

The Effect of Operational Efficiency, Credit Risk, and Revenue Diversification on the Profitability of Commercial Banks

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Abstract—This study aims to analyze the effect of operational efficiency, credit risk, and income diversification on the profitability of conventional commercial banks listed on the Indonesia Stock Exchange (IDX) for the period 2022–2024. Profitability is measured using Return on Assets (ROA), while operational efficiency is proxied by Total Asset Turnover (TATO), credit risk by Gross Non-Performing Loans (NPL), and income diversification by Fee-Based Income (FBI). This study uses a quantitative approach with a causal associative method. The data used is secondary data in the form of annual bank financial reports obtained from the official websites of the IDX and the Financial Services Authority. The sampling technique was carried out using purposive sampling, resulting in 105 observations during the research period. Data analysis was performed using multiple linear regression with the help of SPSS version 23 software, accompanied by classical assumption tests, partial tests (t-tests), and determination coefficients. The results showed that, partially, operational efficiency ($t = 2.728$, $p = 0.008$) and income diversification ($t = 4.064$, $p = 0.000$) had a positive and significant effect on profitability, while credit risk ($t = -7.393$, $p = 0.000$) had a negative and significant effect on profitability. The regression model demonstrates strong explanatory power with an Adjusted R-Square of 0.586, indicating that 58.6% of the variation in bank profitability can be explained by the three independent variables. These findings indicate that banks' ability to manage assets efficiently, maintain credit quality, and develop non-interest income are important factors in improving the profitability of conventional commercial banks amid the dynamics of economic recovery.

Keywords: Operational Efficiency; Credit Risk; Revenue Diversification; Profitability; Commercial Banks

1. INTRODUCTION

The banking sector is an important component of the national financial system, playing a strategic role in supporting development and maintaining economic stability. Banks function as financial intermediaries, collecting funds from the public and redistributing them in the form of credit or financing (Pasha, 2024). Through this function, banks not only drive national financial flows but also play a role in maintaining public trust and facilitating cross-sector economic activity. Dalimunthe & Lubis, (2023) emphasize that the effectiveness of banking's intermediation function is the primary foundation for a country's sustainable economic growth.

The development of the banking sector in Indonesia shows a positive trend, one of which is indicated by the increasing number of conventional commercial banks listed on the Indonesia Stock Exchange (IDX). This condition indicates that the banking sector is highly attractive to investors and contributes significantly to national economic growth. According to Dewi et al., (2025), the presence of banks listed on the IDX encourages transparency in financial reporting and simplifies performance monitoring, making it an important indicator in assessing a bank's ability to survive and create value for shareholders.

However, in recent years, the Indonesian banking sector has faced quite complex dynamics. The 2022–2024 period marks the post-pandemic economic recovery phase, marked by an increase in Bank Indonesia's benchmark interest rate from 3.5% to 6%, inflationary pressures, and rising operational costs due to financial structure adjustments and capital strengthening. Hapsari & Baidhowi, (2025) state that these conditions put pressure on net interest income and increase banks' operating expenses, causing fluctuations in banking profitability.

These profitability fluctuations are reflected in the development of Return on Assets (ROA) of conventional commercial banks during the 2022–2024 period. According to data from the Financial Services Authority (OJK), the average ROA was recorded at 2.43% in 2022, increasing to 2.74% in 2023, and then declining to 2.69% in the January–September 2024 period. Although this figure remains above Bank Indonesia's minimum standard of 1.5%, these fluctuations indicate that the banking industry's profitability has not yet fully stabilized amidst changes in the economic structure. This condition indicates the need to identify factors influencing bank profitability for optimal management.

Pressure on profitability is also reflected in the disparity in performance between banks. Large-scale banks such as Bank Mandiri and BRI were still able to maintain ROA above 3% in 2023, at 4.03% and 3.12%, respectively. Conversely, medium-sized banks in the KBMI 2 group experienced a significant decline in ROA, from 2.20% in December 2023 to 1.64% in March 2024. This difference indicates that banks' resilience to economic pressures varies significantly, necessitating a more in-depth analysis of the determinants of profitability.

Profitability is a key indicator in assessing a bank's financial performance and is generally measured using the Return on Assets (ROA) ratio (Suaidah et al., 2024). This ratio reflects a bank's ability to generate profits from all its assets. Afrizan et al., (2024) states that a higher ROA indicates better management performance in utilizing assets to generate profits. High profitability also indicates efficient resource management, maintained credit quality, and the bank's ability to create added value for shareholders.

From a theoretical perspective, bank profitability can be explained through the Resource-Based View (RBV) Theory proposed by Barney (1991). This theory emphasizes that a company's competitive advantage and performance are determined by its ability to optimally manage internal resources. In the banking context, internal resource management is reflected in operational efficiency, credit risk control, and revenue diversification. Resources that meet the VRIO (Valuable, Rare, Inimitable, and Organized) criteria will generate sustainable competitive advantage that directly impacts profitability.

One factor influencing profitability is operational efficiency. In measuring operational efficiency in banking, there are several proxies commonly used, including Operating Expenses to Operating Income (BOPO), Cost-to-Income Ratio (CIR), and Total Asset Turnover (TATO). While BOPO and CIR directly measure operational cost efficiency by comparing expenses to income, this study employs TATO as a proxy for operational efficiency with a specific focus on asset productivity and managerial utilization of the balance sheet. It is important to acknowledge that TATO has certain limitations as an efficiency measure in banking contexts, as banks generate income primarily through interest spreads rather than through rapid asset turnover as in retail or manufacturing sectors (Priyanti & Oktoriza, 2023). However, TATO remains relevant as it captures management's ability to deploy and utilize the bank's asset base including loans, securities, and other earning assets to generate operating income. In this study, TATO is interpreted not as a measure of cost efficiency, but rather as an indicator of asset productivity and the effectiveness of management in utilizing the bank's balance sheet resources to generate revenue (Tofan et al., 2022). This ratio indicates a bank's ability to utilize assets to generate operating income. The higher the TATO, the more efficient the bank is in managing its assets, thus positively impacting profit growth. Nurmawati, (2022) and Sembiring & Janrosl, (2023) found that TATO positively impacts ROA. However, optimizing asset productivity is often hampered by high digital investment and the cost of updating technology systems.

In addition to operational efficiency, credit risk is also a crucial factor affecting bank profitability. This risk is measured using the Gross Non-Performing Loan (NPL) ratio. A high Gross NPL reflects increasing non-performing loans, which have the potential to reduce bank profits. Although the average Gross NPL in national banks in 2023 remained below the Financial Services Authority (OJK) limit of 5%, increases in several banks indicate pressure on borrowers' repayment capacity. Research by Lestari & Hersugondo, (2021) shows that Gross NPL has a significant negative effect on ROA.

On the other hand, revenue diversification through fee-based income is a crucial strategy for maintaining stable bank profits. Non-interest income from banking services can provide a buffer when interest margins are under pressure. Efriandy et al., (2025) found that revenue diversification positively impacts profitability, although other studies have shown inconsistent results.

Based on various phenomena and inconsistencies in previous research results, this study focuses on the impact of operational efficiency (TATO), credit risk (Gross Non-Performing Loans), and revenue diversification (Fee-Based Income) on the profitability (ROA) of conventional commercial banks listed on the Indonesia Stock Exchange (IDX) for the 2022–2024 period. This study is expected to provide a comprehensive overview of the determinants of banking profitability amidst the dynamics of national economic recovery.

2. RESEARCH METHODS

This study uses a quantitative approach with a causal associative research method. According to Ghozali (2020), quantitative research can be understood as a research method that utilizes various numbers and statistical calculations to conduct data analysis. The quantitative approach was chosen because the study aims to test the influence of independent variables on dependent variables through numerical data processing and statistical analysis. The causal associative method is used to analyze the causal relationship between operational efficiency, credit risk, and revenue diversification on the profitability of conventional commercial banks. The data used are sourced from the banks' annual financial reports, allowing for objective and measurable hypothesis testing.

Research Hypotheses

H1 = Operational Efficiency has a Positive Effect on Commercial Bank Profitability

H2 = Credit Risk has a Negative Effect on Commercial Bank Profitability

H3 = Revenue Diversification has a Positive Effect on Profitability

The population in this study was all conventional commercial banks listed on the Indonesia Stock Exchange (IDX) during the 2022–2024 period, totaling 43 banks. The population was selected based on the availability and transparency of officially published financial data in accordance with the regulations of the Financial Services Authority (OJK) and the IDX. The sample was determined using a purposive sampling technique, which selects samples based on certain criteria, including conventional commercial banks consistently listed on the IDX during the study period and those with complete financial report data related to the research variables. Based on these criteria, 35 banks were selected as research samples, resulting in 105 observations (35 banks × 3 years) for the panel data analysis.

The dependent variable in this study is profitability, measured using the Return on Assets (ROA) ratio. Meanwhile, the independent variables include operational efficiency, measured by Total Asset Turnover (TATO), credit risk, measured by Gross Non-Performing Loans (Gross NPL), and revenue diversification, measured by Fee-Based Income

(FBI). All variables are measured using a ratio scale. The data used are secondary data obtained through documentation methods from annual reports and bank financial statements published on the official IDX website and each bank's website.

The data were analyzed using multiple linear regression with SPSS version 23. Given that this study used panel data (35 banks over 3 years), special attention was paid to the issue of autocorrelation, which commonly occurs in panel datasets. Before performing the regression analysis, classical assumption tests were conducted, including a normality test using the One-Sample Kolmogorov-Smirnov test, a multicollinearity test using Tolerance and VIF, a heteroscedasticity test using the Glejser test, and an autocorrelation test using the Durbin-Watson test to detect residual correlations between observations that could cause inefficient estimates. The regression model used is $ROA = \beta_0 + \beta_1TATO + \beta_2NPL + \beta_3FBI + \varepsilon$. Hypothesis testing was performed using the t-test to test the partial effect of each independent variable (with a significance criterion of < 0.05) and the coefficient of determination (Adjusted R^2) to measure the model's ability to explain the variation in the dependent variable.

3. RESULTS AND DISCUSSION

3.1 Results

This study aims to analyze the effect of operational efficiency, credit risk, and revenue diversification on the profitability of conventional commercial banks listed on the Indonesia Stock Exchange (IDX) for the 2022–2024 period. The study was conducted using a quantitative approach using secondary data sourced from the banks' annual financial reports. The research sample was determined using a purposive sampling technique and resulted in a number of conventional commercial banks meeting the research criteria with a total number of observations during the observation period.

3.1.1 Descriptive Statistical Analysis

Table 1. Results of descriptive statistical tests

	N	Descriptive Statistics			
		Minimum	Maximum	Mean	Std. Deviation
X1 TATO	105	,0003	,2468	,086722	,0446531
X2 NPL Gross	105	,0007	,1025	,034692	,0264568
X3 Fee Based Income	105	,0000	1,1272	,286919	,3225921
Y ROA	105	-,0331	,0454	,008805	,0158154
Valid N (listwise)	105				

Based on the descriptive statistics, the operational efficiency variable measured using Total Asset Turnover (TATO) shows a minimum value of 0.0003 and a maximum of 0.2468 with an average value of 0.086722 and a standard deviation of 0.0446531. These results indicate that the bank's ability to utilize assets to generate operational income is still in the low to moderate category, with a relatively small level of data variation. This condition reflects that most banks have a relatively uniform asset turnover pattern, although it is not yet fully optimal in increasing asset productivity. The credit risk variable measured using Gross Non-Performing Loan (NPL) has a minimum value of 0.0007 and a maximum of 0.1025 with an average of 0.034692 and a standard deviation of 0.0264568. These findings indicate that in general, the level of banking non-performing loans is at a relatively low level and remains within the safe limits set by regulators, with a moderate spread of data around the average value, although some banks experienced increased credit risk. Furthermore, the income diversification variable, measured by Fee-Based Income, has a minimum value of 0.0000 and a maximum of 1.1272, with an average value of 0.286919 and a standard deviation of 0.3225921. A standard deviation greater than the average value indicates significant variation between banks in managing and developing non-interest income sources, indicating differences in business strategies and levels of dependence on interest income. Meanwhile, the profitability variable, measured by Return on Assets (ROA), has a minimum value of -0.0331 and a maximum of 0.0454, with an average value of 0.008805 and a standard deviation of 0.0158154. This shows that the level of bank profitability tends to be low with quite diverse performance variations, including the presence of banks that experienced losses in certain periods, thus reflecting the challenges of the banking industry in maintaining profit stability amidst economic dynamics during the research period.

3.1.2 Classical Assumptions

Normality Test

Table 2. Normality Test

One-Sample Kolmogorov-Smirnov Test		Unstandardized Residual
N		105
Normal Parameters ^{a,b}	Mean	,0000000
	Std. Deviation	,01002601
Most Extreme Differences	Absolute	,070

One-Sample Kolmogorov-Smirnov Test			Unstandardized Residual
	Positive		,052
	Negative		-,070
Test Statistic			,070
Asymp. Sig. (2-tailed) ^c			,200 ^d
Monte Carlo Sig. (2-tailed) ^e	Sig.		,238
	99% Confidence Interval	Lower Bound	,227
		Upper Bound	,249

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

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

e. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 299883525.

Based on the results of the One-Sample Kolmogorov–Smirnov normality test on unstandardized residuals, an Asymp. Sig. (2-tailed) value of 0.200 was obtained, which is greater than the significance level of 0.05. Thus, it can be concluded that the residual data in this study is normally distributed, so that the normality assumption is fulfilled and the data is suitable for further regression analysis.

3.1.3 Multicollinearity Test

Table 3. Multicollinearity Test

Model	B	Coefficients ^a		t	Sig.	Collinearity Statistics	VIF
		nstandardized Coefficients	Standardized Coefficients				
		Std. Error	Beta			Tolerance	
1 (Constant)	,009	,003		2,909	,004		
X1 TATO	,072	,026	,202	2,728	,008	,723	1,384
X2 NPL Gross	-	,041	-,503	-	,000	,858	1,165
	,301			7,393			
X3 Fee Based Income	,015	,004	,296	4,064	,000	,751	1,332

a. Dependent Variable: Y ROA

Based on the results of the multicollinearity test, it is known that all independent variables have a Tolerance value > 0.10 and VIF < 10. The TATO variable (X1) has a tolerance value of 0.723 and a VIF of 1.384, the NPL Gross variable (X2) has a tolerance value of 0.858 and a VIF of 1.165, and the Fee Based Income variable (X3) has a tolerance value of 0.751 and a VIF of 1.332. Thus, it can be concluded that there is no multicollinearity between the independent variables in the regression model, so the model is suitable for further analysis.

Heteroscedasticity Test

Table 4. Heteroscedasticity Test

Model	Coefficients ^a			t	Sig.
	Unstandardized Coefficients	Std. Error	Standardized Coefficients		
	B		Beta		
1 (Constant)	,008	,002		4,368	,000
X1 TATO	-,019	,015	-,142	-1,250	,214
X2 NPL Gross	,040	,023	,179	1,721	,088
X3 Fee Based Income	,003	,002	,163	1,462	,147

a. Dependent Variable: ABS_RES_1

Based on the results of the Glejser test, it is known that the significance value of each independent variable on ABS_RES_1 is greater than the significance level of 0.05. The TATO variable (X1) has a significance value of 0.214, NPL Gross (X2) of 0.088, and Fee Based Income (X3) of 0.147. This indicates that there is no heteroscedasticity in the regression model, so the model meets the classical assumptions and is suitable for further regression analysis.

3.1.4 Autocorrelation Test

Table 5. Autocorrelation Test

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson

1	,773 ^a	,598	,586	,0101738	1,912
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a. Predictors: (Constant), X3 Fee Based Income, X2 NPL Gross, X1 TATO

b. Dependent Variable: Y ROA

Based on the Durbin–Watson test results, a Durbin–Watson value of 1.912 was obtained with 105 observations and 3 independent variables. At a significance level of 5%, the lower limit (dL) is 1.62 and the upper limit (dU) is 1.73, so the decision limit is $dU < DW < 4 - dU$ or $1.73 < 1.912 < 2.27$. Since the Durbin–Watson value falls within these limits, it can be concluded that there is no autocorrelation, either positive or negative, in the regression model. Thus, the regression model meets the classical assumption of autocorrelation and is suitable for further analysis.

3.1.5 Multiple linear regression tests

Table 6. Results of multiple linear regression tests

Model	B	Coefficients ^a		t	Sig.	Collinearity Statistics Tolerance	VIF
		nstandardized Coefficients Std. Error	Standardized Coefficients Beta				
1 (Constant)	,009		,003	2,909	,004		
X1 TATO	,072		,026	2,728	,008	,723	1,384
X2 NPL Gross	-		,041	-	,000	,858	1,165
X3 Fee Based Income	,301 ,015		,004	7,393 4,064	,000	,751	1,332

a. Dependent Variable: Y ROA

Based on the results of multiple linear regression analysis, the regression equation ($Y = 0.009 + 0.072X_1 - 0.301X_2 + 0.015X_3 + e$) is obtained, which describes the relationship between operational efficiency, credit risk, and income diversification on bank profitability. The constant value of 0.009 indicates that when the variables Total Asset Turnover (TATO), Non-Performing Loan (NPL Gross), and Fee-Based Income are in a constant condition or have a value of zero, then Return on Assets (ROA) has a base value of 0.009. This reflects the initial level of bank profitability generated from basic operational activities before being influenced by changes in the independent variables in the research model.

The positive TATO regression coefficient of 0.072 indicates that increasing asset utilization efficiency will drive bank profitability upwards, so that the more optimal asset turnover in generating income, the greater the ROA obtained. Conversely, the negative Gross NPL coefficient of -0.301 indicates that increasing credit risk will have a significant impact on decreasing profitability, as high non-performing loans have the potential to depress income and increase provisioning expenses. Meanwhile, the positive Fee-Based Income coefficient of 0.015 indicates that income diversification through non-interest services contributes to increasing ROA, although with a relatively smaller effect compared to asset efficiency. This finding confirms that bank profitability is influenced by the ability to manage assets efficiently, maintain credit quality, and develop non-interest income sources sustainably.

3.1.6 Partial Hypothesis Testing (T-Test)

Table 7. Hypothesis test results

Model	B	Coefficients ^a		t	Sig.	Collinearity Statistics Tolerance	VIF
		nstandardized Coefficients Std. Error	Standardized Coefficients Beta				
1 (Constant)	,009		,003	2,909	,004		
X1 TATO	,072		,026	2,728	,008	,723	1,384
X2 NPL Gross	-		,041	-	,000	,858	1,165
X3 Fee Based Income	,301 ,015		,004	7,393 4,064	,000	,751	1,332

a. Dependent Variable: Y ROA

Based on the analysis results with 105 respondents, the degree of freedom (df) was calculated using the formula $df = n - k - 1$. Thus, the df value was 101 ($105 - 3 - 1$). At a significance level of $\alpha = 0.05$ with a two-way test, the t-table value used was 1.983. The results of the partial regression test (t-test) on each independent variable are explained as follows.

The Total Asset Turnover (TATO/ X_i) variable has a t-value of 2.728 with a significance level of 0.008. The calculated t-value is greater than the t-table ($2.728 > 1.983$) and the significance value is smaller than 0.05, indicating that TATO has a positive and significant effect on Return on Assets (ROA). Thus, the first hypothesis (H_1) is accepted. These

results indicate that the more effectively a company utilizes its assets to generate revenue, the higher its profitability will be.

The Gross Non-Performing Loan (Gross NPL/ X_2) variable has a t-value of -7.393 with a significance level of 0.000. Since the absolute value of the calculated t is greater than the t-table ($7.393 > 1.983$) and the significance value is less than 0.05, it can be concluded that Gross NPL has a negative and significant effect on ROA. Thus, the second hypothesis (H_2) is accepted. This finding indicates that the higher the level of non-performing loans, the company's profitability tends to decrease.

The Fee-Based Income (X_3) variable has a t-value of 4.064 with a significance level of 0.000. The calculated t-value is greater than the t-table ($4.064 > 1.983$) and the significance value is less than 0.05, indicating that Fee-Based Income has a positive and significant effect on ROA. Thus, the third hypothesis (H_3) is accepted. These results indicate that increasing fee-based income and non-interest commissions can make a positive contribution to increasing company profitability.

3.1.7 Statistical test

Coefficient of Determination (R^2)

Table 8. Determinant coefficient

Model	R	R Square	Model Summary ^b		
			Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,773 ^a	,598	,586	,0101738	1,912

a. Predictors: (Constant), X3 Fee Based Income, X2 NPL Gross, X1 TATO

b. Dependent Variable: Y ROA

Based on the analysis results, an Adjusted R Square value of 0.586 was obtained. This indicates that 58.6% of the variation in Return on Assets (ROA) can be explained by the Total Asset Turnover (TATO), Non-Performing Loan (NPL Gross), and Fee-Based Income variables used in the model. Meanwhile, the remaining 41.4% is explained by other variables outside this research model. The relatively high Adjusted R Square value indicates that the regression model has good explanatory power and is suitable for further analysis.

3.2 Discussion

This study analyzes the effect of operational efficiency, credit risk, and revenue diversification on the profitability of conventional commercial banks listed on the Indonesia Stock Exchange during the 2022–2024 period. Profitability is measured using Return on Assets (ROA), while operational efficiency is proxied by Total Asset Turnover (TATO), credit risk by Gross Non-Performing Loans (NPL), and revenue diversification by Fee-Based Income (FBI). The results of multiple linear regression testing indicate that all three independent variables have a significant effect on ROA, both partially and simultaneously, thus all research hypotheses are accepted.

The research results show that operational efficiency proxied by TATO has a positive and significant effect on ROA. This finding aligns with the Resource-Based View (RBV) theory, which emphasizes the importance of efficiently managing internal resources to create competitive advantage (Barney, 1991). In the banking context, assets are key resources encompassing credit distribution, investment in securities, and other productive assets. Effective asset management enables banks to maximize revenue without significantly increasing costs, thus directly impacting profitability. These results are consistent with the findings of (Afrizan et al., 2024) and (Gobay et al., 2024), who stated that TATO has a significant positive effect on ROA in the banking sector.

Descriptive statistics reveal an average TATO value of 0.087, which is relatively low. However, it is crucial to understand that in the banking industry, a low TATO is a normal characteristic given that banks are institutions with massive asset bases primarily consisting of loans, securities, and other financial instruments—and are highly leveraged. The nature of banking assets, particularly long-term loans with extended maturity periods, naturally results in lower turnover ratios compared to other industries such as manufacturing or retail. Therefore, a "low" TATO in banking does not necessarily indicate poor performance; rather, it reflects the fundamental characteristics of financial intermediation where assets are held for longer periods to generate interest income. What matters more in the banking context is the efficiency with which these assets are deployed to generate operating income, and the positive significant relationship between TATO and ROA in this study confirms that even modest improvements in asset productivity can meaningfully enhance profitability.

Credit risk measured by Gross NPL has a negative and significant effect on ROA. This finding confirms that increasing non-performing loans will depress bank profitability because it requires the establishment of larger allowances for impairment losses (CKPN), thereby reducing net profit. Theoretically, this finding aligns with banking risk management principles, which state that credit asset quality is a key determinant of a bank's financial health and performance. High NPLs also hamper fund turnover and reduce banks' ability to disburse productive loans. These results support the findings of (Rustam & Sutrisno, 2025) and (Susanto et al., 2024), which stated that Gross NPLs have a significant negative effect on ROA.

The relatively large regression coefficient value for Gross NPL (-0.301) compared to other variables indicates that credit risk has the most dominant impact on ROA. This finding indicates that while asset efficiency and revenue diversification are important, credit quality remains a key factor in determining a bank's financial performance. Therefore, strengthening risk management functions, improving the quality of credit analysis, and continuously monitoring credit portfolios are important strategies for banks to maintain stable profitability amid economic uncertainty.

Revenue diversification measured by FBI has a positive and significant effect on ROA. This finding indicates that increasing non-interest income can positively contribute to bank profitability. In conditions where interest margins are under pressure due to intense competition and interest rate policies, fee-based income provides a relatively stable alternative source of income. Theoretically, these results align with the concept of revenue diversification, which states that banks that rely less on interest income will have a more stable revenue structure and lower risk. These results are consistent with the findings of (Efriandy et al., 2025), who stated that fee-based income has a positive effect on banking profitability.

Descriptive statistics reveal particularly noteworthy findings regarding fee-based income heterogeneity. The standard deviation of 0.323, which exceeds the mean value of 0.287, indicates a high degree of data dispersion and significant variation between banks in managing non-interest income sources. This heterogeneity can be explicitly linked to the structural gap between large banks (KBMI 4 category) and small to medium-sized banks (KBMI 1-2 categories) in the Indonesian banking sector. Large-scale banks such as Bank Mandiri, BRI, BCA, and BNI possess much more mature digital infrastructures, extensive branch networks, and sophisticated technological platforms that enable them to generate substantial fee-based income from various sources including digital banking services, payment systems, wealth management, trade finance, and treasury operations. These banks have made significant investments in financial technology, mobile banking applications, and integrated service platforms that allow them to capture a larger share of non-interest income.

In contrast, small and medium-sized banks often face constraints in developing fee-based income streams due to limited technological capabilities, smaller customer bases, less developed distribution networks, and higher relative costs of digital transformation. These banks typically rely more heavily on traditional interest income from lending activities and have not yet fully developed the infrastructure necessary to compete effectively in fee-generating services. This disparity in digital maturity and service capabilities between bank size categories explains the high standard deviation observed in the FBI variable. The findings suggest that revenue diversification through fee-based income is not uniformly accessible across the banking sector; rather, it requires substantial investments in technology, human capital, and service innovation resources that are more readily available to larger, well-capitalized institutions. Therefore, for smaller banks seeking to enhance profitability through income diversification, strategic investments in digital infrastructure and partnerships with fintech companies may be necessary to narrow this capability gap.

Overall, the results of this study reinforce the relevance of the Resource-Based View theory in explaining banking profitability performance. Efficient asset management, credit risk control, and the development of non-interest income sources are manifestations of a bank's ability to optimally manage internal resources. Banks that are able to manage these resources effectively will have a competitive advantage that impacts financial performance. These findings also provide practical implications for bank management to place greater emphasis on strategies to increase efficiency, strengthen risk management, and innovate services to maintain sustainable profitability amidst constantly changing economic dynamics.

4. CONCLUSION

This study concludes that operational efficiency (TATO), credit risk (Gross NPL), and revenue diversification (FBI) significantly affect bank profitability as measured by ROA during the 2022–2024 period. TATO and FBI have positive effects on ROA, while Gross NPL has a negative effect on ROA. Given that credit risk (NPL) has the strongest negative coefficient compared to other variables, credit quality must remain the primary strategic priority for bank management, even over aggressive asset turnover efforts. Bank management needs to focus on strengthening credit risk management systems, implementing more rigorous credit analysis, and continuously monitoring credit portfolios as the main foundation for maintaining profitability. Additionally, improving operational efficiency and developing non-interest income sources through digital service innovation are also important to support sustainable financial performance, but must not compromise credit quality for the sake of rapid asset growth.

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