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## DETERMINANTS INFLUENCING NON-PERFORMING LOAN RATIO OF JOINT STOCK COMMERCIAL BANKS IN VIETNAM

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### ABSTRACT

*This study investigates macro and micro determinants of the ratio of non-performing loans (NPL ratio) of Vietnam commercial banks between 2015 and 2021. Data were collected from fifteen banks with total assets accounting for 62.9% of the total banking industry assets. The regression analytical technique is used to determine the impact of some independent variables on the NPL ratio of sample banks. The results reveal that the non - performing loan ratio is negatively correlated with the bank's asset size and loan growth rate but positively correlated with the net interest margin and the credit risk. The variable of Covid-19 has no statistically significant correlation with the non-performing loans ratio. Although a range of previous studies on that topic has been carried out, none of them digs deeper into the impact of these explanatory variables on the ratio of non-performing loans of Vietnamese commercial banks, especially the impact of Covid-19, whereas the banking industry of Vietnam is far-affected by that epidemic. Therefore, these findings can be used by creditors, investors, bank managers, and policy-makers when they have to give decisions relating to commercial banks in this complex period.*

**Keywords:** *Asset size, Covid-19, Net interest margin, Non-performing loan ratio.*

### INTRODUCTION

Covid-19 is the most serious socio-economic crisis since the 2<sup>nd</sup> world war with a level that has surpassed the 2008 financial crisis, even surpassing the Great Depression in the US in the 1930s (Aadhith & Devi, 2022). It can be said that during and after this crisis, the issue of risk management for the financial and banking system must be prioritized. Credit income is the main source of income for commercial banks. Therefore, credit risk can put banks in a situation of reduced profits, even bankruptcy due to the failure to recover principal and interest from customers. If credit risk is not controlled in the long run, it will affect the maintenance of commercial banks in particular and the whole economy in general. The NPL ratio is one of the indicators reflecting credit risk or in other words, reflects the credit quality of commercial banks. Good control of NPL will help banks avoid the high risk of capital loss. In Vietnam today, commercial banks mainly deal with NPL by selling to VAMC and receiving bonds. This is only a temporary solution, so NPL have not been completely dealt with, especially in the post-Covid period - a period when NPL increase rapidly.

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To be able to address the problem of non-performing loans at the root, banks need to pay attention to the determinants influencing the non-performing loan ratio. There have been many research papers on this topic in the world and Vietnam. However, in different countries, at different periods, and from different angles, the findings of this theme are different. In the current context, Vietnamese commercial banks are facing a surge in non-performing loans due to the Covid-19 pandemic, so it is necessary to have more studies to clarify the outstanding issues in the banking system.

This study is divided into five main sections: Section 1 briefs the context and rationale of the study. Section 2 illustrates the relevant literature on determinants influencing non-performing loan ratio; Section 3 presents the data sample collecting and technique used in the research's execution; Section 4 examines important findings; and Section 5 presents some conclusions and recommendations.

### *Literature Review*

The topic of determinants influencing non-performing loan ratios has been investigated by many scientists in different contexts in the world.

Macit (2012) used bank-specific and macroeconomic data to explore the drivers of non-performing loan ratios for commercial banks in Turkey. The quantitative study's findings indicate that banks with a greater equity-to-total-assets ratio and a larger net interest margin (NIM) are likely to have a higher NPL ratio, but a rise in the loans-to-total-assets ratio is projected to lower non-performing loans. The findings also show that public and international banks are likely to have greater NPA percentages. In terms of macroeconomic factors, GDP growth has a lagged effect on the non-performing loan ratio, and a depreciation of the local currency is projected to affect commercial banks' loan portfolios. Laryea *et al.* (2016) investigated the determinants of the characteristics of the bank and the macro factors of the non-performing loan ratio as well as the impact of non-performing loans on the bank's profit. The author utilizes a sample of 22 Ghanaian banks from 2005 to 2010. Various quantitative methods have been used to test the proposed hypotheses. The results reveal new evidence on the influence of bank-specific factors as well as macroeconomic determinants on non-performing loans, in which the net interest margin shows a statistically significant positive relationship with the non-performing loan ratio. Inflation and industry concentration are not statistically significant in determining non-performing loans, although both have a positive relationship with non - the performing loan ratio.

Panta (2018) investigated the effects of macroeconomic variables (GDP, Inflation, and Real effective exchange rates) and bank-specific variables (size, loan change, real lending rates, loans-to-assets ratio, net interest margin) on the NPL ratio of commercial banks in Nepal. The study was carried out using secondary data collected from 26 commercial banks between 2002 and 2012 with 227 observations. The study shows that macroeconomic variables such as the real exchange rate have a significant negative impact on the NPL ratio. However, the effect of the GDP growth rate is not statistically significant in his study. Past inflation rates have had a significant positive effect on non - performing loans. Banks that charge a relatively higher real interest rate have higher NPL ratios, which is consistent with the results of previous studies. In addition, the net interest margin has a statistically significant positive relationship with non - performing loans.



Kumar *et al.* (2018) investigated the drivers of non-performing loans in the Fiji Islands' commercial banking sector from 2000 to 2013. The survey sampled all financial institutions (five commercial banks and two non-bank financial institutions). The regression models used for the estimations include OLS, FEM, and REM. The findings show that the following factors have a statistically significant negative association with the NPL ratio: return on equity, capital adequacy ratio, asset-based market share, and unemployment/time ratio. The net interest margin, on the other hand, shows a statistically significant positive association with the non-performing loan ratio. Khafid and Anisykurlillah (2020) employed a quantitative method to study the secondary data collected from the Workers' Cooperative of the Republic of Indonesia (KPRI). The results illustrate that Capital Adequacy Ratio (CAR) and NIM do not affect non-performing loans, and credit risk and LDR exert a positive impact on non - performing loans; based on the findings, cooperatives engaged in credit provision should consider loan monitoring as a very strategic variable to prevent non-performing loans.

Hardiyanti and Aziz (2021) examined the determinants influencing non-performing loans, including the objective factor of Covid-19 to commercial banks in Indonesia during the Covid epidemic. The results show that Covid has an impact on non-performing loans in these banks during the research period.

The summary of the determinants affecting the NPL ratio of commercial banks is presented in **Table 1** as follows:

**Table 1.** Summary of determinants influencing non-performing loan ratio of commercial banks

Variables	Sources	Indicators	Methodologies	Data	Expected sign
Loan growth	Sinkey and Greenwalt (1991)	An increase in loans year t compared to t-1	OLS	American commercial Banks. Period: 1984-1987	+
			Self-regression model	American commercial Banks. Period: 1982-1996	+
	Salas and Saurina (2002)		Dynamic Table regression model	Commercial and Provident Banks in Spain. Period: 1985-1997	+
	Castro (2012)		Dynamic Table regression model	Commercial banks in five countries of Ireland, Spain, Portugal, Greek, and Italy	+
	Jimenez and Saurina (2006)		OLS	Commercial banks in Spain	+



NIM	Macit (2012)	Interest incomes – Interest expenses / Average profitable assets	Multivariate regression model	Commercial banks in Turkey	+
	Panta (2018)		Multivariate regression model	Commercial banks in Nepal. Period: 2002-2012	+
	Laryea <i>et al.</i> (2016)		Multivariate regression model	Commercial banks in Ghana. Period: 2005-2010	+
	Kumar <i>et al.</i> (2018)		OLS, FEM, REM	Commercial banks in Fiji Islands. Period: 2000-2013	+
ROA	Hu <i>et al.</i> (2004)	Net profit/Total asset	OLS	Taiwan commercial bank. Period: 1996-1999	-
	Jimenez and Saurina (2006)		OLS	Commercial banks in Spain	-
	Boudriga <i>et al.</i> (2009)		REM	46 commercial banks in 12 countries in the Middle East and North Africa. Period: 2002-2006	-
Income diversification	Winton (1999)	Net non-interest income/Total asset	OLS	American commercial banks. Period: 1992-1997	-
	Templeton and Severiens (1992)		OLS	American commercial banks 1990	-
	Stiroh (2006)		OLS	American commercial banks. Period: 2000-2005	No impact
Credit risk	Ozili (2019)	Credit risk provision/Total loans	OLS, REM, FEM, sensitivity analyze	Commercial banks in 134 countries. Period: 2003-2014	+
	Jimenez and Saurina (2006)		OLS	Spanish commercial banks	+
	Masood and Aktan (2009)		OLS, REM, FEM	State-owned commercial Banks in Turkey and Pakistan. Period: 1996-2001	+
Bank size	Hu <i>et al.</i> (2004)	Total assets	OLS	Taiwan commercial banks. Period: 1996-1999	-
	Espinoza and Prasad (2010)		Multivariate regression model	80 banks in Gulf cooperative countries 1995-2008	-
	Swamy (2012)		Multivariate regression model	Indian commercial banks. Period: 1997-2009	-
Covid-19	Hardiyanti and Aziz (2021)	Dummy variable	SPSS	Indonesian commercial banks	-



GDP growth	Salas and Suarina (2002)	An increase in GDP year t compared to t-1	Dynamic Table regression model	Commercial and provident banks in Spain. Period: 1985-1997	-
	De Bock and Demyanets (2012)		OLS	Commercial banks in 25 emerging markets. Period: 1996-2010	-
	Fofack (2005)		pseudo-panel model	16 African countries in 1990	-
	Khemraj and Pasha (2009)		Panel data	Commercial banks in Guyana	-
	Saba <i>et al.</i> (2012)		OLS	American commercial banks. Period: 1985-2010	-
Inflation	Fofack (2005)	Average inflation rate per year	Panel data pseudo	16 African countries in the 1990s	No impact
	Khemraj and Pasha (2009)		Panel data	Commercial banks Guyana	+
	Nkusu (2011)		Self-regression table vector model	26 developing countries. Period: 1998-2009	-

## MATERIALS AND METHODS

### Data Collection

The banks used in the regression model are 14 joint stock commercial banks in the period from 2015 to 2021: ABBank, ACB; BIDV; Vietinbank; Eximbank, NamAbank; MBBank; LienVietPostBank; PGBank; Techcombank; Vietcombank; VPBank; KienLongBank; NCBank.

These banks represent banks with small, medium, and large assets in Vietnam. The total assets of these banks are estimated at over 60% and can represent all of Vietnam's joint stock commercial banks.

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### Research Model

This research is based on the model suggested in previous studies. From those studies, we employ multiple linear regression models to determine the relationship and sensitivity of factors (independent variables) affecting the non-performing loan ratio of banks.

$$Y_{it} = \alpha + \sum_{k=1}^k \beta_k X_{it} + \varepsilon_{it} \quad (1)$$

In which:

$Y_{it}$  is the dependent variable representing non-performing loan ratio of bank  $i$  with  $i = 1, 2, 3, \dots, 25$  at time  $t$  with  $t = 2015, \dots, 2021$ .

$X_{it}$  is the independent variable representing the factors affecting the non-performing loan

ratio.

$\alpha$  is a constant or coefficient of freedom that indicates the mean of the Y variable when the X variables are 0.

$B_k$  is the correlation coefficient or individual regression coefficient indicating the influence of each independent variable on the mean value of the dependent variable while the remaining variables are kept constant with k being the number of independent variables in the model.

$\epsilon_{it}$  is the regression error.

From the methodologies in the previous studies and the status of the preliminary analysis of the determinants reviewed, we propose the following research model:

$$\text{NPL ratio}_{it} = \beta_0 + \beta_1 * \text{NIM}_{it} + \beta_2 * \text{CAR}_{it} + \beta_3 * \text{LDR}_{it} + \beta_4 * \text{Creditrisk}_{it} + \beta_5 * \text{LnSize}_{it} + \beta_6 * \text{Loangrowth}_{it} + \beta_7 * \text{Incomediver}_{it} + \beta_8 * \text{INF}_{it} + \beta_9 * \text{GDP}_{it} + \beta_{10} * \text{Covid}_{it} + \epsilon_{it} \quad (2)$$

NIM (Net interest margin) is measured as the following formula: (Interest income – Interest expenses) / Average profitable assets

Size is measured by the logarit of bank asset

CAR (Capital Adequacy ratio) is estimated: Tier 1 Capital + Tier 2 Capital / Risk Weighted Assets

LDR (Loan-to-deposit ratio) is calculated as the loan/deposit ratio

Credit risk is measured: Credit risk provision/total loans

Loan growth is measured: An increase in loans year t compared to t-1

Non-interest income is computed: Net Non - interest income/Total asset

GDP: growth of domestic products of year t compared to t-1

INF: Average Rate of inflation per year



The figures of independent variables in the regression model are collected from annual financial statements of commercial banks and the World Bank

### *Techniques*

The data used in the model is shown as panel data. Data is handled and analyzed using STATA 16 software during the investigation. Before doing regression analysis, the PURT test (panel unit root test) is performed to confirm that the data has particular patterns. The estimate that best matches the model and sample is then determined using Hausman tests. Following that, we assess the selected model's faults, such as multicollinearity, variable variance, and autocorrelation. To cope with multicollinearity, eliminate the variable with a VIF higher than or equal to 10. To produce the best best-estimated result for variable variance and autocorrelation, necessary adjustments are applied.

## **RESULTS AND DISCUSSION**

### *Descriptive Analysis*

The study's data were collected from 15 commercial banks between 2015 and 2021, with the statistical results provided in **Table 2** below:

Table 2. Summary of descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Nim	98	3.274388	1.549281	0.22	8.77
SIZE	98	19.1607	1.202117	17.02156	21.28952
CAR	98	12.31143	2.819485	8.34	21.35
LDR	98	83.11508	11.2575	53.98727	109.949
CREDITRISK	98	1.320208	0.403666	0.797856	2.783974
Loan growth	98	0.175307	0.097507	-0.11026	0.511922
income-diver	98	0.017521	0.012426	0.002984	0.071583
GDP	98	5.542224	1.964068	2.91	7.075789
INFLATION	98	2.603594	0.977726	0.631201	3.539628
COVID	98	0.285714	0.454077	0	1
TLNX	98	1.811146	0.943271	0.466695	6.363242

**Table 2** presents descriptive statistics of the variables in the model on the influence of factors on the profitability of 15 Vietnamese commercial banks in the 2015 – 2021 period. The data is collected by year, so the total observation is 105 observations.

NPL ratio (Non-performing loan ratio) is a dependent variable that shows commercial banks' non-performing loan ratio. It is a key financial metric for assessing the credit performance and credit quality of Vietnamese commercial banks. When a bank has a high NPL ratio, it indicates that credit operations in general, and lending in particular, are of low quality and efficiency; consequently, the entire credit activities must be reviewed. Non-performing loans, on the other hand, are an unavoidable problem in credit activity, and banks must address it. Banks must keep NPLs at an acceptable level. According to the World Bank, a ratio of less than 5% is acceptable, and 1-3% is ideal. During the observation period, the non-performing loan ratio of 15 commercial banks averaged 1.82%, which is an acceptable level of NPL by international standards. Nonetheless, the standard deviation of this variable might reach 0.92%, suggesting a significant gap between the least and greatest values. NPL has a minimum value of 0.466% and a maximum value of 6.363%. As a result, there are significant disparities in credit risk among institutions. NIM (Net interest margin) is an independent variable that indicates commercial banks' net interest margin. The mean value of this variable is 3.27%, with a standard deviation of 1.54%. The net interest margin has a range between a minimum and a maximum of 0.22% and 8.77%, correspondingly. This graph depicts the difference in net interest margins amongst banks. Bank's net interest margins are often low during this period. LDR (Loan to deposit ratio) is an independent variable that reflects the percentage of outstanding loans in relation to mobilizing capital. This index rates the safety of banks. The average value of LDR is 83,11%. 11.257 is the standard deviation. The lowest number is 53.98%, while the highest value is 109.949%. Size (bank assets) is an independent variable that reflects the bank's size. This indicator has a mean of 19.28, a minimum of 17,021, and a maximum of 21,290, with a standard deviation of 1.202.

CAR (Capital adequacy ratio) is an independent variable. The average value of this indicator is 12.311. The lowest number is 8.34, the highest is 21.35, and the standard deviation is 2.81. Credit risk is an independent variable that reflects credit risk. The mean value of this indicator is 1.32, with a standard deviation of 0.403. The smallest and greatest values are 0.7978 and 2.78, respectively. Loan growth (Loan growth rate) is an independent variable reflecting the bank's credit development. This indicator has a mean value of 0.172 with a standard deviation of 0.097. The minimum value is -0.11%, and the maximum value is 0.512%.

#### *Incomediver (Non-interest Income)*

This is an independent variable reflecting non-interest income. This indicator has a mean value of 0.017 with a standard deviation of 0.012. The minimum value is 0.00298, the maximum value is 0.0715.

GDP (Gross Domestic Product) refers to an independent variable that reflects the growth rate of Vietnam's gross domestic product, with an average value of 5.54 %/year for the last six years. At 1.964%, the standard deviation is fairly large. This variable has a minimum value of 2.91% and a maximum value of 7.08%.

INF (Inflation) refers to an independent variable that reflects Vietnam's inflation rate over time. The average value of this indicator was 2.60%. This indicator fluctuates little, with a standard deviation of 0.97%. The lowest and highest numbers are 0.63% and 3.53%, correspondingly. COVID (Covid-19): Dummy variable with the assumption that banks operating in the year covid take the value 1, and the rest take the value 0.

#### *Unit Root Test*

Panel data is frequently nonstationary, and utilizing it to do regression will yield inaccurate findings. All variables in the research have to be unit-root checked to avoid this issue. Because the data in the research are balanced, Levin *et al.* (2002)'s unit root test technique is used. The results of the unit root test (PURT) reveal that the values of the dependent and independent variables are stationary, indicating that the data is acceptable for the next research phase.

#### *Correlation Analysis*

Variable correlations are presented in **Table 3**, below:

**Table 3.** Correlation matrix between variables

	TLNX	Nim	SIZE	CAR	LDR	CREDIT~K	Loangr~h	income~diver	GDP	INFLATION	COVID
TLNX	1										
Nim	0.3055	1									





SIZE	-0.2809	0.2716	1								
CAR	0.1357	0.0577	-0.4968	1							
LDR	0.0598	0.3279	0.3523	-0.0193	1						
CREDITRISK	0.1437	0.3274	0.4548	-0.2434	0.0366	1					
Loan growth	-0.2065	0.2241	0.0014	0.1011	0.0785	0.0908	1				
income-diver	0.2194	0.4218	0.1782	-0.0135	0.0073	0.13	-0.1912	1			
GDP	-0.0395	-0.0321	-0.1625	0.1837	-0.0869	-0.2573	0.23	-0.238	1		
INFLATION	0.0032	0.0334	0.0794	-0.1895	0.2257	-0.1063	-0.0651	0.0028	0.1256	1	
COVID	0.0367	0.0281	0.1749	-0.2008	0.1134	0.2264	-0.2667	0.2447	-0.9847	-0.0446	1

According to the Pearson correlation coefficient displayed on the correlation coefficient matrix table, the NPL ratio has a statistically significant positive link with NIM and Incomediver, but a negative association relationship with Size and Loan growth.

#### Checking for Multicollinearity

To check the correctness of the model's estimations, the multicollinearity test was run using the variance exaggeration factor VIF, as shown in **Table 4** below:

**Table 4.** Multicollinearity test result

Variables	VIF	1/VIF
GDP	45.67	0.021895
COVID	45.35	0.02205
SIZE	2.2	0.454556
NIM	1.76	0.566646
Creditrisk	1.72	0.582048
CAR	1.6	0.625528
Incomediver	1.49	0.671972
LDR	1.49	0.672684
INF	1.39	0.718776
Loan growth	1.29	0.77631
Mean VIF	10.4	

The variance exaggeration coefficient calculation findings demonstrate that the GDP and Covid variables have substantial variance exaggeration factors, indicating that there is multicollinearity in the equation. Therefore, to solve multicollinearity, the variable GDP will be removed from the equation. The results of running the multicollinearity test after removing this variable are shown in **Table 5**, below:

**Table 5.** Test results for multicollinearity

Variable	VIF	1/VIF
SIZE	1.99	0.50297
Nim	1.78	0.561038
CAR	1.56	0.642319
CREDITRISK	1.52	0.655937
income-diver	1.5	0.66868
LDR	1.49	0.671541
COVID	1.27	0.784338
Loan growth	1.25	0.79886
INFLATION	1.15	0.870477
Mean VIF	1.5	

The results of the variance exaggeration coefficient calculation demonstrate that the VIF value is less than 10, indicating that there is no multicollinearity. As a result, these variables will have a role in running the regression model.

### *Regression Results*

The results of the regression are illustrated in **Table 6**, below:



Table 6. Regression results

Variables	OLS		FEM				REM	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Nim	0.1607527**	0.0795712	0.2421336	0.159702**	0.2421336	0.1117155	0.1607527**	0.0795712
SIZE	-0.4784214***	0.114236	-0.2352207	0.4317702	-0.2352207	0.220371	-0.4784214***	0.114236
CAR	-0.0268459	0.0362168	-0.0295148	0.0430424	-0.0295148	0.0552241	-0.0268459	0.0362168
LDR	0.0131151	0.009382	0.0009115	0.0120582	0.0009115	0.0249023	0.0131151	0.009382
CREDITRISK	0.7492406***	0.2374486	0.7222468***	0.247012*	0.7222468	0.3950953	0.7492406***	0.2374486
Loan growth	-2.432177***	0.9086171	-1.582719	1.012077**	-1.582719	0.5895634	-2.432177***	0.9086171
income-diver	7.318582	8.022487	-0.0012654	9.778658	-0.0012654	7.843424	7.318582	8.022487



INFLATION	0.006782	0.0799688	0.0404805	0.0851165	0.0404805	0.0578634	0.006782	0.0799688
COVID	-0.1266124	0.1844987	-0.0632265	0.2448309	-0.0632265	0.2436495	-0.1266124	0.1844987
_cons	9.019629***	2.183003	6.635231	7.809833	6.635231	4.937099	9.019629***	2.183003

Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

The test findings demonstrate that the random effects model (FEM) is the best fit for the research sample, and there is a phenomenon of variable variance; thus, the standard error estimate is used in this study to produce trustworthy results, as shown below: Firstly, between 2015 and 2021, NIM and credit risk have a statistically significant positive association with the NPL ratio of Vietnamese commercial banks. As a result, the greater the non-performing loan ratio, the higher the bank's NIM. This finding is in line with the findings of Macit (2012), Panta (2018), Laryea *et al.* (2016), and Kumar *et al.* (2018). Also, the independent variable Credit risk and NPL ratio have a beneficial influence. This conclusion is consistent with prior research by Ozili (2019), Jimenez and Saurina (2006), and Masood and Aktan (2009). Whenever the loan rate is elevated, the high NIM may lead the borrower to fail to satisfy the conditions of the loan contract or to fail to repay the loan. Once the loan interest rate is high, the high NIM may lead the borrower to fail to complete the conditions specified in the credit agreement or to fail to pay a portion of the principal and interest on time, especially under the terms of the loan agreement. Given unpredictable economic conditions, corporation profitability is lower than bank lending rates. Moreover, the net interest margin is calculated by dividing net interest revenue by total profitable assets. As a result, when the net interest margin is large, it indicates that the bank lends too much, resulting in high risk, and non-performing loans are one of the primary causes of credit risk, requiring the bank to make more risk provisions. In particular, when the lending interest rate is high, the high NIM may cause the borrower to fail to fulfill the terms committed in the loan contract or to fail to pay part of the principal and interest on time, especially in terms of the loan agreement. Under volatile economic conditions, corporate profitability is lower than bank lending rates. Besides, the net interest margin is determined by dividing net interest income by total profitable assets. Therefore, when the net interest margin is high, it proves that the bank lends too much, leading to high risk, and non-performing loans is one of the main causes of credit risk and then the bank has to make more risk provisions.

Second, in the 2015-2021 period, loan growth shows a statistically significant negative association with the NPL ratio in Vietnamese commercial banks. Loan growth represents the



scale of capital supplied to the economy. Credit policy in each period determines the growth rate of customer loans. Currently, in the world, there are many conflicting views on the impact of loan growth on the NPL ratio. According to Keeton (1987), when banks follow a short-term profit maximization strategy, banks, by all means, promote credit growth, including lending at low-interest rates and bypassing necessary credibility reviews of customers. This leads to subprime lending and results in an increase in the NPL ratio in the future. Klein (2013) has a similar conclusion about the relationship between the NPL ratio and credit growth rate. Some previous studies indicated that the ratio of overdue loans and NPL ratio are related to the rapid loan growth rate. Salas and Saurina (2002) studied Spanish banks and found that loan growth is related to loan default. Weinberg (1995) hypothesized that lending risk increases during periods of economic growth because the expected return on investment projects improves and therefore, the expected return on all loans has made banks often loosen underwriting standards, while credit standards need to be tightened. Hence, the NPL ratio increases along with credit growth. In addition, the research results of Klein (2013), Do and Nguyen (2013), and Nguyen (2015) are following this finding. In contrast, Dash and Kabra (2010) show that loan growth rate and NPL ratio have a negative relationship. In other words, when loan growth is faster than the NPL ratio, the NPL ratio tends to decrease. This means that an increase in good-quality loans will improve the NPL ratio. Meanwhile, Nguyen and Dinh (2016) discovered that the loan growth rate is adversely connected with the NPL ratio. This is clarified by the fact that, during the study era in Vietnam, non-performing loans emerge following one year of the loan, implying that the bank loan growth rate this year is low since the bank had a high ratio of non-performing loans the previous year. As a result, the bank is required to concentrate on dealing with NPLs while also reducing the loan growth rate set by the State Bank. It is completely true for Vietnamese commercial banks between 2015 and 2021...

Finally, none of the remaining factors in the model had a statistically significant association with the NPL ratio .5.

## CONCLUSION

According to the regression results, the non-performing loan ratio has a statistically significant association with the net interest margin and credit risk. However, is a statistically negative relationship with the expansion rate of outstanding loans at Vietnamese commercial banks. In addition, the -non - performing loan ratio has no connection with the remaining variables, including the dummy variable Covid-19. Based on the findings, the following recommendations are made for managing the non-performing loan rate of commercial banks in the Vietnamese context: Firstly, commercial banks need to increase the quality of assets, especially profitable assets. Profitable assets are the basis of interest income, which is the most important revenue source for commercial banks in Vietnam today. Therefore, commercial banks need to simplify the lending process, and improve the quality of appraisal to shorten the loan processing time, but must strictly manage loans to ensure loan quality. At the same time, commercial banks need to focus on priority growth, and on good quality enterprises in industries such as posts and telecommunications, pharmaceuticals, and medical equipment.

Secondly, commercial banks should narrow the net interest margin. Hence, according to the study model discussed above, raising NIM will raise the NPL ratio. The solution for commercial



banks is to offer diversified preferential interest rates for each customer, and each customer segment. Commercial banks need to proactively develop loan programs with reasonable interest rates, diversify credit products, and balance them to develop consumer loan product packages to meet the proper needs of customers to limit black credit, consider extending debts, adjust repayment terms when customers face difficulties due to legitimate reasons and cannot repay on time, helping customers not to take loan sharks to pay off their debts on the maturity date.

Thirdly, commercial banks should strengthen credit risk management. In the above model, the risk provision cost for loans has a positive impact on the non-performing loan ratio of commercial banks. This is completely consistent with the reality in Vietnam because lending accounts for most of the bank's assets, but the control of the loan portfolio is not good, leading to the formation of non - performing loans in recent years. According to the coefficients in the model to minimize credit risks, commercial banks need to manage their loan portfolio and be more active in making provisions and dealing with non - performing loans. For loan portfolio management, banks need to apply science and technology with goals and action strategies to assess the macroeconomic situation to help allocate the proportion of the loan portfolio following each group of customers and geographies. Each commercial bank needs to improve its credit rating by improving techniques and technology and operate independently between the credit department and the credit rating department. In addition, commercial banks need to carefully consider the business plan before lending and monitor and evaluate the use of loan portfolios per the initial commitment, and flexibly adjust the level of credit risk provision in accordance with the law.

Fourth, in compliance with rules, risk preparations must be made. Even though, according to the study model results, the objective factor of Covid-19 did not affect the non-performing loan ratio of Vietnamese commercial banks throughout the research period. This can be explained by the fact that the State Bank has applied temporary measures to allow commercial banks to restructure debts, not to change debt groups to help customers facing difficulties, but the nature of non - performing loans has not changed, thus the bank should regularly classify credit assets, make provisions to deal with risks in operations, including credit activities used to proactively handle risks, and make the bank's financial position healthy. However, the consideration of qualitative determinants to debt rating into each debt group of most banks is still confusing and has not yet fulfilled the spirit of the provisions of the law. The proposed measure is to be proactive and close in this task and have a system of criteria and levels to classify debts following regulations while still achieving the goal of proactive control of the bank. The provisioning for risks will reduce the bank's immediate profit, but it will help the bank quickly compensate for the loss and reduce the amount of income tax.

In summary, the data show that the non-performing loan ratio has a significant and positive association with net interest margin and credit risk, but a negative link with loan growth rate and asset size. Nevertheless, the Covid-19 determinant had no statistically significant connection with the NPL ratio. As a result, commercial banks can devise strategies to reduce the NPL ratio by restricting the rise in net interest margin as well as loan size. Because a large loan amount will result in a larger asset size. Meanwhile, banks must boost credit risk provisions to cover potential credit concerns. Furthermore, the Vietnam State Bank must continue to check, assess credit activities, and exercise caution when relaxing safety standards.



Although we made effort to have the best conclusions about determinants of the ratio of non-performing loans of commercial banks in Vietnam, our research still has some limitations. Firstly, the sample in this study is small in comparison with the Vietnamese banking industry. Secondly, the post-Covid-19 period is rather short, so the impact of this epidemic on the NPL ratio is not clear yet. Thus, we will continue observing to have more accurate research results of factors that can change the ratio of the non-performing loans of commercial banks in Vietnam.


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