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STRUCTURAL EQUATION MODELING TO EVALUATE THE FINANCIAL PERFORMANCE OF INDONESIAN CONVENTIONAL COMMERCIAL BANKS

Abstract

As financial intermediary institutions, banks operate in a dynamic and complex environment influenced by internal and external factors and various risks that impact their financial performance. This study aims to examine the influence of bank-specific and macroeconomic variables that affect credit risk and Indonesian conventional commercial banks' financial performance. Structural equation modeling is used to analyze time series data from quarter 1993 to quarter 2023. This analysis covers conventional commercial banks registered in Indonesia, namely Bank Mandiri, Bank Rakyat Indonesia, Bank Negara Indonesia, and Bank Tabungan Negara. The results of the study indicate that conventional commercial banks in Indonesia can manage their specific variables effectively so that financial performance increases and non-performing loans decrease. In addition, the stability of economic conditions contributes to an increase in the volume of available loans, allowing commercial banks to earn higher income from loan interest. Therefore, the banking sector can benefit from some recommendations made in this study, especially concerning conventional commercial banks in Indonesia.

Keywords

bank-specific variables, macroeconomic variables, credit risk, bank financial performance

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INTRODUCTION

The banking sector plays a role in financial and economic stability (Yudaruddin et al., 2024) by channeling funds from creditors to debtors (Siddique et al., 2022). This process exposes banks to various financial risks (Jahan et al., 2022), which are addressed by setting high interest rates (Ahmed et al., 2021), although they remain vulnerable to credit risk (Gadzo et al., 2019). Increasing credit risk is a challenge for banks in developing countries (Yudaruddin et al., 2024). Research shows that changes in bad debts have a negative impact on bank performance (Ekinici & Poyraz, 2019; Kwashie et al., 2022). The Financial Services Authority of Indonesia reported an increase in bad debts of 5.04% since May 2024, exceeding the 5% threshold, indicating non-performing loans (Ahmed et al., 2021). Therefore, bank management needs to address this risk by analyzing internal and external factors to support strategic decision-making.

Internal and external factors, such as bank-specific variables and macroeconomic conditions, have an impact on credit risk, which can affect bank performance (Siddique et al., 2022; Alfadli & Rjoub, 2020). However, studies that combine bank variables, macroeconomics, credit risk, and financial performance in a structural equation model are still limited (Bushashe, 2023; Gadzo et al., 2019). This study uses

Partial Least Squares Path Modeling, which is consistent with the studies by Sharma et al. (2024), Gadzo et al. (2019), and Bushashe (2023), to analyze the influence of these factors on the performance of conventional commercial banks by focusing on time series data analysis to capture long-term patterns and predict future performance (Sezer et al., 2020), which is different from previous studies that used panel data (Siddique et al., 2022; Sharma et al., 2024; Gadzo et al., 2019). In addition, macroeconomic factors that influence non-performing loans and bank performance still need to be studied further (O'Connell, 2022).

1. LITERATURE REVIEW

The definition of bank performance varies according to academic views (Tran & Vo, 2020; Sannino et al., 2021). Bank success can be viewed through both financial and non-financial performance, according to Neves and Proença (2021). Bank financial performance is an overall assessment of the soundness and effectiveness of bank operations in generating profits, maintaining financial stability, and meeting obligations and regulations (Soewarno & Tjahjadi, 2020). In addition, Albertini (2013) describes banking financial performance as a meta-analysis that highlights the profitability of banks. There are categories of bank financial performance that are most commonly used in meta-analysis research, namely accounting-based (accounting returns) and market-based (investor returns) measures (Nguyen et al., 2022). A company's financial success can be assessed using accounting-based metrics, which are utilized to measure efficiency, profitability, and financial health. These metrics assist managers, investors, and creditors in making informed decisions based on financial data. Next, market-based indicators can be used to assess the progress of a company's financial performance. According to Bătae et al. (2021), these indicators use financial market data to measure a company's performance, value, or risk. They reflect how the market perceives the company's value and prospects, based on data such as stock prices, market capitalization, and investment returns (Yenni et al., 2024). Thus, these indicators help investors and financial analysts understand how the company is valued by the market and evaluate its performance from an external perspective (Albertini, 2013). Bătae et al. (2021) explained that, in addition to market-based and accounting-based measures, other financial performance categories that can be used are cash flow-based measurements consisting of operating cash flow, free cash flow, and cash flow to debt ratio. Then, economic-based measures with

Economic Value Added (EVA), and finally, risk-based measures with Value at Risk, risk-adjusted return on capital, and Default Probability. In addition, this study refers to Sharma et al. (2024), who state that ROE, ROA, ROI, and Net Interest Margin (NIM) are accounting-based indicators to assess the financial performance of commercial banks in South Asia.

In Siddique et al. (2022), credit risk pertains to the debtor possibly being unable to make loan payments or complete financial arrangements that will harm the creditors or financial institutions. It is emphasized by Brown and Moles (2014) that credit risk includes the potential financial losses that an institution may face due to the default of a borrower or counterparty to a financial contract. Furthermore, credit risk arises at the time debtors do not fulfill their loan commitments on schedule (Accornero et al., 2018). Thus, credit risk is the inability of the borrower (customer) to repay the loan according to the predetermined period. Credit provided to customers is the income received by banks in the form of loan interest, but credit provided to customers has several credit risks (Tran & Vo, 2020). Credit risk can be measured using the NPL proxy as revealed by Siddique et al. (2022), and the results found a significant relationship between NPLs and financial performance, so NPLs reduce the economic performance of banks. As a result, NPLs impact the financial system of any nation, particularly in developing countries. In addition, cost per loan (CPL) and total loans to total deposits (TLTD) can indicate the difficulty of banks in managing their credit risk (Sharma et al., 2024). In line with Saleh and Abu Afifa (2020), when credit risk increases, bank performance decreases, and vice versa. However, when the risk of credit is low, the financial performance of the bank increases because defaults and loan losses are reduced (Gadzo et al., 2019). Banks are in a better position to reduce credit risk and maintain performance when they have a well-diversified

loan portfolio and efficient risk management procedures (Accornero et al., 2018). Similarly, Naili and Lahrichi (2022) explained that the economic performance of banks increases when credit risk or default risk is effectively managed.

Bank-specific variables are intrinsic and can be controlled by a bank. If intrinsic factors are well controlled, the banking industry can earn large profits; however, if this is not the case, the company's income statement and balance sheet will suffer losses (Aspal et al., 2019). Siddique et al. (2022) describe that the performance of financial banks is greatly influenced by all of their distinctive characteristics, such as quality of earnings, quality of assets, efficacy of management, and liquidity. This study uses the capital adequacy ratio, cost efficiency ratio, average lending rate, and liquidity ratio to measure variables unique to individual banks. This study is in line with Siddique et al. (2022), arguing that the liquidity ratio is a proxy for bank-specific variables that have a significant relationship with the financial performance of commercial banks in South Asia. In addition, Naili and Lahrichi (2022) analyzed bank-specific variables using the capital adequacy ratio (CAR), and the results provide evidence that the loan loss rate is significantly affected by the capital adequacy ratio. The CAR indicator is used to show how strong the bank's capital is in facing risks that may arise, such as credit risk (Ahmed et al., 2021). Large capital owned by banks significantly affects lower loan losses because this large capital is a buffer and a proportion of risk-weighted assets (Priyadi et al., 2021). This negative relationship is supported by the concept from Madugu et al. (2020), which suggests that banks with robust capital adequacy are more inclined to issue cautious loans to preserve capital reserves, while banks with low capital tend to take on greater risks by providing larger loans. In line with Zhang et al. (2023) and Siddique et al. (2022), credit risk, bank-specific characteristics, and the ratio of capital adequacy have an inverse relationship.

Bank management cannot control macroeconomic forces because the macroeconomy is an external or exogenous factor (Chalabi-Jabado & Ziane, 2024). Several empirical studies describe macro variables related to a country's banking sector, such as industry concentration, economic growth,

inflation rate, and interest rate (Demirgüç-Kunt et al., 2021; Caby et al., 2022). Then, other macroeconomic factors are also included by Ahmed et al. (2021), including exchange rates and political risk. This study utilizes proxies such as economic growth, inflation rate, interest rate, and exchange rate to evaluate macroeconomic variables, as Alfadli and Rjoub (2020) suggest that a nation's economic growth rate is the primary factor in determining economic performance. Thus, when the economy is growing, the demand for credit from businesses and consumers tends to increase due to business expansion, increased consumption, and investment, which results in increased interest income for banks and improves their financial performance (Kwashie et al., 2022). High interest rates can then boost bank performance (Alfadli & Rjoub, 2020), and the exchange rate affects banks' financial performance, particularly for those with significant foreign currency exposure or transactions (Kwashie et al., 2022). On the other hand, macroeconomic variables are also related to credit quality by much empirical evidence; for example, Naili and Lahrichi (2022) stated that economic growth has a significant impact on bank credit risk, that is, economic growth by gross domestic product reflects the state of the country's business cycle, and when it is good, households and businesses are more able to pay off their debts, thus reducing the level of non-performing loans. Apart from economic growth, high inflation rates can increase banks' credit risk, as elevated inflation lowers the real value of borrowers' income, thus reducing their ability to meet repayment obligations (Gulati et al., 2019). On the other hand, Ahmed et al. (2021) discovered that interest rates are the primary factor influencing bad credit, as high rates of interest result in higher debt amounts, making it costly and challenging for debtors to repay, ultimately leading to bad credit. Chun and Ardaaragchaa (2024) explained that in addition to interest rates, exchange rates are also a major cause of loans that are not performing.

This study conducts an in-depth analysis of the financial performance of conventional Indonesian commercial banks, which is influenced by internal factors such as bank-specific variables and external factors such as macroeconomic variables. Then, it also discusses its impact on the risk of credit. This study is expected to be a means of learning,

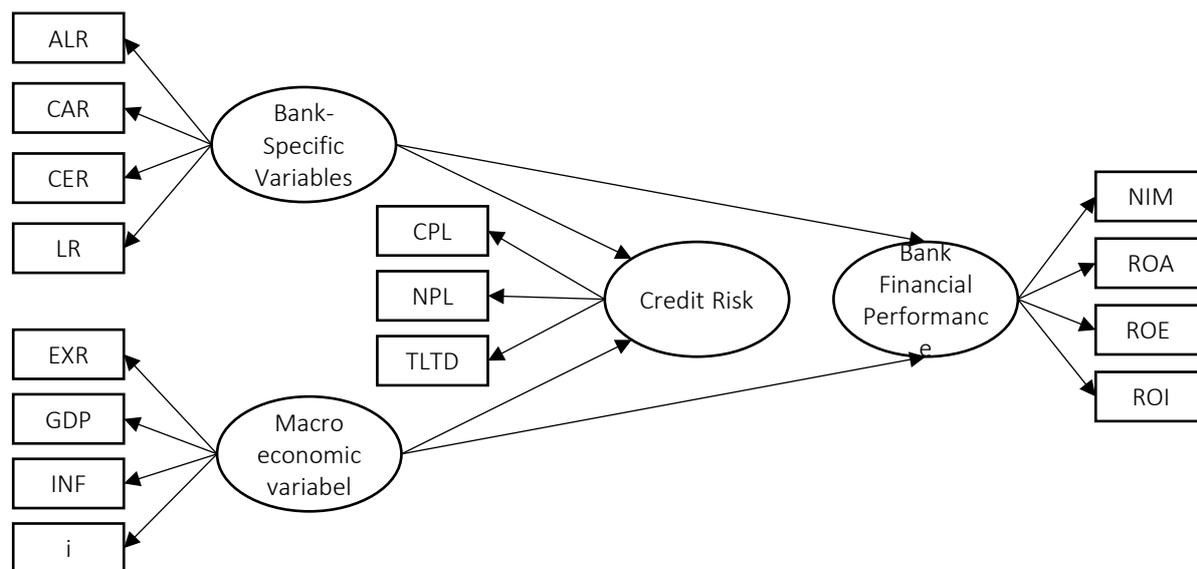


Figure 1. Conceptual model

and it emphasizes the importance of formulating policies to manage banking optimally in the long term, as well as encouraging the achievement of competitive advantage for the banking sector in Indonesia. Based on the results of the previous discussion, the following hypotheses are formulated in this study (Figure 1):

- H_1 : Credit risk significantly impacts Indonesian conventional commercial banks' financial performance.
- H_2 : Bank-specific variables significantly impact Indonesian conventional commercial banks' financial performance.
- H_3 : Bank-specific variables significantly impact Indonesian conventional commercial banks' credit risk.
- H_4 : Macroeconomic variables significantly impact Indonesian conventional commercial banks' financial performance.
- H_5 : Macroeconomic variables significantly impact Indonesian conventional commercial banks' risk of credit.

2. METHOD

This study adopted the causal design methodology from the explanatory research design group

described by Gadzo et al. (2019). The causal research design finds a cause-and-effect problem, so the researcher must be able to categorize the cause. Therefore, the causal research design is very suitable for the current study. The Indonesian Banking Statistics Report, published by the Financial Services Authority, and data from the Central Bureau of Statistics provide data for conventional commercial banks listed in Indonesia from the quarter of 1993 to the quarter of 2023, so the current research data are time series data. Thus, the final number of observations is 124 (31 * 4 = 124). To generalize bank-specific and macroeconomic variables in the analysis of credit risk and financial performance of commercial banks, this study uses the analysis shown in Table 1.

The next step is to create a quantitative statistical equation for the time series data technique, as shown in Equation (1):

$$Y_t = \alpha + \beta_1 X_t + \varepsilon_t \tag{1}$$

Where Y is an endogenous construct, α is the constant term, β represents the estimated coefficient of the exogenous construct, X is the exogenous construct, ε symbolizes the error term for variables intentionally/unintentionally omitted or added, and t represents the period ($t = 1, 2, \dots, N$). The time series regression equation model for this study is shown in equations (2) to (8), which is derived from equation (1):

Table 1. Independent and dependent variable proxies

Variable		Symbol	Measurements	Source	
Dependent Variable	Bank financial performance	Return on assets	ROA	$\frac{\text{Net income}}{\text{Total asset}}$	Siddique et al. (2022)
		Return on equity	ROE	$\frac{\text{Net Income}}{\text{Shareholders' equity}}$	Siddique et al. (2022)
		Return on Investment	ROI	$\frac{\text{Net profit from investment}}{\text{Investment cost}}$	Chalabi-Jabad and Ziane (2024)
		Net Interest Margin	NIM	$\frac{\text{Net interest income}}{\text{Interest earning assets}}$	Chalabi-Jabado and Ziane (2024)
	Credit risk	Non-performing loans	NPL	$\frac{\text{Non performing loans}}{\text{Total loans}}$	Siddique et al. (2022), Naili and Lahrichi (2022)
		Cost per loan	CPL	$\frac{\text{Total bank operating expenses}}{\text{Total loans}}$	Sharma et al. (2024), Burkhanov (2020)
		Total loans to total deposits	TLTD	$\frac{\text{Total loans}}{\text{Total deposits}}$	Sharma et al. (2024), Burkhanov (2020)
Independent Variable	Bank-specific variables	Ratio of Capital Adequacy	CAR	$\frac{\text{Risk weighted assets}}{\text{Total equity}}$	Naili and Lahrichi (2022)
		Ratio of Cost to Efficiency	CER	$\frac{\text{Total operating expenses}}{\text{Total Revenue}}$	Siddique et al. (2022)
		Rate of Average Lending	ALR	$\frac{\text{Net interest income}}{\text{Total Asset}}$	Siddique et al. (2022)
		Ratio of liquidity	LR	$\frac{\text{Total Loans}}{\text{Total Deposits}}$	Siddique et al. (2022)
	Macroeconomic Variable	Economic Growth	GDP	Annual percentage growth rate of GDP	Naili and Lahrichi (2022)
		Inflation Rate	INF	Annual average inflation rate	Naili and Lahrichi (2022)
		Interest Rate	i	Real interest rate per quarter	Kismawadi (2023)
Exchange Rate		EXR	Real exchange rate per quarter	Kismawadi (2023)	

$$ROA_t = \alpha + \beta_1 NPL_t + \beta_2 CPL_t + \beta_3 TLTD_t + \beta_4 CAR_t + \beta_5 CER_t + \beta_6 ALR_t + \beta_7 LR_t + \beta_8 GDP_t + \beta_9 INF_t + \beta_{10} i_t + \beta_{11} EXR_t + \varepsilon_t, \quad (2)$$

$$ROE_t = \alpha + \beta_1 NPL_t + \beta_2 CPL_t + \beta_3 TLTD_t + \beta_4 CAR_t + \beta_5 CER_t + \beta_6 ALR_t + \beta_7 LR_t + \beta_8 GDP_t + \beta_9 INF_t + \beta_{10} i_t + \beta_{11} EXR_t + \varepsilon_t, \quad (3)$$

$$ROI_t = \alpha + \beta_1 NPL_t + \beta_2 CPL_t + \beta_3 TLTD_t + \beta_4 CAR_t + \beta_5 CER_t + \beta_6 ALR_t + \beta_7 LR_t + \beta_8 GDP_t + \beta_9 INF_t + \beta_{10} i_t + \beta_{11} EXR_t + \varepsilon_t, \quad (4)$$

$$NIM_t = \alpha + \beta_1 NPL_t + \beta_2 CPL_t + \beta_3 TLTD_t + \beta_4 CAR_t + \beta_5 CER_t + \beta_6 ALR_t + \beta_7 LR_t + \beta_8 GDP_t + \beta_9 INF_t + \beta_{10} i_t + \beta_{11} EXR_t + \varepsilon_t, \quad (5)$$

$$NPL_t = \alpha + \beta_1 CAR_t + \beta_2 CER_t + \beta_3 ALR_t + \beta_4 LR_t + \beta_5 GDP_t + \beta_6 INF_t + \beta_7 i_t + \beta_8 EXR_t + \varepsilon_t, \quad (6)$$

$$CPL_t = \alpha + \beta_1 CAR_t + \beta_2 CER_t + \beta_3 ALR_t + \beta_4 LR_t + \beta_5 GDP_t + \beta_6 INF_t + \beta_7 i_t + \beta_8 EXR_t + \varepsilon_t, \quad (7)$$

$$TLTD_t = \alpha + \beta_1 CAR_t + \beta_2 CER_t + \beta_3 ALR_t + \beta_4 LR_t + \beta_5 GDP_t + \beta_6 INF_t + \beta_7 i_t + \beta_8 EXR_t + \varepsilon_t. \quad (8)$$

This study uses secondary data with a smart PLS-SEM approach based on the assumption that latent variables cannot be observed directly but are measured indirectly through observable indica-

tor variables, as done by Gadzo et al. (2019). For example, bank financial performance as a latent variable must be assessed using more than one ratio, ROA, ROE, ROI, and NIM. Thus, this study meets the basic assumptions of Smart PLS-SEM. Sharma et al. (2024) also support this by asserting that bank profitability as a latent variable is measured indirectly using NIM, ROA, and ROE ratios analyzed by Smart PLS-SEM. In addition, Hair et al. (2019) explained that researchers should choose PLS-SEM when a complex structural model involves several constructs, indicators, and/or relationships, then there are financial ratios used in the research, secondary data are the foundation of the study and non-normal data distribution, and many more other reasons for choosing PLS-SEM. For this reason, the PLS-SEM methodology has become very popular in various fields, including financial management (Gadzo et al., 2019; Sharma et al., 2024; Ramli et al., 2019; Cuevas-Vargas et al., 2022). Thus, this study is very suitable for using PLS-SEM analysis because it uses secondary data and analyzes banking ratios.

Following Hair et al.'s (2019) guidelines, the PLS-SEM method used in this study is grounded in assessing the measurement and structural models. Evaluation of measurement models in PLS-SEM is a process to assess the extent to which indicators or latent variables in the model have good quality in measuring the intended construct. This evaluation is important to ensure the validity and reliability of the model before proceeding to the structural model analysis stage by assessing internal consistency, validity of convergent, validity of discriminant, and loading Factor. The structural model was evaluated in terms of the coefficient of determination (R^2), effect size (f^2), predictive accuracy determined by the Q^2 value, and path coefficient.

3. RESULTS

Multicollinearity tests between variables were performed before the PLS-SEM evaluation. Hair et al. (2017) claimed that the multicollinearity test guarantees the degree to which the independent variable influences the dependent variable's prediction. To conduct the multicollinearity test, the variance-inflated factor (VIF) can be used.

Multicollinearity is not an issue if the VIF value is less than 5. Table 2 informs that the exogenous latent constructs of this study do not show multicollinearity problems.

The first evaluation is the measurement model evaluating the loading factor value with the specified threshold of 0.70, and if the measurement indicator value is below the specified threshold, it is eliminated from the research model (Hair et al., 2017) as shown in Table 3. The Cronbach's alpha and composite reliability values are next examined to analyze the internal consistency.

Table 2. Multicollinearity test with VIF values

Latent variables	Indicator	VIF
Bank Financial Performance	ROA	1.909
	ROE	1.834
	ROI	1.955
	NIM	1.689
Credit Risk	NPL	1.376
	CPL	1.528
	TLTD	1.391
Bank-specific variables	CAR	1.654
	CER	2.421
	ALR	2.270
	LR	1.292
Macroeconomic variables	GDP	2.263
	INF	2.323
	i	2.660
	EXR	1.681

The traditional view is that Cronbach's alpha produces conservative results for measuring internal consistency dependence in PLS-SEM; thus, the study of Hair et al. (2017) suggested using composite reliability as a substitute. According to Hair et al. (2017), composite reliability values in exploratory research should fall between 0.60 and 0.70, whereas in the later stages of the study, they should fall between 0.70 and 0.90. From Table 2 as well, the composite reliability values of the latent constructs are between 0.8 and 0.9, which means that the latent constructs in this study are reliable. Convergent validity can be verified in this study by passing the composite reliability test and meeting the requirement that the average variance extracted (AVE) value be larger than 0.5. Wong (2013) highlights how crucial it is to confirm each variable's construct validity (AVE). Consequently, latent variables in this research can be incorporated into the research model.

Table 3. The latent construct's validity and reliability

Latent variables	Indicator	Loading Factor	Composite Reliability	AVE
Bank Financial Performance	ROA	0.803	0.889	0.668
	ROE	0.802		
	ROI	0.833		
	NIM	0.829		
Credit Risk	NPL	0.749	0.841	0.639
	CPL	0.805		
	TLTD	0.841		
Bank-specific variables	CAR	0.813	0.859	0.604
	CER	0.786		
	ALR	0.803		
	LR	0.702		
Macroeconomic variables	GDP	0.856	0.901	0.696
	INF	0.867		
	i	0.881		
	EXR	0.724		

The final assessment of the measurement model is discriminant validity. Discriminant validity refers to a construct measure that is empirically distinct and captures specific aspects that other measures in SEM cannot (Hair et al., 2017). In this study, the Fornell-Larcker criterion is used to assess discriminant validity. The Fornell-Larcker criterion requires that in the structural model, the correlation between a construct and each other construct must be less than the square root of the AVE (Wong, 2013). Table 4 shows the correlations

between the latent variables and the square root of the AVE for each, which shows that the square root of each latent variable's AVE is higher than its correlation, confirming discriminant validity.

In this study, the structural model's evaluation was validated. The coefficient of determination (R^2), effect size (f^2), and predictive accuracy (Q^2) are related metrics in structural equation modeling. They share similarities in their roles in evaluating the quality, robustness, and performance of a structural model but focus on different aspects, for example, R^2 focuses on the overall variance explained by the predictors, the independent effects of each predictor on the dependent variable are examined via f^2 , and Q^2 emphasizes the model's ability to predict unseen or out-of-sample data (Ali et al., 2018). R^2 , f^2 , and Q^2 values are shown in Table 5. Hair et al. (2017) stated that the R^2 value ranges from 0 to 1, with higher values indicating better explanatory power. While the f^2 threshold for the small category is 0.02, medium 0.15, and large 0.35. A Q^2 value greater than 0 indicates that the dependent variable in the model has predictive relevance.

The final assessment of the structural model is done through path coefficient analysis. In the structure of the model, the path coefficient shows how strong and in which direction the latent con-

Table 4. Latent variable correlation using AVE square roots (Fornell-Larcker criterion)

Latent variables	Bank financial performance	Bank-specific variables	Credit risk	Macroeconomic variables
Bank Financial Performance	0.817	–	–	–
Bank-Specific Variables	0.698	0.777	–	–
Credit Risk	0.634	0.633	0.799	–
Macroeconomic Variables	0.830	0.775	0.638	0.834

Table 5. R^2 , f^2 , and Q^2 values

Latent variables	R^2	f^2	Q^2
Bank Financial Performance	0.703	–	0.567
Credit Risk	0.446	–	0.453
Bank-specific variables	NA	–	NA
Macroeconomic variables	NA	–	NA
Bank-specific variables → Bank Financial Performance	–	0.009	–
Credit Risk → Bank Financial Performance	–	0.046	–
Macroeconomic variables → Bank Financial Performance	–	0.554	–
Bank-specific variables → Credit Risk	–	0.089	–
Macroeconomic variables → Credit Risk	–	0.100	–

Note: NA denotes that it cannot be used to calculate.

Table 6. Hypothesis testing

Hypothesis	Beta	T scores	P scores	Conclusions
H_1	0.156	1.772	0.077	Not Confirmed
H_2	0.184	2.021	0.001	Confirmed
H_3	-0.347	3.179	0.002	Confirmed
H_4	0.665	7.029	0.000	Confirmed
H_5	0.369	3.492	0.001	Confirmed

structs are directly related to each other. By analyzing the path coefficient, it can be seen whether the hypothesis proposed in the model is accepted or rejected, and understand the degree to which the variables in the structural model are related. The hypothesis can be accepted based on the analysis if the significance value is between 0.001 to 0.05 and the t-statistic value is at the level of 1.96.

4. DISCUSSION

Several hypotheses explore the interaction of risk of credit, factors specific to banks, and macroeconomic influences on banks' financial outcomes. These hypotheses share a common goal of understanding the dynamics between internal (credit risk and bank-specific factors) and external (macroeconomic factors) elements in shaping the overall financial outcomes of banks. The relationship between the risk of credit and the performance of banks is examined in the current study using the measures of CAR, CPL, and TLTD. Currently, the findings demonstrate that credit risk can improve the performance of financial banks with the help of strict and controlled risk management, effective lending policies, appropriate interest rates, strong capital, adequate credit evaluation, clear lending procedures, adequate guarantees, effective government intervention, and the central bank's mandatory supervision of commercial banks to enforce effective regulations that ultimately do not cause problems in credit because credit is the main activity that provides income from bank interest which is the main component of financial performance. It becomes very clear, as shown in Table 4, that credit risk is directly proportional to the financial performance of conventional commercial banks listed in Indonesia. However, the results of this study contradict Siddique et al. (2022), Saleh and Abu Afifa (2020), Gadzo et al. (2019), Naili and Lahrichi (2022), and Accornero et al. (2018), who found a negative relationship between credit

risk and the financial performance of banks. The study by Sharma et al. (2024) supports these findings, noting that a positive credit risk shows banks have taken steps to address and reduce the related risks. Similarly, Ekinçi and Poyraz (2019) stated that the risk of credit can positively affect the performance of financial banks in certain situations, for example, higher credit risk encourages banks to develop innovative products or services such as microcredit, flexible collateral-based credit, or co-financing schemes. These innovations can expand the bank's market share and increase revenues, even though credit risk is often viewed as having a negative impact.

The present study discovered that bank-specific factors had a statistically significant favorable effect on the financial performance of banks. According to the findings, a rise in bank-specific factors (such as CAR, CER, ALR, and LR) resulted in an improvement in bank financial performance. According to Bushashe (2023), bank-specific factors are essential in assessing banks' financial success. Each ratio and indicator used to measure internal bank factors, such as capital adequacy, cost efficiency, lending rates, and liquidity, can provide a clear picture of the bank's ability to generate profits, manage risks, and maintain financial stability. These results corroborate the findings of Aspal et al. (2019) and Siddique et al. (2022) that bank financial performance is influenced by bank-specific variables. The SEM results show that internal bank variables significantly reduce credit risk, implying that the characteristics or internal factors inherent in banking operations play an important and measurable role in determining the level of credit risk. Banks with enough capital to finance their operations would typically avoid making foolish loans to protect the capital they have set aside, which is typically employed as a safeguard against excessive risk. This is because capital is one of the internal variables that sustain bank operations (Siddique et al., 2022). These results sup-

port the findings reported by Naili and Lahrichi (2022), Priyadi et al. (2021), Madugu et al. (2020), and Zhang et al. (2023) that there is a significant and negative relationship between bank-specific variables and credit risk. Then, this study supports the moral hazard hypothesis that undercapitalized banks tend to lend recklessly with inadequate risk screening because they will experience fewer losses in the event of a future financial crisis, causing the number of non-performing loans to be higher. Thus, credit risk is influenced not only by external factors but also by a bank's internal decisions, policies, and efficiency. Bank-specific variables significantly affect credit risk, so banks can focus more on managing their internal aspects to minimize risk and improve financial performance.

Statistically, there is a significant influence of macroeconomic variables (GDP, inflation, interest rates, and exchange rates) on the financial performance of banks. In line with Alfadli and Rjoub (2020) and Kwashie et al. (2022), the increase in bank performance is caused by the economic conditions of a country. Thus, good or stable economic conditions can have a substantial influence on the performance of financial banks, because banks are one of the sectors strongly influenced by macroeconomic factors. Similarly, Bushashe (2023) stated that the banking sector, as the main pillar of the economy, plays an important role in supporting the flow of funds, financing investments, and maintaining overall economic stability. Thus, the performance of banks is strongly

influenced by various factors related to economic conditions. Then this study supports the initial hypothesis that there is a significant relationship between macroeconomic variables and non-performing loans. The hypothesis's outcomes corroborate earlier discoveries that macroeconomic variables are the main cause of non-performing loans (Naili & Lahrichi, 2022; Gulati et al., 2019; Ahmed et al., 2021; Chun & Ardaaraghaa, 2024). This means that a strong economy increases the ability of firms and households to repay their obligations, thereby reducing the number of non-performing loans, and conversely, creditors will find it difficult to meet their loan commitments during an economic downturn, which lowers the credit quality of banks (Ahmed et al., 2021). Thus, macroeconomic variables such as economic growth, inflation rate, interest rate, and exchange rate have a strong impact on nonperforming loans because they affect the stability of debtors' income and the financial performance of firms. In line with Alfadli and Rjoub (2020), macroeconomic variables can pose credit risk due to changes in general economic conditions that affect the borrower's ability to meet loan payment obligations. When economic conditions are poor, financial pressures on individuals and businesses increase, making the risk of credit default higher. Therefore, understanding and managing macroeconomic risk is very important for banks to maintain the quality of the loan portfolio by mitigating credit risk through better risk management and lending policies that are adaptable to economic changes.

CONCLUSION

This study examines credit risk that affects the financial performance of conventional commercial banks in Indonesia, which is influenced by internal factors such as bank-specific variables and external factors such as macroeconomic variables. The results of the study indicate that bank-specific variables are internal factors that are interrelated with credit risk and the financial performance of conventional commercial banks in Indonesia. Likewise, macroeconomic variables play a role in stabilizing the economy, which encourages increased credit from debtors and ultimately improves bank performance through credit interest income. Thus, this study confirms that both internal factors, such as bank-specific variables, and external factors, such as macro variables, are related in influencing credit risk and bank financial performance.

From the study's outcomes, banks must enforce credit risk management policies, with an emphasis on managing bank-specific and macroeconomic factors together. Good management of these two types of variables can help banks maintain stability, optimize financial performance, and increase resilience to potential changes in economic conditions. Effective credit risk management by considering these two

types of variables can be done by maintaining CAR above the minimum threshold to absorb potential losses and ensure a balance between the amount of loans disbursed and available funds, and by reducing the level of NPLs by strengthening the monitoring of customer loan payments. In addition, although macroeconomic variables are beyond the direct control of banks, these factors can be managed through adaptation and risk mitigation strategies, such as allocating assets to investment instruments that are resistant to inflationary fluctuations and channeling loans to sectors that have the most direct impact on economic growth, such as infrastructure, manufacturing or technology.

The model presented in this study is designed for conventional commercial banks, but is also suitable for adoption by shari'ah banks. Therefore, upcoming studies can evaluate and contrast Islamic banks with conventional banks using this methodology. In addition, this study used time series data, so this study is quantitative. Because qualitative data aids in the triangulation of quantitative findings, future research in this area could employ a mixed methodology approach that incorporates both quantitative and qualitative research. Another limitation is that the research data are from Indonesia, so the scope of this study is still narrow. Therefore, future research can expand this study to include more countries in the Southeast Asian region so that the results provide a more accurate and comprehensive picture of developed and developing countries in Southeast Asia, as the macro environment and bank-specific characteristics vary greatly from country to country.

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