Original Paper

Non-performing Loans and Deposit Money Banks' Financial Performance: Empirical Evidence from Nigeria

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Abstract

Nigeria's deposit money banks (DMBs) are financial institutions licensed by the Central Bank of Nigeria to mobilize demand and saving deposits from the surplus economic units for on-lending to the deficit economic units for investment and consumption   purposes. In carrying out this intermediation function, DMBs are exposed to several risks including credit risk, market risk, interest rate risk, exchange rate risk, and others. Of these risks, the credit risk seems the most harmful to DMBs' financial performance as its occurrence can easily and quickly send a bank into distress or outright liquidation. For over a decade now, DMBs in the country have been experiencing continuously increasing nonperforming loans portfolios. This type of scenario had led to poor financial performance among the Banks. It is for this reason that the present study seeks to verify empirically the impact of certain financial and macroeconomic variables on DMBs' financial performance for the period 2001 to 2021, that is, 21 years. In doing this, we dissected financial performance into return on assets and return on equity. Hence, two separate models were specified in the study with return on asset and return on equity serving as the dependent variables in each of the models, while non-performing loans, loan-loss provisions, lending rate, bank size, monetary policy rate and inflation rate represented the independent variables. The longitudinal research design was adopted since   the study's data covered a specific timeframe. The fully modified ordinary least squares and the panel data regression techniques were used to analyze the data. The findings of the study revealed, among others, that non-performing loans exerted a negative impact on the financial performance of the DMBs in terms of return on assets and return on equity. It was, therefore, recommended that provisions for loan losses, even though appeared with positive impact on return assets and return on equity, should to be scaled up

as the variable is frequently used as a strategic and effective means for mitigating loans losses and, invariably, the financial performance of the DMBs.

1. Introduction

In Nigeria, deposit money banks (DMBs) are financial institutions that are licensed by the Central Bank of Nigeria to mobilize deposits from the surplus economic units for on-lending to the deficit economic units for investment and consumption purposes. This is to say that DMBs are resident corporations and quasi-corporations which have their liabilities in the form of deposits payable on demand, transferrable by cheques or otherwise usable for making payments, CBN (2021) https://www.cbn.gov.ng. There are 37 DMBs in Nigeria and they are subdivided into commercial banking license with international authorization (8 in number), commercial banking license with national authorization (11 in number), commercial banking license with regional authorization (4 in number), non-interest banking license with national authorization (1 in number), and non-interest banking license with regional authorization (1 in number); merchant banking license with national authorization (6 in number), and financial holding companies (4 in number). It is pertinent to point out at this outset that the eight (8) DMBs holding commercial banking licenses with international authorization are the focus of the study.

Generally speaking, many customers see bank credit as the primary source of available debt-financing especially in the emerging countries such as Nigeria. On the part of the banks, they view good loans as the most profitable asset. For the investors, extending loans to businesses and individuals involves taking risk to earn high returns. DMBs' returns come from several sources including loan interest income, fee income, and investment income from new deposits. They also use loans to cross sell other fee-generating services. In banking, the greatest risk commonly assumed by banks is the credit risk – the possibility that loans may not be repaid in accordance with the terms and conditions governing them. Many factors can lead to loan default. An entire industry, such as the oil and gas industry, the agricultural industry, the real estate industry, can decline because of general unfavorable economic conditions. Firm-specific problems may also arise from changing technology, industrial upheavals, shifts in consumer preferences, as well as bad management.

These risks notwithstanding, the DMBs play the crucial role of financial intermediation in the economy. The efficient performance of this role serves as an impetus for economic growth and development because it induces more saving and lending activities that are crucially needed for financial sector stability and invariably bank financial performance (Uwubanmwen & Ughulu, 2005). However, it must be stated that these banks assume several risk exposures in playing this crucial role and such risks include credit risk, market risk, exchange rate risk, inflation rate risk, etc. Of these risks, the credit risk seems to be the greatest as its occurrence can easily and quickly send a bank into distress or even

outright liquidation. This is why the banking industry is the most regulated industry in the economy – when a bank fails, the government suffers for it, the depositors suffer for it, and the economy as a whole suffers for it. Aware of this fact, the Central Bank of Nigeria (2010) introduced the Prudential Guidelines that require the DMBs to review their credit portfolios continuously, at least once every quarter, in order to identify any deterioration in credit quality. Accordingly, the CBN classified nonperforming loan into three categories:

(i)   **Sub Standard Credit Facilities:** These are loans on which unpaid principal and/or interest remain outstanding for more than 90 days but less than 180 days.

(ii)   **Doubtful Credit Facilities:** These are credit facilities on which unpaid principal and/or interest remain outstanding for at least 180 days but less than 360 days and are not secured by legal title to leased assets or perfected realizable collateral in the process of collection or realization.

(iii)   **Lost Credit Facilities:** These are credit facilities on which unpaid principal and/or interest remain outstanding for 360 days or more and are not secured legal title to leased assets or perfected realizable collateral in the course of collection or realization.

The purpose of these Guidelines is to curtail the magnitude of DMBs' poor credit risk management practices that were largely responsible for the rising non-performing loan portfolios among the banks. Consequently, banks' credit officers (under the close supervision of designated authorities)are expected to follow the sound lending rules so as to ensure that only properly evaluated loan requests are recommended for approval.

The thrust of the study, therefore, is to examine empirically the impact of non-performing loans on the financial performance of DMBs in Nigeria for the period 2001 to 2021, that is, 21 years. In doing this, banks' financial performance would be dissected into return on asset (ROA) and return on equity (ROE); these variables represent the dependent variables, while nonperforming loans, provision for loan losses, lending rate, bank size, monetary policy rate, and inflation rate serve as the independent variables in the two models.

2. Literature Review

The literature review of the study is conducted in three phases including conceptual review, empirical review, and theoretical framework as follows:

2.1 Conceptual Review

The conceptual issues of the study are discussed as follows:

2.1.1 Bank Financial Performance

Financial performance is a subjective measuring rod of how well a firm can use assets from its primary mode of business and generate revenues (Madelyne Goodnight, 2022) https://www.investopedia.com. According to Goodnight, financial performance is a common way a firm's overall health can be measured over a given period. In most cases, analysts and investors use financial performance to evaluate similar firms across the same industry or for comparison of industries or sectors in totality. In

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specific terms (Ughulu, 2021) sees financial performance indicators as quantifiable metrics used to measure how well a company is doing.

The major task of the study is to verify empirically the extent to which credit risk management has affected the financial performance of DMBs in Nigeria for the period 2001 to 2021. To successfully do this, bank financial performance is dissected into ROA and ROE.

2.1.2 Return on Assets (ROA)

ROA is a profitability measure that shows how much profit a company can realize from its assets. In other words, ROA measures the efficiency of a company's management in generating profits from its economic resources or assets on its balance sheet. Hence, Marshall Hargrave (2022) https://www.investopedia.com stated that ROA is a metric that is commonly expressed as a percentage by dividing a company's net income by its average assets. An increase in ROA signifies that a firm is more efficient and productive at managing its balance sheet to generate profits while a low ROA implies there is room for improvement.

The relationship between nonperforming loans and return on assets remains one of the issues to be verified empirically in the study.

2.1.3 Return on Equity (ROE)

ROE measures the rate of return that the owners of common stock of a firm receive from their investment. It shows how good a firm is at generating return on investment for its shareholders. Indeed, ROE is a measure of a company's financial performance which shows the relationship between a company's profit and the shareholders' return (Corinne Bernstein, 2018, https://www.investopedia.com). In simple terms, ROE shows how much profit a firm could generate with the money shareholders have invested and how successful the company's management team is at turning the cash put into the business into greater gains and growth for the company and investors. The higher the ROE, the more efficient the company's operations are in making use of those funds.

The effect of credit risk management on ROE constitutes an issue for empirical verification in the study.

2.1.4 Non-Performing Loans

A nonperforming loan is a loan on which the outstanding principal and interest have remained unpaid for 90 days or more (Troy Segal, 2022, https://www.investopedia.com). In other words, loans are considered nonperforming if the borrower is 90 days past due. According to CFI Team (2022) https://www.corporatefinanceinstitute.com), a nonperforming loan is a loan in which the borrower is in default and has not paid the monthly principal and interest for a specified period. Nonperforming loans occur when borrowers run out of money to make repayments or get into situations that make it difficult for them to continue making repayments of ongoing loans in accordance with the terms and conditions governing the loans.

One of the critical issues to be resolved empirically in the study is the relationship between nonperforming loans and financial performance of DMBs in Nigeria (represented ROA and ROE.

2.1.5 Provision for Loan Losses

Traditionally, every bank makes provisions for loan losses so as to protect depositors' money and bank capital. In this context, banks estimate the expected future loss on a particular loan portfolio. Thus, the provision for loan losses means that the bank recognizes a loss on the loan ahead of time. Banks use their capital to absorb these losses; by making this provision, the bank takes a loss and hence reduces its capital by the amount of money that it will not be able to collect from the client (Dan Marticio 2022 https://www.the balancemoney.com). In another fashion, Gabe Alpert (2021, https://www.investopedia.com) defines a loan loss provision as an income statement expense set aside as an allowance for uncollected loans and loan payments.

Estimating the relationship between loan-loss provisions and DMBs' financial performance remains one of the tasks of the study.

2.1.6 Lending Rate

Lending rate is the bank rate that usually meets the short- and medium-term financing needs of the private sector (World Bank Data Bank (2023) (https://databank.worldbank.org). The rate is normally differentiated according to the creditworthiness of borrowers and objectives of financing. The terms and conditions attached to these rates differ from one country to another and, hence, confining their comparability.

One of the issues to be resolved empirically in the study is the relationship between lending rate and DMBs' financial performance.

2.1.7 Bank Size

Bank size is measured as the natural logarithm of the value of total assets expressed in the currency of the country in which the bank is domiciled (James Chen (2022 https://www.igi-global.com). In other words, it is the total market value of the securities in a fund. Bank size can also means the assets under management. Bank size commonly shows the range of products and services offered customers by the bank.

The contribution of bank size to the financial performance of DMBs in Nigeria constitutes one of the issues to be resolved empirically in the study.

2.1.8 Monetary Policy Rate

The monetary policy interest rate is an interest rate that the monetary authority (i.e., the central bank) sets in order to influence the evolution of the main monetary variables in the economy (e.g., consumer prices, exchange rate or credit expansion, among others, (https://www.focus-econoimics.com). The monetary policy interest rate determines the levels of the rest interest rates in the economy, since it is the price at which private agents – mostly private banks – obtain money from the central bank. These banks will then offer financial products to their clients at an interest rate that is normally based on the monetary policy rate.

The extent to which monetary policy rate has impacted the financial performance of the DMBs in Nigeria would be verified empirically in the study.

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2.1.9 Inflation Rate

Inflation rate expresses percentage change in the price index in a particular period compared to that recorded in a preceding period (European Commission, https://ec.europa.eu). In another vein, Jason Fernando (2023) defined inflation rate as the rate at which prices for goods and services rise https://www.investopedia.com Thus, inflation can be computed on a year-on-year or annual basis. For an index value of 243.6 for January of this year, and an index value of 196.2 in January last year, the annual rate of inflation of January this year would be: (243.6/196.2) * 100   =   2.6%.

The relationship between DMBs' financial performance and inflation rate would be estimated in the study.

2.2 Empirical Review

A plethora of studies exists in the extant literature concerning the nexus of credit risk management and bank financial performance. For example, Cundo, Pandoyo and Mohammad (2022) examine the effects of macroeconomic factors, including inflation projections, and bank-specific characteristics, such as return on asset, equity to asset ratio, and bank size. Panel data regression analysis was used to analyze the data of the study employing the E-Views Version 10 software package. Non-Performing Loans exerted a negative but significant impact on return on assets, while inflation had a beneficial impact on non-performing loans, equity to asset ratio and bank size had a positive impact on DMB's financial performance.

Kamal (2022) https://www.eibmr.org investigated the impact of non-performing loans on profitability while controlling for operating effectiveness. The author employed the multiple regression, route analysis, and descriptive statistics approaches to analyze the study's data. The findings of the study showed, among others, that   nonperforming loans recorded a negative but significant impact on profitability. The statistical analysis of the direct impact of non-performing loans on profitability demonstrated that, even in the presence of operating efficiency, nonperforming loans exerted a negative but significant impact on profitability. The findings also revealed that the relationship between NPL and ROA was unaffected by operating efficiency. However, the findings showed that was a statistically significant but an inverse correlation between non-performing loans and profitability.

Joseph and Okike (2021) investigated the effect of nonperforming loans on the profitability of banks in Nigeria for the period 2010 to 2019 using 10 banks as the sample size. The outcome of the study showed that there was no correlation between return on assets and non-performing loans. Furthermore, the maximization of shareholders' value revealed a positive relationship between nonperforming loans and return on equity.

Rajha (2017) examined the factors that influenced bank long-term loans in for the period 2001 to 2010. The study used panel data on 35 commercial banks spread across six different African nations. Nonperforming loans served as the dependent variable, while bank size, GDP growth rate, and capital adequacy ratio represented the independent variables. The panel data regression methodology was utilized for estimating the fixed and random effects model. The findings of the study showed, among

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others, that capital adequacy ratio exerted a negative impact on nonperforming loans. Thus, the study concluded that banks with greater diversification and capitalization are better prepared to withstand future credit shocks. However, the inflation variable had no statistical significance on banks' total business loans. In a similar vein, Shingjergji (2017) used the multiple regression technique to analyze the data sets of his study which were obtained from 30 commercial banks listed on the Dhaka Stock Exchange (DSE). He found that nonperforming loans represented one of the key elements that affected banks' profitability. In fact, the author asserted that nonperforming loans recorded a statistically positive but significantly adverse impact on net profit margin.

Ozurumba (2016) investigated the effect of non-performing loans on the financial performance of selected commercial banks in Nigeria for the period 2000 to 2013. The study utilized secondary data which was sourced from the annual reports and statements of accounts of the sampled banks and employed the ordinary least squares method (OLS) and ratio analysis for his estimation exercise. His findings showed that nonperforming loans recorded an inverse relationship with bank financial performance denoted by ROE; indeed, an increase in nonperforming loans led to a fall in ROE. The study therefore concluded that the effects of nonperforming loans on banks' financial performance couldn't be understated given the serious danger they pose to the banks' ability to continue operating as ongoing concerns.

Using the descriptive research design methodology, Ebba (2016) investigated the relationship between nonperforming loans and the financial performance of commercial banks in Ethiopia. The study used secondary data for a five-year period: between 2011 and 2015 and found that nonperforming loans had a negative but significant impact on banks' financial performance in Ethiopia. It therefore concluded that the financial performance of banks in Ethiopia improved from 2011 to 2015 as result of a significant decline in nonperforming loans during the period. Accordingly, the study recommended that there is the need for the management of commercial banks in Ethiopia to critically evaluate the creditworthiness of their clients and adhere strictly to the policies governing loan requests so that the incidence of nonperforming loans could be minimized significantly.

3. Theoretical Framework and Model Specification

This section comprises two sub-sections and they are presented, thus:

3.1 Theoretical Framework

The study is anchored on the agency theory. This theory is considered appropriate since bank managers who act as agents in this situation, might engage in self-serving activities that could jeopardize the interests of stockholders. Specifically, the agents represent the principal and are responsible for acting in the principal's best interests by putting the interests of the principal before their own (Fadun, 2013). The agency theory's principal-agent models can be sub-divided into three kinds, each reflecting a fundamental aspect of information asymmetry. The models with ex-post asymmetric information are the first class. After the principal and the agent have signed the contract, the agent in these models

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receives certain confidential information. They are referred to as 'moral hazard models.' The models with ex-ante asymmetric information belong to the second class. In these models, the agent already possesses confidential information before the contract is signed. Adverse selection models are what these models are called. The third class of signaling models is closely related. In these models, the informed agent may send the principal a signal that contained his personal information (Shadnam, 2014). Because the agent's ability to cover potential losses in the future is unpredictable, and because the principal is unaware of the needs and wants of the agents, the principal will design the contract to receive some profits from the agents. The principal wants to assign the contract in a way that increases his profit while paying the agent for carrying out the duty that is expected of him (Ibrahim, Saiful & Kayes, 2021).

The formula can be denoted as probability expected (prob.exp.) of principal's utility:

$$\text{Exp. U}_p = \text{Exp. F(capability)}_a - \text{F (agent's cost)} \tag{1}$$

Where;

Exp. U_p: Expected Utility from the Principal

Exp. F $(\text{capability})_a$:   Expected from the function of agent's capability

F (Agent's cost):   The function of agent's cost.

3.2 Model Specification

The study employs a longitudinal research method, which is predicated on the fact that it includes repeated observations of the same variables throughout a 21-year period, from 2001 to 2021. The population of the study consists of all nineteen (19) deposit money banks with commercial banking licenses in Nigeria. The sample size of the study is made up of the eight (8) deposit money banks holding commercial banking licenses with international authorization. They include Access Bank Plc, Fidelity Bank Plc, First City Monument Bank Plc, First Bank Nigeria Limited, Guaranty Trust Bank Plc, Union Bank of Nigeria Plc, United Bank of Africa Plc, and Zenith Bank Plc (CBN Statistical Bulletin, 2021).

The Fully Modified Ordinary Least Squares (FMOLS) and Panel Data Regression Methodology were both used for data analyses.

$$Y_{it} = \partial_o + \beta x_{it} + \mu_{it} + v_{it} \tag{2}$$

Where;

Y_{it} = dependent variable, ∂_o = intercept, βx_{it} = vector of explanatory variable, μ_{it} = individual specific effect, v_{it} = error term.

To determine whether the Random Effect Model or Fixed Effect Model is most appropriate for the study, the Hausman Test was employed. The generalized form of the fixed effect model is given by;

$$Y_{it} = \partial + \beta x_{it} + \epsilon_i + \epsilon_{it} \tag{3}$$

Where;

ϵ_i = cross sectional error term. ϵ_{it} = individual observational error term.

The panel data regression model is presented in its functional form, thus:

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MODEL 1:

$$\text{ROA} = \text{F (NPL, PLL, LDR, BKS, MPR, INF)} \tag{4}$$

MODEL 2:

$$\text{ROE} = \text{F (NPL, PLL, LDR, BKS, MPR, INF)} \tag{5}$$

The econometric forms of models (4) and (5) are given thus:

Model 1:

$$\text{ROA}_{it} = \beta_0 + \beta_1 \text{NPL}_{it} + \beta_2 \text{PLL}_{it} + \beta_3 \text{LDR}_{it} + \beta_4 \text{BKS}_{it} + \beta_5 \text{MPR}_{it} + \beta_6 \text{INF}_{it} + e_{it} \tag{6}$$

Model 2:

$$\text{ROE}_{it} = \beta_0 + \beta_1 \text{NPL}_{it} + \beta_2 \text{PLL}_{it} + \beta_3 \text{LDR}_{it} + \beta_4 \text{BKS}_{it} + \beta_5 \text{MPR}_{it} + \beta_6 \text{INF}_{it} + e_{it} \tag{7}$$

i   = cross-sectional variables from 1, 2, 3-----------------21

t   = time series variables from 1, 2, 3 --------------------21

e   = error term

Where;

ROA_{it} = Return on Assets of bank i at the end of year t proxy for bank performance.

ROE_{it} = Return on Equity of bank i at the end of year t proxy for bank performance.

NPL_{it} = Non-performing loans of bank i at the end of year t

NPL = Non-performing loan

PLL_{it} = Provision for loan losses

LDR it = Lending Rate

BKS it = Bank Size

MPR it = Monetary policy rate

INF it = Inflation rate

Apriori (Presumptive) Expectation:

$\beta_{1, \beta_3, \beta_5, \beta_6} < 0$ and $\beta_2, \beta_4 > 0$

β_0 = Constant Term, β_1 is the coefficient of Non-Performing Loans ($\beta_1 < 0$). This is because it is expected to be negatively related to Return on Assets (ROA) and Return on Equity (ROE). β_2 = coefficient of Provision for Loan losses ($\beta_2 > 0$), β_3 = coefficient of Lending Rate ($\beta_3 < 0$); B_4 = coefficient of Bank Size ($\beta_4 > 0$), β_5 = Monetary Policy Rate ($\beta_5 < 0$), β_6 = coefficient of Inflation Rate ($\beta_5 < 0$).

4. Data Analyses and Interpretations of Results

In this section, the empirical results are presented and interpreted, thus:

4.1 Descriptive Statistics

The descriptive statistics of the study are presented in Table 1, thus:

Table 1. Descriptive Statistics of the Data

Variable	Mean	Max.	Min.	Std. Dev.	Skew.	Kurt.	J-B	Prob.	Obs.
ROA	2.02	34.87	-31.06	4.00	-0.04	56.36	19928.20	0.00	168
ROE	0.37	4.73	-0.47	0.71	3.98	19.23	2286.39	0.00	168
NPL	8.22	41.07	0.88	8.62	1.97	6.45	191.81	0.00	168
PLL	14.33	37.47	-28.00	7.23	-2.37	17.02	1533.27	0.00	168
LDR	63.30	102.31	15.44	18.87	-0.17	2.14	6.05	0.05	168
BKS	6.64	8.69	2.08	1.50	-1.09	3.54	35.21	0.00	168
MPR	15.46	24.85	6.48	4.83	-0.59	2.60	10.72	0.00	168
INFL	12.72	23.79	6.60	4.05	0.87	3.59	23.48	0.00	168

Source: Regression output using E-Views 10 (2023).

From the results in Table 1, it would be noticed that the average nonperforming loan ratio (i.e., ratio of the amount of non-performing loans to total loan disbursement) is 8.22, suggesting that about 8.2 percent of loans created by the selected DMBs is lost during the period under investigation. This ratio is quite high and is clearly the highest for banks when compared to countries of other contents in 2021. For example, the average nonperforming loans in Europe stood at 2.63 percent, for the US it stood at 0.89, for the South East Asia, it stood at 4.2, while it stood at 2.77 percent in Latin America (World Bank, 2022). Thus, banks in Nigeria are performing less effectively in terms of loan administration with the attendant high loan losses in the system. The mean value of nonperforming loans is positively skewed at 1.97, indicating that more of the non-performing loans recorded by the banks in our sample are generally less than the reported mean value. However, there are large values of non-performing loans among the banks in the sample, with maximum value of non-performing loans of 41.07 percent. This shows that there are banks in Nigeria that have excessive non-performing loan ratios, and this is quite appalling for the entire banking system. The value of the standard deviation for the nonperforming loans is higher than the mean value, indicating that which indicates that there is a high level of divergence in the nonperforming loan conditions in Nigeria's banking system.

The average ratio of provision for loan losses to total loans disbursed is 14.33, indicating that over 14 percent of loan disbursed are predicted to be bad loans. This is a high loan failure rate in Nigeria's banking system. There are different perspectives to this condition; some of them include weak internal loan management systems and the ever-present macroeconomic instability that exacerbates the tendency for loan failure to rise sharply in the economy. In relation to this outcome, average loan to deposit ratio (LDR) is 63.3 percent. Given that this variable shows the level of risk-taking by these DMBs, the high LDR shows that more banks are taking high risks in terms of loan disbursements in Nigeria, especially in relation to their poor liquidity conditions.

For the macroeconomic and policy variables, the average inflation rate stood at 12.2, which is double digits, with a maximum value of at 23.79 or approximately 24.00 percent. These are high inflation rate values for the country and underscore the risk of high loan repayments over the years. Interest rate is 15.8 percent on average with a standard deviation of 4.3, suggesting that the mean value is relatively representative of the high incidence of nonperforming loans within the Nigerian banking system. Average interest rate is higher than average inflation rate (as to be expected), thus demonstrating that macroeconomic stability matters for bank lending activities as well as the entire financial system soundness and, by implication, DMBs' financial performance.

The Jarque-Bera statistics for all the variables are all significant at the 5 percent level, which shows the absence of normality in their respective data distributions. The outcome is to be expected since a panel of different banks was adopted for the study. Hence, the result shows that bank-level characteristics may be exerting strong heterogeneous influences for the behavior of the datasets. This is a strong basis for providing a panel-form analysis in the regression process for the study.

The variables in the study are also considered in terms of the individual banks in order to highlight the main banks that provide strong dimensions in the data series. The mean and standard deviation of the variables are reported in Table 2:

Table 2. Descriptive Statistics of Individual Banks

Bank	ROA		ROE		NPL	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Access Bank	3.37	7.26	0.14	0.10	6.81	4.79
Fidelity Bank	1.31	1.12	0.16	0.13	10.92	9.53
First Bank Holding	1.80	1.11	0.34	0.22	13.54	12.43
First City Monumental Bank	1.39	1.14	0.31	0.42	6.51	7.10
Guaranty Trust Bank	3.80	0.82	0.39	0.57	4.84	3.90
Union Bank of Nig	0.24	8.08	0.07	0.18	14.72	10.79
United Bank for Africa	1.57	0.78	1.05	1.50	5.49	5.62
Zenith Bank	2.67	0.70	0.45	0.83	2.93	1.42
	PLL		LDR		BKS	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Access Bank	15.29	4.81	74.74	15.44	6.34	2.10
Fidelity Bank	13.80	6.46	65.52	16.75	6.11	1.69
First Bank Holding	12.99	4.93	59.84	10.17	7.29	1.08
First City Monumental Bank	16.59	4.93	71.32	19.42	5.77	1.69
Guaranty Trust Bank	16.65	3.25	73.55	18.24	6.76	1.37
Union Bank of Nig	13.27	16.23	55.76	19.93	6.58	0.54

| United Bank for Africa | 11.31 | 3.64 | 45.44 | 15.18 | 7.05 | 1.04 |
| Zenith Bank | 14.71 | 3.29 | 60.19 | 16.59 | 7.20 | 1.48 |

Source: Regression output using E-Views 10 (2023).

It could be seen from the results contained in Table 2 that the average ROA is highest for Guarantee Trust Bank and Access Bank at 3.8 percent and 3.37 percent respectively. On the other hand, Union Bank had the lowest ROA for the banks at 0.24 percent. Surprisingly, Union Bank also has the highest standard deviation value for the ROA variable, indicating that the bank experienced the highest level of instability in the ROA over the period of the study. UBA has the highest average ROE, indicating that the banks performed better than the others in terms of management of shareholders' funds. Again, Union Bank had the least ROE value of 0.07 on average, which signifies that the bank had the least financial performance indicators over the period under study. For the nonperforming loans, the ratio is highest for Union Bank as it stood at 14.72 percent. This outcome gives some indication that the bank with the highest non-performing loans also had the poorest financial performance ratios among the DMBs in Nigeria. In terms of loan-risk taking, however, Access Bank had the highest outcome which stood at 74.74 for the loan to deposit ratio, while First Bank shown as the biggest bank in our sample.

Only GTB and Zenith Bank exhibited relatively upward trends in their nonperforming loans portfolios for the period under study. This shows that these banks have been having some form of increases in their nonperforming loans portfolios during the period covered by the study, although the general ratio is very low for all the banks when compared to banks like Union, Fidelity and First Banks. Thus, it appears that banks with relatively low NPL are those that are experiencing some form of increase over the years. Banks like FCMB, UBA and Access have done quite well in bringing down their NPL from high levels to very low levels over the years. On the other hand, there are strong fluctuations in the nonperforming loans of banks like Union Bank, Zenith Bank and First Bank. In general, the trends in the nonperforming loans for the DMBs in Nigeria indicated that there are heavy fluctuations in the rate of nonperforming loans, while many banks have succeeded in bringing down their nonperforming loan profiles between the 2001 and 2021 period.

4.3 Econometric Results

4.3.1 Non-Performing Loans and Return on Assets

The results of the fixed and random effects models for return on assets as the bank performance variable are presented in Table 3.

Table 3. Panel Regression Result for the ROE Equation

Variable	Fixed effects				Random effects			
	Coeff.	**Prob.**	**Coeff.**	**Prob.**	**Coeff.**	**Prob.**	**Coeff.**	**Prob.**
Constant	10.534	0.00	8.965	0.00	8.952	0.02	7.504	0.05
NPL	-0.042	0.00	-0.022	0.04	-0.076	0.05	-0.055	0.16
PLL	--	--	0.053	0.00	--	--	0.091	0.05
LDR	-0.002	0.59	-0.005	0.30	0.008	0.68	-0.005	0.79
BKS	-0.920	0.00	-0.875	0.00	-0.838	0.01	-0.754	0.02
MPR	-0.046	0.27	-0.046	0.27	-0.073	0.53	-0.076	0.49
INFL	-0.035	0.29	-0.001	0.97	0.021	0.82	0.037	0.67
R-sq.	0.634		0.66		0.062		0.085	
Adj. R-sq.	0.603		0.63		0.027		0.045	
F-stat.	21.502		20.49157		1.761		2.134	

Source: Regression output using E-Views 10 (2023).

From the results contained in Table 3, it could be seen that the goodness of fit statistics has improved significantly over the pooled OLS estimates in each of the estimations. The goodness of fit statistics values are also better in the fixed effects estimates than those in the random effects estimates. The adjusted R-squared value in the fixed effects estimates shows that about 60 percent of systematic variations in ROA for the banks are captured in the model with control, while 63 percent is captured in the model without control.

It must be pointed out that the focus of the analysis in the study is on the fixed effect estimated values. Thus, the coefficient of nonperforming loans is negative but significant at the traditional 1 percent level; but the coefficient of the provisions for loan losses was negative and did not pass the test of significance at the 5 percent level. This result shows that nonperforming loans had a significant negative impact on the return on assets of DMBs in Nigeria. The effect of nonperforming loans is larger when the provisions for loan losses are included than when they are not included. Thus, the result suggests that the debilitating effect of non-performing loans on ROA is weaker when the provisions for loan losses are not taken into cognizance.

The effectiveness of loan loss provision in boosting ROA of the DMBs is observed by considering that the coefficient of PLL in the model, which is positive and significant at the traditional 1 percent level. This result shows that provisions for loan losses tend to lead to improvement in ROA of the DMBs. Thus, banks with effective loan loss provisions tend to perform better in terms of ROA than banks without this mechanism. The coefficient of loan to deposit ratio failed the test of significance at the 5 percent level in both estimates, indicating that credit risk-taking of banks does not affect their ROA significantly in Nigeria. This implies that although such risk taking may directly influence the direction

of non-performing loans for the DMBs, its direct impact on ROA is not significant. The coefficient of bank size is significant at the 1 percent level for both estimates. This shows that the size of banks matter for their ROA performance. Essentially, bigger banks are shown to exhibit lower financial performance in terms of return on assets.

For the other external factors in the model, the result shows that the impact of interest rate and inflation rate on ROA of the DMBs are both insignificant since the coefficients of both variables failed the test of significance even at the 5 percent level. Thus, the two factors which are external to the banks are shown as irrelevant in terms of explaining the ROA of the DMBs over the period covered by the study. Rising interest rates may lead to more incidences of non-performing loans, but they do not influence the ROA of the DMBs. In the same vein, price changes are shown to be weak in influencing the pattern of return on assets of the DMBs in Nigeria.

4.3.2 Non-Performing Loans and Returns on Equity

The value of the adjusted R-squared with regard to fixed effects estimates is larger than those of the pooled OLS and the random effects estimates. This again justifies the fact that the fixed effects approach is the most efficient estimation methodology for the study. The important focus of the analysis is on the coefficients of the explanatory variables. In the results, the coefficient of nonperforming loans is negative but significant at the 1 percent level. Quite clearly, the result supports the outcome of the ROA equation and shows that non-performing loans unequivocally lead to a decline in the financial performance of DMBS in Nigeria. The negative impact is the same for both the estimates with provision for loan losses and without the provision for loan losses, indicating that the presence of the provision for loan losses does not influence the impact of nonperforming loans on ROE in relation to the DMBs in Nigeria. This is unlike the outcome of the ROA equation. The coefficient of the provision for loan losses in the model is positive and significant at the traditional 1 percent level. This finding also shows that the provision for loan losses has a positive and significant impact on the financial performance of DMBs in Nigeria irrespective of the measure of performance used.

The results of the panel regression for the return on assets equation and contained in Table 4, thus:

Table 4. Panel Regression Result for the ROA Equation

Variable	Fixed Effects				Random Effects			
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
C	0.985	0.00	0.947	0.00	1.152	0.06	1.171	0.07
NPL	-0.006	0.00	-0.006	0.00	-0.016	0.02	-0.016	0.02
PLL			0.003	0.19			-0.001	0.90
LDR	-0.005	0.00	-0.006	0.00	-0.014	0.00	-0.014	0.00
BKS	-0.030	0.09	-0.025	0.16	0.022	0.67	0.021	0.69
MPR	-0.008	0.22	-0.008	0.22	-0.011	0.54	-0.011	0.54

INFL	0.004	0.39	0.005	0.32	0.014	0.33	0.014	0.35
R-squared	0.469		0.473		0.144		0.144	
Adj.R-squared	0.425		0.425		0.112		0.106	
F-statistic	10.476		9.806		4.505		3.840	

Source: Regression output using E-Views 10 (2023).

The coefficient of the LDR, -0.005[0.000] exerted a negative but significant impact on ROA at the traditional 1% level. This empirical finding portends that the rising lending rate in the DMBs discouraged borrowing and hence lowered the return on assets. In other words, the loan extension activities of the DMBS tended to have significantly limited the return on equity of the Banks. Even though this risk-taking activity does not affect the asset quality of the Banks, its empirical finding showed that it directly reduced the return on equity or shareholders' funds among the Banks. Thus, risks on loans are shown to lower shareholders' value rather than the ROA of the Banks. This is an important aspect of the study as it has glaringly demonstrated that risk-taking on loans might not influence the asset quality or internal operational management of the DMBs but the shareholders' funds in the Banks. Essentially, there is evidence that the agency problem between the shareholders and the managers of the DMBs is critically triggered when bank mangers engage in risky loan management activities. This is because the managers are shown to be prone to pushing the effects on non-performing loans to shareholders' interests rather than directly on the asset management of the banks. The coefficient of both monetary policy rate and inflation rate also failed the test of significance at the 5 percent level. This showed that, just like ROA, the external macroeconomic factors do not have significant impact on the return on equity of the DMBS in Nigeria.

4.5 Test of Hypotheses

H_{01}: Non-performing loans does not have effect on DMBs' financial performance in Nigeria.

In the results in Tables 3 and 4, the coefficients of nonperforming loans passed the test of significance at the 5 percent level. Therefore, the null hypothesis cannot be accepted in this case and it is demonstrated that non-performing loans had a negative but impact on DMBs' financial performance in Nigeria.

H_{02}: Provision for loan-losses does not affect DMBs' financial performance in Nigeria.

The coefficient of the provision for loan losses variable in the estimates contained in Tables 3 and 4 are used to test this hypothesis. In the results, the coefficients of the provision for loan losses passed the test of significance at the traditional 1 percent level for the ROA estimates but failed the test of significance in the ROE estimates. Based on these results, the null hypothesis is rejected in this case. Thus, it is shown that provision for loan-losses positively affects the DMBs' financial performance in Nigeria.

4.6 Discussion of Results

The study showed that nonperforming loans exhibited a strong and direct and unequivocal negative

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impact on DMBs' financial performance of in Nigeria. This finding is in line with studies by Ibitomi and Micah (2021), and Somoye (2019). However, the presence of the provision for loan losses in the Banks softened the unfavorable impacts. The empirical result of the financial performance indicator of ROA made this particularly pertinent. The import of this finding implied that rising nonperforming loans affected DMBs' returns on assets or operational efficiency more severely when loan loss provisions are low. Non-performing loans exerted a minimal and ineffective influence on ROA when there is a loan loss reserve. The study therefore showed that loan loss provisions have the ability to reduce the effects of nonperforming loans on the return on assets of the DMBs in Nigeria. These results are consistent with those of the studies on other emerging economies including Olszak, Chodnicka-Jaworska, Kowalska and Witaa (2018), Arajo, Lustosa and Paulo (2018) and Arbak (2017). In fact, the outcome is in alignment t with a related finding by Abdulai, Ahmad and Ajape (2022), who found that loan loss provisions are fundamentally counter-cyclical in Nigeria during periods of financial crisis.

5. Findings, Conclusion and Recommendations

5.1 Summary of Findings

The study examined empirically the interrelationships between credit risk management and DMBs' financial performance for the period 2001 to 2021. In doing this, financial performance was denoted by return on assets and return on equity and they served as the dependent variables of the two models contained in the study. The findings of the study showed that:

i.   Nonperforming loans exerted a negative but significant impact on DMBs' financial performance in Nigeria for the period 2001 to 2021.

ii.   Provision for loan losses impacted DMBs' financial performance positively and significantly at the 5 per cent of significance.

iii.   Lending rate exerted a negative and insignificant impact on DMBs' financial performance during the period being studied.

iv.   Bank size impacted the DMBs' financial performance negatively and insignificantly at the 2 per cent level of significance.

v.   Monetary policy rate impacted the DMBs' financial performance negatively and was neither significant at the 1 per cent, 5 per cent nor 10 per cent level.

vi.   Inflation rate exerted a negative and insignificant impact on DMBs' financial performance in Nigeria during the period covered by the study.

5.2 Conclusion

Arising from the findings of the study as enumerated in 5.1, the study concluded that the loans appraising officers and the top management of the DMBs must pay special attention to the credit processes which rely on each bank's systems and controls that allow management and credit officers to evaluate risk and return trade-offs. This is particularly important given that credit risk management lax

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represents the greatest source of bank distress and/or outright liquidation.

5.3 Recommendations

Based on the findings and conclusion in 5.1 and 5.2, respectively, it is strongly recommended that:

i.   The management of each of the DMBs in Nigeria must put in place appropriate measures aimed at scaling down the already huge profiles of nonperforming loans**.**

ii.   DMBs should continually increase their provisions for loan losses so as to mitigate losses that are most likely to hamper profitability.

iii. Both the monetary authority and the Management of the DMBs must work in synergy to bring down the monetary policy rate which is currently set at 18% so as to reduce the lending rate that presently hovers around 30%.

iv.   The managers of the Nigerian economy should urgently introduce those monetary and fiscal policies aimed at encouraging productivity thereby reducing inflation.

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