

DETERMINANTS OF NET INTEREST MARGIN IN INDONESIAN CONVENTIONAL BANKS: EVIDENCE FROM 2020–2024 (Quantitative Study on Conventional Banks Listed on the Indonesia Stock Exchange for the Period 2020–2024)

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Abstract

This study aims to analyze the effect of Capital Adequacy Ratio (CAR), Non Performing Loan (NPL), and Operating Expenses to Operating Income (BOPO) on Net Interest Margin (NIM) in conventional banks listed on the Indonesia Stock Exchange during the 2020-2024 period. This study uses a quantitative approach with an associative research design. The sample was selected using purposive sampling and consisted of 11 conventional banks, resulting in 55 firm-year observations. The data were obtained from annual financial reports, official publications, and relevant banking sources. The data were analyzed using multiple linear regression with IBM SPSS Statistics 25, while the Cochrane-Orcutt method was applied to correct positive autocorrelation in the final model. The results show that CAR has a positive and significant effect on NIM, while NPL and BOPO have negative but insignificant effects on NIM. Simultaneously, CAR, NPL, and BOPO have a significant effect on NIM. The adjusted R-square value of 0.099 indicates that the independent variables explain 9.9% of the variation in NIM. These findings imply that capital adequacy remains an important internal factor in maintaining net interest margins, while credit risk control and operational efficiency should continue to be improved.

Keywords: BOPO; Capital Adequacy Ratio; Net Interest Margin; Non Performing Loan; Operational Efficiency

1. INTRODUCTION

The banking sector plays a strategic role in maintaining financial system stability and supporting economic growth through its intermediation function. Banks collect funds from surplus economic units and redistribute them to deficit units in the form of credit and other financial services. Therefore, bank performance is not only assessed from profitability, but also from the ability to manage capital, credit risk, and operational efficiency. One of the key indicators used to measure banking profitability and intermediation performance is Net

Interest Margin (NIM). NIM reflects the ability of banks to generate net interest income from earning assets and is often used as an indicator of banking sustainability and financial soundness (Lestari et al., 2021). In the banking literature, the formation of interest margins is explained through the dealership model, in which banks are viewed as risk-averse intermediaries facing uncertainty in loan and deposit transactions (Ho & Saunders, 1981). In a broader perspective, bank interest margins and profitability are also influenced by bank-specific characteristics, macroeconomic conditions, taxation, regulation, financial structure, and institutional factors (Demirguc-Kunt & Huizinga, 1999).

The development of the Indonesian banking industry after the COVID-19 pandemic indicates a relatively stable recovery, although several performance indicators still require attention. The Financial Services Authority reported that in the fourth quarter of 2024, bank credit grew by 10.39% year-on-year, while the Capital Adequacy Ratio (CAR) remained strong at 26.69%. Credit risk also improved, as reflected in the gross Non Performing Loan (NPL) ratio of 2.08% and net NPL ratio of 0.74%. However, from the profitability and efficiency perspective, the banking industry still faced pressure. NIM decreased from 4.81% in the previous year to 4.62% in 2024, while Operating Expenses to Operating Income (BOPO) increased from 78.92% to 81.30% (Otoritas Jasa Keuangan, 2025a). This condition shows that although capital and credit quality remained relatively strong, the decline in interest margin and the weakening of operational efficiency need to be examined further, particularly in the post-pandemic period.

Theoretically, CAR, NPL, and BOPO are relevant bank-specific factors in explaining changes in NIM. CAR reflects the adequacy of bank capital in absorbing risk and supporting business expansion, while NPL represents credit risk that may reduce interest income when debtors fail to meet their obligations (Berger et al., 1995; Saunders & Cornett, 2014). BOPO reflects operational efficiency because a higher BOPO ratio indicates that operating expenses are relatively higher than operating income. Therefore, these three indicators are important for assessing how banks maintain margins through capital strength, credit quality, and cost efficiency (Farrell, 1957; Maudos & Fernandez de Guevara, 2004; Saunders & Schumacher, 2000).

Previous studies have confirmed that NIM is influenced by bank-specific, industry-specific, and macroeconomic conditions. International studies show that bank margins are affected by internal characteristics, market structure, and macroeconomic dynamics (Angori et al., 2019; Demirguc-Kunt & Huizinga, 1999; Islam & Nishiyama, 2016). In the Indonesian context, Endri et al. (2020), Lestari et al. (2021), and Setiawan & Wisna (2021) also show that NIM is associated with internal banking performance and external economic conditions.

However, empirical findings regarding the effects of CAR, NPL, and BOPO on NIM remain mixed. Purba & Triaryati (2018) found that CAR and NPL significantly affected NIM, while BOPO was not significant. Widyanto et al. (2020) found that NPL had a significant effect on NIM, whereas BOPO did not. Putri & Yafiz (2023) reported that NPL

was significant, but CAR was not significant during the COVID-19 pandemic. Safitri et al. (2024) further found that capital adequacy was not significant, while NPL had a negative and significant effect. These differences indicate that the relationship between CAR, NPL, BOPO, and NIM remains empirically inconclusive.

This inconsistency may be caused by differences in research periods, sample characteristics, banking conditions, and analytical methods. In addition, limited studies have focused on the 2020-2024 period, which captures both pandemic-related disruption and post-pandemic banking recovery. During this period, Indonesian banks experienced changes in credit growth, capital management, risk mitigation, cost efficiency, and interest income performance. Therefore, updated empirical evidence is needed to examine whether CAR, NPL, and BOPO still explain NIM dynamics in Indonesian conventional banks.

Based on this research gap, this study aims to analyze the effect of Capital Adequacy Ratio, Non Performing Loan, and BOPO on Net Interest Margin in conventional banks listed on the Indonesia Stock Exchange during the 2020-2024 period. This study examines both partial and simultaneous effects using multiple linear regression. The findings are expected to provide updated evidence on bank-specific financial indicators affecting NIM in the post-pandemic period and to offer practical insights for bank management in maintaining interest margins through capital management, credit risk control, and operational efficiency.

2. RESEARCH METHOD

This study uses a quantitative approach with an associative research design. A quantitative approach is appropriate because this study examines the relationship between independent variables and a dependent variable using statistical analysis (Safitri et al., 2024; Sugiyono, 2020). The purpose of this study is to analyze the effect of Capital Adequacy Ratio (CAR), Non Performing Loan (NPL), and Operating Expenses to Operating Income (BOPO) on Net Interest Margin (NIM) in conventional banks listed on the Indonesia Stock Exchange during the 2020–2024 period. The analysis is conducted using multiple linear regression to examine both partial and simultaneous effects among the variables.

The population of this study consists of conventional commercial banks listed on the Indonesia Stock Exchange during the 2020-2024 period. The sample was selected using purposive sampling, which is a sampling technique based on specific criteria relevant to the research objectives (Sugiyono, 2020). The criteria were determined to ensure that the selected banks were conventional banks, remained listed during the observation period, published annual financial reports, and had complete data for CAR, NPL, BOPO, and NIM. Based on the final screening process, 11 conventional banks were obtained as the research sample, namely BBKA, BBNI, BBRI, BBTN, BJBR, BJTM, BMRI, BNGA, BNII, MASB, and NISP. With a five-year observation period, the total number of observations used in this study was 55 firm-year observations.

Table 1 Sample Selection Criteria

No.	Criteria	Total
1	Conventional commercial banks listed on the Indonesia Stock Exchange during the 2020-2024 period	46
2	Banks that did not publish complete annual financial reports during the 2020-2024 period	(3)
3	Banks that experienced delisting, merger, or change in business status during the observation period	(8)
4	Banks with incomplete data for CAR, NPL, BOPO, and NIM during the observation period	(12)
5	Banks with extreme or inconsistent financial ratio data based on screening	(12)
	Total selected banks	11
	Observation period	5 years
	Total observations	55

Source: Annual financial reports and processed data, 2026.

The data used in this study are secondary data obtained from annual financial reports of conventional banks listed on the Indonesia Stock Exchange, official publications of the Indonesia Stock Exchange, the Financial Services Authority, and the official websites of each sampled bank. Secondary data are suitable for this study because the financial ratios used in the analysis are obtained from audited and publicly available financial statements. The data collection technique used in this study is documentation, namely collecting, recording, and processing financial information from published reports and official documents (Creswell & Creswell, 2018; Sugiyono, 2020).

The dependent variable in this study is Net Interest Margin (NIM), while the independent variables are Capital Adequacy Ratio (CAR), Non Performing Loan (NPL), and BOPO. The operational definitions and measurement of the variables are presented in Table 2. The measurement of banking financial ratios follows the common formulation used in banking financial performance analysis and official banking publications, particularly in measuring capital adequacy, credit risk, operational efficiency, and net interest income performance (Kasmir, 2021; Otoritas Jasa Keuangan, 2025b).

Table 2 Operational Definition and Measurement of Variables

Variable	Symbol	Measurement	Scale
Net Interest Margin	NIM	Net Interest Income / Average Earning Assets × 100%	Ratio
Capital Adequacy Ratio	CAR	Capital / Risk-Weighted Assets × 100%	Ratio
Non Performing Loan	NPL	Non Performing Loans / Total Loans × 100%	Ratio
Operating Expenses to Operating Income	BOPO	Operating Expenses / Operating Income × 100%	Ratio

Source: Otoritas Jasa Keuangan (2025) and Kasmir (2021).

The data analysis technique used in this study consists of descriptive statistics, classical assumption tests, multiple linear regression analysis, partial test, simultaneous test, and coefficient of determination. Descriptive statistics are used to describe the characteristics of the research data through minimum, maximum, mean, and standard deviation values. The classical assumption tests include normality, multicollinearity, heteroscedasticity, and autocorrelation tests. The normality test is conducted using the Kolmogorov-Smirnov test, while multicollinearity is examined using tolerance and Variance Inflation Factor (VIF) values. Heteroscedasticity is tested using the Glejser test, and autocorrelation is examined using the Durbin-Watson test. When autocorrelation is detected, the Cochrane-Orcutt method is applied to obtain a more reliable final regression model (Ghozali, 2021).

Multiple linear regression is used to examine the effect of CAR, NPL, and BOPO on NIM. The regression model used in this study is formulated as follows:

$$\text{NIM} = \alpha + \beta_1\text{CAR} + \beta_2\text{NPL} + \beta_3\text{BOPO} + \varepsilon \quad (1)$$

Where NIM represents Net Interest Margin, CAR represents Capital Adequacy Ratio, NPL represents Non Performing Loan, BOPO represents Operating Expenses to Operating Income, α represents the constant, β_1 - β_3 represent the regression coefficients, and ε represents the error term.

Hypothesis testing is conducted using the t-test and F-test. The t-test is used to examine the partial effect of each independent variable on NIM, while the F-test is used to examine the simultaneous effect of CAR, NPL, and BOPO on NIM. The level of significance used in this study is 5% or 0.05. If the significance value is less than 0.05, the independent variable is considered to have a significant effect on the dependent variable. In addition, the coefficient of determination is used to measure the ability of the independent variables to explain variations in NIM. All statistical analyses are conducted using IBM SPSS Statistics 25.

3. RESULTS AND DISCUSSION

3.1 Descriptive Statistics

This study used 11 conventional banks listed on the Indonesia Stock Exchange during the 2020-2024 period. With a five-year observation period, the total number of observations was 55 firm-year observations. Descriptive statistics were used to describe the characteristics of each research variable, including minimum, maximum, mean, and standard deviation values. The results of the descriptive statistics are presented in Table 3.

Table 3 Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
CAR	55	16.80	29.40	22.7280	3.15212
NPL	55	0.97	4.48	2.7075	0.90207
BOPO	55	28.30	91.61	69.7733	18.50084
NIM	55	2.61	6.89	4.7776	0.97509
Valid N (listwise)	55				

Source: Processed data, 2026.

Based on Table 3, the Capital Adequacy Ratio (CAR) has a minimum value of 16.80%, a maximum value of 29.40%, a mean value of 22.7280%, and a standard deviation of 3.15212. The mean CAR value indicates that, on average, the sampled banks maintained a relatively strong capital position during the observation period. The relatively moderate standard deviation also shows that capital adequacy among the sampled banks varied, but the variation was not as extreme as in the previous screening data.

The Non Performing Loan (NPL) variable has a minimum value of 0.97%, a maximum value of 4.48%, a mean value of 2.7075%, and a standard deviation of 0.90207. This result indicates that, in general, the credit risk level of the sampled banks remained within a manageable range. However, differences in NPL values across banks still need to be considered because credit risk may affect the ability of banks to generate interest income from productive assets.

The BOPO variable has a minimum value of 28.30%, a maximum value of 91.61%, a mean value of 69.7733%, and a standard deviation of 18.50084. This result indicates that operational efficiency varied across the sampled banks. Meanwhile, the Net Interest Margin (NIM) variable has a minimum value of 2.61%, a maximum value of 6.89%, a mean value of 4.7776%, and a standard deviation of 0.97509. These values show that the ability of banks to generate net interest income differed across the sample, although the variation in NIM was lower than the variation in BOPO.

3.2 Classical Assumption Test

Classical assumption tests were conducted to ensure that the regression model met the requirements for linear regression analysis. The tests included normality, multicollinearity, heteroscedasticity, and autocorrelation tests. The results are summarized in Table 4.

Table 4 Classical Assumption Test Results

Test	Indicator	Result	Criteria	Conclusion
Normality	Kolmogorov-Smirnov Asymp. Sig.	0.545	Sig. > 0.05	Normally distributed
Multicollinearity	CAR Tolerance / VIF	0.997 / 1.003	Tolerance > 0.10; VIF < 10	No multicollinearity
Multicollinearity	NPL Tolerance / VIF	0.951 / 1.052	Tolerance > 0.10; VIF < 10	No multicollinearity
Multicollinearity	BOPO Tolerance / VIF	0.948 / 1.055	Tolerance > 0.10; VIF < 10	No multicollinearity
Heteroscedasticity	CAR Sig.	0.796	Sig. > 0.05	No heteroscedasticity
Heteroscedasticity	NPL Sig.	0.805	Sig. > 0.05	No heteroscedasticity
Heteroscedasticity	BOPO Sig.	0.054	Sig. > 0.05	No heteroscedasticity
Autocorrelation	Initial Durbin-Watson	0.834	$du < DW < 4 - du$	Autocorrelation detected
Autocorrelation	Durbin-Watson after Cochrane-Orcutt	2.019	$1.6815 < 2.019 < 2.3185$	No autocorrelation

Source: Processed data, 2026.

The normality test showed an Asymp. Sig. value of 0.545, which is greater than 0.05. This result indicates that the residuals were normally distributed. The multicollinearity test showed that all independent variables had tolerance values above 0.10 and VIF values below 10. Therefore, the regression model was free from multicollinearity problems. The heteroscedasticity test also showed that the significance values of CAR, NPL, and BOPO were greater than 0.05, indicating that the model did not experience heteroscedasticity.

The initial Durbin-Watson value was 0.834, indicating positive autocorrelation. To overcome this problem, the Cochrane-Orcutt method was applied. After transformation, the Durbin-Watson value increased to 2.019 and was located between du and $4 - du$. Therefore, the final regression model was considered free from autocorrelation. The application of the Cochrane-Orcutt method reduced the number of observations from 55 to 54 because the model used transformed lagged variables.

3.3 Multiple Linear Regression Analysis

Multiple linear regression analysis was used to examine the effect of CAR, NPL, and BOPO on NIM. After correcting the autocorrelation problem using the Cochrane-Orcutt method, the final regression results are presented in Table 5.

Table 5 Multiple Linear Regression and Partial Test Results

Variable	Coefficient	Std. Error	Beta	t-statistic	Sig.	Conclusion
Constant	3.153	1.227		2.571	0.013	
CAR	0.101	0.043	0.313	2.320	0.024	Significant
NPL	-0.127	0.137	-0.130	-0.926	0.359	Not significant
BOPO	-0.005	0.008	-0.089	-0.652	0.517	Not significant

Source: Processed data, 2026.

Based on Table 5, the multiple linear regression equation is formulated as follows:

$$\text{NIM} = 3.153 + 0.101\text{CAR} - 0.127\text{NPL} - 0.005\text{BOPO} + \varepsilon \quad (2)$$

The constant value of 3.153 indicates that if CAR, NPL, and BOPO are assumed to be constant or equal to zero, the NIM value is predicted to be 3.153. The regression coefficient of CAR is 0.101, indicating that an increase in CAR tends to increase NIM by 0.101, assuming other variables remain constant. This effect is statistically significant. The coefficient of NPL is -0.127, indicating that an increase in NPL tends to reduce NIM by 0.127, although the effect is statistically insignificant. Meanwhile, the coefficient of BOPO is -0.005, indicating that an increase in BOPO tends to reduce NIM by 0.005, but this effect is also statistically insignificant at the 5% significance level.

The partial test results show that CAR has a significance value of 0.024, which is lower than 0.05. Therefore, CAR has a positive and significant effect on NIM, and the first hypothesis is accepted. NPL has a significance value of 0.359, which is greater than 0.05. Therefore, NPL has a negative but insignificant effect on NIM, and the second hypothesis is rejected. BOPO has a significance value of 0.517, which is also greater than 0.05. Thus, BOPO has a negative but insignificant effect on NIM, and the third hypothesis is rejected.

3.4 Simultaneous Test and Coefficient of Determination

The F-test was used to examine whether CAR, NPL, and BOPO simultaneously affect NIM. The coefficient of determination was used to measure the ability of the independent variables to explain variations in NIM. The results are presented in Table 6.

Table 6 Simultaneous Test and Coefficient of Determination

Indicator	Value
F-statistic	2.931
Sig. F	0.042
R	0.387
R Square	0.150
Adjusted R Square	0.099
Std. Error of the Estimate	0.76307

Source: Processed data, 2026.

Based on Table 6, the F-statistic value is 2.931 with a significance value of 0.042. Since the significance value is lower than 0.05, CAR, NPL, and BOPO simultaneously have a significant effect on NIM. Therefore, the fourth hypothesis is accepted. This result indicates that capital adequacy, credit risk, and operational efficiency collectively contribute to explaining changes in NIM, even though not all variables have significant partial effects.

The Adjusted R Square value is 0.099, indicating that CAR, NPL, and BOPO explain 9.9% of the variation in NIM. Meanwhile, the remaining 90.1% is explained by other factors outside the model. These factors may include Loan to Deposit Ratio, Return on Assets, bank size, interest rate, inflation, economic growth, market structure, and other macroeconomic variables. This is consistent with previous banking studies showing that NIM is influenced not only by bank-specific factors, but also by industry structure and macroeconomic conditions (Angori et al., 2019; Demirguc-Kunt & Huizinga, 1999; Islam & Nishiyama, 2016).

3.5 Discussion

3.5.1 The Effect of CAR on NIM

The results show that CAR has a positive and significant effect on NIM. This finding indicates that capital adequacy is an important internal factor in supporting the ability of banks to generate net interest income. A stronger capital position may provide banks with greater capacity to absorb risk, support credit expansion, and allocate funds to productive assets that generate interest income.

From a theoretical perspective, capital functions as a buffer against potential losses and supports public confidence in financial institutions (Berger et al., 1995). In the context of this study, the positive coefficient suggests that better-capitalized banks may have more flexibility in managing earning assets and maintaining interest margins. Therefore, capital adequacy does not merely reflect regulatory compliance, but also supports the intermediation capacity of banks.

This finding is consistent with Purba & Triaryati (2018), who found that CAR had a positive and significant effect on NIM. However, it differs from Putri & Yafiz (2023) and Safitri et al. (2024), who found that capital adequacy did not significantly affect NIM. These

differences indicate that the role of capital in determining NIM may depend on the observation period, sample characteristics, risk appetite, and the ability of banks to transform capital strength into productive asset growth.

Thus, the significant effect of CAR in this study suggests that, during the 2020-2024 period, capital strength became an important factor in explaining NIM dynamics among conventional banks listed on the Indonesia Stock Exchange.

3.5.2 The Effect of NPL on NIM

The results show that NPL has a negative but insignificant effect on NIM. The negative coefficient indicates that an increase in credit risk tends to reduce net interest margin. This direction is consistent with the theoretical expectation that higher non-performing loans may reduce interest income because problem loans do not generate interest optimally. Credit risk is one of the most important risks faced by banks because debtor default may reduce interest income, weaken asset quality, and increase the need for loan loss provisions (Saunders & Cornett, 2014).

However, the insignificant result indicates that the effect of NPL on NIM was not statistically strong in the sampled banks during the 2020-2024 period. This result may be explained by the ability of banks to manage credit risk through restructuring, loan monitoring, collateral management, and allowance for impairment losses. During and after the COVID-19 pandemic, banks tended to strengthen risk management practices to maintain asset quality, which may have reduced the direct impact of NPL on NIM.

The finding is in line with Briliantoro & Saryadi (2022), who found that NPL did not have a significant effect on NIM. However, this finding differs from Purba & Triaryati (2018) and Safitri et al. (2024), who found that NPL had a negative and significant effect on NIM. These differences indicate that the effect of credit risk on NIM is highly dependent on asset quality, loan portfolio composition, credit restructuring policies, and the effectiveness of risk mitigation during the observation period.

Therefore, although NPL is not significant in this study, the negative direction remains theoretically relevant. Credit risk still needs to be controlled because a persistent increase in problem loans may weaken interest income and reduce the quality of earning assets.

3.5.3 The Effect of BOPO on NIM

The results show that BOPO has a negative but insignificant effect on NIM. The negative coefficient indicates that lower operational efficiency tends to reduce net interest margin. A higher BOPO ratio reflects higher operating expenses relative to operating income, which may place pressure on profitability and reduce the ability of banks to maintain net interest income.

This direction is consistent with the efficiency concept proposed by Farrell (1957), which emphasizes the ability to produce optimal output using minimum input. In the banking context, operational efficiency reflects the ability of banks to manage costs in generating

operating income. However, the insignificant result indicates that BOPO was not the strongest direct determinant of NIM in the sampled banks during the 2020-2024 period.

This finding differs from Briliantoro & Saryadi (2022) and Hidayat et al. (2024), who found that BOPO played an important role in explaining NIM. It also differs from the view of Maudos & Fernandez de Guevara (2004), who identified operating costs as one of the determinants of bank interest margins. Nevertheless, the negative direction in this study supports the theoretical argument that inefficient cost management may weaken margin performance, even if its statistical effect is not significant in the model.

From a managerial perspective, banks still need to improve cost efficiency through digital transformation, process optimization, better cost control, and improved operational productivity. Although BOPO is not significant in this study, operational efficiency remains important for maintaining profitability and long-term banking competitiveness.

3.5.4 The Simultaneous Effect of CAR, NPL, and BOPO on NIM

The simultaneous test shows that CAR, NPL, and BOPO collectively have a significant effect on NIM. This finding indicates that capital adequacy, credit risk, and operational efficiency together contribute to explaining changes in net interest margin. Although NPL and BOPO do not have significant partial effects, their presence in the model remains relevant because NIM is shaped by a combination of internal banking indicators.

The simultaneous significance of the model supports the view that NIM cannot be explained by a single factor. Ho & Saunders (1981) explain that bank interest margins are formed through the intermediation process in which banks face uncertainty in deposits and loans. Demircuc-Kunt & Huizinga (1999) further show that bank interest margins and profitability are influenced by bank characteristics, macroeconomic conditions, taxation, regulation, and institutional factors. Therefore, the significant simultaneous result in this study confirms that NIM is influenced by a combination of financial performance indicators rather than one isolated variable.

The Adjusted R Square value of 0.099 indicates that the independent variables explain 9.9% of the variation in NIM. This relatively low explanatory power suggests that other variables outside the model still have a larger role in explaining NIM. These variables may include Loan to Deposit Ratio, Return on Assets, bank size, market concentration, interest rate, inflation, GDP growth, and monetary policy. This is consistent with Islam & Nishiyama (2016), who found that NIM is affected by bank-specific, industry-specific, and macroeconomic variables. Endri et al. (2020) also found that internal and external factors influence the NIM of banks in Indonesia.

Overall, the findings of this study indicate that CAR is the most prominent variable in the final model because it has a positive and significant effect on NIM, while NPL and BOPO have negative but insignificant effects. Therefore, banks need to maintain adequate capital

while continuing to control credit risk and improve operational efficiency to support sustainable net interest margins.

4. CONCLUSION

The main findings of this study show that Capital Adequacy Ratio (CAR) has a positive and significant effect on Net Interest Margin (NIM) in conventional banks listed on the Indonesia Stock Exchange during the 2020-2024 period. This indicates that stronger capital adequacy can support banks in maintaining interest margins. Meanwhile, Non Performing Loan (NPL) and Operating Expenses to Operating Income (BOPO) have negative but insignificant effects on NIM. Simultaneously, CAR, NPL, and BOPO have a significant effect on NIM. The adjusted R-square value of 0.099 shows that these variables explain 9.9% of the variation in NIM, while the remaining 90.1% is explained by other factors outside the model.

The practical implication of these findings is that bank management should maintain adequate capital as a foundation for supporting earning asset growth and margin stability. At the same time, banks should continue to control credit risk and improve operational efficiency because NPL and BOPO still show negative directions toward NIM. For investors, CAR can be considered an important indicator in assessing the ability of banks to maintain net interest margins, while NPL and BOPO remain relevant indicators for evaluating risk and efficiency.

This study has limitations because it only uses 11 conventional banks and three internal financial indicators during the 2020-2024 period. Future studies are suggested to include other internal and macroeconomic variables, such as Loan to Deposit Ratio, Return on Assets, bank size, interest rate, inflation, and economic growth, to obtain more comprehensive results.

REFERENCES

- Angori, G., Aristei, D., & Gallo, M. (2019). Determinants of banks' net interest margin: Evidence from the Euro Area during the crisis and post-crisis period. *Sustainability*, 11(14), 3785. <https://doi.org/10.3390/su11143785>
- Berger, A. N., Herring, R. J., & Szego, G. P. (1995). The role of capital in financial institutions. *Journal of Banking & Finance*, 19(3-4), 393-430. [https://doi.org/10.1016/0378-4266\(95\)00002-X](https://doi.org/10.1016/0378-4266(95)00002-X)
- Briliantoro, S., & Saryadi. (2022). Pengaruh Capital Adequacy Ratio (CAR), Non Performing Loan (NPL), Beban Operasi Pendapatan Operasi (BOPO), dan Loan to Deposit Ratio (LDR) terhadap Net Interest Margin (NIM): Studi pada Bank Umum Swasta Nasional Devisa dengan manajemen konvensional yang terdaftar di Bursa Efek Indonesia tahun 2015-2019. *Jurnal Ilmu Administrasi Bisnis*, 10(3), 1247-1263. <https://doi.org/10.14710/jiab.2021.32054>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Demircuc-Kunt, A., & Huizinga, H. (1999). Determinants of commercial bank interest margins and profitability: Some international evidence. *The World Bank Economic Review*, 13(2), 379-408. <https://doi.org/10.1093/wber/13.2.379>
- Endri, Marlina, A., & Hurriyaturrohman. (2020). Impact of internal and external factors on the net interest margin of banks in Indonesia. *Banks and Bank Systems*, 15(4), 99-107. [https://doi.org/10.21511/bbs.15\(4\).2020.09](https://doi.org/10.21511/bbs.15(4).2020.09)
- Farrell, M. J. (1957). The measurement of productive efficiency. *Journal of the Royal Statistical Society: Series A (General)*, 120(3), 253-290. <https://doi.org/10.2307/2343100>
- Ghozali, I. (2021). *Aplikasi analisis multivariate dengan program IBM SPSS 26*. Badan Penerbit Universitas Diponegoro.
- Hidayat, A., Liliana, Gustriani, Shodrokov, X., & Hakim, M. N. (2024). COVID-19 pandemic: Impact on net interest margin of Indonesian banking industry. *Sriwijaya International Journal of Dynamic Economics and Business*, 8(1), 23-44. <https://doi.org/10.29259/sijdeb.v8i1.23-44>
- Ho, T. S. Y., & Saunders, A. (1981). The determinants of bank interest margins: Theory and empirical evidence. *Journal of Financial and Quantitative Analysis*, 16(4), 581-600. <https://doi.org/10.2307/2330377>
- Islam, M. S., & Nishiyama, S.-I. (2016). The determinants of bank net interest margins: A panel evidence from South Asian countries. *Research in International Business and Finance*, 37, 501-514. <https://doi.org/10.1016/j.ribaf.2016.01.024>
- Kasmir. (2021). *Analisis laporan keuangan*. Rajawali Pers. <https://www.rajagrafindo.co.id/produk/analisis-laporan-keuangan/>
- Lestari, H. S., Chintia, H., & Akbar, I. C. (2021). Determinants of net interest margin on conventional banking: Evidence in Indonesia Stock Exchange. *Jurnal Keuangan dan Perbankan*, 25(1), 104-116. <https://doi.org/10.26905/jkdp.v25i1.5102>

- Maudos, J., & Fernandez de Guevara, J. (2004). Factors explaining the interest margin in the banking sectors of the European Union. *Journal of Banking & Finance*, 28(9), 2259-2281. <https://doi.org/10.1016/j.jbankfin.2003.09.004>
- Otoritas Jasa Keuangan. (2025a). Laporan surveillance perbankan Indonesia: Triwulan IV 2024. Otoritas Jasa Keuangan. <https://ojk.go.id/id/kanal/perbankan/data-dan-statistik/laporan-profil-industri-perbankan/>
- Otoritas Jasa Keuangan. (2025b). Statistik perbankan Indonesia: Desember 2024. Otoritas Jasa Keuangan. <https://www.ojk.go.id/id/kanal/perbankan/data-dan-statistik/statistik-perbankan-indonesia/Pages/Statistik-Perbankan-Indonesia---Desember-2024.aspx>
- Purba, P. L., & Triaryati, N. (2018). Pengaruh CAR, NPL, BOPO, dan LDR terhadap Net Interest Margin pada perusahaan perbankan yang terdaftar di BEI. *E-Jurnal Manajemen Universitas Udayana*, 7(1), 387-411. <https://doi.org/10.24843/EJMUNUD.2018.v7.i01.p15>
- Putri, R. N., & Yafiz, I. A. (2023). The effect of internet banking, size, NPL and CAR on Net Interest Margin (NIM) and banking efficiency in Indonesia during COVID-19 pandemic. *International Journal of Economic, Business and Applications*, 8(1), 69-90. <https://doi.org/10.31258/ijeaba.84>
- Safitri, E. Z., Zahrah, Saputra, S., & Anwar, M. Z. (2024). Determinants of Net Interest Margin in conventional commercial banking: A fixed effect model. *Target: Jurnal Manajemen Bisnis*, 6(2), 123-134. <https://doi.org/10.30812/target.v6i2.4816>
- Saunders, A., & Cornett, M. M. (2014). *Financial institutions management: A risk management approach* (8th ed.). McGraw-Hill Education.
- Saunders, A., & Schumacher, L. (2000). The determinants of bank interest rate margins: An international study. *Journal of International Money and Finance*, 19(6), 813-832. [https://doi.org/10.1016/S0261-5606\(00\)00033-4](https://doi.org/10.1016/S0261-5606(00)00033-4)
- Setiawan, C., & Wisna, N. M. M. M. (2021). The determinants of Net Interest Margin: An empirical study of Indonesia category-IV banks for the period of 2014-2017. *Studies of Applied Economics*, 39(12). <https://doi.org/10.25115/eea.v39i12.6179>
- Sugiyono. (2020). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Alfabeta.
- Widyanto, D. A., Agung, R. E. W., & Alwiyah. (2020). Analisis faktor-faktor yang mempengaruhi Net Interest Margin pada perusahaan perbankan yang terdaftar di Bursa Efek Indonesia periode 2012-2016. *MAKSIMUM: Media Akuntansi Universitas Muhammadiyah Semarang*, 10(1), 12-22. <https://doi.org/10.26714/mki.10.1.2020.12-22>