

Key Banking Risks Affecting The Financial Performance of Conventional Banks In Indonesia

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ABSTRACT

This study examines the effects of banking risks on the financial performance of conventional banks in Indonesia during the 2019–2024 period. Financial performance is measured using return on assets (ROA), return on equity (ROE), and net interest margin (NIM). The examined risk factors include credit risk, liquidity risk, capital risk, operational risk, leverage risk, market risk, macroeconomic risk, and bank size. This study employs a quantitative approach using panel data from 42 conventional banks, resulting in 252 observations selected through purposive sampling. Data were analyzed using panel data regression. The findings indicate that credit risk, cash-to-deposit ratio, operational risk, inflation, and exchange rates negatively affect financial performance. In contrast, capital adequacy, economic growth, bank size, and interest rates positively influence financial performance. Liquidity coverage ratio and leverage risk are found to have no significant effect. The results suggest that effective risk management, adequate capitalization, and favorable macroeconomic conditions are essential for improving bank profitability. This study contributes to the banking literature by providing comprehensive evidence on the simultaneous effects of multiple banking risks on financial performance in Indonesia and offers practical implications for bank managers, investors, and regulators.

Keywords: bank financial performance; banking risks; liquidity risk; operational risk; panel data regression

INTRODUCTION

Within the financial system, banking performance is an important indicator of financial stability and reflects banks' ability to manage assets, liabilities, and risks while maintaining profitability and operational continuity (Eltweri et al., 2024). Banks are exposed to various risks, including credit, liquidity, capital, operational, leverage, market, and macroeconomic risks, which may directly affect financial performance. The Indonesian banking sector is particularly relevant because banks dominate the national financial system, accounting for more than 75% of total financial sector assets (OJK, 2024). However, post-pandemic recovery, tighter global monetary policies, exchange rate volatility, inflation, and increasing competition have increased the complexity of banking risk management.

OJK data for 2019–2024 show fluctuations in banking risk and performance indicators. The decline in the capital adequacy ratio (CAR) in 2024 indicates reduced capital buffers, while the increasing loan-to-deposit ratio (LDR) suggests greater liquidity pressure. Although non-performing loans (NPL) declined, return on assets (ROA) and net interest margin (NIM) also decreased, indicating that credit risk alone does not explain changes in banking performance. Therefore, a comprehensive examination of multiple risk dimensions is needed.

Previous studies have reported inconsistent findings regarding the effects of banking risks on financial performance. (Eltweri et al., 2024) found that NPL negatively affects ROA, LDR negatively affects ROE, and LCR negatively affects ROA, ROE, and NIM, while CAR and CDR positively affect several performance indicators. Fentaw (2024) reported positive effects of CAR

and LDR but negative effects of credit risk and exchange rates. Al-Ali and Alaskar et al. (2024) and Oscar et al. (2024) found that operational risk negatively affects financial performance, while some liquidity, capital, and bank size variables were insignificant. Similar inconsistencies have been reported for LDR (Kayani & Hakiman, 2023; Yuniarti et al., 2024; Siddique et al., 2022), LCR (Eltweri et al., 2024; Vu, 2024), leverage (Arin et al., 2025; Al-Aaraji, 2024), interest rates (Al-Slehat, 2022; Ondari et al., 2024), and macroeconomic factors (El Mahdy, 2023; Tomak, 2025; Ul Hassan, 2024). These differences suggest that the relationship between banking risks and financial performance remains inconclusive.

Empirical inconsistencies are also found in studies examining liquidity risk, market risk, leverage risk, and macroeconomic factors. Kayani & Hakiman (2023) together with Yuniarti et al. (2024) found that LDR positively affects bank performance, while Siddique et al. (2022) reported a negative relationship. Eltweri et al. (2024), Obadire & Obadire (2023), and Sidhu et al. (2022) showed that LCR negatively affects bank financial performance, whereas Vu (2024) concluded the opposite result. Similar inconsistencies also appear in studies on leverage and market risk. Alaskar et al. (2024), Arin et al. (2025), Ghafel & Bougatef (2024) documented a positive effect of leverage on bank performance, while Al-Aaraji (2024), Aregbesola & Kolawole (2024) found a negative association. In addition, Al-Slehat (2022), Mkaro et al. (2023) found that interest rates positively affect banking performance, whereas Ondari et al. (2024) reported that interest rates weaken bank profitability. Studies regarding inflation and economic growth also provide contradictory findings. El Mahdy (2023), Tomak (2025), Ul Hassan (2024) documented that economic growth improves bank performance, while Yahaya et al. (2022) found insignificant effects.

From a theoretical perspective, banking risks affect profitability through different mechanisms. Credit risk may reduce income through loan defaults and provisions, while liquidity risk affects the ability to meet obligations and support lending. Capital adequacy strengthens loss absorption capacity, whereas operational inefficiency increases costs. Market risks influence revenues, funding costs, and investment returns, while inflation and economic growth affect credit demand, repayment capacity, and banking activities. Thus, banking risks should be examined simultaneously rather than independently.

Several research gaps remain. First, most previous studies focus on individual risk dimensions, leaving the combined effects of multiple risks insufficiently explored. Second, studies commonly use a single profitability measure, particularly ROA, rather than simultaneously examining ROA, ROE, and NIM. Third, evidence on Indonesian conventional banks incorporating Basel III-based indicators, particularly LCR and leverage ratio, remains limited. Fourth, operational risk is commonly measured using BOPO, whereas the Cost-to-Income Ratio (CIR) provides an alternative measure of operational efficiency.

Accordingly, this study simultaneously examines credit, liquidity, capital, operational, leverage, market, and macroeconomic risks, as well as bank size, in relation to ROA, ROE, and NIM among conventional banks in Indonesia. The study employs Basel III-based LCR and leverage ratio indicators and panel data covering 2019–2024, encompassing post-pandemic recovery and monetary policy tightening. This integrated approach provides a more comprehensive assessment of the key banking risks affecting financial performance.

Financial performance is measured by ROA, ROE, and NIM (Oudat et al., 2024), while banking risks are represented by NPL, LDR, LCR, CDR, CAR, CIR, leverage ratio, interest rates, exchange rates, inflation, economic growth, and bank size. Based on risk management theory and previous empirical findings, these factors are hypothesized to significantly influence the financial performance of conventional banks in Indonesia.

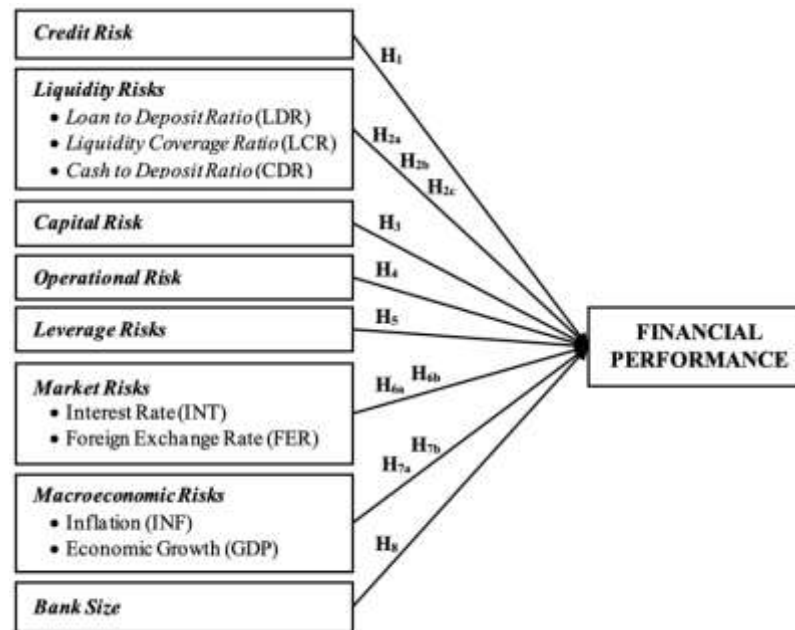


Figure 2. Research Framework
Source: Developed by the authors (2026)

Based on previous empirical findings, credit risk, liquidity risk represented by LDR, LCR, and CDR, capital risk, operational risk, leverage risk, market risk represented by interest rates and exchange rates, macroeconomic risk represented by inflation and economic growth, and bank size are hypothesized to significantly influence the financial performance of conventional banks in Indonesia.

LITERATURE REVIEW

Financial performance is an important indicator of banking stability, profitability, and efficiency. It is commonly measured by return on assets (ROA), return on equity (ROE), and net interest margin (NIM), which reflect banks' ability to generate returns from assets, equity, and earning assets (Gashi & Hajdari, 2023). Financial performance may be affected by internal and external factors, including credit, liquidity, capital, operational, leverage, market, and macroeconomic risks.

Previous studies have reported mixed findings regarding banking risks and financial performance. Cahyani & Amirudin (2024) found that NPL negatively affects ROA, while CAR positively affects profitability and LCR negatively affects ROA, ROE, and NIM. Yakub & Murtanto (2024) reported positive effects of CAR and LDR but a negative effect of exchange rate fluctuations. Abujassar & Al-Khoury (2025) found that operational risk negatively affects financial performance, while liquidity and credit risks were insignificant. Similar inconsistencies were reported for LDR Wakid et al. (2022), leverage (Arin et al., 2025; Meliza et al., 2024), and economic growth (Doğan & Yildiz, 2023; Węgrzyn & Kruszką, 2025). These inconsistent findings indicate that the effects of banking risks on financial performance remain inconclusive.

This study integrates multiple banking risk dimensions and three financial performance measures simultaneously. Unlike previous studies, it employs the Cost-to-Income Ratio (CIR) as an operational risk proxy and the Basel III leverage ratio, which remain relatively limited in studies of Indonesian conventional banks. The following hypotheses are developed based on risk management theory and previous empirical findings.

Credit Risk

Credit risk arises from borrowers' inability to meet contractual obligations and may reduce profitability through loan defaults, lower interest income, and higher loan-loss provisions. Previous

studies generally indicate a negative relationship between credit risk and bank profitability (Eltweri et al., 2024; Cahyani & Amirudin, 2024). Therefore:

H1: Credit risk negatively affects the financial performance of conventional banks in Indonesia.

Liquidity Risk

Liquidity risk reflects a bank's ability to meet short-term obligations and maintain sufficient funds for lending. Excessive liquidity may reduce income-generating opportunities, whereas insufficient liquidity increases funding pressure. Previous studies report mixed effects of liquidity indicators on profitability (Eltweri et al., 2024; Vu, 2024; Siddique et al., 2022). Thus:

H2a: Loan-to-Deposit Ratio (LDR) significantly affects the financial performance of conventional banks in Indonesia.

H2b: Liquidity Coverage Ratio (LCR) significantly affects the financial performance of conventional banks in Indonesia.

H2c: Cash-to-Deposit Ratio (CDR) significantly affects the financial performance of conventional banks in Indonesia.

Capital Risk

Capital adequacy strengthens banks' capacity to absorb unexpected losses, support lending, and maintain confidence during economic shocks. Previous studies predominantly report a positive relationship between capital adequacy and profitability (Fentaw, 2024; Yakub & Murtanto, 2024). Therefore:

H3: Capital risk positively affects the financial performance of conventional banks in Indonesia.

Operational Risk

Operational risk results from inefficient processes, human errors, technological failures, and inadequate controls. Higher operating costs reduce profitability, making CIR an important measure of operational efficiency. Higher CIR indicates lower efficiency and is therefore expected to weaken financial performance (Abujassar & Al-Khoury, 2025; Oscar et al., 2024).

H4: Operational risk negatively affects the financial performance of conventional banks in Indonesia.

Leverage Risk

Leverage risk reflects the extent to which banks rely on liabilities relative to their capital base. Although moderate leverage may improve asset utilization and profitability, excessive leverage increases financial vulnerability. Previous evidence is mixed, with both positive and negative effects reported (Arin et al., 2025; Al-Aaraji, 2024). Therefore:

H5: Leverage risk significantly affects the financial performance of conventional banks in Indonesia.

Market Risk

Market risk is associated with fluctuations in interest and exchange rates that affect lending and deposit pricing, funding costs, foreign currency transactions, and asset values. Consequently, these factors may influence bank profitability (Mkaro et al., 2023; Ondari et al., 2024).

H6a: Interest rates significantly affect the financial performance of conventional banks in Indonesia.

H6b: Exchange rates significantly affect the financial performance of conventional banks in Indonesia.

Macroeconomic Risk

Macroeconomic conditions influence banking performance through credit demand, investment, operating costs, and borrowers' repayment capacity. Economic growth is generally expected to improve profitability, whereas inflation may increase costs and financial uncertainty (El Mahdy, 2023; Ul Hassan, 2024; Tomak, 2025).

H7a: Inflation significantly affects the financial performance of conventional banks in Indonesia.

H7b: Economic growth significantly affects the financial performance of conventional banks in Indonesia.

Bank Size

Larger banks may benefit from economies of scale, broader market access, diversified income sources, and stronger competitive positions, potentially resulting in higher profitability (Oudat et al., 2024; Oscar et al., 2024).

H8: Bank size positively affects the financial performance of conventional banks in Indonesia.

Research Framework

Based on risk management theory and previous empirical evidence, financial performance is influenced by internal factors—credit, liquidity, capital, operational, leverage risks, and bank size—and external factors, including market and macroeconomic risks. These factors may affect profitability through income generation, cost efficiency, risk exposure, and business sustainability. Accordingly, this study proposes a comprehensive framework linking these factors to financial performance measured by ROA, ROE, and NIM.

METODE

This study employed a quantitative research approach to examine the effect of banking risks on the financial performance of conventional banks in Indonesia. The study utilized secondary panel data obtained from annual reports, financial statements, and supporting financial data published by conventional banks operating in Indonesia during the 2019–2024 period. The population consisted of all conventional commercial banks operating in Indonesia during the observation period. The sample was selected using purposive sampling based on the following criteria: (1) conventional commercial banks continuously operating during 2019–2024; (2) banks that published complete annual reports and financial statements throughout the observation period; (3) banks that disclosed information required to calculate all research variables; and (4) banks with complete data on profitability, risk indicators, and financial characteristics. Based on these criteria, 42 conventional banks were selected, resulting in 252 bank-year observations (42 banks × 6 years).

The Chow Test was first conducted to compare the Common Effect Model (CEM) and Fixed Effect Model (FEM). Subsequently, the Hausman Test was performed to determine whether the Fixed Effect Model or Random Effect Model (REM) was more appropriate. Following Baltagi, (2021), model selection was based on statistical decision rules rather than solely on coefficient characteristics. Where the Hausman Test indicated no systematic difference between FEM and REM estimators, the Random Effect Model was selected because it provides more efficient estimates. The final model selection was further confirmed using the Breusch-Pagan Lagrange Multiplier Test, which evaluates the suitability of REM relative to CEM. To ensure the reliability of the estimated coefficients, robust standard errors were applied to address potential heteroscedasticity and serial correlation commonly found in panel data analysis (Hoechle, 2022).

Prior to estimating the regression model, several diagnostic tests were conducted to ensure the validity of the estimation results. Multicollinearity was examined using correlation coefficients and Variance Inflation Factor (VIF) values. Heteroscedasticity was tested using the Breusch-Pagan test, while autocorrelation was assessed through the Wooldridge test for panel data. Furthermore, cross-sectional dependence was examined using Pesaran's CD test because banking observations may be exposed to common macroeconomic shocks. Normality was evaluated using the Jarque-Bera test; however, considering the large sample size, minor deviations from normality were not considered problematic. The results of these diagnostic tests indicated that the estimated regression models satisfied the required econometric assumptions.

The panel regression equations used in this study are presented as follows:

$$\begin{aligned} \text{ROA}_{it} &= \beta_0 + \beta_1 \text{NPL}_{it} + \beta_2 \text{LDR}_{it} + \beta_3 \text{LCR}_{it} + \beta_4 \text{CDR}_{it} + \beta_5 \text{CAR}_{it} + \beta_6 \text{CIR}_{it} + \\ &\quad \beta_7 \text{LEV}_{it} + \beta_8 \text{INT}_{it} + \beta_9 \text{FER}_{it} + \beta_{10} \text{INF}_{it} + \beta_{11} \text{GDP}_{it} + \beta_{12} \text{BSZ}_{it} + \varepsilon_{it} \\ \text{ROE}_{it} &= \beta_0 + \beta_1 \text{NPL}_{it} + \beta_2 \text{LDR}_{it} + \beta_3 \text{LCR}_{it} + \beta_4 \text{CDR}_{it} + \beta_5 \text{CAR}_{it} + \beta_6 \text{CIR}_{it} + \\ &\quad \beta_7 \text{LEV}_{it} + \beta_8 \text{INT}_{it} + \beta_9 \text{FER}_{it} + \beta_{10} \text{INF}_{it} + \beta_{11} \text{GDP}_{it} + \beta_{12} \text{BSZ}_{it} + \varepsilon_{it} \\ \text{NIM}_{it} &= \beta_0 + \beta_1 \text{NPL}_{it} + \beta_2 \text{LDR}_{it} + \beta_3 \text{LCR}_{it} + \beta_4 \text{CDR}_{it} + \beta_5 \text{CAR}_{it} + \beta_6 \text{CIR}_{it} + \end{aligned}$$

$$\beta_7\text{LEV}_{it} + \beta_8\text{INT}_{it} + \beta_9\text{FER}_{it} + \beta_{10}\text{INF}_{it} + \beta_{11}\text{GDP}_{it} + \beta_{12}\text{BSZ}_{it} + \varepsilon_{it}$$

The measurement indicators and operational definitions of the variables used in this study are presented in Table 1.

Table 1. Variable and Measurement

Variable	Proxy	Measurement	Operational Definition	References
Financial Performance	Return on Assets (ROA)	Net Income / Total Assets	Measures the bank's ability to generate profits from total assets employed in its operations.	Gashi & Hajdari (2023); Oudat et al. (2024)
Financial Performance	Return on Equity (ROE)	Net Income / Total Equity	Measures the return generated for shareholders from invested equity.	Gashi & Hajdari (2023); Oudat et al. (2024)
Financial Performance	Net Interest Margin (NIM)	Net Interest Income / Average Earning Assets	Measures the effectiveness of banks in generating interest income from productive assets.	Oudat et al. (2024)
Credit Risk	Non-Performing Loans (NPL)	Non-Performing Loans / Total Loans	Measures the proportion of problematic loans that may reduce profitability and increase credit losses.	Eltweri et al. (2024); Cahyani & Amirudin (2024)
Liquidity Risk	Loan-to-Deposit Ratio (LDR)	Total Loans / Total Deposits	Measures the extent to which customer deposits are utilized to finance lending activities.	Kayani & Hakiman (2023); Yuniarti et al. (2024)
Liquidity Risk	Liquidity Coverage Ratio (LCR)	High-Quality Liquid Assets / Net Cash Outflows	Measures the bank's ability to withstand short-term liquidity stress according to Basel III standards.	Basel Committee (2023); Vu (2024)
Liquidity Risk	Cash-to-Deposit Ratio (CDR)	Cash and Cash Equivalents / Total Deposits	Measures the availability of highly liquid funds relative to customer deposits.	Eltweri et al. (2024)
Capital Risk	Capital Adequacy Ratio (CAR)	Total Capital / Risk-Weighted Assets	Measures the adequacy of bank capital to absorb unexpected losses.	Fentaw (2024); Yakub & Murtanto (2024)
Operational Risk	Cost-to-Income Ratio (CIR)	Operating Expenses / Operating Income	Measures operational efficiency by comparing operating costs to operating income. Higher values indicate lower efficiency.	Abujassar & Al-Khoury (2025); Oscar et al. (2024)
Leverage Risk	Leverage Ratio (LEV)	Tier 1 Capital / Total Exposure	Measures the extent to which banks rely on leverage and their ability to absorb losses under Basel III requirements.	Basel Committee (2023); Arin et al. (2025)
Market Risk	Interest Rate (INT)	Annual BI Policy Rate	Represents interest rate fluctuations that affect lending, funding costs, and profitability.	Mkaro et al. (2023); Ondari et al. (2024)
Market Risk	Exchange Rate (FER)	Annual Average IDR/USD Exchange Rate	Measures exposure to foreign exchange fluctuations that may affect banking performance.	Fentaw (2024); Yakub & Murtanto (2024)
Macroeconomic Risk	Inflation (INF)	Annual Inflation Rate (%)	Measures changes in the general price level that may affect banking	El Mahdy (2023); Ul Hassan (2024)

			operations and profitability.	
Macroeconomic Risk	Economic Growth (GDP)	Annual GDP Growth Rate (%)	Measures economic expansion that may influence credit demand and banking profitability.	Tomak (2025); Yahaya et al. (2022)
Bank Characteristics	Bank Size (BSZ)	Natural Logarithm of Total Assets	Measures the scale of bank operations and market power. Larger banks may benefit from economies of scale.	Oudat et al. (2024); Oscar et al. (2024)

Source: Developed by the authors based on previous studies (2026).

RESULTS

Descriptive statistics were used to summarize the minimum, maximum, mean, median, and standard deviation of all research variables. The results are presented in Table 2.

Table 2. Descriptive Statistics

Variable	Mean	Median	Maximum	Minimum	Std. Deviation
ROA	0.0123	0.0132	0.0585	-0.0850	0.0185
ROE	0.0426	0.0529	0.2731	-1.5460	0.1547
NIM	0.0421	0.0396	0.2438	0.0022	0.0265
NPL	0.0282	0.0259	0.1168	0.0000	0.0205
LDR	0,9675	0,8832	3,7361	0,2302	0,3918
LCR	3,7986	2,3833	43,6748	0,9065	4,5704
CDR	0,0906	0,0785	0,7947	0,0153	0,0682
CAR	0,3490	0,2695	1,2742	0,1050	0,2205
CIR	0,6398	0,5369	3,9745	0,2232	0,4345
LEV	0,1875	0,1529	0,7425	0,0503	0,1178
INT	0,0496	0,0525	0,0600	0,0350	0,0101
FER	14.874,08	14.824,75	16.095,00	13.882,50	847,62
INF	0,0266	0,0224	0,0551	0,0157	0,0135
GDP	0,0367	0,0503	0,0531	-0,0207	0,0263
BSZ	31,8285	31,8047	35,4255	28,8701	1,5605
Total Observations					252

Source : Data Processing by Eviews

ROA, ROE, and NIM show different levels of variability during 2019–2024. ROE has the widest dispersion, including a minimum of -1.5460, while ROA ranges from -0.0850 to 0.0585. NIM is more stable, ranging from 0.0022 to 0.2438. Among the risk variables, LCR and CIR show relatively wide ranges, indicating differences in liquidity and operational conditions across banks.

The Chow, Hausman, and LM tests were used to select the panel model. Their results are presented in Table 3.

Table 3. Panel Data Model Selection Test

Variable Dependent		Chow Test (Prob.)	Hausman Test (Prob.)	LM Test (Prob.)
Models				
1	ROA	0,0000	1,0000	0,0000
2	ROE	0,0000	1,0000	0,0000
3	NIM	0,0000	1,0000	0,0000

Source : Data Processing by Eviews

The Chow test probabilities for ROA, ROE, and NIM are below 0.05, indicating that FEM is preferred to CEM. The Hausman probabilities are 1.0000, indicating no systematic difference

between FEM and REM. The LM probabilities are 0.0000, supporting REM over CEM. Based on the sequence of tests, REM is selected as the final model for all three dependent variables.

Table 4. Correlation between Independent Variables

	NPL	LDR	LCR	CDR	CAR	CIR	LEV	INT	FER	INF	GDP	BSZ
NPL	1.0000											
LDR	0.1678	1.0000										
LCR	0.2480	0.3871	1.0000									
CDR	-0.2679	0.0921	0.1578	1.0000								
CAR	0.0820	0.3452	0.5795	0.3630	1.0000							
CIR	0.2287	-0.0965	-0.0789	-0.0200	-0.0626	1.0000						
LEV	0.0274	0.4576	0.4969	0.2420	0.7995	-0.1440	1.0000					
INT	-0.1841	0.1127	0.0498	0.0529	0.1051	-0.1317	0.0286	1.0000				
FER	-0.1379	0.0145	0.0850	0.0155	0.1604	-0.1003	0.0634	0.7951	1.0000			
INF	-0.0557	-0.0100	-0.0258	0.1082	0.0457	-0.0463	0.0255	0.3318	0.2716	1.0000		
GDP	-0.1167	0.0543	0.0126	0.1172	0.0809	-0.0845	0.0182	0.6769	0.5181	0.4154	1.0000	
BSZ	-0.1919	-0.1885	-0.3361	-0.0265	-0.4921	-0.1915	-0.4735	0.0539	0.0744	0.0069	0.0299	1.0000

Source : Data Processing by Eviews

The correlation matrix shows that most correlations are below 0.80, indicating no severe multicollinearity. The highest correlation is between CAR and LEV (0.7995), remaining below the commonly used threshold.

The results of panel data regression analysis for Model 1 using ROA as the dependent variable are presented in Table 5.

Table 5. Results of Regression Model 1 (ROA)

Independent Variables	Dependent Variable		
	Model 1 : ROA		
	Coefficient	Probability	Conclusion
C	-0,07195300	-	-
NPL	-0,24027300	0,0013	Negative Effect
LDR	-0,00205600	0,6353	No Effect
LCR	0,00047500	0,3555	No Effect
CDR	-0,02866000	0,0128	Negative Effect
CAR	0,01697300	0,0023	Positive Effect
CIR	-0,01331000	0,0000	Negative Effect
LEV	0,00542400	0,2229	No Effect
INT	0,43098800	0,0033	Positive Effect
FER	-0,00000466	0,0000	Negative Effect
INF	-0,09513700	0,0000	Negative Effect
GDP	-0,00137300	0,9142	No Effect
BSZ	0,00492700	0,0000	Positive Effect

Source : Data Processing by Eviews

NPL has a negative and significant effect on ROA ($\beta = -0.2403$; $p < 0.01$), supporting H1. Higher credit risk is associated with weaker asset profitability.

CDR also negatively affects ROA ($\beta = -0.0287$; $p < 0.05$), supporting H2c. Excess liquidity may reduce the share of funds allocated to income-generating assets.

CAR positively affects ROA ($\beta = 0.0170$; $p < 0.01$), supporting H3 and indicating that stronger capitalization is associated with higher profitability.

Interest rates positively affect ROA ($\beta = 0.4310$; $p < 0.01$), while exchange rates have a negative effect ($\beta = -0.000005$; $p < 0.01$), supporting H6a and H6b.

The ROE regression results are presented in Table 6.

Table 6. Results of Regression Model 2 ROE

Independent Variables	Dependent Variable		
	Model 2 : ROE		
	Coefficient	Probability	Conclusion
C	-0,24522900	-	-
NPL	-1,63329700	0,0813	No Effect
LDR	-0,05313800	0,0269	Negative Effect
LCR	0,00202700	0,2028	No Effect
CDR	-0,08726600	0,0939	No Effect
CAR	0,01827500	0,7344	No Effect
CIR	-0,12333500	0,0000	Negative Effect
LEV	0,06887000	0,2860	No Effect
INT	1,89056300	0,0006	Positive Effect
FER	-0,00003730	0,0000	Negative Effect
INF	0,07730700	0,0764	No Effect
GDP	0,16306100	0,0002	Positive Effect
BSZ	0,03256300	0,0012	Positive Effect

Source : Data Processing by Eviews

LDR negatively affects ROE ($\beta = -0.0531$; $p < 0.05$), supporting H2a. CIR also has a negative effect ($\beta = -0.1233$; $p < 0.01$), supporting H4.

Interest rates, GDP growth, and bank size positively affect ROE, supporting H6a, H7b, and H8. NPL, LCR, CDR, CAR, leverage, and inflation are not significant in the ROE model.

The NIM regression results are presented in Table 7.

Table 7. Results of Regression Model 3 (NIM)

Independent Variables	Dependent Variable		
	Model 3 : NIM		
	Coefficient	Probability	Conclusion
C	0.05557200		-
NPL	0.04390500	0.5179	No Effect
LDR	0.00775300	0.2543	No Effect
LCR	0.00090300	0.2646	No Effect
CDR	-0.03662300	0.0000	Negative Effect
CAR	0.01403000	0.2169	No Effect
CIR	-0.00815300	0.0000	Negative Effect
LEV	0.00232800	0.4412	No Effect
INT	0.36829500	0.0001	Positive Effect
FER	-0.00000306	0.0044	Negative Effect
INF	-0.05322300	0.0022	Negative Effect
GDP	0.05015100	0.0000	Positive Effect
BSZ	0.00028200	0.8838	No Effect

Source : Data Processing by Eviews

CDR negatively affects NIM ($\beta = -0.0268$; $p < 0.05$), supporting H2c. CIR also negatively affects NIM ($\beta = -0.1233$; $p < 0.01$), supporting H4.

Interest rates and economic growth positively affect NIM, whereas exchange rates and inflation negatively affect NIM, supporting H6a, H7a, and H7b.

Overall, H1, H2a, H2c, H3, H4, H6a, H6b, H7a, H7b, and H8 are supported by at least one profitability indicator. H2b and H5 are not supported.

The explanatory power of the three models is summarized by the coefficient of determination in Table 8.

Table 8. Coefficient of Determination

Model	Variable	<i>R-squared</i>	<i>Adjusted R-squared</i>
1	ROA	0.419886	0.390759
2	ROE	0.315607	0.281244
3	NIM	0.443031	0.415066

Source : Data Processing by Eviews

Adjusted R^2 ranges from 0.2812 to 0.4151, indicating moderate explanatory power. The models explain a meaningful but incomplete share of variation in bank profitability.

CIR is the most consistent determinant because it negatively affects all three performance indicators. Interest rates, exchange rates, and selected liquidity, capital, and macroeconomic variables also show indicator-specific effects.

DISCUSSION

The findings indicate that internal banking risks remain the primary determinants of financial performance among conventional banks in Indonesia. Credit risk, capital adequacy, and operational risk significantly influence profitability, suggesting that bank-specific factors continue to play a more important role than external conditions in explaining variations in financial performance. This finding is consistent with risk management theory, which argues that effective identification, measurement, and control of risks are fundamental to maintaining sustainable profitability (Kumar & Meena, 2022).

The negative effect of credit risk confirms that deteriorating asset quality reduces banks' ability to generate earnings from productive assets. Higher levels of non-performing loans require banks to allocate additional loan loss provisions, thereby reducing profitability. This finding is particularly relevant in the Indonesian context because the banking sector experienced extensive credit restructuring during the COVID-19 pandemic under OJK Regulation No. 11/POJK.03/2020. Although the restructuring policy successfully maintained financial system stability, some restructured loans subsequently became non-performing, creating profitability pressures during the post-pandemic recovery period (OJK, 2024). The result supports previous studies conducted by Eltweri et al. (2024), Cahyani and Amirudin (2024), and Fentaw (2024), which identified credit risk as a major determinant of banking profitability.

Capital adequacy also contributes positively to profitability, indicating that well-capitalized banks possess greater capacity to absorb losses, maintain lending activities, and sustain public confidence. This finding supports capital buffer theory, which suggests that adequate capitalization enhances resilience and enables banks to exploit profitable business opportunities (Hackney, 2023). The result is particularly relevant because Indonesian banks maintained average CAR levels significantly above regulatory minimum requirements throughout the observation period, reflecting strong financial resilience following the pandemic.

Among all risk indicators, operational risk represented by the Cost-to-Income Ratio (CIR) demonstrates the most consistent effect across ROA, ROE, and NIM. This finding suggests that operational efficiency has become a strategic factor in determining banking profitability. The result may reflect the increasing importance of digital transformation, automation, and technology investment within the Indonesian banking industry. Banks that fail to control operating expenses may experience profitability deterioration even when macroeconomic conditions remain favorable. Therefore, improving operational efficiency appears to be one of the most effective strategies for enhancing banking profitability in Indonesia.

The findings provide important insights into liquidity management practices within Indonesian banks during the post-pandemic period. Although LDR and CDR significantly affect profitability, LCR does not significantly influence any profitability indicator. This result suggests that different liquidity measures capture different dimensions of banking operations and should not be interpreted uniformly.

The insignificant effect of LCR may indicate that Basel III liquidity regulations have successfully standardized liquidity management practices among conventional banks. Since most banks maintain LCR levels substantially above the minimum regulatory requirement established by OJK, differences in liquidity coverage ratios no longer translate into meaningful differences in profitability. In this context, LCR functions primarily as a regulatory compliance indicator rather than a profitability driver. Similar findings have been reported by Al-Ali and Alaskar et al. (2024), who found that liquidity indicators become less relevant once regulatory requirements are consistently fulfilled.

In contrast, the significance of LDR and CDR demonstrates that operational liquidity decisions remain economically important. The negative effect of CDR implies that excessive cash holdings may create opportunity costs because liquid assets generally generate lower returns than productive loans. During the post-pandemic recovery period, many banks adopted conservative liquidity strategies to manage uncertainty and maintain resilience. While such strategies improved stability, they may also have reduced profitability by limiting lending opportunities. Therefore, the results highlight the existence of a trade-off between liquidity and profitability, consistent with liquidity preference theory.

The significant effects of interest rates, exchange rates, inflation, and economic growth indicate that banking profitability cannot be fully understood without considering the broader macroeconomic environment. These findings demonstrate that profitability is jointly determined by internal risk management and external economic conditions.

The positive effect of interest rates reflects the monetary policy environment observed during 2022–2024. In response to inflationary pressures and global financial uncertainty, Bank Indonesia gradually increased the BI Rate. Higher policy rates generally allow banks to increase lending rates more rapidly than funding costs, thereby widening net interest spreads and improving profitability (Bank Indonesia, 2024). This finding supports previous studies by Mkaro et al. (2023) and Al-Slehat (2022), which documented positive relationships between interest rates and banking performance.

Conversely, exchange rate depreciation negatively affects profitability. The weakening of the Indonesian rupiah against the US dollar increases foreign exchange exposure, raises the cost of foreign currency funding, and may weaken the repayment capacity of borrowers engaged in international trade. This result indicates that exchange rate stability remains an important prerequisite for maintaining banking profitability. The finding also highlights the increasing interconnectedness between the Indonesian banking sector and global financial markets.

Economic growth contributes positively to banking profitability, confirming that favorable macroeconomic conditions stimulate credit demand, business expansion, and investment activities. During the post-pandemic recovery period, Indonesia experienced gradual improvements in economic growth, which enhanced banking business opportunities and strengthened profitability. On the other hand, inflation negatively affects profitability because rising prices increase operational costs and may weaken borrowers' purchasing power. Collectively, these findings emphasize the importance of maintaining macroeconomic stability to support sustainable banking performance.

An important finding of this study is that several theoretically relevant variables, particularly LCR and leverage ratio, do not significantly affect financial performance. At first glance, these results appear inconsistent with theoretical expectations. However, several explanations may account for these findings.

First, regulatory convergence may have reduced variability across banks. Since Indonesian banks operate under the same supervisory framework and regulatory standards, differences in leverage and liquidity coverage positions have become increasingly limited. Consequently, these indicators may no longer explain profitability differences as effectively as operational efficiency or credit quality indicators.

Second, the insignificant effect of leverage ratio may reflect the strong capitalization of Indonesian banks during the observation period. Most banks maintained leverage positions comfortably above regulatory thresholds, reducing the economic relevance of leverage differences.

Similar findings were reported by Meliza et al. (2024), who concluded that leverage becomes less important when capital adequacy remains consistently high across institutions.

Third, profitability may be influenced by factors not included in the model. Variables such as corporate governance quality, ownership structure, income diversification, managerial capability, environmental, social, and governance (ESG) practices, and digital transformation initiatives may affect profitability but were not incorporated into the present analysis. Therefore, the insignificant findings should not necessarily be interpreted as evidence that these risks are unimportant but rather as an indication that their effects may be indirect or conditional upon other factors.

The findings provide several implications for banking practitioners and policymakers. For bank management, the results highlight the importance of maintaining asset quality, strengthening operational efficiency, and optimizing liquidity allocation. These factors appear to exert a more direct influence on profitability than regulatory compliance indicators such as leverage ratio and liquidity coverage ratio. Therefore, strategic efforts to improve credit risk management and cost efficiency should receive greater managerial attention.

For regulators, the findings suggest that maintaining macroeconomic stability remains essential for sustaining banking profitability. The results demonstrate that exchange rates, inflation, economic growth, and interest rates significantly influence banking performance. Consequently, coordination between OJK, Bank Indonesia, and other policymakers remains necessary to ensure a stable financial environment. In particular, monetary policy decisions affecting BI Rate levels and exchange rate stability may have substantial implications for banking profitability and financial stability.

Despite providing important insights, this study has several limitations. The adjusted R^2 values indicate that a considerable proportion of profitability variation remains unexplained, suggesting the existence of additional determinants beyond those included in the model. Furthermore, the use of annual data may limit the ability to capture short-term fluctuations in banking performance. Potential endogeneity issues may also arise because profitability and risk indicators can influence each other simultaneously. Although robustness checks indicate stable results, future studies should consider employing dynamic panel estimators such as Generalized Method of Moments (GMM) and incorporating governance, digitalization, and sustainability variables to obtain a more comprehensive understanding of banking performance determinants.

Overall, the findings suggest that profitability among conventional banks in Indonesia is shaped by a complex interaction between internal risk management, regulatory conditions, and macroeconomic dynamics. Therefore, achieving sustainable banking performance requires not only compliance with prudential regulations but also continuous improvements in operational efficiency, credit quality, and strategic adaptability to changing economic conditions.

CONCLUSIONS

This study examined the effects of banking risks on the financial performance of conventional banks in Indonesia during 2019–2024. Credit risk, liquidity measures, capital adequacy, operational efficiency, market variables, macroeconomic conditions, and bank size showed significant effects on at least one of ROA, ROE, and NIM, while LCR and leverage were not significant.

The study contributes by integrating multiple banking risks, applying Basel III-based indicators, and using three profitability measures. The results provide a broader view of the determinants of conventional-bank performance in Indonesia.

For practice, banks should strengthen credit-risk monitoring, operational efficiency, liquidity allocation, and capital management. Regulators should maintain macroeconomic stability and effective supervision.

The study is limited to conventional banks and the 2019–2024 period. Future studies should consider broader bank types, longer periods, additional determinants, and alternative econometric approaches.

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