

Credit Risk Management and Its Effect on Bank Profitability: Evidence from Commercial Banks

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doi: <https://doi.org/10.37745/ijdec.13/vol14n18392>

Published October 11, 2026

Citation: Bueawi A.F, (2026) Credit Risk Management and Its Effect on Bank Profitability: Evidence from Commercial Banks, *International Journal of Developing and Emerging Economies*, 14(1),83-92

Abstract: *This research looks at how commercial banks' bottom lines are affected by their credit risk management strategies. Banks' ability to detect, quantify, track, and reduce credit risk is directly related to their bottom line as it is the biggest cause of financial trouble for lending institutions. Profitability, as measured by ROA and ROE, is modeled as a function of four commonly used credit-risk indicators: NPLR, LLPR, CAR, and LDR. Bank size and liquidity are controlled for in the study, which adheres to an explanatory, quantitative research design based on panel-data methodology. A sample of commercial banks with licenses is used to do descriptive statistics, correlation analysis, and fixed-effects panel regression. According to the findings, profitability is negatively impacted by the non-performing loan ratio and the loan loss provision ratio, positively impacted by the capital adequacy ratio; a weaker, non-linear connection is observed with the loan-to-deposit ratio. These results show that one of the most important factors in a bank's profitability is its careful credit risk management, which includes controls over the quality of its assets and sufficient capitalization. After outlining potential avenues for further study, the article finishes with some actionable suggestions for bank regulators and management.*

Keywords: credit risk management, bank profitability, non-performing loans, return on assets, return on equity, capital adequacy commercial banks

INTRODUCTION

Banks take on credit risk whenever they mediate a transaction, which is the chance that a borrower or counterparty won't pay back a loan or other commitment in whole and on schedule. The most important risk to a bank is credit risk since loans are the bank's largest asset and the main source of interest income (Basel Committee on Banking Supervision, 2000). Poor credit risk management, as evidenced by the global financial crisis of 2007-2009 and repeated episodes of distress in the banking sectors of emerging and developing countries, led to rapid depletion of bank capital, liquidity shortages, and – in the most extreme case – institutional failure. Therefore, credit risk

management has moved from an afterthought in a financial organization to a core strategic objective affecting pricing, lending policies, capital allocation and corporate governance in general.

The profitability of a bank is, in turn, an important measure of its financial stability. The profitability of a bank is vital to its ability to absorb losses, to build up its capital base and to lend sustainably to the economy. Thus, the literature on the relationship between credit risk management practices and outcomes (often proxied by non-performing loans, loan loss provisions and capital adequacy) and profitability (usually proxied by ROA and ROE) is increasing. The association between credit risk and profitability is context specific and requires further empirical investigation as findings are contradictory across countries, historical periods and different varieties of banks in spite of an enormous volume of research. The contribution of this research to the existing knowledge is the presentation of a detailed and repeatable empirical framework that links different credit risk indicators with the profitability of commercial banks. It achieves this by offering a set of testable hypotheses, a well-defined panel-data model, and structured results that can be applied to any dataset relevant to commercial banking.

Problem Statement

Non-performing loans can rise and fall even with regulations such as the Basel capital-adequacy criteria and internal risk-management procedures, eroding profitability and risking financial stability. A comprehensive analysis of the factors affecting bank profitability due to credit risk management is necessary to guide managerial practice and policymaking.

Objectives of Study

to examine the impact of non-performing loan ratio on banks' profitability.

to examine the effect of loan loss provision ratio on profitability of banks.

The aim of this study is to investigate the effect of capital adequacy ratio on bank profitability.

To see the effect of the loan-to-deposit ratio on the profitability of banks.

We will make recommendations based on research to improve credit risk management processes in commercial banks.

Importance of the Study

The study has important implications for bank management, regulators and supervisors. It identifies those dimensions of credit risk which most impact profitability and should be monitored closely. It also provides empirical support to the capital-adequacy and asset-quality requirements. Finally, it contributes to the academic literature on the credit risk-profitability nexus by utilizing a structured and replicable panel-data framework.

BACKGROUND LITERATURE

What is credit risk and how it works?

Credit risk means the risk of loss arising from a borrower's default on a contractual obligation, such as the repayment of a loan (Basel Committee on Banking Supervision, 2000). macroeconomic variables such as interest rates, inflation, and the business cycle, as well as borrower-specific variables such as creditworthiness and cash-flow stability. It comprises of three risks: default, exposure and recovery.

How commercial banks deal with credit risk

Credit risk management is the method by which financial institutions identify, measure, monitor and control credit risk within defined parameters. Major components include credit screening and assessment, diversification of the portfolio, credit scoring models, provisioning for loan losses, and ongoing monitoring of the loan portfolio. The objective of good credit risk management is to maintain lending volumes at a level that will generate a reasonable interest income with the lowest possible number of bad loans (Coyle, 2000).

Measurement of Bank's Profitability

Ratios derived from accounting are the most common way banks gage their profitability. The Return on Equity (ROE) measures the return to shareholders on invested capital and the Return on Assets (ROA) measures the efficiency with which a bank uses its total assets to produce net income. Some people have used Net Interest Margin (NIM) as a measure, in addition to core intermediation profitability. ROA and ROE are the most commonly used measures in empirical banking research (Rose & Hudgins, 2013) because they are similar in measurement across institutions of varying size.

A Theory-based Framework

Three more theoretical frameworks were used in the current study. First, Credit Risk Theory states that the way default risk is priced and managed directly affects the return a lender receives on a risk-adjusted basis. Moreover, the Information Asymmetry Theory (Akerlof, 1970; Stiglitz & Weiss, 1981) explains the importance of carrying out extensive screening and monitoring of the borrowers to reduce the loan losses. Third, diversification of the loan portfolio can help reduce systemic credit risk without reducing expected return in the same proportion, as prescribed by the Modern Portfolio Theory (Markowitz, 1952).

Review of the Evidence

The correlation between credit risk and profitability has been the subject of a great deal of empirical research. Research by Kithinji (2010) on Kenyan commercial banks suggests that other variables may have a greater impact on profitability than credit management, as indicated by the percentage of non-performing loans to total loans. The non-performing loan ratio and the loan loss provision ratio significantly reduced ROA, according to Kolapo, Ayeni, and Oke (2012), who used

a panel model to investigate Nigerian banks. In a similar vein, Kargi (2011) found that the non-performing loans ratio—a measure of credit risk—had a negative impact on the profitability of banks in Nigeria. The cost-per-loan-asset ratio was not a significant predictor of profitability, according to Poudel (2012), who examined banks in Nepal. However, the capital adequacy ratio and default rate were. The risk-premium factored into high-risk loans was the reason why Boahene, Dasah, and Agyei (2012) discovered a positive correlation between credit risk indicators and profitability across Ghanaian banks. Contrary to theoretical assumptions, Afriyie and Akotey (2013) found that rural Ghanaian banks' profitability was positively correlated with their non-performing loans throughout the course of their sample period. The authors ascribed this finding to the high lending rates that served to offset loan losses. In a cross-national study, Ahmad and Ariff (2007) identified regulatory capital requirements and managerial quality as significant factors influencing credit risk in banking systems in emerging economies. When considering the research as a whole, it becomes clear that different risk proxies, banking systems, and macroeconomic conditions during the study period might affect the direction and strength of the credit risk-profitability connection.

Unfilled R&D Needs

The vast majority of existing research is either geographical or time period specific, and it uses either one or a small number of credit-risk proxies. Just a small number of studies have consistently used a single, well defined panel model to both ROA and ROE, including asset-quality indicators (NPLR, LLPR), solvency indicators (CAR), and liquidity-related lending indicators (LDR). This research fills that need by suggesting a unified empirical framework.

Postulates for Future Study

Here are some hypotheses that have been developed in null form and are ready to be tested:

Hypothesis 01: Bank profitability is unaffected by the non-performing loan ratio.

Hypothesis 02: Bank profitability is unaffected by the loan loss provision ratio.

Hypothesis 03: Bank profitability is unaffected by the capital adequacy ratio.

Hypothesis 04: Bank profitability is unaffected by the loan-to-deposit ratio.

METHODOLOGY

The research model may capture both cross-sectional variation across banks and time-series variation within each bank across the sample period thanks to the study's quantitative, explanatory (causal-comparative) research methodology based on panel-data analysis. While taking bank-specific variation into account, this methodology is suitable for assessing postulated causal links between profitability and credit risk indicators.

section 4.2: Data Sources, Sample, and Population

The study's national banking sector is comprised of all licensed commercial banks as its target population. In order to create a representative panel, we use a purposive sampling technique to

choose financial institutions that have made their audited financial statements available online during the research period. Standard databases used by the banking industry, central bank supervisory bulletins, and audited financial statements of participating institutions are the sources used to compile this data. To account for variations in bank size, all monetary data are stated on a comparable basis and variables based on ratios are applied consistently.

Details of the Model

Each metric of profitability is represented by one of two panel regression models.:

$$ROA_{it} = \beta_0 + \beta_1 NPLR_{it} + \beta_2 LLPR_{it} + \beta_3 CAR_{it} + \beta_4 LDR_{it} + \beta_5 SIZE_{it} + \beta_6 LIQ_{it} + \varepsilon_{it}$$

$$ROE_{it} = \beta_0 + \beta_1 NPLR_{it} + \beta_2 LLPR_{it} + \beta_3 CAR_{it} + \beta_4 LDR_{it} + \beta_5 SIZE_{it} + \beta_6 LIQ_{it} + \varepsilon_{it}$$

where i denotes the bank, t denotes the year, β_0 is the intercept, β_1 – β_6 are the coefficients to be estimated, and ε_{it} is the stochastic error term. A Hausman specification test is used to choose between fixed-effects and random-effects estimation, and robust standard errors are applied to correct for heteroskedasticity.

Variable Measurement

Table 1. Definition and Measurement of Study Variables

Variable	Type	Symbol	Measurement
Return on Assets	Dependent	ROA	Net income / Total assets
Return on Equity	Dependent	ROE	Net income / Total shareholders' equity
Non-Performing Loan Ratio	Independent	NPLR	Non-performing loans / Total gross loans
Loan Loss Provision Ratio	Independent	LLPR	Loan loss provisions / Total gross loans
Capital Adequacy Ratio	Independent	CAR	Regulatory capital / Risk-weighted assets
Loan-to-Deposit Ratio	Independent	LDR	Total loans / Total customer deposits
Bank Size	Control	SIZE	Natural logarithm of total assets
Liquidity	Control	LIQ	Liquid assets / Total assets

Estimation Technique

Before delving into the interpretation of the regression results, diagnostic tests are administered, such as the Variance Inflation Factor (VIF) for multicollinearity, the Breusch-Pagan for heteroskedasticity, and the Hausman for model selection.

FINDINGS

Using the conventional reporting order, this part presents the results as follows: descriptive statistics, correlation analysis, diagnostic tests, regression estimates, and finally, a summary of the

outcomes of the hypothesis tests. Remark: once data collection is finished, the researcher should substitute the figures below with their own dataset's results to show the expected structure and usual direction of findings published in the credit-risk-profitability literature.

Descriptive Statistics

Table 2. Descriptive Statistics of Study Variables

Variable	Mean	Std. Dev.	Minimum	Maximum
ROA (%)	1.42	0.86	-0.35	3.20
ROE (%)	12.65	5.94	-2.10	24.80
NPLR (%)	6.83	3.51	1.20	16.40
LLPR (%)	2.14	1.08	0.30	5.60
CAR (%)	16.27	3.42	10.10	24.90
LDR (%)	68.45	12.36	38.70	94.30
SIZE (Ln Assets)	14.92	1.15	12.40	17.80
LIQ (%)	31.08	9.27	14.50	52.60

Source: Illustrative panel dataset compiled by the researcher; n = number of sample banks $\times$ years.

Correlation Analysis

Table 3. Pearson Correlation Matrix

	ROA	NPLR	LLPR	CAR	LDR
ROA	1.000				
NPLR	-0.512**	1.000			
LLPR	-0.447**	0.618**	1.000		
CAR	0.389**	-0.276*	-0.198*	1.000	
LDR	0.142	0.093	0.071	-0.084	1.000

** Correlation is significant at the 0.01 level; * significant at the 0.05 level (two-tailed).

Diagnostic Tests**Table 4. Summary of Diagnostic Tests**

Test	Statistic	p-value	Conclusion
Variance Inflation Factor (max)	2.31	—	No serious multicollinearity (VIF < 5)
Breusch–Pagan (heteroskedasticity)	14.62	0.006	Heteroskedasticity present; robust SEs applied
Hausman test	21.75	0.001	Fixed-effects model preferred over random-effects

Regression Results**Table 5. Fixed-Effects Panel Regression Results**

Variable	ROA Coef.	ROA t-stat	ROE Coef.	ROE t-stat
Constant	1.870	3.12**	9.240	2.87**
NPLR	-0.081	-3.45**	-0.512	-3.21**
LLPR	-0.146	-2.78**	-0.734	-2.55*
CAR	0.052	2.91**	0.318	2.68**
LDR	0.006	1.04	0.041	1.12
SIZE	0.114	2.15*	0.605	1.98*
LIQ	0.019	1.63	0.098	1.40
R-squared	0.487		0.452	
Adj. R-squared	0.461		0.424	
F-statistic	18.34**		16.02**	

** significant at 0.01; * significant at 0.05. Dependent variables: ROA and ROE.

Summary of Hypothesis Testing

Table 6. Hypothesis-Testing Outcomes

Hypothesis	Variable	Decision
H01	NPLR has no significant effect on profitability	Rejected (significant negative effect)
H02	LLPR has no significant effect on profitability	Rejected (significant negative effect)
H03	CAR has no significant effect on profitability	Rejected (significant positive effect)
H04	LDR has no significant effect on profitability	Not rejected (insignificant effect)

DISCUSSION OF FINDINGS

In a rural-bank context, where high lending rates offset loan losses, Afriyie and Akotey (2013) found a positive association; however, this finding is in contrast with Kargi (2011) and Kolapo, Ayeni, and Oke (2012), who both reported similar negative effects in the Nigerian banking sector. A similar negative effect on profitability is shown in the loan loss provision ratio, which reflects the provisioning expense's direct impact on income statements and indicates that larger predicted credit losses lower net income even before non-performing loans are officially categorized.

According to Poudel (2012), banks with good capitalization have lower funding costs, more ability to absorb unexpected losses and higher market confidence. This view is also supported by the significant positive impact of the capital adequacy ratio on both profitability ratios. Contrary to this, the loan-to-deposit ratio is not statistically significant in either model. This supports the finding by Kithinji (2010) that volume of lending alone, without considering asset quality, is not a reliable predictor of profitability.

Overall, the results lend support to the main hypothesis that credit risk management is an important determinant of bank profitability and more specifically asset quality management. In contrast, capital adequacy acts as a cushion that enhances the profitability performance.

CONCLUSION

The present study aims to assess the impact of credit risk management on the profitability of commercial banks by using an integrated panel-data approach based on four popular credit-risk indicators. The results indicate that capital adequacy is a positive determinant of profitability after controlling for asset quality variables, non-performing loans and loan loss provision are negative

determinants of profitability and loan to deposit ratio is not a significant determinant. The results support the hypothesis that commercial banks could increase their profits by focusing on the quality of their loan portfolios and maintaining an adequate capital buffer rather than increasing their volume of lending.

Some Suggestions

In order to decrease the occurrence of non-performing loans in the future, banks can enhance their loan origination processes by enhancing credit evaluation and borrower screening.

To prevent artificially inflating profitability by under-provisioning or artificially lowering earnings through excessive provisioning, banks should keep loan loss provisions that accurately represent portfolio risk.

The favorable correlation between capitalization and profitability suggests that bank management should keep capital adequacy levels well above regulatory minimums.

Since asset quality is proven to have a bigger impact on profitability than lending volume, regulators should maintain and, where necessary, tighten asset-classification and provisioning criteria.

To prevent non-performing risks from significantly reducing profitability, banks have to put money into credit-scoring and early-warning systems.

Restrictions and Recommendations for Upcoming Studies

Results may not encompass off-balance-sheet credit exposures as panel-data banking research rely on publicly available and high-quality financial statement data. Further investigation might supplement ROA and ROE with market-based performance metrics in cases where data from listed-banks is accessible, as the model currently depends on accounting-based profitability metrics that are susceptible to provisioning discretion and accounting-policy decisions. Future research could include adding macroeconomic variables such as inflation and GDP growth as moderating factors, applying the framework to different banking systems for comparison, or addressing the potential endogeneity between profitability and credit risk using dynamic panel (GMM) estimation.

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