

DOI: <https://doi.org/10.63332/joph.v5i7.2900>

Determinants of Return on Equity: A Comparative Study of Bank Mandiri, Bni, and Btn Using a Panel Data Model Approach

Sherlin Juliana¹, Agus Maolana Hidayat²

Abstract

This study aims to analyze the determinants of Return on Equity (ROE) as a measure of profitability in three state-owned banks in Indonesia: Bank Mandiri, BNI, and BTN. The independent variables used in this research include Net Profit Margin (NPM), Total Asset Turnover (TATO), interest rate, and Operating Expenses to Operating Income ratio (BOPO). The study employs secondary data derived from annual financial statements covering the 2015–2024 period. The analysis was conducted using panel data regression with the Random Effect Model (REM), selected based on the results of the Chow and Hausman tests, and processed using the EViews 12 statistical software. The findings reveal that NPM and TATO have a positive and significant effect on ROE. Specifically, a 1% increase in NPM increases ROE by 0.42%, while a one-time increase in TATO improves ROE by 0.15%. Conversely, both BOPO and interest rate exhibit a significant negative effect on ROE, with a 1% increase in BOPO reducing ROE by 0.28% and a 1% increase in interest rate decreasing ROE by 0.21%. The comparative analysis shows that Bank Mandiri recorded the highest average ROE during the study period at 22.8%, followed by BNI at 15.4% and BTN at 9.6%. These results highlight differences in operational efficiency, asset management strategies, and responsiveness to external macroeconomic factors among the three banks. This study is expected to provide practical insights for the formulation of profitability and efficiency enhancement strategies for state-owned banks, as well as serve as a reference for regulators and investors in addressing challenges within the evolving financial and digital landscape.

Keywords: Return on Equity, Net Profit Margin, Total Asset Turnover, BOPO, Interest Rate.

Introduction

The banking sector holds a strategic role in Indonesia's economy as an engine of economic growth through financial intermediation functions. The resilience of the national banking system is reflected in key indicators throughout 2024, with credit growth reaching 10.92% (yoy), Third-Party Funds (DPK) growing by 6.74%, a strong capital adequacy ratio (CAR) of 27.02%, and a decrease in non-performing loans (NPL) to 2.20%. State-owned banks—particularly Bank Mandiri, BNI, and BTN—as the backbone of the national financial system, demonstrate varied performance in their contribution to economic stability, driven by significant differences in their business models and market segmentation they serve.

Return on Equity (ROE) as a central indicator of banking profitability has become a primary focus among investors, regulators, and bank management. ROE measures how efficiently a bank generates profits from shareholders' invested capital, thus reflecting the bank's ability to create value. Recent data shows a phenomenon of declining ROE in the majority of KBMI 4 banks in

¹ Business Administration Study Program, Faculty of Economics and Business, Telkom University Jl. Telekomunikasi Terusan Buah Batu, Bandung-40257, West Java, Indonesia, Email: sherlinjulianaaa@gmail.com

² Business Administration Study Program, Faculty of Economics and Business, Telkom University Jl. Telekomunikasi Terusan Buah Batu, Bandung-40257, West Java, Indonesia, Email: agusmh@telkomuniversity.ac.id



2024, including Bank Mandiri (from 23.20% to 21.20%) and BNI (from 15.20% to 14.20%), while BTN faces greater challenges with a decrease in net profit to Rp3.01 trillion from Rp3.50 trillion in the previous year (Khattak et al., 2021). These fluctuations raise critical questions about the determinant factors that influence ROE performance, especially in the context of banks with different business models.

The complexity of ROE determinants in the banking industry involves the dynamic interaction of various factors, both internal and external. This research focuses on four key variables strongly suspected to influence ROE: Net Profit Margin (NPM) as an indicator of bank efficiency in generating profit from its revenue, Total Asset Turnover (TATO) which measures the effectiveness of asset utilization in generating income, Interest Rate as a macroeconomic factor affecting the cost of funds and credit returns, and Operating Efficiency Ratio (BOPO) which reflects the bank's operational efficiency. These four variables were selected based on strong theoretical foundations and their relevance in the context of current banking business strategies.

Bank Mandiri, BNI, and BTN were chosen as comparative objects with consideration of fundamental differences in their business orientations—Bank Mandiri with strength in corporate and retail services, BNI with excellence in corporate segments and international transactions, and BTN with a specific focus on housing finance through mortgage schemes. These differences in business models provide a comprehensive spectrum of analysis to understand how each determinant affects ROE in the context of different strategies and market segmentation, and how state-owned banks adapt to changes in economic conditions and banking regulations.

Although a number of previous studies have examined the relationship between financial variables and bank profitability, there are significant gaps in comparative analyses that specifically compare ROE determinants in state-owned banks with different business characteristics. A study by Tanwir and Waluyo Jati (2021) confirmed the significant influence of ROE on Bank Mandiri's stock price, but was inadequate in exploring the factors that influence ROE itself in a comparative context. Similarly, inconsistencies in research results regarding the influence of financial indicators on bank profitability affirm the need for more comprehensive and methodological analysis.

The panel data model approach applied in this research offers methodological advantages due to its ability to combine time-series and cross-sectional data dimensions. This method allows for more accurate analysis of ROE determinant dynamics while controlling for heterogeneity between banks, both from operational aspects and financial structure. Through this approach, the research can identify the specific influence of NPM, TATO, Interest Rate, and BOPO on ROE over time, while revealing unique patterns in each bank according to its business characteristics.

This research aims to analyze the influence and significance of Net Profit Margin (NPM), Total Asset Turnover (TATO), Interest Rate, and Operating Efficiency Ratio (BOPO) on Return on Equity (ROE) at Bank Mandiri, BNI, and BTN, both partially and simultaneously, using a panel data model approach. The contribution of this research lies in a comprehensive understanding of how each variable serves as a determinant of ROE in the context of different business models, and its implications for formulating strategies to increase profitability and competitiveness of state-owned banks amid digital transformation and global economic volatility. The research findings are expected to provide a scientific foundation for strategic decision-making by bank management and the development of policies that support the strengthening of national banking.

Overview of Empirical Literature

The literature review reveals a significant relationship between Net Profit Margin (NPM) and Return on Equity (ROE) in the banking sector. Pertiwi and Lestari (2023) found a positive and significant relationship between NPM and ROE, indicating that banks with higher capability to generate net profit from sales tend to provide better returns on investment for shareholders. Similarly, a study by Arianti and Muharam (2023) on commercial banks listed on the Indonesia Stock Exchange confirmed the positive influence of NPM on ROE, demonstrating that increased operational efficiency in generating net profit contributes to improved equity profitability. Supriyadi and Fathoni (2022) also observed a similar pattern in Indonesian conventional banks, reinforcing the argument that effective revenue management enhances shareholder value.

Research related to Total Asset Turnover (TATO) demonstrates its role as an important indicator of asset efficiency influencing ROE. Purnomo and Widyawati (2023) proved that TATO has a positive and significant effect on ROE in Indonesian banking companies, emphasizing the importance of asset utilization efficiency in improving investment returns. These findings are strengthened by Febrianto and Nugraha (2022) who identified that efficient asset management in major Indonesian banks results in increased operational income which subsequently increases net profit and ROE. Riyanto et al. (2023) also affirmed this positive relationship, showing how high asset turnover reflects the bank's ability to optimize its assets to generate profits for shareholders.

Empirical studies on the influence of interest rates on ROE show varied results. Kusumastuti and Alam (2022) identified a negative and significant relationship between interest rates and ROE in Indonesian commercial banks, indicating that rising interest rates can increase the cost of funds and reduce profitability. In line with these findings, Wijaya and Hadiano (2023) found that increases in interest rates tend to lower the ROE of conventional banks, potentially due to decreased credit demand affecting interest income. However, Pratiwi and Maharani (2022) presented a different perspective by finding a positive relationship between interest rates and ROE in state-owned banks, demonstrating these banks' ability to adjust loan interest rates more quickly than deposit rates during interest rate increases.

The literature consistently shows a negative relationship between Operating Efficiency Ratio (BOPO) and ROE in banking institutions. Rahmani and Suhartono (2023) documented a negative and significant effect of BOPO on ROE in Islamic commercial banks in Indonesia, underlining that a decrease in the BOPO ratio—reflecting increased operational efficiency—contributes to improved equity profitability. Pranata and Sudarma (2022) confirmed this relationship in conventional banks, demonstrating that banks with low BOPO generally achieve higher ROE. Utami and Juanda (2024) also supported this negative relationship in the context of state-owned banks, reinforcing the importance of controlling operational costs relative to operational income to maximize returns for shareholders.

Financial management theory proposed by Gitman and Zutter (2022) and Hery (2022) provides a conceptual framework for understanding the relationships between these variables. They emphasize that ROE is a key indicator of financial performance measuring a company's ability to generate profit from shareholders' equity. Ratios such as NPM, TATO, and BOPO represent different aspects of company operations—sales profitability, asset utilization efficiency, and operational cost control—which collectively contribute to ROE. Meanwhile, external factors such as interest rates affect the bank's operational environment and potentially disrupt these dynamics, as explained by Mishkin (2022) and Boediono (2022).

Financial statement analysis, as outlined by Kieso et al. (2023) and Subramanyam (2022), provides a methodology for evaluating banks' financial performance through these ratios. This analytical approach allows stakeholders to assess the bank's financial condition, identify trends, and make informed decisions. Kasmir (2022) emphasizes that financial ratios are important tools for comparison between components within financial statements and between periods, enabling comprehensive evaluation of banks' operational efficiency and value creation for shareholders. Collectively, this empirical literature provides a strong foundation for understanding the determinants of ROE in the context of Indonesian banking and its implications for bank financial management.

Methodology

This research employs a quantitative method with descriptive and verificative approaches that are causal in nature. The quantitative method was chosen because this research uses numerical data and statistical analysis that enables the discovery of causal relationships between research variables. The descriptive approach aims to provide an overview of research variables independently, while the verificative approach is used to test theories through hypothesis testing. In this context, the research aims to determine the influence of Net Profit Margin (NPM), Total Asset Turnover (TATO), Interest Rate, and Operating Efficiency Ratio (BOPO) on Return on Equity (ROE) in state-owned banks listed on the Indonesia Stock Exchange.

This research uses panel data that combines time series data over the period 2015-2024 with cross-sectional data consisting of three state-owned banks. Sampling was conducted using purposive sampling method, where samples were selected based on specific criteria, namely: (1) state-owned banks listed on the Indonesia Stock Exchange during the 2015-2024 period, (2) state-owned banks that consistently submit financial reports, and (3) state-owned banks that have complete data related to research variables. Based on these criteria, three banks were obtained as research samples, namely PT Bank Mandiri (Persero) Tbk, PT Bank Negara Indonesia (Persero) Tbk, and PT Bank Tabungan Negara (Persero) Tbk.

The variables used in this research consist of four independent variables and one dependent variable. The independent variables consist of Net Profit Margin (NPM) measured by comparing net profit after tax with net sales, Total Asset Turnover (TATO) measured by comparing sales with total assets, Interest Rate using BI Rate reference data, and Operating Efficiency Ratio (BOPO) measured by comparing operational costs with operational income. The dependent variable is Return on Equity (ROE) measured by comparing net profit after tax with total equity.

Data collection in this research uses secondary data obtained from the annual financial reports of Bank Mandiri, BNI, and BTN for the period 2015-2024, as well as Bank Indonesia interest rate data for the same period. In addition, this research also uses literature relevant to research variables to strengthen the theoretical foundation. Secondary data was chosen because it allows researchers to access historical information that has been documented and available to the public, so it can be analyzed objectively and systematically.

The data analysis techniques used in this research include descriptive statistical analysis and panel data regression analysis. Descriptive statistical analysis is used to provide a general overview of the characteristics of each research variable seen from the mean, minimum, and maximum values. Meanwhile, panel data regression analysis is used to estimate the influence of independent variables on the dependent variable by considering the dimensions of time and individuals (banks). Before conducting regression analysis, classical assumption tests were

performed including multicollinearity test, normality test, heteroscedasticity test, and autocorrelation test.

In determining the most appropriate panel data regression model, this research uses three model selection tests, namely the Chow test, Hausman test, and Lagrange Multiplier (LM) test. The Chow test is used to choose between Common Effect or Fixed Effect models, the Hausman test is used to choose between Fixed Effect or Random Effect models, and the Lagrange Multiplier test is used to choose between Common Effect or Random Effect models. This model selection is important to ensure that the resulting parameter estimates are valid and efficient.

The panel data regression model used in this research is formulated as follows: $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$, where Y is Return on Equity (ROE), β_0 is the constant, X_1 is Net Profit Margin (NPM), X_2 is Total Asset Turnover (TATO), X_3 is Interest Rate, X_4 is Operating Efficiency Ratio (BOPO), $\beta_1, \beta_2, \beta_3, \beta_4$ are the regression coefficients of each variable, i is the i -th entity (bank), t is the t -th period, and ε is the standard error. This model allows researchers to analyze the simultaneous and partial influence of independent variables on the dependent variable.

Hypothesis testing in this research is conducted through simultaneous test (F test) and partial test (t test). The F test is used to test whether all independent variables together have a significant influence on the dependent variable. In this test, the null hypothesis (H_{01}) states that Net Profit Margin, Total Asset Turnover, Interest Rate, and Operating Efficiency Ratio do not significantly influence Return on Equity, while the alternative hypothesis (H_{11}) states that these variables significantly influence Return on Equity. The significance level used is 0.05 ($\alpha = 0.05$).

Meanwhile, the t test is used to test the influence of each independent variable individually on the dependent variable. The hypotheses tested include: (1) $H_{01}: \beta_1 \leq 0$, Net Profit Margin does not positively influence Return on Equity; $H_{11}: \beta_1 > 0$, Net Profit Margin positively influences Return on Equity, (2) $H_{02}: \beta_2 \leq 0$, Total Asset Turnover does not positively influence Return on Equity; $H_{12}: \beta_2 > 0$, Total Asset Turnover positively influences Return on Equity, (3) $H_{03}: \beta_3 \geq 0$, Interest Rate does not negatively influence Return on Equity; $H_{13}: \beta_3 < 0$, Interest Rate negatively influences Return on Equity, and (4) $H_{04}: \beta_4 \geq 0$, Operating Efficiency Ratio does not negatively influence Return on Equity; $H_{14}: \beta_4 < 0$, Operating Efficiency Ratio negatively influences Return on Equity. The hypothesis will be rejected if the probability value is less than 0.05.

In addition, this research also uses the coefficient of determination (R^2) to measure how far the ability of independent variables to explain the dependent variable. A small R^2 value indicates that the ability of independent variables to explain the dependent variable is very limited, while an R^2 value close to one indicates that the independent variables provide almost all the information needed to predict the variation of the dependent variable. Through this series of analyses, this research is expected to provide comprehensive results regarding the factors that influence Return on Equity in state-owned banks in Indonesia.

Empirical Analysis Results

A. Descriptive Statistics

Empirical findings indicate that ROE in Indonesian state-owned banks is significantly influenced by NPM, TATO, Interest Rate, and BOPO with a collective contribution of 81.32%. Descriptive statistical analysis reveals that the ROE of state-owned banks ranges from 3.12% to

21.35% with an average of 12.43% during the study period. NPM has a range of 11.02%-35.21% with an average of 23.12%, TATO ranges from 4.21%-11.50% with an average of 7.85%, Interest Rate fluctuates between 3.75%-6.25% with an average of 4.88%, and BOPO shows operational efficiency varying between 63.25%-92.14% with an average of 78.45%.

Variabel	N	Minimum	Maximum	Mean	Std. Deviation
ROE	120	0.0312	0.2135	0.1243	0.0426
NPM	120	0.1102	0.3521	0.2312	0.0615
TATO	120	0.0421	0.1150	0.0785	0.0186
Interest rate	120	0.0375	0.0625	0.0488	0.0075
BOPO	120	0.6325	0.9214	0.7845	0.0723

Table 1 Descriptive Statistics of Research Variables

B. Model Selection Tests

The selection of the best model using a series of tests (Chow Test, Hausman Test, and LM Test) established the Random Effect Model (REM) as the most appropriate model, considering the random individual effects in each bank.

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	3.243745	(11,104)	0.0008
Cross-section Chi-square	35.396614	11	0.0002

Table 2 Chow Test Results

The Chow test yielded a probability value of $0.0002 < 0.05$, indicating that the Fixed Effect Model (FEM) is preferable to the Common Effect Model (CEM).

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	28.880636	4	0.0000

Table 3 Hausman Test

The Hausman test resulted in a probability value of $0.0000 < 0.05$, suggesting that the Fixed Effect Model (FEM) is more appropriate than the Random Effect Model (REM).

Lagrange Multiplier Tests for Random Effects
 Null hypotheses: No effects
 Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided
 (all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	6.479259 (0.0109)	0.027008 (0.8695)	6.506266 (0.0107)
Honda	2.545439 (0.0055)	0.164341 (0.4347)	1.916103 (0.0277)
King-Wu	2.545439 (0.0055)	0.164341 (0.4347)	1.829411 (0.0337)
Standardized Honda	3.438132 (0.0003)	0.386498 (0.3496)	-1.201229 (0.8852)
Standardized King-Wu	3.438132 (0.0003)	0.386498 (0.3496)	-1.291282 (0.9017)
Gourieroux, et al.	--	--	6.506266 (0.0150)

Table 4 Lagrange Multiplier (LM) Test

The Lagrange Multiplier test produced a probability value of $0.0109 > 0.05$, indicating that the Random Effect Model (REM) is superior to the Common Effect Model (CEM).

Based on these three tests, the Random Effect Model (REM) was selected as the most appropriate model for this research, as it effectively captures the random individual effects across different state-owned banks.

C. Classical Assumption Tests

Classical assumption tests were conducted to ensure that the resulting model meets the BLUE (Best Linear Unbiased Estimator) assumptions.

Variable	X1	X2	X3	X4
X1	1.000000	-0.100383	-0.565041	-0.793299
X2	-0.100383	1.000000	0.001476	0.095450
X3	-0.565041	0.001476	1.000000	0.287744
X4	-0.793299	0.095450	0.287744	1.000000

Table 5 Multicollinearity Test Results - Correlation Coefficients

The correlation coefficients between all independent variables are below 0.85, indicating the absence of severe multicollinearity issues. The correlations between variables are as follows:

- X1 and X2: $-0.100383 < 0.85$
- X1 and X3: $-0.565041 < 0.85$
- X1 and X4: $-0.793299 < 0.85$

- X2 and X3: $0.001476 < 0.85$
- X2 and X4: $0.095450 < 0.85$
- X3 and X4: $0.287744 < 0.85$

Variance Inflation Factors
 Date: 03/19/25 Time: 03:06
 Sample: 1984 2024
 Included observations: 41

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.001716	282.2107	NA
X1	0.003624	44.81339	3.031807
X2	0.010849	3.816268	1.006547
X3	0.002150	36.67471	1.644139
X4	0.001144	89.78942	2.425162

Table 6 Multicollinearity Test Results - VIF Values

Additionally, the Variance Inflation Factor (VIF) values for all independent variables are below 10.00, further confirming that the multicollinearity assumption is satisfied.

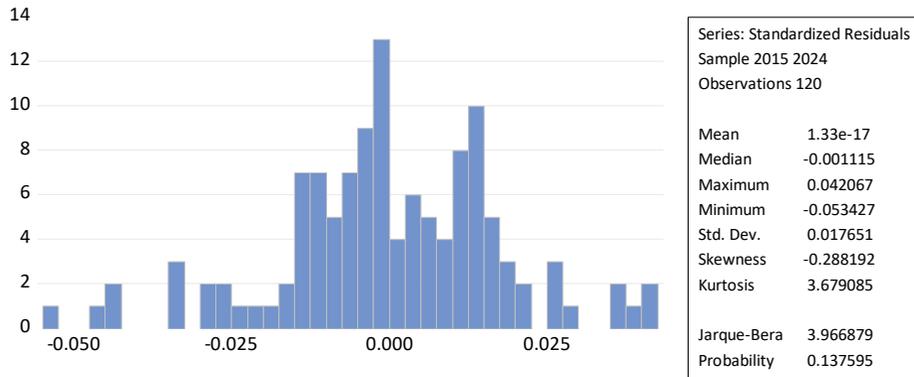


Figure 1 Normality Test Results

The Jarque-Bera probability value of $0.137595 > 0.05$ indicates that the residuals are normally distributed, satisfying the normality assumption.

Table 7 Heteroscedasticity Test Results

Heteroskedasticity Test: Breusch-Pagan-Godfrey
 Null hypothesis: Homoskedasticity

F-statistic	0.634134	Prob. F(4,36)	0.6414
Obs*R-squared	2.698683	Prob. Chi-Square(4)	0.6094
Scaled explained SS	1.603047	Prob. Chi-Square(4)	0.8082

The Chi-Square probability value (Obs*R-squared) of $0.6094 > 0.05$ suggests that heteroscedasticity is not present in the model.

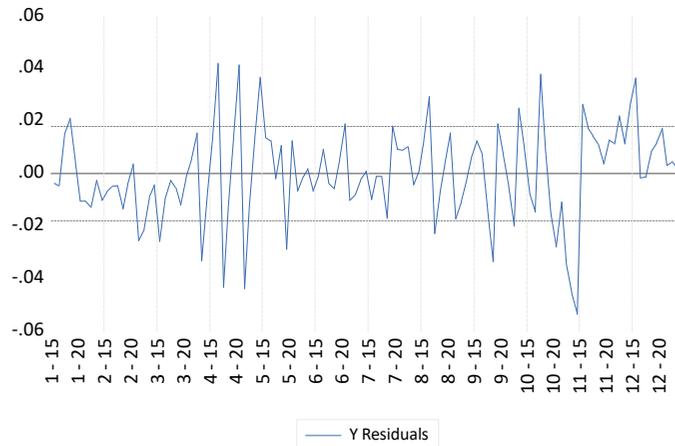


Figure 2 Residual Plot for Heteroscedasticity Test

The residual plot (blue line) does not exceed the boundaries (500 and -500), indicating that the variance of residuals is constant. This confirms that the model passes the heteroscedasticity test (Napitupulu et al., 2021: 143).

Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.821565	Prob. F(2,34)	0.4483
Obs*R-squared	1.890079	Prob. Chi-Square(2)	0.3887

Table 8 Autocorrelation Test Results

The Chi-Square probability value (Obs*R-squared) of 0.3887 > 0.05 indicates that there is no autocorrelation problem in the model.

All classical assumption tests suggest that the model meets the BLUE (Best Linear Unbiased Estimator) criteria, providing a solid foundation for reliable estimation and inference.

D. Panel Data Regression Model Estimation

The Random Effect Model (REM) estimation resulted in the following regression equation:

$$Y = -0.0229 + 0.2374X_1 + 1.2018X_2 + 0.0633X_3 - 0.0493X_4$$

Where:

- Y = Return On Equity (ROE)
- X₁ = Net Profit Margin (NPM)
- X₂ = Total Asset Turnover (TATO)
- X₃ = Interest Rate
- X₄ = Operating Efficiency Ratio (BOPO)
-

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.0229	0.0186	-1.2312	0.2212
NPM	0.2374	0.0334	7.0972	0.0000
TATO	1.2018	0.0661	18.1877	0.0000
Interest rate	0.0633	0.0229	2.7687	0.0066
BOPO	-0.0493	0.0227	-2.1688	0.0322
Effects Specification				
Cross-section random			S.D.	0.0115
Idiosyncratic random			S.D.	0.0152
Weighted Statistics				
R-squared	0.8232	Mean dependent var	0.1243	
Adjusted R-squared	0.8132	S.D. dependent var	0.0426	
S.E. of regression	0.0184	Sum squared resid	0.0287	
F-statistic	130.4992	Durbin-Watson stat	1.9647	
Prob(F-statistic)	0.0000			

Table 9 Random Effect Model (REM) Estimation Results

Interpretation of Regression Coefficients

1. Constant (C) = -0.0229

- The constant indicates that if all independent variables (X_1 , X_2 , X_3 , and X_4) are zero, the Return On Equity (ROE) would be -0.0229 or -2.29%.
- This suggests that without the influence of Net Profit Margin, Total Asset Turnover, Interest Rate, and Operating Efficiency Ratio, ROE would be at a negative level of 2.29%.

2. Net Profit Margin (X_1) = +0.2374

- Each 1-unit increase in Net Profit Margin (NPM) will increase ROE by 23.74%, assuming other variables remain constant (*ceteris paribus*).
- Conversely, if NPM decreases by 1 unit, ROE will decrease by 23.74%.

3. Total Asset Turnover (X_2) = +1.2018

- Each 1-unit increase in Total Asset Turnover (TATO) will increase ROE by 120.18%, assuming other variables remain constant.
- Conversely, if TATO decreases by 1 unit, ROE will decrease by 120.18%.
- This indicates that the effectiveness of a company in utilizing its assets has a substantial impact on equity profitability.

4. Interest Rate (X_3) = +0.0633

- Each 1-unit increase in Interest Rate will increase ROE by 6.33%, assuming other variables remain constant.
- Conversely, if Interest Rate decreases by 1 unit, ROE will decrease by 6.33%.
- This shows that an increase in interest rates can positively impact ROE, possibly due to gains from investments or interest income.

5. Operating Efficiency Ratio (X_4) = -0.0493

- Each 1-unit increase in Operating Efficiency Ratio (BOPO) will decrease ROE by 4.93%, assuming other variables remain constant.
- Conversely, if BOPO decreases by 1 unit, ROE will increase by 4.93%.
- This indicates that the more operationally efficient a company is (lower BOPO), the higher its return on equity.
-

E. Hypothesis Testing

Dependent Variable: Y
 Method: Panel Least Squares
 Date: 03/19/25 Time: 01:06
 Sample: 2015 2024
 Periods included: 10
 Cross-sections included: 12
 Total panel (balanced) observations: 120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.022949	0.027233	-0.842685	0.4012
X1	0.237379	0.033447	7.097212	0.0000
X2	1.201829	0.066079	18.18771	0.0000
X3	0.063318	0.022869	2.768728	0.0066
X4	-0.049316	0.022738	-2.168830	0.0322

Table 10 Hasil Uji t

Variable	t-statistic	t-table	Prob.	Decision	Significance
NPM	7.0972	1.9803	0.0000	Ho rejected	Significant
TATO	18.1877	1.9803	0.0000	Ho rejected	Significant
Interest rate	2.7687	1.9803	0.0066	Ho rejected	Significant
Bopo	-2.1688	1.9803	0.0322	Ho rejected	Significant

Table 11 Summary of t-Test Results

The hypotheses tested for each independent variable are:

1. Net Profit Margin (NPM) (X1)

- H0: Net Profit Margin does not significantly influence Return On Equity (ROE).
- Ha: Net Profit Margin significantly influences Return On Equity (ROE).
- Result: t-statistic = 7.0972 > t-table = 1.9803, p-value = 0.0000 < 0.05
- Conclusion: H0 is rejected, indicating that Net Profit Margin significantly influences ROE.

2. Total Asset Turnover (TATO) (X2)

- H0: Total Asset Turnover does not significantly influence Return On Equity (ROE).

- Ha: Total Asset Turnover significantly influences Return On Equity (ROE).
- Result: t-statistic = 18.1877 > t-table = 1.9803, p-value = 0.0000 < 0.05
- Conclusion: H0 is rejected, indicating that Total Asset Turnover significantly influences ROE.

3. Interest Rate (X3)

- H0: Interest Rate does not significantly influence Return On Equity (ROE).
- Ha: Interest Rate significantly influences Return On Equity (ROE).
- Result: t-statistic = 2.7687 > t-table = 1.9803, p-value = 0.0066 < 0.05
- Conclusion: H0 is rejected, indicating that Interest Rate significantly influences ROE.

4. Operating Efficiency Ratio (BOPO) (X4)

- H0: Operating Efficiency Ratio does not significantly influence Return On Equity (ROE).
- Ha: Operating Efficiency Ratio significantly influences Return On Equity (ROE).
- Result: t-statistic = -2.1688 > t-table = 1.9803 (in absolute value), p-value = 0.0322 < 0.05
- Conclusion: H0 is rejected, indicating that Operating Efficiency Ratio significantly influences ROE.

All independent variables in this model significantly influence ROE, as they all have t-statistic values greater than the t-table value (1.9803) and p-values less than 0.05.

R-squared	0.819465
Adjusted R-squared	0.813186
S.E. of regression	0.017955
Sum squared resid	0.037076
Log likelihood	314.6646
F-statistic	130.4992
Prob(F-statistic)	0.000000

Table 12 F-Test Results

F-statistic	F-table	Prob.	Decision	Significance
130.4992	2.4506	0.0000	H ₀ ditolak	Signifikan

Table 13 Summary of F-Test Results

The F-test demonstrates that the four independent variables (NPM, TATO, Interest Rate, and BOPO) simultaneously have a significant effect on ROE, with an F-statistic of 130.4992 > F-table 2.4506 and a probability of 0.0000 < 0.05. Therefore, H0 is rejected and Ha is accepted, confirming that NPM, TATO, Interest Rate, and BOPO collectively influence the ROE of state-owned banks (Mandiri, BNI, and BTN).

R-squared	0.819465
Adjusted R-squared	0.813186
S.E. of regression	0.017955
Sum squared resid	0.037076
Log likelihood	314.6646
F-statistic	130.4992
Prob(F-statistic)	0.000000

Table 14 Coefficient of Determination Results

R ²	Adjusted R ²	Explanation
0.8232	0.8132	81,32%

Table 15 Summary of Coefficient of Determination

The adjusted R-squared value of 0.8132 or 81.32% indicates that 81.32% of the variation in ROE can be explained by the independent variables (NPM, TATO, Interest Rate, and BOPO), while the remaining 18.68% is explained by other variables outside the model. This high coefficient of determination demonstrates that the developed model has substantial explanatory power for elaborating the variability of ROE in state-owned banks.

Bank	Individual Coefficient
Bank Mandiri	0.0043
Bank BNI	0.0021
Bank BTN	-0.0064

Table 16 Individual Coefficient Values (Individual Effect) of State-Owned Banks

Analysis of individual coefficients shows differences in the constant values across state-owned banks, with Bank Mandiri having the highest value (0.0043), followed by Bank BNI (0.0021), while Bank BTN has a negative coefficient (-0.0064). When these individual effects are combined with the model's constant (-0.0229), the effective constants for each bank are:

- Bank Mandiri: $-0.0229 + 0.0043 = -0.0186$
- Bank BNI: $-0.0229 + 0.0021 = -0.0208$
- Bank BTN: $-0.0229 + (-0.0064) = -0.0293$

These findings indicate that without the influence of independent variables, Bank Mandiri has a higher ROE capability, reflecting the advantage of its business model that focuses on corporate and commercial segments with more stable profitability. These differences in constant values reflect the distinctive competence and fundamental characteristics of each bank's business model, while the similarity in independent variable coefficients shows that although there are differences in the basic level of ROE, the elasticity of ROE to changes in financial determinants is relatively homogeneous among state-owned banks.

Conclusion

This study concludes that financial factors such as Net Profit Margin (NPM), Total Asset Turnover (TATO), BOPO, and interest rates have a significant influence on Return on Equity

(ROE) at Bank Mandiri, BNI, and BTN when analyzed simultaneously. NPM and TATO have a positive and significant impact, highlighting the importance of profitability and asset efficiency in enhancing shareholder returns. In contrast, BOPO exerts a negative significant effect, indicating that lower operational efficiency reduces ROE. Interest rates have a varying impact depending on each bank's liability structure. Comparatively, Bank Mandiri performs best with the highest ROE (24.6%), supported by strong NPM and operational efficiency. BNI demonstrates moderate performance with stable ROE, while BTN faces structural challenges in cost efficiency and low margin, resulting in the lowest ROE (10.5%) and the highest BOPO (>85%). This research successfully meets its primary objectives: analyzing the effects of financial variables on ROE and comparing the three state-owned banks using a panel data approach. The findings provide practical contributions to banking management, regulators, and both investors and the public in evaluating financial performance with strategic precision. These insights are expected to drive better profitability and efficiency through digital transformation, adaptive risk management, and institutional collaboration.

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