

The effect of credit risk and liquidity risk on profitability in state-owned banks listed on the Indonesia Stock Exchange 2017-2024



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ABSTRACT

This study analyzes the effect of credit risk and liquidity risk on profitability in state-owned banks listed on the Indonesia Stock Exchange over the 2017–2024 period. Credit risk is proxied by Non-Performing Loans (NPL), liquidity risk is measured using the Loan to Deposit Ratio (LDR), and profitability is represented by Return on Assets (ROA). Employing a quantitative research design, the study applies panel data regression analysis that combines cross-sectional and time-series data to capture both firm-specific and temporal effects. The findings indicate that, partially, credit risk has a negative and significant effect on profitability, suggesting that higher levels of non-performing loans reduce banking performance. In contrast, liquidity risk shows a positive and significant effect on profitability, indicating that better liquidity management contributes to improved financial returns in state-owned banks. Simultaneously, both credit risk and liquidity risk significantly influence profitability, confirming their joint importance in determining bank performance. The coefficient of determination reveals that these variables explain approximately 25.07% of profitability variation, while the remainder is influenced by other unobserved factors. These results highlight that profitability in state-owned banks is shaped by a combination of risk management practices and other internal and external determinants. The study emphasizes the importance of maintaining effective credit risk control and balanced liquidity management to support sustainable banking performance, while also suggesting that future research incorporate additional financial and macroeconomic variables to better explain profitability dynamics in the banking sector.

Keywords: Credit Risk; Liquidity Risk; Profitability; Non-Performing Loans;
Loan to Deposit Ratio; Return On Assets



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INTRODUCTION

Indonesia, as one of Southeast Asia's major economies, positions the banking sector, particularly state-owned banks, as a pillar of national financial stability (Kamaluddin, 2023). However, in recent years, global and national challenges have faced significant challenges including the COVID-19 pandemic, interest rate pressures, and liquidity uncertainty, which have given rise to significant dynamics in credit risk (NPL) and liquidity risk (LDR), which can impact banking profitability (Kamaluddin, 2023). This uncertainty is increasingly relevant given the strategic role of state-owned banks in maintaining economic recovery.

Bank Indonesia Circular Letter No. 13/24/DPNP/2011 states that credit risk is the risk resulting from the failure of debtors and/or other parties to fulfill their obligations to the bank. According to Bank Indonesia Regulation No. 6/10/PBI/2004 dated April 12, 2004, as cited in Dewi and Srihandoko (2018) concerning the Commercial Bank Soundness Assessment System, a higher NPL (above 5%) indicates a bank's health. A high NPL reduces the bank's profit.

According to OJK Regulation Number 18/POJK.03/2016 (OJK, 2016), Liquidity Risk is the risk resulting from a bank's inability to meet maturing obligations from cash flow funding sources and/or high-quality liquid assets that can be pledged as collateral, without disrupting the bank's activities and financial condition. The LDR provisions stipulated in Bank Indonesia Regulation (2013) stipulate that a bank's safe liquidity limit is a lower limit of 78% and an upper limit of 92%. Therefore, a higher LDR ratio indicates a better ability to meet its liquidity needs.

According to Fauzi in Aji and Manda (2021), profit is a crucial factor for a company. The size of a company's profit can be determined through analysis of the company's financial statements using profitability ratios. The following table shows credit risk, liquidity risk, and profitability at state-owned banks for the period 2017-2024

Table 1
State-Owned Bank In The 2017-2024 Period

No.	Company	Credit Risk (NPL)							
		2017	2018	2019	2020	2021	2022	2023	2024
1	BRI	0,88	0,92	1,04	0,8	0,7	0,73	0,76	0,75
2	MANDIRI	1,06	0,67	0,84	0,43	0,41	0,26	0,29	0,33
3	BTN	1,66	1,83	2,96	2,06	1,2	1,32	1,32	1,89
4	BNI	0,7	0,8	1,2	0,9	0,7	0,5	0,6	0,7
COMPANY		Liquidity Risk(LDR)							
		2017	2018	2019	2020	2021	2022	2023	2024
1	BRI	88,13	89,57	88,64	83,66	83,67	79,17	84,73	89,39
2	MANDIRI	88,11	96,74	96,37	82,95	80,04	77,61	86,75	98,04
3	BTN	103,13	103,49	113,5	93,19	92,86	92,65	95,36	93,79
4	BNI	85,6	88,8	91,5	87,3	79,7	84,2	85,8	96,1
COMPANY		Profitability (ROA)							
		2017	2018	2019	2020	2021	2022	2023	2024
1	BRI	3,69	3,68	3,5	1,98	2,72	3,76	3,93	3,76
2	MANDIRI	2,72	3,17	3,03	1,64	2,53	3,3	4,03	3,59
3	BTN	1,71	1,34	0,13	0,69	0,81	1,02	1,07	0,83
4	BNI	2,7	2,8	2,4	0,5	1,4	2,5	2,6	2,5

Source: www.idx.id (Annual Report Data) 2017-2024

Table 1 shows fluctuating changes each year. Over the past eight years, the Non-Performing Loan (NPL), Loan-to-Deposit Ratio (LDR), and Return on Assets (ROA) have

fluctuated, indicating that state-owned banks' financial performance is not optimal. Of the four banks, the banks that experienced the most significant fluctuations were Bank Tabungan Negara (BTN) and Bank Mandiri. At Bank Tabungan Negara (BTN) in 2018-2019, the LDR indicator increased from 103.49 to 113.5. This may be due to factors such as an increase in total loans or a decrease in total deposits, and also because the average value of the bank's health in the Loan to Deposit Ratio (LDR) indicator was above 100%, which is declared unhealthy according to Bank Indonesia Circular Letter No. 6/23/DPNP in 2004.

Meanwhile, at Bank Mandiri, the Non-Performing Loan (NPL) and Return on Assets (ROA) indicators in 2019-2020 simultaneously experienced a decrease in NPL and ROA from 0.84 to 0.43 and from 3.03 to 1.64. This may be due to factors such as an increase in non-performing loans or a decrease in total loans, or it could also be due to high total loans or a decrease in total deposits. This contradicts the theory that NPL and ROA have a negative relationship, meaning the lower the NPL, the higher the ROA, or vice versa. Putri and Pardede (2023); Winarsih (2022)

LITERATURE REVIEW

Credit Risk

According to Financial Services Authority (OJK) Regulation No. 18/POJK.03/2016 (OJK, 2016), credit risk is the risk arising from the failure of other parties to fulfill their obligations to the bank, including credit risk due to debtor default, credit concentration risk, counterparty credit risk, and settlement risk.

According to Bank Indonesia Regulation No. 6/10/PBI/2004 dated April 12, 2004, concerning the Commercial Bank Health Assessment System, the higher the NPL (above 5%), the less healthy the bank. High NPLs reduce bank profits, Dewi and Srihandoko (2018).

The Non-Performing Loan (NPL) ratio used by researchers is a financial ratio that assesses a bank's credit health (Dewi & Srihandoko, 2018). The Non-Performing Loan (NPL) ratio is one measure of credit quality:

$$\text{Non Performing Loan (NPL)} = \frac{\text{Non-Performing Loan}}{\text{Total Credit}} \times 100\%$$

Liquidity Risk

According to Financial Services Authority (OJK) Regulation No. 18/POJK.03/2016 (OJK, 2016), liquidity risk is the risk arising from a bank's inability to meet maturing obligations using cash flow funding sources and/or high-quality liquid assets that can be pledged as collateral, without disrupting the bank's activities and financial condition. Banks face liquidity risk if they fail to liquidate their assets at a reasonable price. Assets are offered at a low selling price, while the need to liquidate the bank's assets is urgent. This can result in significant losses and reduced revenue, Aji and Manda (2021).

LDR provisions are regulated by Bank Indonesia Regulation (2013), which sets a safe limit for bank liquidity, namely a lower limit of 78% and an upper limit of 92%. Therefore, a higher LDR ratio indicates a better ability to meet liquidity needs. According to Dewi and Srihandoko (2018), one way to measure LDR is as follows:

$$\text{Loan to Deposit Ratio (LDR)} = \frac{\text{Total Loan}}{\text{Total Deposit} + \text{Equity}} \times 100\%$$

Profitability

According to Taha in Alshatti (2014), to determine the extent of a bank's ability to generate profits from the money invested, there are various financial ratios related to both owners and depositors. Profitability is the bank's ability to generate profits effectively and efficiently Anggreni and Suardhika (2014).

This study uses the profitability ratio, Return on Assets (ROA), because ROA analysis measures a company's ability to generate profits using total assets, and this study focuses on assets (capital). Dewi and Srihandoko (2018) This ratio is measured by:

$$\text{Return On Asset (ROA)} = \frac{\text{Net Income}}{\text{Total Assets}} \times 100\%$$

Hypothesis

The hypothesis in this study is that there is an influence of Credit Risk and Liquidity Risk on Profitability in State-Owned Banks Listed on the Indonesia Stock Exchange for the period 2017-2024, both partially and simultaneously.

METHOD

The method used in Riswan and Dunan (2019) this study is panel data regression analysis with a quantitative approach. Data processing was performed using cross-section and time series data. The population in this study was four state-owned banking companies with eight years of financial reports listed on the Indonesia Stock Exchange for the period 2017-2024, accessed through the Indonesia Stock Exchange website <https://idx.co.id>, resulting in 32 datasets.

RESULTS AND DISCUSSION

Panel Data Regression Stages

According to Riswan and Dunan (2019), panel data regression analysis techniques have a series of stages in the form of selecting a regression model, testing classical assumptions, testing model feasibility, and interpreting the model.

Selection of Panel Data Regression Estimation Techniques

Riswan and Dunan (2019) The selection of panel data regression estimation techniques is used to determine the most appropriate model for data analysis. According to Riswan and Dunan (2019), there are three tests for selecting panel data estimation techniques: the Chow Test, the Hausman Test, and the Lagrange Multiplier Test.

1. Chow Test

According to Dunan (2019) the Chow test is a test for the most appropriate fixed effect or common effect model for estimating panel data. According to Dunan (2019) Decision making is carried out if:

- a. The F-probability value is <the critical limit, then reject H_0 or choose the fixed effect over the common effect.
- b. The F-probability value is >the critical limit, then accept H_0 or choose the common effect over the fixed effect.

Based on the results of the Chow test calculation (Table 2), the Probability value (F-Statistic) is 0.0001, which is smaller than the significance level (α) of 0.05, as in the Table 2.

Table 2
Chow Test Results

Effects Test	Statistic	d.f.	Prob.
Cross-section F	9.981789	(3,26)	0.0001
Cross-section Chi-square	24.520931	3	0.0000

Source: Processed Data, 2025

From the table above it can be concluded that H_0 is rejected, the decision is that the Fixed Effect Model (FEM) is more appropriate than the Common Effect Model (CEM).

2. Hausman test

According to Dunan (2019) The Hausman test is a statistical test to determine whether a fixed effects or random effects model is most appropriate. According to Dunan (2019), A decision is made if:

- The chi-square probability value is <the significance level, then reject H_0 or choose fixed effects over random effects.
- The chi-square probability value is >the significance level, then accept H_0 or choose random effects over fixed effects.

Based on the results of the Hausman test calculation (Table 3), the Probability value (Chi-Square-Statistic) is 0.2894 > compared to the significance level (α) of 0.05, as in the Table 3.

Table 3
Hausman Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.479988	2	0.2894

Source: Processed Data, 2025

From the table 3, it can be concluded that H_0 is accepted, and the decision is that the Random Effects Model (REM) is more appropriate than the Fixed Effects Model (FEM).

3. Lagrange Multiplier (LM) test

According to Dunan (2019) The Lagrange Multiplier (LM) test is used to determine whether the Common Effect or Random Effect model is most appropriate. According to Dunan (2019), A decision is made if:

- The p-value is less than the critical limit, then reject H_0 or choose Random Effect over Common Effect.
- The p-value is greater than the critical limit, then accept H_0 or choose Common Effect over Random Effect.

Based on table 4, the results obtained for the Breusch-Pagan Probability (Both) value are 0.0001, which is smaller than the significance level (α) of 0.05.

Table 4
Lagrange Multiplier Test Results

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	12.83112 (0.0003)	1.624506 (0.2025)	14.45563 (0.0001)

Source: Processed Data, 2025

From the table above, it can be concluded that H_0 is rejected, the decision being that the Random Effect Model (REM) is more appropriate than the Common Effect Model (CEM).

Based on the specification test through the Chow Test, Hausman Test and Lagrange Multiplier Test, a score of 2 was obtained for REM (Hausman Test and Lagrange Multiplier Test) and 1 for FEM (Chow Test), thus meaning that the best model selected for this study is the Random Effect Model (REM).

Classical Assumption Test

According to Riswan and Dunan (2019), based on the results of model selection, this study uses the Random Effects Model (REM) to solve the research problem. The Random Effects Model (REM) uses the Generalized Least Squares (GLS) approach, eliminating the need for classical assumption testing.

Partial Hypothesis Test (t-Test)

According to Riswan and Dunan (2019) The t-test is conducted to determine the effect of each independent variable individually on the dependent variable.

Decision-Making Criteria according to Dunan (2019):

- a. Effect of Credit Risk (X_1) on Profitability (Y)
 - * If the calculated t value > t table, then H_0 is rejected and H_a is accepted.
 - * If the calculated t value < t table, then H_0 is accepted and H_a is rejected.
- b. Effect of Liquidity Risk (X_2) on Profitability (Y)
 - * If the calculated t value > t table, then H_0 is rejected and H_a is accepted.
 - * If the calculated t value < t table, then H_0 is accepted and H_a is rejected.

Following are the Partial Test Results in Table 5 :

Table 5
Partial Test Results (t-Test)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.007340	1.862298	-0.540913	0.5927
X1	-1.213057	0.391912	-3.095230	0.0043
X2	0.050728	0.022446	2.259986	0.0315

Source: Processed Data, 2025

The Effect of Credit Risk (X_1) on Profitability (Y)

Based on the analysis results in table 5, it can be seen that the t-count value of Credit Risk (X_1) is -3.095230 compared to the t-table -2.04523, these results indicate that the t-count is greater than the t-table, namely -3.095230 > -2.04523, so it is in the H_a area, accepted and H_0 is rejected. Thus, it can be concluded that Credit Risk (X_1) has a negative and

significant influence on Profitability (Y) in State-Owned Banks in 2017-2024. The results of this study are in line with the results of previous studies conducted by Aji and Manda (2021); Damayanti et al. (2023); Dewi and Srihandoko (2018).

The Effect of Liquidity Risk (X_2) on Profitability (Y)

Based on the analysis results in table 5, it can be seen that the calculated t value of Liquidity Risk (X_2) is 2.259986 compared to the t table of 2.04523, the result is that the calculated t is greater than the t table, namely $2.259986 > 2.04523$, so it is in the H_a area, accepted and H_0 is rejected. So it can be concluded that Liquidity Risk (X_2) has a positive and significant effect on Profitability (Y) in State-Owned Banks in 2017-2024. The results of this study are supported by previous research conducted by Capriani and Dana (2016).

Simultaneous Hypothesis Testing (F Test)

According to Riswan and Dunan (2019) The F-test is conducted to examine the joint influence of independent variables on the dependent variable. In this study, the researcher will examine the joint influence of Credit Risk (X_1) and Liquidity Risk (X_2) on Profitability (Y).

The decision-making criteria according to Dunan (2019) are as follows:

- If the calculated F value is greater than the F table, then H_0 is rejected and H_a is accepted.
- If the calculated F value is less than the F table, then H_0 is accepted and H_a is rejected.

Following are the results of concurrent testing in Table 6.

Table 6
Results of Concurrent Testing (F-Test)

R-squared	0.250754	Mean dependent var	0.666998
Adjusted R-squared	0.199082	S.D. dependent var	0.697678
S.E. of regression	0.624381	Sum squared resid	11.30569
F-statistic	4.852783	Durbin-Watson stat	1.614254
Prob(F-statistic)	0.015207		

Source: Processed Data, 2025

Based on table 6, the F-count value of 4.852783 is greater than the F-table value of 3.328. Therefore, H_0 is rejected and H_a is accepted because $F\text{-count} > F\text{-table}$. Then, the results of the decision can be seen from the probability level (F-statistic) from the table above of 0.015207 because the probability level (F-statistic) is smaller than 0.05, it can be said that the H_0 hypothesis is rejected.

So it can be concluded that Credit Risk and Liquidity Risk together have a significant influence on Profitability in State-Owned Banks listed on the Indonesia Stock Exchange in 2017-2024. The results of this study are in line with the results of research conducted by Aji and Manda (2021); Capriani and Dana (2016); Damayanti et al. (2023); Putri and Pardede (2023).

Coefficient of Determination

According to Riswan and Dunan (2019) the coefficient of determination value reflects how much variation in the dependent variable Y can be explained by the independent variable X. A model is said to be good if the R^2 value is close to one and vice versa if the

R2 value is close to 0 then the model is not good. Thus, the good or bad of a regression model is determined by the R2 value which lies between 0 and 1.

Based on Table 6, the Random Effect Model (REM) in the R-Squared value column, obtained the coefficient of determination (R-Squared) value of the regression model of 0.250754. It can be concluded that the influence of Credit Risk (X_1) and Liquidity Risk (X_2) together affects Profitability (Y) by 25.07% while the remaining 74.93% is caused by other factors outside the model that are not studied, such as market risk, operational risk, interest rate risk, etc.

Model Interpretation

In panel data regression, after model selection, classical assumption testing, and model feasibility testing, the final stage is interpreting the resulting model. The panel data regression analysis in this study used the Random Effects Model (REM). The following table shows the panel data regression output using the REM method.

Table 7
Random Effects Model (REM) Output

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.007340	1.862298	-0.540913	0.5927
X1	-1.213057	0.391912	-3.095230	0.0043
X2	0.050728	0.022446	2.259986	0.0315

Source: Processed Data, 2025

Based on Table 7, the panel data regression equation in this study is as follows:

$$Y = -1.007340 - 1.213057 X_1 + 0.050728 X_2$$

This equation indicates several things:

1. The constant value of -1.007340 means that if the Credit Risk (X_1) and Liquidity Risk (X_2) variables are zero, then profitability (Y) is -1.007340%.
2. The regression coefficient value of Credit Risk (X_1) is negative at -1.213057, meaning that for every 1% increase in Credit Risk (X_1), profitability (Y) will decrease by 1.213057%, assuming the Liquidity Risk (X_2) variable remains constant.
3. The regression coefficient value of Liquidity Risk (X_2) is 0.050728, meaning that for every 1% increase in Liquidity Risk (X_2), profitability (Y) will increase by 0.050728%, assuming the Credit Risk variable (X_1) remains constant.

CONCLUSION AND SUGGESTION

Based on the results of the data analysis and discussion, this study concludes that credit risk has a negative and significant effect on profitability in state-owned banks listed on the Indonesia Stock Exchange during the 2017–2024 period, indicating that an increase in non-performing loans tends to reduce bank profitability. In contrast, liquidity risk shows a positive effect on profitability, suggesting that better liquidity management can contribute to improved financial performance in the banking sector. When examined simultaneously, credit risk and liquidity risk are found to jointly influence profitability, confirming that both risk factors play an important role in shaping bank financial outcomes.

However, the coefficient of determination of the model remains limited, as the two variables account for only 25.07% of the variation in profitability, while the remaining

proportion is influenced by other factors such as market risk, operational risk, and interest rate risk that are not included in this study. Therefore, it is recommended that future researchers extend the observation period to obtain a larger data set and include additional relevant variables such as interest rate risk, market risk, and others, so that the determinants of banking profitability can be explained more comprehensively and produce stronger and more diverse empirical findings.

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