

The Effect of Non-Performing Loans (NPL), Operational Efficiency (BOPO), and CET1 Ratio on Financial Performance (Case Study of PT Bank Mandiri Tbk for the 2016-2025 Period)

Yunita Maha Rani¹, Jamaludin²

¹²Universitas Pamulang

Corresponding Author e-mail: Yunitamaha12345@gmail.com, dosen01020@unpam.ac.id

Article History:

Received: 20-08-2026

Revised: 24-08-2026

Accepted: 24-08-2026

Keywords: Non Performing Loans, Operational Efficiency, CET1 Ratio, Return On Assets

Abstract: This study examines the relationships between the Non-Performing Loan (NPL) ratio, Operating Expenses to Operating Income (BOPO), and the Common Equity Tier 1 (CET1) ratio and financial performance, measured by Return on Assets (ROA), at PT Bank Mandiri Tbk during the 2016–2025 period. This study employs a quantitative approach using secondary annual financial-report data from ten observations. The data were analyzed using multiple linear regression with SPSS version 26. The results indicate that the NPL ratio has a negative but statistically insignificant relationship with ROA ($B = -0.177$; $p = 0.264$). BOPO has a negative and statistically significant relationship with ROA ($B = -0.050$; $p = 0.019$), indicating that improved operational efficiency is associated with higher profitability. In contrast, the CET1 ratio has a positive and statistically significant relationship with ROA ($B = 0.233$; $p = 0.036$), suggesting that stronger core capital adequacy is associated with better financial performance. Simultaneously, NPL, BOPO, and CET1 are significantly associated with ROA ($F = 28.164$; $p = 0.001$). The model produces an Adjusted R^2 of 0.901, indicating that the three variables jointly explain 90.1% of the variation in ROA within the observed period. Given the limited number of annual observations and the single-bank research object, the findings should be interpreted as preliminary empirical evidence rather than generalized causal conclusions.

How to Cite: First author., Second author., & Third author. (20xx). The title. Escalate : Economics and Business Journal. 4(3). pp. 472-479 <https://doi.org/10.61536/escalate.v4i3.742>



<https://doi.org/10.61536/escalate.v4i3.742>

This is an open-access article under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) License.



Introduction

The banking industry is the backbone of Indonesia's financial system, contributing significantly to economic development, maintaining monetary stability, and acting as a financial intermediary between those with excess funds and those in need. Through this intermediary function, banks collect

funds from the public through various forms of deposits, which are then redistributed in the form of credit.

PT Bank Mandiri Tbk is one of the largest public banking institutions in Indonesia, established in 1998 through the merger of four state-owned banks: Bank Bumi Daya, Bank Dagang Negara, Bank Ekspor Impor Indonesia, and Bank Pembangunan Indonesia. PT Bank Mandiri Tbk was chosen as the object of this research because it is among the largest banks in Indonesia in terms of assets, loans disbursed, and market share. As a state-owned bank with a very large business scale, Bank Mandiri faces complex challenges, especially in maintaining credit quality to remain within healthy limits and ensuring operational efficiency to maintain good financial performance.

Non-Performing Loan describes the proportion of non-performing loans to total loans disbursed, the higher the NPL, the greater the risk of debtor default which can reduce bank profitability. Operating Costs to Operating Income (BOPO) reflects the bank's efficiency in controlling costs to generate income, while the Common Equity Tier 1 (CET1) Ratio, calculated based on Basel III standards, measures the adequacy of a bank's core capital to risk-weighted assets (RWA) as an indicator of the bank's capital resilience in absorbing potential losses.

Data from the results of the calculation of PT Bank Mandiri Tbk's financial ratios during the 2016-2025 period shows that NPL, BOPO, CET1, and ROA fluctuate from year to year, as shown in the following table:

Table 1.1 Research variable data for PT. Bank Mandiri Tbk for the period 2016-2025

Year	NPL (%)	BOPO(%)	CET1 (%)	ROA(%)
2016	3.95	81.55	20.26	1.77
2017	3.45	71.62	20.57	2.56
2018	2.78	66.82	19.82	3.02
2019	2.37	67.80	20.29	2.87
2020	3.25	80.83	18.81	1.57
2021	2.79	69.50	18.51	2.37
2022	1.87	57.66	18.35	2.97
2023	1.01	51.86	20.29	3.71
2024	0.86	62.38	18.92	3.35
2025	0.95	60.23	18.19	2.84

Source: Data processed from the Financial Report of PT. Bank Mandiri Tbk (2026)

Based on Table 1.1, the NPL ratio shows improvement from 3.95% in 2016 to 0.95% in 2025, despite a slight increase in 2020 due to the impact of the Covid-19 pandemic. The BOPO ratio also shows an improving trend, from 81.55% in 2016 to 60.23% in 2025, indicating increased operational efficiency. Meanwhile, the CET1 ratio remains relatively stable at around 18%-20%, reflecting strong capitalization. Meanwhile, ROA fluctuates, with its lowest point in 2020 (1.57%) and its highest point in 2023 (3.71%), indicating that the bank's financial performance remains inconsistent despite improvements in credit conditions and operational efficiency.

Many studies have investigated the relationship between NPLs, BOPO, and capital ratios on bank financial performance, but the results still show a research gap, particularly regarding the effect of NPLs and BOPO on ROA. Research by Fauziyyah and Nurismalatri (2021) and Abdurrohman et al. (2020) found that NPLs had no significant effect on ROA. Meanwhile, Dini and Manda (2020) found that BOPO had a negative effect on ROA. Furthermore, the use of the Common Equity Tier 1 (CET1) ratio as a capital indicator based on Basel III is still relatively limited, as most previous studies have primarily used the Capital Adequacy Ratio (CAR). Based on this background, this study is entitled "The



Effect of Non-Performing Loans, Operational Efficiency (BOPO), and the CET1 Ratio on Financial Performance at PT Bank Mandiri Tbk for the 2016–2025 Period."

Literature Review

According to Musthafa (2017) financial management means that we are expected to be able to explain several decisions that must be made, namely investment decisions, funding decisions or decisions to fulfill funding needs (financing decisions), and dividend policy decisions which are also commonly called profit sharing decisions (distribution decisions).

According to Kasmir (2016), the definition of Non-Performing Loan (NPL) is credit that includes obstacles caused by two elements, namely from the banking side in analyzing and from the customer who intentionally or unintentionally does not make payments in their obligations. According to Kasmir (2017), BOPO is a ratio to measure the level of bank efficiency, namely the comparison between operational costs and operational income.

According to the Basel Committee on Banking Supervision (BCBS, 2011), the Common Equity Tier 1 (CET1) Ratio is a bank's primary core capital ratio used to measure a bank's ability to absorb losses arising from the risks it faces. CET1 consists of core capital such as common stock and retained earnings, which are the highest quality in a bank's capital structure. Return on Assets (ROA) is used to measure a bank's ability to generate profits based on its assets. ROA was chosen as a proxy for financial performance because it can illustrate management's effectiveness in generating profits from the bank's total assets (Kasmir, 2016).

Research methods

This study applies a quantitative research type with an associative approach, which aims to explain the causal relationship between independent and dependent variables. The data used in this study are secondary data of the time series type with an observation period of 10 years, namely the period 2016 to 2025. The data source was obtained directly from the annual financial report of PT Bank Mandiri Tbk for the period 2016-2025 which was accessed through official publications on the company's website and the Indonesia Stock Exchange. The population in this study includes all financial reports of the company in the specified period, with a sampling technique that focuses on financial data relevant for analysis.

The data analysis technique was processed with the help of SPSS version 26 software, starting from descriptive statistical analysis to provide an overview of the minimum, maximum, average, and standard deviation values of each variable. Before testing the hypothesis, a classical assumption test was conducted which included the normality test (Shapiro-Wilk), multicollinearity test (Tolerance and VIF), heteroscedasticity test (Glejser test), and autocorrelation test (Durbin-Watson and Runs Test). The main analysis method used multiple linear regression, with the final stage being a hypothesis test that included a partial test (t test), a simultaneous test (F test), and a coefficient of determination (Adjusted R Square) to measure the model's ability to explain variations in the dependent variable. The regression model in this study was formulated as follows:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Information:

Y : Financial performance (*Return on Assets*)
 X1 : *Non-Performing Loan*
 X2 : Operating Expenses to Operating Income
 X3 : *Common Equity Tier 1*
 a : Regression constant (intercept)
 $\beta_1 \beta_2 \beta_3$: Regression Coefficient
 ε : *Error Term*

Results and Discussion

Data Results

1. Descriptive Analysis



Descriptive statistical analysis is used to provide an overview of the minimum, maximum, average (mean), and standard deviation values of each research variable.

Table 1.2 Descriptive Statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Standard Deviation
NPL	10	.86	3.95	2.3280	1.11356
BOPO	10	51.86	81.55	67.0250	9.51528
CET1	10	18.19	20.57	19.4010	.93132
ROA	10	1.57	3.71	2.7030	.66136
Valid N (listwise)	10				

Descriptive Statistics, Non Performing Loan (NPL) Variable with a sample (N) of 10 Descriptive Statistics shows that the Non Performing Loan (NPL) variable with a sample (N) of 10 has a minimum value of 0.86 and a maximum of 3.95, with an average of 2.3280 and a standard deviation of 1.11356. The Operating Cost to Operating Income (BOPO) variable has a minimum value of 51.86 and a maximum of 81.55, with an average of 67.0250 and a standard deviation of 9.51528. The Common Equity Tier 1 (CET1) variable has a minimum value of 18.19 and a maximum of 20.57, with an average of 19.4010 and a standard deviation of 0.93132, indicating a relatively stable level of bank capital. The Return On Assets (ROA) variable has a minimum value of 1.57 and a maximum of 3.71, with an average of 2.7030 and a standard deviation of 0.66136, which indicates a level of profitability with relatively small data variations.

2. Classical Assumption Test Results

A. Normality Test

Table 1.3 Normality Test

Tests of Normality

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
NPL	.182	10	.200*	.920	10	.359
BOPO	.127	10	.200*	.963	10	.818
CET1	.222	10	.178	.866	10	.089
ROA	.182	10	.200*	.954	10	.721

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on Table 1.3, all variables have a significance value (Sig.) above 0.05 in the Shapiro-Wilk test, so it can be concluded that all research data are normally distributed and meet the normality assumption.

3. Autocorrelation Test Results

Table 1.4 Autocorrelation Test

Model Summary

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate	Durbin-Watson
1	.966a	.934	.901	.20857	2,603

a. Predictors: (Constant), CET1, BOPO, NPL

b. Dependent Variable: ROA

The Durbin-Watson value in this study was 2.603. This value hovers around 2, indicating no strong indication of autocorrelation in the model. This result was confirmed by a Run Test.

Runs Test

	Unstandardized Residual
Test Value ^a	-.01752
Cases < Test Value	5
Cases ≥ Test Value	5
Total Cases	10
Number of Runs	7
Z	.335
Asymp. Sig. (2-tailed)	.737

a. Median

Based on the results of the Run Test on the residual values of the regression model, the Asymp. Sig. (2-tailed) value was obtained at 0.737, which is greater than 0.05. This indicates that the residuals are random and do not follow a specific pattern. Thus, the regression model does not experience autocorrelation.

4. Multicollinearity Test Results

Table 1.5 Multicollinearity Test Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	NPL	.188	5,313
	BOPO	.215	4,659
	CET1	.748	1,336

a. Dependent Variable: ROA

The tolerance value of the three independent variables is above 0.1 and the VIF value is below 10, so it can be concluded that there are no symptoms of multicollinearity in this regression model, and the model is suitable for further analysis.

5. Heteroscedasticity Test Results

Table 1.6 Heteroscedasticity Test Coefficients^a

Unstandardized Coefficients			Standardized Coefficients				
Model	B	Std. Error	Beta	t	Sig.		
1	(Constant)	-.351		1,028			
	NPL	-.085		.073	-.955	-1.162	.289
	BOPO	.006		.008	.567	.737	.489
	CET1	.015		.044	.138	.334	.750

a. Dependent Variable: ABS_RES

Based on the heteroscedasticity test results, NPL has a significance of 0.289, BOPO is 0.489, and CET1 is 0.750. All three variables have significance values above 0.05, so it can be concluded that the regression model does not experience heteroscedasticity.

6. Multiple Regression Analysis Results

Table 1.7 Multiple Linear Regression Analysis
Coefficientsa

Unstandardized Coefficients			Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
1	(Constant)	1,978		.979	.366
	NPL	-.177	-.299	-1.232	.264
	BOPO	-.050	-.725	-3,196	.019
	CET1	.233	.328	2,697	.036

a. Dependent Variable: ROA

The constant value of 1.978 indicates that if the NPL, BOPO, and CET1 variables are 0, then the ROA value is predicted to be 1.978. The NPL variable has a regression coefficient of -0.177, which means that every 1 unit increase in NPL will decrease ROA by 0.177 assuming other variables remain constant, but the effect is not significant. The BOPO variable has a regression coefficient of -0.050, which means that every 1 unit increase in BOPO will decrease ROA by 0.050 and the effect is significant. The CET1 variable has a regression coefficient of 0.233, which means that every 1 unit increase in CET1 will increase ROA by 0.233 and the effect is significant. Based on the Standardized Coefficients Beta value, BOPO has the largest absolute beta value (-0.725) compared to NPL (-0.299) and CET1 (0.328), so BOPO is the most dominant variable in influencing ROA in this study.

7. Hypothesis Test Results

A. T-Test Results (Partial)

Coefficients ^a					
		Unstandardized Coefficients		Standardized Coefficients	
Model		B	Std. Error	Beta	t
1	(Constant)	1,978	2,021		.979
	NPL	-.177	.144	-.299	-1.232

BOPO	-.050	.016	-.725	-3,196	.019
CET1	.233	.086	.328	2,697	.036

a. Dependent Variable: ROA

The Non-Performing Loan (NPL) variable has a t-value of -1.232 with a significance of 0.264 > 0.05, so H₀ is accepted and H_a is rejected. This means that NPL does not have a significant effect on Financial Performance (ROA) at PT Bank Mandiri Tbk for the 2016-2025 period. The Operating Costs to Operating Income (BOPO) variable has a t-value of -3.196 with a significance of 0.019 < 0.05, so H₀ is rejected and H_a is accepted. This means that BOPO has a negative and significant effect on Financial Performance (ROA). The Common Equity Tier 1 (CET1) variable has a t-value of 2.697 with a significance of 0.036 < 0.05, so H₀ is rejected and H_a is accepted. This means that CET1 has a positive and significant effect on Financial Performance (ROA).

B. F Test Results (Simultaneous)

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3,676	3	1,225	28,164	.0011
	Residual	.261	6	.044		
	Total	3,937	9			

a. Dependent Variable: ROA

b. Predictors: (Constant), CET1, BOPO, NPL

Based on the results of the F test (simultaneous), the calculated F value was 28.164 while the F table was 4.76. Because the calculated F is greater than the F table (28.164 > 4.76) with a significance value of 0.001 < 0.05, then H₀ is rejected and H_a is accepted. Thus, it can be concluded that simultaneously the variables Non-Performing Loan (NPL), Operating Costs to Operating Income (BOPO), and Common Equity Tier 1 (CET1) have a significant effect on Financial Performance (ROA) at PT Bank Mandiri Tbk for the period 2016-2025.

8. Results of the Determination Coefficient Test

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.966 ^a	.934	.901	.20857

a. Predictors: (Constant), CET1, BOPO, NPL

b. Dependent Variable: ROA

Sumber: data diolah dengan IMB SPSS 26

Based on the results of the determination coefficient test, the R Square value of 0.934 indicates that NPL, BOPO, and CET1 together are able to explain 93.4% of the variation in ROA. The Adjusted R Square value of 0.901 indicates that after adjustments for the number of variables and samples, the model is able to explain 90.1% of the variation in ROA, while the remaining 9.9% is explained by other factors outside the research model.

Discussion

The results of the study indicate that Non-Performing Loans (NPLs) did not significantly impact Financial Performance (ROA) at PT Bank Mandiri Tbk for the 2016-2025 period, with a significance value of 0.264 > 0.05. This result aligns with research by Fauziyyah and Nurismalatri (2021) and Abdurrohman et al. (2020), which also found that NPLs did not significantly impact ROA. This condition indicates that fluctuations in PT Bank Mandiri Tbk's non-performing loan ratio, which were relatively

controlled during the study period, did not significantly impact the bank's profitability. Operating Costs to Operating Income (BOPO) had a negative and significant effect on ROA, with a significance value of $0.019 < 0.05$. This finding aligns with research by Dini and Manda (2020) and Loindong and Assa (2023). A lower BOPO ratio indicates a more efficient bank operation, thus increasing profitability, as measured by ROA. BOPO is also the most dominant variable based on an absolute Standardized Beta value of 0.725. The Common Equity Tier 1 (CET1) Ratio has a positive and significant effect on ROA, with a significance value of $0.036 < 0.05$. This result is consistent with research by Hawaldar, Meher, Kumari, and Kumar (2022). This indicates that greater core capital adequacy can support operational activities and the bank's ability to absorb potential losses, thereby increasing profitability. Simultaneously, NPL, BOPO, and CET1 significantly influence ROA with a calculated F value of $28.164 > F \text{ table } 4.76$ and a significance value of $0.001 < 0.05$. The Adjusted R Square value of 0.901 indicates that 90.1% of the variation in ROA can be explained by these three independent variables, while the remaining 9.9% is explained by other factors outside the research model.

Conclusion

Based on the results of research on the influence of Non Performing Loan (NPL), Operating Costs to Operating Income (BOPO), and Common Equity Tier 1 (CET1) on Financial Performance (ROA) at PT Bank Mandiri Tbk for the period 2016-2025, it can be concluded as follows: (1) Non Performing Loan (NPL) does not have a significant effect on ROA, with a significance value of $0.264 > 0.05$ and a calculated t of -1.232; (2) Operating Costs to Operating Income (BOPO) has a negative and significant effect on ROA, with a significance value of $0.019 < 0.05$ and a calculated t of -3.196; (3) Common Equity Tier 1 (CET1) has a positive and significant effect on ROA, with a significance value of $0.036 < 0.05$ and a calculated t of 2.697; (4) Simultaneously, NPL, BOPO, and CET1 have a significant effect on ROA, with a calculated F value of $28.164 > F \text{ table } 4.76$ and a significance of $0.001 < 0.05$. The Adjusted R Square value of 0.901 (90.1%) shows that the three independent variables are able to explain 90.1% of the variation in Financial Performance (ROA), while the remaining 9.9% is explained by other factors outside the research model.

Bibliography

- Abdurrohman, A., Fitrianingsih, D., Salam, A. F., & Putri, Y. (2020). Pengaruh capital adequacy ratio (CAR), loan to deposit ratio (LDR) dan non performing loan (NPL) terhadap return on asset (ROA) pada sektor perbankan di Bursa Efek Indonesia. *Jurnal Revenue: Jurnal Ilmiah Akuntansi*, 1(1), 125–132. <https://doi.org/10.46306/rev.v1i1.12>
- Basel Committee on Banking Supervision. (2011). *Basel III: A global regulatory framework for more resilient banks and banking systems—revised version June 2011*. Bank for International Settlements. <https://www.bis.org/publ/bcbs189.htm>
- Dini, N., & Manda, G. S. (2020). Pengaruh CAR, NPL, NIM, BOPO, LDR dan suku bunga SBI terhadap ROA Bank BUMN periode tahun 2009–2018. *E-Jurnal Ekonomi dan Bisnis Universitas Udayana*, 9(9), 899–920. <https://doi.org/10.24843/EEB.2020.v09.i09.p05>
- Fauziyyah, H. S., & Nurismalatri. (2021). Pengaruh NPL dan BOPO terhadap ROA pada sektor Bank BUMN periode 2015–2020. *Jurnal Arastirma*, 1(2), 173–180. <https://doi.org/10.32493/arastirma.v1i2.12356>
- Hawaldar, I. T., Meher, B. K., Kumari, P., & Kumar, S. (2022). Modelling the effects of capital adequacy, credit losses, and efficiency ratio on return on assets and return on equity of banks during COVID-19 pandemic. *Banks and Bank Systems*, 17(1), 115–124. [https://doi.org/10.21511/bbs.17\(1\).2022.10](https://doi.org/10.21511/bbs.17(1).2022.10)
- Kasmir. (2016). *Analisis laporan keuangan*. Rajawali Pers.
- Kasmir. (2017). *Analisis laporan keuangan*. Rajawali Pers.
- Musthafa. (2017). *Manajemen keuangan*. Andi.
- PT Bank Mandiri (Persero) Tbk. (2016–2025). *Laporan tahunan PT Bank Mandiri (Persero) Tbk tahun 2016–2025*.



