



The Relationship between COVID-19 Pandemic and Non-Performing Loan Ratio in Indonesian Conventional Banks

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ABSTRACT: This study examines the relationship between COVID-19 variables (COVID-19 cases and COVID-19 deaths) and the nonperforming loan (NPL) ratio in Indonesian conventional banks from Q1 2017 to Q4 2022. Data from 56 conventional banks—comprising 4 government-owned and 52 privately-owned banks, were gathered from the Indonesian Financial Service Authority's bank publication reports. Utilizing a quantitative approach, panel data regression with a fixed effect model is employed, with the NPL ratio as the dependent variable. COVID-19 cases and COVID-19 deaths are the main independent variables. Control variables include loan-to-deposit ratio, bank size, return on assets, regulatory capital ratio, equity ratio, GDP growth rate, inflation rate, overnight rate, and unemployment rate. The analysis is conducted separately for COVID-19 cases and COVID-19 deaths to independently evaluate their impact on the NPL ratio. Results indicate a significant positive relationship between COVID-19 cases and COVID-19 deaths with the NPL ratio. Additionally, the study identifies negative significant relationships between the NPL ratio and return on assets, loan-to-deposit ratio, bank size, regulatory capital ratio, and GDP growth rate.

KEYWORDS: Banking, COVID-19 pandemic, COVID-19 cases, COVID-19 death, conventional banks, non-performing loan ratio

INTRODUCTION

In December 2019, the world faced an unprecedented crisis with the emergence of COVID-19, a novel coronavirus that originated in Wuhan, China. The rapid spread of the virus led the World Health Organization (WHO) to declare it a global pandemic on March 11, 2020. Indonesia reported its first COVID-19 cases in March 2020, marking the beginning of a significant public health and economic crisis in the country. To contain the virus, governments worldwide, including Indonesia, implemented various measures such as lockdowns and social distancing. While these measures were effective in controlling the virus's spread, they also caused substantial economic disruptions, leading to business closures, supply chain interruptions, and reduced consumer demand. The banking sector was notably affected, with the Indonesian Financial Services Authority (OJK) reporting a spike in the nonperforming loan (NPL) ratio for conventional banks, reaching 3.35% in May 2021, the highest level since the pandemic began. This increase in NPLs reflected the broader economic distress as borrowers struggled to meet their loan obligations amid widespread financial hardship (Indonesian Financial Services Authority, 2021).

The COVID-19 pandemic has had profound impacts on the global economy, with one significant issue being the increase in nonperforming loans (NPLs) across various financial institutions. NPLs, which are loans in default or close to being in default, present a serious risk to banks' financial stability and the overall economy. During the pandemic, many businesses experienced a decline in revenue, making it difficult for them to repay their debts. Additionally, the rise in unemployment rates and the decrease in household incomes put additional pressure on individual borrowers, leading to higher default rates on personal loans, mortgages, and credit card debts. Consequently, the volume of NPLs in the banking sector increased, threatening the stability of financial institutions (International Monetary Fund, 2020). This study is motivated by these developments and aims to investigate the specific relationship between COVID-19 cases, COVID-19 deaths, and the NPL ratio in Indonesian conventional banks. By isolating these COVID-19 variables and analyzing their individual impacts, the study seeks to provide a clearer understanding of how the pandemic has influenced the financial stability of banks.

Previous studies have shown that COVID-19 cases and deaths significantly impact the NPL ratios in various countries. For instance, a study conducted in Russia by Popova (2024) found a positive significant relationship between new COVID-19 cases and the NPL ratio, indicating that higher COVID-19 case numbers correlate with increased financial stress for banks. Similarly, Kryzanowski, Liu, and Zhang (2022) found a significant positive relationship between COVID-19 cases and NPL ratios in Chinese banks, and also suggested a positive significant relationship between COVID-19 deaths and the NPL ratio in Chinese banks. Additionally, Beck



and Keil (2022) highlighted that banks in the U.S. more exposed to COVID-19 deaths experienced an increase in non-performing loans. These findings underscore the critical impact of the pandemic's public health crisis on the financial stability of banking institutions.

The primary objectives of this study are to identify whether the number of COVID-19 cases and the number of COVID-19 deaths have significant relationships with the non-performing loan ratio in Indonesian conventional banks. Understanding these relationships is crucial for developing strategies to enhance economic resilience and recovery in the face of future crises.

Specifically, the study aims to determine how the pandemic's public health impact translates into financial stress within the banking sector, thereby contributing to broader discussions on economic recovery and resilience.

METHODOLOGY

This study employs a quantitative research design to investigate the relationship between COVID-19 cases and COVID-19 death with the non-performing loan ratio in the Indonesian conventional banks. The research is structured to address the identified problem, define the research objectives, and test the formulated hypotheses using empirical data.

Research Objects

In order to assure balanced panel data, the study includes 56 conventional banks listed on the Indonesia Financial Authority (OJK), 4 government-owned banks, and 52 privately held banks that operate between 2017 Q1 and 2022 Q4. Since merger and acquisition operations change the trend of the non-performing loan ratio, banks that undergo mergers and/or acquisitions with other banks throughout the study period will not be included in this analysis.

Data Collection Technique

The data used for this analysis is secondary data collected from various sources. The analysis utilizes quarterly data from Q1 2017 until Q4 2022, covering 3 years pre-COVID-19 and 3 years post-COVID-19 to avoid bias related to period imbalance. The data sources and variables used in this study are detailed below:

1. Dependent variables

Data for the non-performing loan ratio of the 56 conventional banks (4 government-owned banks and 52 private-owned banks) was collected from the banks' publication reports available on the Indonesia Financial Services Authority's website. Banks included in the analysis must have been operating continuously from Q1 2017 to Q4 2022 to ensure the use of balanced panel data. Banks that underwent mergers or acquisitions during this period were excluded to maintain the reliability of the analysis.

2. Independent variables

- a. COVID-19 Cases: Data on the number of COVID-19 cases was collected from andrafarm.com daily COVID-19 report, a website that compiles COVID-19 data in Indonesia from sources such as the Ministry of Health (kemkes.go.id), the national COVID-19 task force (covid19.go.id), and the National Agency for Disaster Management (BNPB).
- b. COVID-19 Deaths: Data on COVID-19 deaths was also sourced from andrafarm.com, compiled from the same credible sources as above.

3. control variables

- a. GDP Growth Rate: Annual data collected from the Indonesian Ministry of Trade's official site's GDP report, satudata.kemendag.go.id.
- b. Inflation Rate: Collected from Bank of Indonesia's statistical reports.
- c. Overnight Rate: Collected from Bank of Indonesia's statistical reports.
- d. Unemployment Rate: Semi-annual data released in February and August each year, collected from the Central Statistics Agency of Indonesia (BPS).
- e. Return on Assets (ROA): Quarterly data collected from the banks' publication reports available on the Indonesia Financial Services Authority's website.
- f. Loan to Deposit Ratio (LDR): Quarterly data collected from the banks' publication reports available on the Indonesia Financial Services Authority's website.



- g. Bank Size: Quarterly data collected from the banks' publication reports available on the Indonesia Financial Services Authority's website.
- h. Equity Ratio: Quarterly data collected from the banks' publication reports available on the Indonesia Financial Services Authority's website.
- i. Regulatory Capital Ratio: Quarterly data collected from the banks' publication reports available on the Indonesia Financial Services Authority's website.

Definition of Variables

The model tests three types of independent variables: digital maturity, profitability, and sales growth.

1. **COVID-19 cases:** COVID-19 cases refer to the count of individuals who have tested positive for the virus within a specific timeframe.
2. **COVID-19 death:** representing the number of individuals who have passed away due to the virus infection.

The dependent variable, non-performing loan ratio, is defined as a loan when the borrower has failed to make the required payments for a specific period, typically 90 days or longer (International Monetary Fund ,2019). Several control variables are included in the regression model to improve its robustness:

1. **GDP growth rate:** measure the growth of the market value of all goods and services inside a country over a specific time period.
2. **Inflation rate:** measured by the increasing rate of the overall price of goods and services.
3. **Overnight rate:** a key benchmark interest rate representing the overnight interbank lending rate in Indonesia.
4. **Unemployment rate:** the proportion of the labor force that is unemployed and actively seeking employment.
5. **Return on asset:** The return on assets is determined by dividing the net income of a bank by its total assets.
6. **Loan to deposit ratio:** the proportion of total loans distributed divided by the bank total deposits.
7. **Bank size:** the natural logarithm of bank's total asset.
8. **Equity ratio:** the proportion of total equity compared to total asset.
9. **Regulatory capital ratio:** liquid capital that must be set aside by banks to cover any potential losses.

Panel Data Regression Model Analysis

The hypotheses are tested using panel data regression analysis, conducted with the statistical software STATA. The analysis includes estimation model tests (Chow Test, Hausman Test, Lagrange Multiplier Test) to determine the most appropriate model (Fixed Effects, Common Effects, or Random Effects). Classical assumption tests (normality, autocorrelation, multicollinearity, heteroscedasticity) are performed to ensure the validity of the regression model.

The final model is formulated to examine the relationship of COVID-19 cases and COVID-19 death with non-performing loan ratio, incorporating control variables to enhance the model's explanatory power. The findings are analyzed in relation to the research hypotheses and compared with previous studies to reconcile any discrepancies. This model will be separated into 2 model to isolate the relationship between each COVID-19 variables independently using the following equation:

$$NPL_{i,t} = \alpha_i + \beta COVcases_{i,t} + \gamma control_{i,t} + \varepsilon_{i,t}$$

$$NPL_{i,t} = \alpha_i + \beta COVdeath_{i,t} + \gamma control_{i,t} + \varepsilon_{i,t}$$

$NPL_{i,t}$ is the dependent variable for non-performing loan ratio, which in the formula includes the independent variable of $COVcases_{i,t}$ represents recorded COVID-19 cases in a quarter and $COVdeath_{i,t}$ represents recorded COVID-19 related death in a quarter. $Control_{i,t}$ represent the control variables used in this study which include return on asset, loan to deposit ratio, bank size, equity ratio, regulatory capital ratio, GDP growth rate, overnight rate, inflation rate, and unemployment rate.

RESULT AND DISCUSSION

List of the Company

This study examines 1344 observations involving 56 conventional banks, 4 government owned banks and 52 private owned banks, over 6 years period, from 2017 q1 to 2022 q4. This study will not use conventional banks that undergo merger and/or acquisition with other banks during the study period to ensure that the non-performing loan ratio movement comes organically, not from merger and/or acquisition activities.



Regression Results

Table 1. Panel Data Regression Result in STATA

	Model 1	Model 2
Covid cases	0,00000000236***	
Covid death		0,0000000723***
Return on asset	-0,1477*	-0,1481*
Loan to deposit ratio	-0,0025*	-0,0027*
Bank size (ln total asset)	-0,0096***	-0,0092***
Regulatory capital ratio	-0,0030***	-0,0031***
Equity ratio	-0,0180	-0,0172
GDP growth rate	-0,0669**	-0,0624**
Overnight rate	-0,0610	-0,0765
inflation	0,0289	0,03191
Unemployment rate	-0,0053	-0,0127
Constant	0,2082***	0,2029***
R square	0,1459	0,1463

From the analysis that has been carried out, it can be seen that COVID-19 cases has a positive significant relationship with nonperforming loan ratio in Indonesia conventional banks. This means that if there is a new COVID-19 confirmed cases, the non-performing loan ratio also increase. For every increase in COVID-19 cases, the non-performing loan ratio increases by 0,000000236%. The increase in COVID-19 cases has led to an increase in missed loan payments, which have negative consequences for banks (Perkins and Gnanarajah, 2020). The findings of this study align with previous research in other regions. In Russia, region with higher COVID-19 cases and stricter lockdown measures experienced a more significant increase in NPL ratio (Popova, 2024). Kryzanowski, Liu, and Zhang (2022) also reported a positive significant relationship between COVID-19 deaths and NPL ratios in Chinese banks.

From the second model, it can be seen that COVID-19 death has a positive significant relationship with non-performing loan ratio in Indonesia conventional banks. This indicate that in every increase in COVID-19 related death, the non-performing loan ratio increase by 0,00000723%. The findings of this study align with previous research in other regions. Beck and Keil (2022) found that U.S. banks exposed to higher COVID-19 death rates experienced an increase in NPL ratio. Kryzanowski, Liu, and Zhang (2022) also reported a positive significant relationship between COVID-19 deaths and NPL ratios in Chinese banks.

The return on asset has a significant negative relationship with NPL ratio indicating that the increase in return on asset decrease the non-performing loan ratio. This findings is aligned with the study done by Rizqi (2021) in Indonesian banks where they found that return on asset has a negative relationship with non-performing loan ratio. The loan to deposit ratio has a significant negative relationship with NPL ratio indicating that the increase in loan to deposit ratio decrease the non-performing loan ratio. This findings is aligned with the study done by Wanjala and Gachanja (2020) where they found that loan to deposit ratio has a negative relationship with non-performing loan ratio.

This study reveals that bank size has a significant negative relationship with NPL ratio indicating that the increase in bank size decrease the non-performing loan ratio. This findings is aligned with the study done by Panta (2018) in Nepal where they found that bank size has a negative relationship with non-performing loan ratio. This result is supported by Berger et.al (2002) where they found that large banks are less willing to lend to "difficult" credits, indicating a potential lower risk of non-performing loans. An increase in non-performing loans increases costs, but that scale economies may exist even for the largest banks, this suggests that larger banks are less likely to have a high non-performing loan ratio (Bernstein, 1996).

This study reveals that regulatory capital ratio has a significant negative relationship with NPL ratio indicating that increasing regulatory capital ratio decrease the non-performing loan ratio. This findings is aligned with the study done by Swandewi and Purnawati (2021) indonesian banks where they found that higher regulatory capital is associated with lower non-performing loans.



Lastly, this study reveals that GDP growth rate has a significant negative relationship with NPL ratio indicating that the growth of economic decrease its non-performing loan ratio. This findings is aligned with the study done by Tanasković and Jandrić (2015) and Koju, Koju, and Wang (2018). Tanasković and Jandrić noting a negative relationship between GDP growth and NPL ratio in CEEC and SEE countries. While, Koju, Koju, and Wang identify low economic growth as a primary cause of high NPLs in the Nepalese banking system. These consistent findings suggest that a higher GDP growth rate is associated with a lower nonperforming loan ratio.

CONCLUSION

The study investigates the impact of COVID-19 on the non-performing loan (NPL) ratio in Indonesian conventional banks, motivated by the observed increase in NPLs to 3.35% in May 2021. Using data from 56 banks between Q1 2017 and Q4 2022, the author employs panel data regression with fixed effects, focusing on two models: one for COVID-19 cases and the other for COVID-19 deaths.

The results show a significant positive relationship between both COVID-19 cases and deaths with the NPL ratio, indicating that increases in COVID-19 metrics lead to higher NPL ratios. Specifically, for every increase in COVID-19 cases, the NPL ratio increases by 0.000000236%, and for COVID-19 deaths, it increases by 0.00000723%. These findings are consistent with similar studies in other regions, such as Russia, China, and the U.S. (Popova, 2024; Kryzanowski, Liu, and Zhang, 2022; Beck and Keil, 2022).

Additionally, the study reveals that several control variables significantly influence the NPL ratio. Return on assets (ROA), loan to deposit ratio (LDR), bank size, regulatory capital ratio, and GDP growth rate all show significant negative relationships with the NPL ratio, indicating that better financial health, adequate capital, and stronger economic growth help reduce NPL ratios in Indonesian conventional banks.

RESEARCH IMPLICATIONS

The study's findings indicate that regulatory capital ratio and bank size have significant negative relationships with the nonperforming loan (NPL) ratio at a 99% significance level. An increase in the regulatory capital ratio and larger bank size correspond to a decrease in the NPL ratio. This is supported by Bernstein (1996), who suggests that larger banks benefit from economies of scale and are less likely to lend to risky borrowers, thereby maintaining lower NPL ratios.

Based on these findings, it is recommended that banks should focus on increasing their regulatory capital ratio. This can be achieved through strategies such as retaining more earnings, issuing new equity, or other capital-raising measures. Adopting more conservative dividend policies during economic crises can also help retain earnings and bolster capital. Regular reviews and optimization of the capital structure are essential to ensure compliance with regulatory requirements and support growth.

Furthermore, banks should aim to grow their asset base by effectively managing their loan portfolios, reducing unnecessary costs, and adopting new technologies. During economic downturns, such as the COVID-19 pandemic, banks should provide support to borrowers facing temporary difficulties by offering loan restructuring, payment deferrals, and other forms of relief to prevent defaults and manage the NPL ratio. Improving operational efficiency and leveraging economies of scale can help larger banks manage their risk profiles and reduce NPL ratios. Implementing cost-cutting measures, such as reducing non-essential expenses, optimizing branch networks, and leveraging technology to automate processes, can further enhance financial resilience. By focusing on these strategies, bank management can enhance the bank's size and regulatory capital ratio, thereby reducing the NPL ratio and contributing to the overall resilience and profitability of the bank. This approach will not only improve financial performance but also ensure resilience during economic crises such as the COVID-19 pandemic.

While this study focuses on the relationship between COVID-19 specific variables (such as COVID-19 cases and deaths) and the NPL ratio, there are several areas that future research could explore to build upon these findings and address the study's limitations. Given the relatively low explanatory power of the models, as indicated by the R-squared values (0.1459 for Model 1 and 0.1463 for Model 2), future research should include a broader range of variables to better explain the variations in the NPL ratio. Incorporating more variables can provide a more comprehensive understanding of the determinants of NPL ratios. Future studies should also examine the impact of government interventions and regulations on reducing the NPL ratio during the COVID-19 pandemic. Understanding how these interventions influence NPL ratios can provide valuable insights into the effectiveness of these programs



in reducing NPLs. Incorporating qualitative research can provide in-depth information on the factors influencing NPL ratios. Qualitative analysis can help identify nuances and contextual factors that are not easily captured by quantitative analysis alone. This approach can uncover factors that are difficult to measure quantitatively, providing a richer understanding of the dynamics affecting NPL ratios.

REFERENCES

1. Popova, P., 2024. COVID-19, Corporate Non-performing Loans, and Corporate Lending Dynamics: Evidence from Russian Regions. *WP BRP*, 93.
2. Kryzanowski, L., Liu, J. and Zhang, J., 2023. Effect of COVID-19 on non-performing loans in China. *Finance Research Letters*, 52, p.103372.
3. Beck, T. and Keil, J., 2022. Have banks caught corona? Effects of COVID on lending in the US. *Journal of Corporate Finance*, 72, p.102160.
4. Perkins, D.W., Gnanarajah, R., Labonte, M. and Scott, A.P., 2020. COVID-19 and the Banking Industry: Risks and Policy Responses. *Congressional Research Service (CRS) Reports and Issue Briefs*, pp.NA-NA.
5. Rizqi, Nilta Alfi. "Pengaruh Non Performing Loan dan Loan to Deposit Ratio Terhadap Return On Asset." *Jurnal Akuntansi, Manajemen dan Ekonomi* (2021)
6. Wanjala, K. and Gachanja, J.N., 2020. Mr Bank Specific Determinants of Nonperforming Loans in Kenya. *Business Perspective Review*, 2(1), pp.29-44.
7. Panta, B., 2018. Non-performing loans and bank profitability: Study of joint venture banks in Nepal. *International Journal of Sciences: Basic and Applied Research (IJSBAR)*, (2018) Volume, 42, pp.151-16.
8. Berger, A.N., Miller, N.H., Petersen, M.A., Rajan, R.G. and Stein, J.C., 2005. Does function follow organizational form? Evidence from the lending practices of large and small banks. *Journal of Financial economics*, 76(2), pp.237-269.
9. Bernstein, D., 1996. Asset quality and scale economies in banking. *Journal of economics and Business*, 48(2), pp.157-166.
10. Swandewi, N.K.M. and Purnawati, N.K., 2021. Capital adequacy ratio mediates the effect of non-performing loan on returns on assets in public commercial banks. *American Journal of Humanities and Social Sciences Research (AJHSSR)*, 5(1), pp.651-656.
11. Tanasković, S. and Jandrić, M., 2015. Macroeconomic and institutional determinants of non-performing loans. *Journal of Central Banking Theory and Practice*, 4(1), pp.47-62.
12. Koju, L., Koju, R. and Wang, S., 2018. Macroeconomic and bank-specific determinants of non-performing loans: Evidence from Nepalese banking system. *Journal of Central Banking Theory and Practice*, 7(3), pp.111-138.

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