	-0.348933	1.000000	
NPL	0.326446	0.495499	0.010017	-0.050041	1.000000

Source: Authors Computation from E-view 7, 2022

Result show that loans and advances, capital adequacy, and non-performing loans have positive relationship with return on asset while loan loss provision has negative association with loan loss provisioning. The association between the explanatory variables and the dependent variable (ROA) are weak suggesting absence of multicollinearity among the variables.

Table 3 also present the association between the independent variables (loans and advances, capital adequacy, loan loss provisions, and non-performing loans). The result showed that all the explanatory variables except capital adequacy has positive association with the dependent variable (ROE). The result suggests the absence of possible multicollinearity between the dependent and the independent variables.

Table 3: Correlation Matrix of model 2

	ROE	LA	CAR	LLP	NPL
ROE	1.000000				
LA	0.067915	1.000000			
CAR	-0.038281	-0.348933	1.000000		
LLP	0.341880	-0.119989	0.164334	1.000000	
NPL	0.495499	-0.050041	0.010017	0.326446	1.000000

Source: Authors Computation from E-view 7, 2022

Table 4 presents the result of the panel regression analysis of model 1 and 2 as shown in panel A and panel B below. Panel A presents the result of model 1. The coefficient of determination (R^2) showed that the explanatory variables; loans and advances, capital adequacy, loan loss provision, and non-performing loans explain 49% variation of the dependent variable (ROA). The F-statistics (5) and the probability of F-statistics (0.000) indicates that the model is well specified.

Stationarity Test

The Augmented Dickey Fuller stationarity test as shown in Table 2 showed that credit risk management indicators and financial performance are stationary at level 1(0) and first difference. 1(1).

Table 4: Stationarity Test Result

Variable	t – statistic	Prob	Order of integration
ROA	-4.406932	0.0108	I (1)
LA	-4.458071	0.0159	I (0)
CAR	-2.150647	0.0237	I (0)
LLP	-3.810574	0.0037	I (1)
NPL	-6.028745	0.0100	I (1)

Source: Authors Computation from E-views

Specifically, financial performance (ROA), loan loss provision (LLP) and non-performing loans (NPL) are stationary at first difference, while loans and advances and capital adequacy ratio are stationary at level.

Panel Data Regression Analysis

Hypothesis One Model 1: The coefficient of loans and advances (LA) has negative and significant relationship with return on asset. A percentage change in loans advances results in 4.46 percentage change in return on asset of banks. Therefore, the null hypothesis is rejected and the alternative hypothesis accepted. This finding at variance with our *a priori* expectation and consistent with findings of Adegbe and Otitolaiye (2020), but contrary to the findings of Helen and Ikupolati (2017).

Hypothesis Two Model 1: The coefficient of capital adequacy (CAR) has positive but insignificant relationship with return on asset. This is consistent with the result of Helen and Ikupolati (2017) who found positive and significant relationship between return on asset (ROA) and capital adequacy ratio (CAR).

Table 5: Panel Data Regression Result

Dependent Variable ROA

Variables	Coefficient	t-stat	Prob
C	1.1524	1.5775	0.1168
LA	-0.0436***	-4.4986	0.0000
CAR	0.0169	0.5347	0.5936
LLP	-0.1973**	-2.0827	0.0389
NPL	-0.1280	-1.2139	0.2266

Diagnostic Result

R ₂	0.4931
F-stat	5.0994
P (F-stat)	0.0000

Source: Authors Computation, 2022

Note: **, *** denotes significance at 5% and 1 respectively.

Hypothesis 3 Model 1: The coefficient of loan loss provision (LLP) has negative and significant relationship with return on asset (ROA). A percentage change in loan loss provisioning result in 19 percentage change in return on asset. Therefore, the null hypothesis of no significant relationship is rejected while the alternative hypothesis accepted. This finding is consistent with the findings of Ogboi and Unuaefe (2013), who found negative and significant relationship between capital adequacy ratio and banks financial performance of listed deposit money banks in Nigeria but contrary to the findings of Helen and Ikupolati (2017).

Hypothesis 4 Model 1: The coefficient of non-performing loans (NPL) has negative but insignificant relationship with banks performance. This is consistent with the *a priori* expectation.

Panel B in table 4 present the panel data regression result of model 2. The coefficient of determination (R²) is 13.3 % implying that the explanatory variables (loans and advances, capital adequacy ratio, loan loss provisions and non-performing loans) explained 13% of changes in the return on equity. Additionally, F-statistics of (6) and probability of F-statistics (0.000) indicates that the model is well specified for policy formulation and recommendation.

Table 6: Panel Data Regression Result

Dependent Variable ROE

Variables	Coefficient	t-stat	Prob
C	-0.3612**	-2.2585	0.0251
LA	0.0110***	2.6491	0.0088
CAR	0.0477**	2.0317	0.0437
LLP	-0.0888	-1.1917	0.2349
NPL	-0.0575***	-2.7031	0.0075

Diagnostic Result

R ₂	0.133415
F-stat	6.812499
P (F-stat)	0.000040

Source: Authors Computation from E-view 7, 2022

The coefficient of loans and advances (LA) has positive and significant relationship with banks financial performance as proxied by return on equity (ROE). A percentage change in loans and advances resulted in 1.1 percentage change in return on equity. Therefore, the null hypothesis is rejected will the alternative hypothesis rejected.

Hypothesis 2 Model 2: The coefficient of capital adequacy ratio (CAR) has positive and significant relationship with banks financial performance as proxied by return on equity (ROE). A percentage change in capital adequacy ratio resulted in 4.36 percentage change in return on equity. Therefore, the null hypothesis is rejected while the alternative hypothesis of a significant relationship between capital adequacy ratio and banks financial performance is accepted.

Hypothesis 3 Model 2: The coefficient of loan loss provision (LLP) has negative but insignificant relationship with banks financial performance as proxied by return on equity (ROE).

Hypothesis 4 Model 2: The coefficient of non-performing loans (NPL) has negative and significant relationship with banks financial performance as proxied by return on equity (ROE). A percentage change in non-performing loans resulted in 5.8 percentage change in return on equity. Therefore, the null hypothesis of no significant relationship between the dependent and independent variables is rejected while the alternative hypothesis accepted.

5.0 Conclusion

The importance of robust credit risk management and the availability of adequate capital to the performance of banks cannot be underestimated. While banks have continued to craft robust credit risk management strategies to mitigate the adverse effect credit risk management, it is however unclear whether or not these strategies have enhanced the performance of these banks.

This study examined the impact of credit risk management of banks in conjunction with the capital adequacy on the performance of banks using panel data regression analysis. This study found that loans and advances (LA) has negative and significant relationship with return on asset (ROA). This finding at variance with our *a priori* expectation and consistent with findings of Adegbie and Otitolaiye (2020). Loans and advances (LA) have positive and significant relationship with banks financial performance as proxied by return on equity (ROE).

This study found that capital adequacy ratio (CAR) has positive and significant relationship with banks financial performance as proxied by return on equity (ROE) as consistent with a priori expectation.

Another finding from this study is that loan loss provision (LLP) has negative and significant relationship with return on asset (ROA). This finding is consistent with the findings of Ogboi and Unuaefe (2013), who found negative and significant relationship between capital adequacy ratio and banks financial performance of listed deposit money banks in Nigeria but contrary to the findings of Helen and Ikupolati (2017).

Additional finding of this study is the negative and significant relationship between banks financial performance and return on equity (ROE). This is in consonance with our expectation.

5.1 Recommendations

In consonance with the findings of the study, the following recommendations are made: Banks must constantly review their credit policy guidelines from time to time in consonance with the dynamics of business environment. In the wake of current economic depression with the consequences on the currency depreciations , Nigerian banks must constantly evaluate their capital adequacy and enhance their capitalization position so as to provide buffer for cushioning the adverse effect of loan capital erosion arising from non-performing loans and sustain their business in case of any economic shocks .

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