

Research Article

Loan Portfolio Management and Commercial Banks' Profitability in Nigeria (2000-2023)

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Abstract

Lending is considered the main business of commercial banks, and it is regarded as the most crucial part of any business venture. Thus, commercial banks in Nigeria face numerous challenges that impact their operations. This study investigated the impact of loan portfolio management on the profitability of commercial banks in Nigeria from 2000 to 2023. Using the ARDL approach, the study employed preliminary econometric techniques to analyze the results, including descriptive statistics, a correlation matrix, and the Unit Root test. Return on Assets was used as the dependent variable, while Non-performing Loan (NPL) and Loan to Deposit Ratio (LTDR) served as independent variables. The findings showed that both Non-Performing Loans (NPL) and Loan to Deposit Ratio (LDR) have a positive but statistically insignificant effect on the return on assets of commercial banks in Nigeria. Based on these results, this study recommends that commercial banks implement effective loan recovery strategies, such as loan negotiation and restructuring. Ensuring efficiency in loan recovery will help increase returns for commercial banks in Nigeria.

Keywords

Loan Portfolio, Loan Portfolio Management, Profitability, Return on Assets, Loan

1. Introduction

In many of Africa's emerging economies, particularly Nigeria, commercial banks primarily generate income through lending. For most banks, loans represent their most significant assets and are a core revenue source. Consequently, they also pose one of the greatest risks to a bank's liquidity and profitability. A loan portfolio, which includes obligations such as mortgages and car loans, is essentially a collection of debt-based investments [1]. Effective management of these portfolios requires the bank's board and management to

thoroughly understand and supervise the institution's risk profile and lending practices. They must ensure that the policies and procedures used to handle risks associated with individual loans and the overall portfolio are robust and effective [2]. This is vital because a stable and efficient financial system is a cornerstone of any economy focused on sustainable growth and development. Given the central role of credit in the banking sector and its broad economic impact, it is important to examine how loan portfolio management influ-

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ences bank profitability. Banking theory outlines six key risks associated with credit policies: credit (repayment) risk, credit deficiency risk, operational risk, portfolio risk, interest rate risk, and trade union risk. Of these, credit risk is widely regarded as the most significant and prevalent [3, 4].

Loan portfolio management, therefore, seeks to keep credit risk within acceptable levels to optimize the bank's risk-adjusted return. Yet, in practice, borrowers often fail to meet repayment obligations, which can negatively affect a bank's profitability and potentially lead to failure. Since the 2007 financial crisis, managing credit risk has become a central focus for banks worldwide [3-6]. While managing loan portfolios remains a key banking function globally, inadequate credit risk management has been identified as a major cause of bank collapse [7]. As such, credit quality is viewed as a vital indicator of a bank's financial health and stability.

Recent global disruptions, such as the COVID-19 pandemic and the Russia-Ukraine conflict, have heightened financial risks and unsettled economic activities worldwide. These developments have raised concerns among banks and financial institutions about the growing risks associated with lending to businesses. This study is significant as it explores whether commercial banks are effectively managing their loan portfolios to fulfill profitability and liquidity expectations for both shareholders and depositors, especially considering ongoing debates regarding the impact of loan portfolio management on bank performance in Nigeria. The objective of this study is to enhance the existing literature by examining how loan portfolio management influences the profitability of Nigerian commercial banks over the period from 2000 to 2023. It focuses on key indicators such as the loan-to-deposit ratio and nonperforming loans to assess loan portfolio management, while return on assets is used to measure profitability.

The research is organized into five sections: Section 1 introduces the study, Section 2 reviews relevant literature, Section 3 outlines the methodology, Section 4 presents and analyzes the results, and Section 5 concludes with key policy recommendations.

2. Theoretical and Empirical Reviews

According to Adam Smith's theoretical arguments in 1776, commercial banks should only provide short-term, self-liquidating, productive business loans. He also stated that whenever a commercial bank makes such loans, the central bank should lend to the banks based on the security of these loans. The shiftability theory, established by *Harold G. Mouton* in 1915, asserts that a bank's liquidity is adequate if it retains assets that can be transferred or sold to other lenders or investors for cash, even during times of crisis or hardship. The shiftability theory focuses on the liabilities side of the balance sheet. This notion diverged from the commercial loan theory in that it argued that assets should be related not just to self-liquidating bills, but also to other shiftable open-market assets, such as government securities [8]. Fischer Black and

Myron Scholes established portfolio theory in 1973, which allows banks to diversify their loans and investments. In 1949, Prochnow developed a new lending theory he dubbed "the Anticipated Income Theory". According to the notion, banks are supposed to arrange loan liquidation based on predicted inflows from the borrower's existing business. This means that banks get repayment of their loans in installments from the borrower's future income rather than paying the entire loan amount and interest at once at maturity.

However, various empirical studies have investigated the impact on loan portfolio management and commercial bank performance in developing nations, with equivocal and disputed results. Some research indicated a favorable benefit [9, 10, 12-15] evaluated the impact of portfolio management on commercial bank profitability in Ghana. Data were collected from the Ghana Stock Exchange and the Bank of Ghana between 2008 and 2017. According to the panel study findings, any rise in the bank's purchase of government securities boosts its profitability.

In the same spirit, [11] investigated the impact of loan portfolio management on the profitability of deposit-taking microfinance institutions in Kenya. The study attempted to address Kenyan microfinance institutions' loan portfolios and profitability disputes. Correlation and regression analysis were utilized as estimation techniques, and the study's findings demonstrated a substantial association between loan portfolio management and the profitability of deposit-taking microfinance institutions. Others [16, 17-23] discovered an adverse effect. During 2001-2011, [24] identified several variables of credit risk management and their impact on the financial results of Indian banks. The findings from previous studies revealed that credit risk management significantly hurts the bank's financial performance.

3. Research Methodology

In estimating the model, we performed a preliminary evaluation of the series' basic statistical and time series features, which is a critical step in merging them into an estimation model form. This includes calculating the aggregate average, measuring spread and variance, and performing linear association and stationarity tests (unit root tests). The Autoregressive Distributed Lag (ARDL) bound testing developed by [25, 26] was used to determine the long-term and short-term impact of loan portfolio management on commercial bank performance in Nigeria.

The ARDL is appropriate since it applies regardless of whether the underlying variables are of order $I(0)$, $I(1)$, or not $I(2)$. The ARDL strategy is proven to be more robust and performs better with finite samples than previous co-integration strategies. Furthermore, ARDL is adjusted using an Unrestricted Error Correction Model (ECM) to examine both long- and short-run dynamics simultaneously [27]. This approach was employed by [25, 28] and [29]. The generalized ARDL (p, q) model is specified as:

$$Y_t = \alpha_0 + \sum_{i=1}^p \beta_i Y_{t-i} + \sum_{i=1}^q \delta_i X_{t-i} + \epsilon_t \quad (1)$$

Y_t is the dependent variable, and the variables in X_t are independent variables that can be purely $I(0)$, $I(1)$, or co-integrated; β and δ are coefficients; α is the constant; $i = 1, \dots, k$; p is the optimal lag order for the dependent variable,

and q is the optimal lag order for the exogenous variables. The lag durations of p and q may not be the same; ϵ_t represents the white noise error term. This test utilizes the FPSS critical values provided by [25] and [26], along with the decision rules outlined in Table 1 below.

Table 1. Summary of the FPSS Decision Rule.

State	Inference	Remark
FPSS > I(1)	H_0 is rejected	Co-integration is inferred
FPSS < I(0) and I(1)	H_0 cannot be rejected	No Co-integration
FPSS within I(1) and I(0)	Inconclusive Results	The results are inconclusive

In developing our model, we followed the theoretical and empirical specifications of earlier studies. The study follows a research approach like that employed by Kolapo, Ayeni, and Oke (2012) [30]. Their econometric model is described as:

$$ROA = f(NPL, LLP, LA) \quad (2)$$

LA CL TD

Expressed as follows:

$$ROA = f(NPL, LLP, LA) \quad (3)$$

Where: ROA: Return on Assets, NPL: Non-Performing Loan, LA: Loan and Advances, LLP: Loan loss provision, CL: Classified Loan, TD: Total Deposit.

However, by the specified model, a minor adjustment was made by including the loan-to-deposit ratio as an independent variable. The models are defined mathematically as follows: The ARDL model for the investigation is shown in the model:

$$\Delta ROA_{it} = \theta_0 + \sum_{i=0}^p \theta_0 \Delta ROA_{it-1} + \sum_{i=0}^p \theta_1 \Delta NPL_{it-1} + \sum_{i=0}^p \theta_2 \Delta LDR_{it-1} + \sum_{i=0}^p \theta_3 \Delta INT_{it-1} + \delta_0 \Delta ROA_{it-1} + \delta_1 \Delta NPL_{it-1} + \delta_2 \Delta LDR_{it-1} + \delta_3 \Delta INT_{it-1} + \epsilon \quad (4)$$

Where: ROA: Return on Assets, NPL: Non-performing loans, INT: Interest Rate, β_0 , Regression Constant, β_1 : Coefficient of total debt ratio, ϵ : Stochastic / error term.

Table 2. Description of Research Variables.

Variables	Description	Reason for Inclusion	Previously Adopted
Return on Asset (ROA)	Return on assets gives an idea as to how efficiently management uses the company's assets to generate profit (Ghosh, 2007). ROA Earnings Before Interest and Tax Total Assets	Indicates the percentage of profit a company earns concerning its overall resources (total assets).	[29]
Independent Variables			
Non-Performing Loan (NPL)	This demonstrates the ability of DMBs to control credit risk. A decreased NPL is indicative of an effective credit risk management plan.	Indicator for sound credit risk management	[33, 31]
Loan to Deposit Ratio (LTDR)	The loan-to-deposit ratio (LTD) is a widely used statistic for analyzing a bank's liquidity, calculated by dividing the bank's total loans by its total deposits.	Analysis of depositors' Contribution to the total loan	[30, 33]
Control Variable			

Variables	Description	Reason for Inclusion	Previously Adopted
Interest rate	The interest rate is the amount of interest due per period expressed as a percentage of the amount lent, also known as the major sum.		[32]

Source: Author's Compilation

4. Results and Discussion

Table 3 summarizes the descriptive statistics of the panel results for commercial banks in Nigeria from 2000 to 2023. The findings revealed that the variables were both positively and negatively skewed, indicating the degree of the departure from symmetry, with kurtosis ranging from mesokurtic, leptokurtic, and platykurtic across Commercial Banks factors. The traditional measures of central tendency, such as the

mean and median, revealed that the loan-to-deposit ratio and non-performing loans had the highest mean values of 70.75 and 12.51, and median values of 70.78 and 9.5, respectively. While return on assets and interest rates had lower mean and median values of 1.44, 5.55, and 2.08, 5.79, respectively. The coefficient of variance, which quantifies the strength of the variables' correlative association, was positive and generally distributed, with a tendency to hang around the mean.

Table 3. Descriptive Statistics.

VAR	MEAN	MEDIAN	MAX	MINI	STD DEV.	CV	SKEWNESS	KURTOSIS
PANEL								
ROA	1.4366	2.0863	3.2607	-12.8298	3.1821	2.2150	-4.1572	19.2153
NPL	12.5056	9.5	37.3	2.96	8.8186	0.7052	0.9624	3.5376
LDR	70.75	70.78	96.14	37.97	15.8797	0.2244	0.3230	2.5351
INT	5.5583	5.7905	18.18	5.6279	5.7386	1.0324	0.1039	2.6345

Authors' Compilation from EViews Results

4.1. Correlation Matrix

In Table 4, the correlation analysis revealed a combination of positive and negative correlations between financial inclusion and monetary policy factors. The correlation matrices show no evidence of considerable multicollinearity.

Table 4. Correlation Matrix.

CORRELATION MATRIX						
VARIABLES	ROA	ROE	NPL	LDR	INT	MS
ROA	1					
NPL	-0.67 (0.00)	-0.27 (0.24)	1			
LDR	-0.31 (0.19)	-0.05 (0.83)	0.65 (0.00)	1		
INT	-0.50 (0.02)	-0.21 (0.36)	0.06 (0.79)	-0.02 (0.94)	1	

Author's Compilation from EViews result

4.2. Unit Root Test

Table 5 shows the results of the unit root test on the panel data. The unit root characteristics of the supplied series were investigated because the ARDL estimation technique only takes I(1) and I(0) variables. Order two I(2) variables are not

authorized. The results showed that all variables in the panel data are integrated of orders I(1) and I(0). As a result, at the 0.05 level of significance, the null hypothesis of I(2) is rejected for each variable. The findings, however, support the use of the ARDL estimator without regard for data misspecification or spuriousness.

Table 5. Unit Root Test.

PANEL						
Series	ADF T-Stat	Critical Values			P. Value	Order
		1%	5%	10%		
ROA	-8.371567	-3.788030	-3.012363	-2.646119	0.0000	I(1)
NPL	-5.280671	-3.788030	-3.012363	-2.646119	0.0004	I(1)
LDR	-5.819887	-4.532598	-3.673616	-3.277364	0.0009	I(1)
INT	-4.316749	-3.831511	-3.029970	-2.655194	0.0036	I(1)

Source: Authors' Compilation from EViews Result.

4.3. Short and Long Run ARDL Result

The panel ARDL results that followed were examined below:

The panel ARDL result revealed that the return on assets of Nigerian banks is positively, although not significantly, impacted by both the loan-to-deposit ratio and non-performing loans (NPL/ROA = Coeff: 0.22, Prob: 0.07, LDR/ROA = Coeff: 0.13, Prob: 0.62). This suggests that the return on assets of Nigerian banks will marginally increase with each unit increase in NPL and LDR. However, the long-run coin-

tegration between the independent and dependent variables was verified by the ARDL bound test method, and ROA revealed an FPSS of 13.71, which is higher than I(0) and I(1), respectively. The short-run parameter of interest error correction term (ECT), which reveals how the system adjusts towards long-run equilibrium at a speed of 148% for ROA, which is approximately 1 year. The diagnostic tests prove that the ARDL model have a good fit (ROA $R^2 = 93\%$), is stable (RESET p-value: ROA = 0.46), have no autocorrelated residual (LM p-value: ROA 1.00), and the variance of the residual is constant (HET p-value: ROA 0.95).

Table 6. Short And Long Run ARDL Model.

DEPENDENT VARIABLE - ROA						
VARIABLES	CO-EFFICIENT		T-STAT		PROB	
LNPL	0.22		2.19		0.07	
LLDR	0.13		0.53		0.62	
LINT	0.14		3.96		0.007	
R^2	F-STAT	FPSS	ECMt-1	LM	HET	RESET
0.93	10.32	13.71	-1.48 (0.00)	0.00 (1.00)	0.26 (0.95)	0.79 (0.46)

Source: Authors' Compilation from Eviews Result.

5. Conclusion and Recommendations

Lending is the primary business of commercial banks. Funding for both governmental and private enterprises is provided by this intermediary position, which stimulates economic activity. Nevertheless, we used the panel ARDL bound test approach in this study to look at how loan portfolio management affected Nigerian commercial banks' profitability between 2000 and 2023. Return on assets was used to gauge commercial bank profitability, while financial ratios such as non-performing loans and loan-to-deposit ratio were used to gauge loan portfolio management. The empirical results of this study provide a more substantial value addition to the corpus of previous research in this field. Our research indicates that non-performing loans do, however, have a positive but insignificant effect on Nigerian commercial banks' return on assets (Coeff: 0.22; Prob: 0.07). The results showed that the loan-to-deposit ratio influences the return on assets in a favorable but non-significant manner (Coeff: 0.13; Prob: 0.62). The study's finding is regarded as noteworthy since they expand our understanding of this field of study. Therefore, to produce more manageable and advantageous debt structures for the borrowers, this study suggests that commercial banks ensure efficient loan recovery strategies, such as loan negotiation and restructuring, are put in place. Ensuring efficiency in loan recovery will increase returns for commercial banks.

Abbreviations

NPL	Non-performing Loan
LTDR	Loan to Deposit Ratio
ROA	Return on Assets
ARDL	The Autoregressive Distributed Lag
ECT	Error Correction Term

Author Contributions

Eleje Emmanuel C: Conceptualization, Formal Analysis, Methodology, Project administration, Supervision, Writing – original draft

Onu Calistus Chuks: Funding acquisition, Investigation, Resources

Temiloluwa Adeoye: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

Onyeike Andrew: Conceptualization, Resources, Writing – review & editing

Conflicts of Interest

The authors declare no conflicts of interest.

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