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METHODS

Credit risk management and the performance of Nigerian deposit money banks

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We have used a multiple regression model to identify the impacts of the variables of credit risk management on the Nigerian deposit money banks' performance from 2000 to 2020. The estimation was completed using the ordinary least squares method with E-Views 12. The data was sourced from the Nigerian Stock Exchange for information and the *Statistical Bulletin* of the Central Bank of Nigeria. The outcome determined that return on equity (ROE) is negatively correlated with the nonperforming loan/loan and advances ratio. Last but not least, the ROE measurements of the deposit money banks in Nigeria show a substantial correlation between the ratios of advances and loans to nonperforming loans, loan loss provision to loans and advances, and capital adequacy. These ratios are positively correlated with each other and negatively correlated with the capital adequacy ratio. We advise effective surveillance of pre- and post-deposit financial institution loans for the early detection of problematic debts that won't be repaid according to schedule and for the thorough analysis of prospective projects as indicated in the financial statement given by the intended client (cash budget, income statement). Accurate identification of realistic projects and repayment terms based on the customer's past performance will be achieved.

Keywords: credit risk, bank performance, credit management

Introduction

Any may expand thanks to the financial services provided by the banking industry of that nation. A nation's financial stability index is determined by the banking sector's long-term efficiency and effectiveness to the extent to which the public can evaluate bank credit for productive endeavors to aid the quickening of the speed of a country's economic expansion and also ensure its long-term viability (1). Lending activities carried out by the banks expose them to significant credit risk, which can result in financial difficulty and possibly bankruptcy (nonperforming loans).

Simply put, credit risk is the potential to lose an existing debt entirely or substantially as a result of credit events. It is also significant in commercial banks' profitability because loans with interest generate a significant portion of commercial banks' income (2). Given that credit is one of the primary sources of income for commercial banks, controlling credit-related risk is critical for profitability (3).

According to Ejoh et al. (4), credit risk increases whenever there may be a contravention to the principles of credit. Since lending comprises a reasonable portion of the resource exposure of Nigeria's deposit-taking banks, the capacity to generate profit and stay sound for banks becomes a function of effective and efficient management of their risk and lending portfolio.

Therefore, an important component of lending is credit risk management, and as such, its absence can turn a good loan into a bad one. For banks to be successful and maintain their soundness while enhancing performance, their corporate credit appraisal, disbursement, adequate monitoring, and repayment practices must be assured (5).

This study draws from the foregoing and intends to carry out an empirical analysis of the correlation between the efficiency of Nigeria's deposit money banks and credit risk management. Some of the previous studies include the following:

Examining the credit risk management practices and the profitability satisfaction inventory through banks' credit risk management practices (BACRIMAP), in Ekpoma, Edo State, Nigeria, Aigbomian, and Akinlosotu (5) conducted their study on deposit money banks' profitability and credit risk management (PSI) for profitability indices of banks. Their results showed a strong correlation between deposit money institutions' profitability and credit risk management.

TABLE 1 | Time series data on measures of performance and proxies of credit management of deposit money banks in Nigeria.

Years	ROE	NPLR	LLPR	CAR
	(%)	(%)	(%)	(%)
2000	2.06	6.21	2.28	7.76
2001	3.3	5.65	3.05	7.95
2002	2.63	5.13	2.74	8.19
2003	2	7.24	3.91	8.47
2004	2.58	6.25	1.90	8.25
2005	0.21	7.91	2.45	8.93
2006	2.16	9.30	3.07	9.30
2007	4.54	10.06	2.68	10.97
2008	7.3	10.57	4.83	11.23
2009	4.41	12.69	4.41	12.11
2010	4.11	11.46	5.68	12.82
2011	2.06	10.00	7.33	13.49
2012	13.79	9.67	6.90	14.32
2013	15.72	13.85	9.71	16.43
2014	7.3	14.10	7.22	17.16
2015	2.68	11.50	5.51	18.45
2016	2.55	14.21	9.80	16.45
2017	6.49	12.35	4.81	17.04
2018	16.75	10.99	6.77	17.84
2019	9.04	18.66	5.98	16.89
2020	13.27	15.76	5.44	16.58

Source: CBN statistical bulletin and NSE database.

TABLE 2 | Descriptive statistics of employed research variables.

	ROE	NPLR	LLPR	CAR
Mean	5.645714	10.64571	5.070000	12.88333
Median	4.110000	10.57000	4.830000	12.82000
Maximum	16.75000	18.66000	9.800000	18.45000
Minimum	0.210000	5.130000	1.900000	7.760000
Std. Dev.	4.682639	3.541704	2.315463	3.853662
Skewness	1.251037	0.293049	0.509208	−0.012555
Kurtosis	3.490108	2.585726	2.442739	1.425260
Jarque-Bera	5.688006	0.450741	1.179246	2.170382
Probability	0.058192	0.798220	0.554536	0.337837
Sum	118.5600	223.5600	106.4700	270.5500
Sum Sq. Dev.	438.5421	250.8733	107.2274	297.0143
Observations	21	21	21	21

Source: EViews 12-based results.

TABLE 3 | Ordinary least square technique of regression analysis.

Variables	Coefficients	Std. error	*t*-statistic	Prob.
C	4.905308	0.670213	7.319027	0.0000
NPLR	−0.246894	0.133960	−3.843041	0.0009
LLPR	0.234100	0.144704	2.617782	0.0183
CAR	0.518059	0.275724	2.478907	0.0220
R-squared	0.852676	Mean dependent var		13.57438
Adjusted *R*-squared	0.844997	S.D. dependent var		1.322470
S.E. of regression	0.304464	Akaike info criterion		0.586917
Sum squared resid	2.317465	Schwarz criterion		0.775510
Log likelihood	−4.510298	Hannan-Quinn criter.		0.645982
F-statistic	167.7570	Durbin-Watson stat		2.063538
Prob (*F*-statistic)	0.000000			

Source: EViews 12-based results.

Ifeanyi and Francis (6) tested the nexus that exists between Nigeria's deposit money banks' profitability (ROA) and credit management (DMBs) from 2006 to 2015. Secondary data bulletins and bank annual reports were given by the Central Bank of Nigeria's Statistical Department. They discovered that nonperforming loans were detrimental but very slightly affected profitability, whereas loans, advances, and loan loss provisions had a positive but insignificant impact.

Olalere and Ahmad (7) tested eight commercial banks (SIBs) from 2011 to 2014, using a panel data analysis to investigate how Nigerian commercial banks' profitability is affected by credit risk. The findings revealed a significant and adverse relationship between profitability and the nonperforming loan ratio. During the research period, there was no relationship between bank profitability and the debt-to-equity ratio or the debt-to-total assets ratio.

In their 2014 study, (8) looked at how the profitability of Lagos State's banks was impacted by credit risk. They advised managers of the banks to place a great deal of importance on credit risk as a result of their discovery that credit risk may contribute to a decline in earnings.

Methodology

The study used secondary data from 24 DMBs from the data gathered from the Central Bank of Nigeria (CBN) and the Nigerian Stock Exchange (NSE) database between 2000 and 2020. The ordinary least square technique using EViews 12 statistical package was used to estimate the model. The dependent variable is the return on equity (ROE). The independent variable includes the nonperforming loan/loan and advances ratio (NPLR), loan loss provision/loan and advances ratio (LLPR), and capital adequacy ratio (CAR) (**Tables 1**, **3**).

The multiple regression model used for this investigation is as follows:

$$Y = K0 + K1X1 + K2X2 + \ldots + KnXn + u \quad (1)$$

where

Y = the dependent variable representing measure of performance of deposit money banks.

$X_1 \ldots X_n$ = the independent variables representing proxies for credit risk management.

When transformed into a mathematical model, this reads as follows:

$$ROE = = K\mathbf{0} + K\mathbf{1}NPLR + K\mathbf{2}LLPR + K\mathbf{3}CA \quad (2)$$

where

ROE = return on equity; NPLR = nonperforming loan/loan and advances ratio.

LLPR = loan loss provision/loan and advances ratio; CAR = capital adequacy ratio.

$$K0 = Regressionconstant$$

Findings

The following are the findings of our study:

1. NPLR and the ROE are negatively correlated.
2. ROE and LLPR have a positive correlation of 0.234100.
3. The CAR and ROE are positively correlated.

Analysis of *t*-test

The summary of our *t*-test as presented in **Table 4** reveals that all our estimated parameters are individually significant. This is further ascertained by their *P*-values (i.e., 0.0009, 0.0183, and 0.0220, respectively), which are less than 0.05.

Finally, it can therefore be inferred based on this outcome that ROE is significantly impacted by each of the following metrics: CAR, loan loss provisions and loan and advance ratios, often known as NPLR and LLPR, respectively.

Conclusion and recommendations

The study looked at how credit risk management in Nigeria had an influence on deposit money banks' performance from 2000 to 2020 using a multiple regression model estimated by the ordinary least square technique using the EViews 12 statistical package to analyze both the individual and joint performance of Nigerian deposit money banks as measured by ROE, credit risk management variables (interactions between NPLR, LLPR, and loan loss provision). The data were gathered from the Central Bank of Nigeria (CBN) and the Nigerian Stock Exchange Nigeria's Statistical Bulletin (NSE).

The findings are consistent with the hypothesis that NPLR and ROE of deposit money banks in Nigeria have a negative and significant impact on the Nigerian banks that take deposits, according to prior findings of Kolapo et al. (1) study on credit risk.

Second, there is a significant and positive correlation between the Nigerian deposit money banks' ROE and their LLPR as aforementioned by Olalere and Ahmad (7) who indicated that the LLPR and the performance of Nigeria's deposit money banks are highly positively associated.

Thirdly, there is a strong and positive correlation between deposit money banks' capital adequacy ratio and ROE in Nigeria. This is consistent with the results that the CAR significantly improves the performance of Nigeria's deposit money banks, as agreed by Saeed and Zahid (9), who established that the CAR has a significant positive effect on deposit money banks' returns on assets and ROE.

Finally, there is a joint influence on the performance of deposit money banks in Nigeria as evaluated by ROE. It is notably influenced by the loan loss provision, loans and advances, and nonperforming loans to loans and advances, and capital adequacy.

The following recommendations have been provided based on the research findings and its conclusions:

1. Deposit money institutions should keep track of their outstanding loans to identify payment loans that the borrower will fail to repay as scheduled as soon as possible.

2. Prior to making a loan, deposit money institutions should carefully review the project as described in the customer-provided financial statement (cash budget, income statement). Based on the clients' prior performance, they will be able to determine reasonable projects and payback conditions.

3. Deposit money banks should strictly follow loss prevention methods for risk management. An excellent example is the written agreement in which the borrower

TABLE 4 | Summary of *t*-test.

Variables	*t*-calculated values	*t*-tabulated values	Prob. values	Decision rules	Conclusions
NPLR	3.843041	2.110	0.0009	Reject H_0	Significant
LLPR	2.617782	2.110	0.0183	Reject H_0	Significant
CAR	2.478907	2.110	0.0220	Reject H_0	Significant

Source: Researcher's computation (2022).

agrees to deliver specified financial statements at specific times during the loan's life.

4. Loans and advances should be given to borrowers on a merit basis and not on personal recognition. Thus, credit facilities should be granted only after a thorough evaluation of the loan applicants' proposals.

5. Efficient supervision and collection systems should be given priority as this will reduce the possibility of diversion of loans to other uses, which always hinders effective loan recovery.

Author contributions

PO-N, JK-N, and PW contributed by collecting articles and materials for publication, preparing the paper and submitting it for publication, proofreading of the article, correcting and final submission. We agree to be accountable for the content of the work.

Conflict of interest

The authors hereby declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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