

IMPACT OF CREDIT RISK ON THE FINANCIAL PERFORMANCE OF VIETNAMESE BANKS DURING COVID-19 PERIOD

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Abstract: *The study investigates the impact of credit risk on the financial performance of Vietnamese commercial banks during the Covid-19 pandemic. Using panel data from 27 commercial banks in Vietnam over the period from 2011 to 2023, the study employs OLS, FEM, REM, and FGLS models. The results show that NPLs have a significant negative relationship with ROA. Furthermore, Covid-19 strengthens the impact of NPLs on banks' ROE. While the relationship is significant, the significance level is not as strong as in previous studies, suggesting that the Vietnamese banking system may have developed effective mechanisms to mitigate the adverse effects of non-performing loans. The research offers valuable insights for bankers and regulators to better manage credit risk, particularly during crisis periods.*

• Keywords: credit risk, non-performing loan, covid-19, financial performance, vietnamese commercial bank.

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1. Introduction

The Covid-19 pandemic has had a profound impact on the global banking sector. The economic disruptions caused by the pandemic, including widespread business closures, rising unemployment, and supply chain interruptions, have led to an increase in non-performing loans (NPLs), thereby eroding banks' profitability. The heightened credit risk has also prompted banks to adopt more conservative lending practices, which may limit credit growth. As a result, many banks have been significantly affected by the pandemic.

Since the peak of the non-performing loan (NPL) ratio in the Vietnamese banking market following the global economic crisis of 2008-2009, the Vietnamese banking system has implemented a series of stringent measures to control bad debt. These measures include the strict enforcement of credit growth limits, the enactment of Resolution No. 42, which provides a legal framework for solving NPLs, and the strengthening of the restructuring process for weak banks. Additionally, improvements have been made in loan classification standards, the establishment of asset management companies to handle bad debts more efficiently, and the introduction of stricter regulations on risk provisioning, coupled with enhanced transparency in reporting. As a result, the NPLs ratio was significantly reduced and remained within the acceptable limit. Despite several years of recovery, the recent Covid-19 pandemic and the Russia-Ukraine conflict have led to a global economic downturn, pushing the Vietnamese economy into a severe difficulty. Consequently, the NPLs ratio began to rise again. By June 2024, the NPLs ratio of the credit institution system had reached 2.3%, up from 1.49% in 2021. The total ratio of bad debt, including unresolved debt at the Vietnam

Asset Management Company (VAMC) and potential bad debt, compared to total outstanding debt, stood at 6.44% (Trieu Minh, 2025).

From a theoretical standpoint, numerous studies have examined the impact of credit risk on the profitability of commercial banks; however, the findings remain inconsistent. Some research highlights the negative effect of credit risk on the banks' performance (Jacob, 2022; Oketch, 2018; Le & Ngo, 2020; Andries, 2020; Vu & Turnell, 2020), while other studies suggest a positive relationship between credit risk and bank profitability (Alshatti, 2017; Embaye, 2018; Nguyen & Nguyen, 2021; Marshal & Onyekachi, 2016; Kolapo, 2022; Cheng, 2020). Several studies have also explored the link between credit risk and financial performance in crisis contexts (Le & Ngo, 2020; However, a significant gap exists in the literature regarding the direct relationship between credit risk and bank performance during the Covid-19 pandemic.

This study investigates the impact of non-performing loans (NPLs) on the financial performance of Vietnamese banks, considering the context of the Covid-19 pandemic. It makes several important contributions to both the literature and practical applications. Specifically, it seeks to answer the question of whether, despite the various measures taken by the banking system to mitigate the negative effects of Covid-19, the pandemic has intensified the impact of NPLs on banks' financial performance. The research covers the period from 2011 to 2023, a notable timeframe during which Vietnamese banks standardized their operations through the implementation of Basel II and prepared for the adoption of International Financial Reporting Standards 9 (IFRS9). This period coincides with the emergence, spread, and eventual subsiding

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of the Covid-19 pandemic. The findings of this study are highly relevant to policymakers, bank executives, board members, and financial investors, as they provide valuable insights for taking proactive measures to mitigate credit risk. Furthermore, the study's outcomes can assist policymakers in shaping a more resilient banking sector, safeguarding it from future crises, and ensuring that the banking industry continues to play its critical role in driving economic growth.

The remainder of this paper is structured as follows: Section 2 provides a comprehensive literature review. Section 3 outlines the methodological framework. Section 4 presents a succinct synthesis of the key findings and outcomes. Finally, Sections 5 and 6 offer a discussion of the results and conclude the study, respectively.

2. Literature review

The study is grounded in the theory of information asymmetry (Akerlof et al., 2014) and the trade-off theory (Campbell & Kelly, 1994). Information asymmetry refers to a situation where one party in an economic transaction possesses more information than the other (Stiglitz, 2002). In the banking context, this means that the borrower typically knows more about their ability to repay a loan than the lender (Spence, 1973). Information asymmetry is a primary factor contributing to banks' credit risk, as it leads to adverse selection and moral hazard (Dietrich, 2017). The trade-off theory (Campbell & Kelly, 1994) posits that investors and firms face a fundamental trade-off between risk and reward, where higher levels of risk are expected to yield higher potential returns. In the context of banking, Tan (2019) argues that when banks are exposed to higher credit risk, they typically anticipate higher profits.

Many relevant empirical research findings align with the trade-off theory. For instance, Nguyen and Nguyen (2022) examine the relationship between banks' profitability and credit risk in Vietnam and find a significant positive correlation. Similar evidence is also reported in Nigeria (Marshall & Onyekachi, 2016; Kolapo, 2022), South Africa (Cheng, 2020), and Eritrea (Embaye, 2018). Le and Ngo (2020) test this relationship using cross-country data and observe a similar positive impact. The positive relationship identified in these studies can be attributed to the exceptionally high interest rates charged by banks to offset the risks associated with high credit risk, ultimately leading to higher profits in these contexts.

In contrast, numerous studies have found a negative relationship between credit risk and banks' profitability in various countries. These include studies in Nigeria (Ebenezer & Omar, 2016), Bangladesh (Noman et al., 2015), Ghana (Gadzo, 2019). This negative relationship can be explained by the fact that credit risk leads to an increase in the cost of bank assets. As a result, high credit risk leads to higher operational costs while simultaneously reducing the return on cash flows.

Several studies have examined the impact of crises on bank performance. Le and Ngo (2020) found a negative relationship between financial crises and bank performance. Andries (2020) reported that crises have a significant and positive impact on both the cost and profit inefficiencies of commercial banks in the EU, with a more pronounced effect on Eurozone banks. Similarly, Vu and Turnell (2020) found that the crisis adversely impacted the profit efficiency of Australian banks. In contrast, Gulati and Kumar (2016) found no significant or long-lasting adverse effects of the global financial crisis on the efficiency of the Indian banking sector.

3. Conceptual model

This research uses annual data from all listed commercial banks in Vietnam over the period 2011 to 2023. Banks with incomplete financial data for this period were excluded from the analysis. Additionally, all bank-level variables are winsorized at the 1% and 99% levels to mitigate the potential effects of outliers. The final sample consists of a balanced panel of 27 banks, which account for 95% of the total charter capital in the Vietnamese banking system.

The research model is based on previous studies. Return on Assets (ROA) and Return on Equity (ROE) are used as measures of financial performance, while credit risk is measured by the Non-Performing Loan (NPL) ratio and the Loan Loss Provision (LLP) ratio. The model includes five control variables: the Cost to Income Ratio (CIR), Liquidity Ratio (LR), Average Lending Rate (ALR), Capital Adequacy Ratio (CAR), Bank Size (SIZE), and the History of Establishment (AGE). Additionally, two macroeconomic variables, the GDP Growth Rate (GDP) and Inflation Rate (INF), are incorporated. To account for the impact of financial crises, a dummy variable, CRISIS, is included in the model. The CRISIS variable takes the value of 1 to represent crisis conditions and 0 to represent normal conditions during the remaining years of the research period.

The equations of the baseline model are specified as follows:

$$\begin{aligned} \text{Bank performance}_{i,t} = & \alpha_{i,t} + \beta_1 \text{NPL}_{i,t} + \beta_2 \text{CIR}_{i,t} + \beta_3 \text{CAR}_{i,t} + \beta_4 \text{ALR}_{i,t} \\ & + \beta_5 \text{LR}_{i,t} + \beta_6 \text{LLP}_{i,t} + \beta_7 \text{INF}_{i,t} + \beta_8 \text{AGE}_{i,t} \\ & + \beta_9 \text{GDP}_{i,t} + \beta_{10} \text{CRISIS}_{i,t} \quad (1) \end{aligned}$$

The study extends the baseline model by incorporating interactive variables of NPL*CRISIS and LLP*CRISIS to examine whether the Covid-19 period influences the relationship between credit risk and bank performance.

The study was conducted using OLS, FEM, and REM regressions. To select the most appropriate model, the study employs the Hausman test. The chosen model is then subjected to hypothesis testing, including multicollinearity testing (VIF test), heteroscedasticity testing (Breusch and Pagan Lagrangian test), and autocorrelation testing (Wooldridge test). The Hausman test results indicate that the appropriate model for

regressing ROA is the Fixed Effects Model (FEM), while the Random Effects Model (REM) is suitable for regressing ROE. The results from the VIF, White, and Wooldridge tests reveal that both the FEM and REM models do not suffer from multicollinearity but exhibit heteroscedasticity and autocorrelation.

Table 1. Summary of explanatory variables and dependent variables

	Variables	Measurement	Expected sign	Reference
Dependent variables				
	ROA (Return on asset)	$\frac{\text{Net income}}{\text{Total assets}}$		Kolapo et al. (2022) Al Zaidanin & Al Zaidanin (2021) Alshatti (2017).
	ROE (Return on equity)	$\frac{\text{Net income}}{\text{Equity}}$		Alshatti (2017). Ebenezer, & Omar, (2016)
Credit risk	NPL (Non-performing loans)	$\frac{\text{Total nonperforming loan}}{\text{Total loans}}$		Kolapo et al. (2022) Al Zaidanin & Al Zaidanin (2021) Alshatti (2017).
	LLP (Loan loss provision)	$\frac{\text{Loan loss provision}}{\text{Total assets}}$	-	Kolapo et al. (2022) Alshatti (2017).
Control variables				
	CAR (Capital adequacy ratio)	$\frac{(\text{Tier1 Capitalit} + \text{Tier2 Capitalit})/\text{Total Risk weighted Assetit}}{100\%}$	+	Al Zaidanin & Al Zaidanin (2021) Alshatti (2017).
	LR (Liquidity ratio)	$\frac{\text{Total loans}}{\text{Total deposits}}$	+/-	Al Zaidanin & Al Zaidanin (2021)
	CIR (Cost-income ratio)	$\frac{\text{Total operating cost}}{\text{Total revenue}}$	-	Al Zaidanin & Al Zaidanin (2021)
	BS (Bank size)	$\ln(\text{total assets})$	+	Elshaday et al. (2018)
	ALR (Average lending rate)	$\frac{\text{Net interest income}}{\text{Total assets}}$	+	Alshatti (2017) Elshaday et al. (2018)
	AGE	Age of commercial banks from established to the year calculated	+	Author's proposal
Other factors	INF (Inflation)	Annual inflation rate declared by word bank yearly	+/-	Vo et al (2022) Le & Ngo (2020)
	GDP (Gross domestic products)	Growth rate of gross domestic products	+/-	Vo et al (2022) Le & Ngo (2020)
	CRISIS (Covid Pandemic)	Panel data: From 2011 - 2019: 0 value From 2020 - 2023: value at 1	+/-	Gulati & Kumar (2016) Le & Ngo (2020)

Source: Author, 2024

The study employs the Feasible Generalized Least Squares (FGLS) estimation method, as proposed by Hansen (2007), to restructure the models and address the heteroscedasticity issue.

4. Result

4.1. Descriptive statistics

Table 2. Descriptive statistics of variables

Variable	Obs	Mean	Std. dev.	Min	Max
ROA	351	0.019	0.010	0.004	0.42
ROE	351	0.217	0.118	0.049	0.441
NPL	351	0.021	0.009	0.008	0.045
CAR	351	0.103	0.031	0.065	0.174
CIR	351	0.231	0.060	0.123	0.324
ALR	351	0.029	0.013	0.014	0.065
LR	351	0.886	0.154	0.599	1.16
LLP	351	0.008	0.003	0.004	0.015
AGE	351	23.909	10.811	6	55
INF	351	4.852	4.481	0.631	18.678
CRISIS	351	0.308	0.462	0	1
BS	351	5.128	0.489	4.329	6.066
GDP	351	0.087	0.039	0.025	0.173

Source: Author, 2024

Table 2 presents the descriptive statistics for all variables over the period 2011 - 2023 (351 observations). The key dependent variables, ROA & ROE, have the mean of 1.9% and 21.7%. The NPL ratio has a mean of 2.1% and range from 0.8% to 4.5%, highlights a vast disparity in risk exposure among banks. Capital Adequacy Ratio (CAR) shows a standard deviation of 0.031 with a mean of 10.3%, showing most banks exceed the regulatory minimum of 8%. The cost-income ratio (CIR) is relatively low at 23.1%. Average lending rate (ALR) is 0.029 and LR showing a mean of 0.886, suggesting that most banks maintain high ratio of loan

to deposit. The average age of banks in the dataset is 24 years, with a range from newly established banks (6 years) to much older institutions (55 years).

The correlation matrix and VIF among variables is displayed in Table 3. All correlations are below 0.8, indicating relatively weak relationships between the variables. The highest VIF is observed for inflation (INF) with a value of 3.68, within acceptable limits, indicating no significant degree of multicollinearity.

Table 3. Correlation matrix

	NPL	CAR	CIR	ALR	LR	LLP	AGE	INF	CRISIS	BS	GDP	VIF
NPL	1.00											1.36
CAR	0.26 ***	1.00										1.81
CIR	-0.10 **	0.11 **	1.00									1.54
ALR	-0.04 ***	0.25 ***	0.13 **	1.00								1.56
LR	-0.12 **	0.19 ***	-0.05 **	0.36 ***	1.00							1.46
LLP	0.13 ***	-0.06 **	-0.06 **	0.27 ***	0.34 ***	1.00						1.95
AGE	-0.15 ***	-0.12 ***	0.07 **	-0.06 **	0.19 ***	0.49 ***	1.00					2.11
INF	0.16 ***	0.23 ***	-0.48 ***	0.10 *	-0.01 **	-0.08 **	-0.19 ***	1.00				3.68
CRISIS	-0.10 *	-0.04 **	0.03 **	0.07 **	0.31 ***	0.30 ***	0.25 ***	-0.29 ***	1.00			1.42
BS	-0.31 ***	-0.44 ***	0.03 **	0.16 ***	0.26 ***	0.51 ***	0.62 ***	-0.27 ***	0.35 ***	1.00		3.05
GDP	0.14 ***	0.19 ***	-0.33 ***	0.10 **	0.01 **	-0.04 **	-0.16 ***	0.8 ***	-0.36 ***	-0.22 ***	1.00	3.13

Source: Author, 2024

4.2. Baseline model and extended model

Table 4: Regression results with FGLS estimation

Variable	Baseline model		Extended model	
	ROA	ROE	ROE	ROE
NPL	-0.0507* [-1.73]	-0.5113 [-1.20]	-0.414 [-1.05]	-0.865** [-2.47]
CAR	0.0758*** [5.62]	-0.5295*** [-3.59]	-0.667*** [-4.31]	-0.634*** [-4.05]
CIR	-0.0122** [-2.14]	-0.1776** [-2.56]	-0.176*** [-2.70]	-0.169** [-2.57]
ALR	0.4926*** [15.65]	3.6983*** [11.32]	4.160*** [12.62]	4.134*** [12.50]
LR	0.0028 [1.29]	0.1067*** [4.07]	0.0476* [1.86]	0.0374 [1.46]
LLP	-0.0797 [-0.66]	-2.5659 [-1.48]	-0.910 [-0.66]	-0.389 [-0.26]
AGE	0.0000 [0.47]	0.0021*** [4.73]	0.00205*** [4.18]	0.00201*** [4.06]
BS	0.0079*** [6.99]	0.1128*** [9.42]	0.110*** [8.39]	0.113*** [8.28]
CRISIS	0.0021*** [3.30]	0.0140 [1.62]	0.0429*** [2.75]	0.0147 [0.79]
GDP	0.0078 [1.09]	0.0993 [0.66]	0.0498 [0.61]	0.0576 [0.70]
INF	0.0001** [2.34]	0.0006 [0.48]	0.000963 [1.02]	0.00104 [1.09]
CRISIS*NPL			-1.632** [-2.42]	
CRISIS*LLP				-0.684 [-0.30]
_cons	-0.0449 [-7.56]	-0.5033*** [-7.72]	-0.444*** [-6.27]	-0.445*** [-6.02]

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Source: Author, 2024

The baseline model investigates the individual impact of credit risk and other control variables on bank performance. Table 4 presents the FGLS results for the dependent variables, ROA and ROE, respectively. The results show that NPL negatively affects ROA at the 10% significance level, while this negative relationship

with ROE is not statistically significant. The financial crisis negatively impacts banks' ROA, though it does not significantly affect ROE. CAR positively influences ROA but negatively affects ROE, with both relationships significant at the 1% level. CER negatively impacts both ROA and ROE at the 5% significance level, while ALR and BS positively affect both ROA and ROE at the 1% significance level.

The extended models with interactive variables of NPL*CRISIS and LLP*CRISIS are used to examine whether the Covid-19 period influences the relationship between credit risk and bank performance. The results indicate that, for the dependent variable ROA, neither the interaction of NPL*CRISIS nor the interaction of LLP*CRISIS significantly affects bank performance. However, for the dependent variable ROE, the interaction between NPL*CRISIS negatively impacts bank performance at the 5% significance level, while the interaction between LLP*CRISIS remains statistically insignificant. Other controlling variable still have positive strong impact (ALR, AGE, BS) and positive impact (CAR, CIR).

5. Discussion

NPLs and LLPs exhibit negative coefficients across all models. However, NPL is statistically significant with ROA in the baseline model and with ROE in the extended model, while LLP does not have a significant impact on banks' performance in any model. These results align with previous study of Ebenezer & Omar (2016), Noman et al., (2015), Gadzo (2019), Musyoki & Kadubo (2012); Oketch (2018), Alshatti, (2017), Al Zaidanin & Al Zaidanin (2021). Although the result show a significant negative impact, but it is not as strong as expected. It may be attributed to the period of 2011-2023 not have witnessed the same level of severe credit risk as earlier periods. Additionally, efforts by the banking system to address bad debt and restructure the sector may have mitigated the impact of credit risk on banks' performance.

The crisis caused by the Covid-19 pandemic had a significant negative impact on banks' ROA (in the baseline model) and has strengthened the effect of NPL on banks' ROE (in the extended model). These results align with studies by Le and Ngo (2020), Andries (2020), and Vu and Turnell (2020), which suggest that the Covid-19 crisis may have been as severe as a financial crisis and that such crises could amplify the impact of credit risk.

Among other notable findings from the control variables, CAR has a negative and highly significant relationship with ROE in all models, but a positive and significant relationship with ROA. This result implies that a higher CAR, which represents a higher proportion of equity over risk-weighted assets, may reduce the return on equity. However, banks with a higher CAR are often perceived as having greater financial strength and reputation, which can help them generate higher returns

on assets. This finding is contrast with the work of Al Zaidanin & Al Zaidanin (2021)

Alshatti (2017), but consistent with Kosmidou (2008), who highlighted that banks with higher capital buffers tend to have better profitability due to their increased ability to absorb shocks and maintain operations, even during financial downturns.

The positive relationship between ALR and bank performance aligns with the theoretical framework that higher lending rates enhance bank profitability by increasing interest margins. This is in line with the findings of Alshatti (2017) and Elshaday et al. (2018). CIR negatively impacts both ROA and ROE in all models, which is consistent with Al Zaidanin & Al Zaidanin (2021), who emphasize the importance of controlling operating costs to improve financial results. Finally, the positive relationship between bank size and age is similar to Elshaday et al. (2018) who supports the theory of economies of scale, suggesting that in the Vietnamese market, the size and history of a bank's establishment provide competitive advantages that enable more efficient performance.

6. Conclusion: This study investigates the impact of credit risk on the financial performance of commercial banks in Vietnam during the period of Covid-19. The study utilizes panel data from 27 commercial banks in Vietnam over the period 2011 to 2023 with yearly financial statements. Results show that NPLs demonstrate a significant negative relationship with ROA. The Covid-19 also strengthen the impact of NPLs to banks' ROE. While the impact is significant, but the significant level is not as strong as previous studies, suggesting that Vietnamese banking system might have developed effective mechanisms to mitigate the adverse effects of non-performing loans. The research offer valuables insight for banker and regulators to better control credit risk, especially in the crisis period.

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