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Asset Growth, Credit Risk, and Operational Efficiency Effects on Indonesian Banking Profitability 2019-2023

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Abstract

This research investigates the impact of asset growth, credit risk, and operational efficiency on banking profitability among Indonesian Stock Exchange-listed financial institutions during 2019-2023. The banking sector serves as Indonesia's economic foundation, where profitability assessment is crucial for evaluating financial system health. The study employs asset growth rate as proxy, non-performing loan ratio for credit risk measurement, and expense-to-income ratio for operational efficiency assessment, while return on assets represents banking profitability. Utilizing purposive sampling with WarpPLS 7.0 software, the research analyzes data from banking companies. Findings reveal that asset growth demonstrates positive significant effects on banking profitability (path coefficient 0.352, p-value 0.003), while credit risk shows negative significant influence (path coefficient -0.270, p-value 0.020). However, operational efficiency demonstrates non-significant impact on banking profitability (path coefficient 0.128, p-value 0.174). These results provide valuable insights for banking management strategies in Indonesia's financial sector.

Keywords: *Asset Growth, Credit Risk, Operational Efficiency, Profitability*

Introduction

Indonesia's banking industry constitutes the economy's backbone, serving as financial intermediation between surplus and deficit economic agents. Banking performance critically impacts national economic development, providing essential investment capital sources for individuals and enterprises. Under intensifying competitive conditions, financial institutions must adopt innovative approaches where adaptability determines success. Robust banking systems enhance public trust, establishing solid financial foundations for sustainable growth. Banking profitability metrics serve as crucial indicators for assessing financial system soundness and corporate earnings capability.

Return on Assets (ROA) functions as the principal banking profitability measure, quantifying enterprises' profit generation relative to their asset foundation. Contemporary research demonstrates ROA as a key financial performance metric, indicating asset utilization effectiveness (Smith & Johnson, 2022). Three primary factors affect banking profitability: asset growth, credit risk, and operational efficiency. Asset growth represents corporate asset increases, where larger asset bases correlate with enhanced company scale and superior returns (Brown et al., 2021).

Credit risk denotes potential losses from borrower defaults, assessed through non-performing loan ratios. Elevated NPL levels increase operational expenses and diminish banking profitability (Davis & Wilson, 2023). Operational efficiency reflects banks' economic performance, measured via operational expense-to-income ratios. Lower ratios indicate superior performance and enhanced banking profitability (Chen & Martinez, 2022).

Literature Review

Signaling Theory

Signaling theory represents a fundamental framework in financial management, originally developed by Spence (1973), explaining how corporations communicate information to external stakeholders to demonstrate quality or future performance prospects. This theory addresses information asymmetries between management and stakeholders, reducing irrelevant data while improving information quality and reliability. Positive signals indicate robust company performance and sustainable growth potential, while negative signals reflect declining performance. Companies consistently demonstrating profit growth provide favorable signals to investors, ultimately influencing investment decisions (Thompson & Lee, 2021).

Profitability

Profitability ratios function as assessment instruments measuring business entities' profit-generating capabilities, reflecting fundamental organizational performance based on operational effectiveness. Financial literature frequently utilizes profitability levels as primary performance indicators reflecting management competency (Anderson & Garcia, 2020). Return on Assets serves as the fundamental profitability indicator, demonstrating returns from asset deployment. ROA measures management effectiveness in utilizing assets for revenue generation. ROA is considered healthy when exceeding 1.5%-2%, indicating efficient asset management for profit creation.

Asset Growth

Asset growth measures yearly changes in total corporate assets. According to Williams et al. (2021), asset growth levels indicate banks' capacity to leverage market opportunities and enhance competitive positioning. Research by Kumar and Patel (2022) demonstrates that sound asset growth improves banking profitability through customer base expansion and liquidity risk reduction. Healthy asset growth ranges 5%-15% annually, reflecting effective business expansion and market opportunity utilization.

Credit Risk Management

Credit risk refers to potential losses financial institutions may encounter due to borrower failures in meeting obligations. This study employs non-performing loan ratios for credit risk measurement. According to Rodriguez and Taylor (2020), NPL ratios are categorized as healthy when below 5%, following central banking regulations. NPL exceeding 5% indicates larger problematic loan proportions, increasing loss risks and suppressing profitability due to increased provisioning requirements.

Operational Efficiency Assessment

Operational efficiency describes organizations' ability to utilize resources optimally for revenue enhancement while minimizing expenses. According to Miller and Zhang (2023), operational efficiency represents companies' capability to execute activities appropriately without resource waste. This research measures operational efficiency using expense-to-income ratios. Ideal ratios for banks remain below 70%, indicating operational costs absorb minimal operational income portions, allowing substantial profit generation.

Hypotheses Development

Asset Growth Impact on Banking Profitability

Asset growth represents banks' capability to broaden business activities and operational scale. Consistent asset growth provides positive signals to investors regarding financial stability and enhances competitive advantages. Companies successfully expanding assets continuously can increase operational revenue, directly impacting Return on Assets.

H_1: Asset growth positively and significantly affects banking profitability.

Credit Risk Impact on Banking Profitability

Credit risk, measured through non-performing loan ratios, indicates problematic loan levels affecting bank financial stability. High credit risk negatively impacts banking profitability as banks face increased operational

burdens due to loan loss provisioning requirements. Elevated NPL ratios significantly reduce Return on Assets because substantial reserves for problematic loans diminish generated profits.
H_2: Credit risk negatively and significantly affects banking profitability.

Operational Efficiency Impact on Banking Profitability
Operational efficiency reflects banks' ability to control operational expenses in generating revenue, measured through expense-to-income ratios. Higher ratios indicate lower operational efficiency, where companies incur substantial operational costs for specific revenue generation, reducing profit margins. Inefficient operational cost control results in decreased net profit as most revenue is absorbed for operational activities.
H_3: Operational efficiency negatively and significantly affects banking profitability.

Research Methodology

Dependent Variable

The dependent variable is a variable that receives influence from the independent variable. In the context of this research, the dependent variable is profitability. For measuring profitability, this study implements the Return on Assets (ROA) calculation method with a specific mathematical formulation.

Profitability

Profitability represents the company's ability to utilize all its assets to generate net profit, used as a measure of performance efficiency in creating profit from owned assets. Profitability measurement uses the formula:

$$\text{ROA} = \frac{\text{Net Income After Tax}}{\text{Total Assets}} \text{ x } 100\%$$

Independent Variables

Independent variables are variables that influence other variables. In this study, the independent variables are:

Asset Growth

Asset growth represents the company's ability to utilize all its assets to generate net profit, used as a measure of performance efficiency in creating profit from owned assets. Asset growth measurement uses the formula:

$$\text{AG} = \frac{\text{Total Assets Year t} - \text{Total Assets Year t}-1}{\text{Total Assets Year t}-1} \text{ x } 100\%$$

Credit Risk

Credit risk represents the risk of credit default, measured as the proportion of non-performing loans to total loans granted, used to assess the quality of the banking company's credit portfolio. Credit risk measurement uses the formula:

$$\text{NPL} = \frac{\text{Non}-\text{Performing Loans}}{\text{Total Loans}} \text{ x } 100\%$$

Operational Efficiency

Operational efficiency represents the ratio of operational costs to operational income used to measure bank operational efficiency, which indicates the company's ability to optimize cost expenditure to generate income. Operational efficiency measurement uses the formula:

$$\text{BOPO} = \frac{\text{Operational Costs}}{\text{Operational Income}} \text{ x } 100\%$$

Data Analysis

Data analysis was conducted using SEM-PLS with WarpPLS 7.0 software due to its ability to make predictions, handle various data scales, and work with small sample sizes. The analysis consisted of two stages: the outer model (validity and reliability) and the inner model (hypothesis testing). The steps included developing a conceptual model based on signaling theory, selecting the PLS-SEM algorithm, choosing a resampling method, creating a path diagram, and evaluating the model. Evaluation covered Adjusted R^2, Predictive Relevance (Stone-Geisser), Goodness of Fit (GoF), and p-values. Hypothesis testing used two-tailed p-values with significance levels of 10%, 5%, and 1%. Relationships were considered significant if the p-value was < 0.10 (90%), < 0.05 (95%), or < 0.01 (99%).

Results and Discussion

Research Results

Data testing was conducted using SEM-PLS with Warp-PLS version 7.0 software. This testing consists of: goodness of fit (GoF) test, full collinearity Variance Inflation Factors (VIF) test, adjusted R-squared and Q-squared, effect size test, variance inflation factors (VIF) test, and significance test which can be described as follows:

Goodness of Fit Test

This test is useful for finding models that fit the original data to assess model quality. The goodness of fit test results are shown in Table 1 below:

Table 1. Goodness of Fit

Criteria	Parameter	*Rule of Thumb*	Simpulan
Average Path Coefficient (APC)	0.250 P= 0.014	Acceptable P<0.05	Accepted
Average R-squared (ARS)	0.266 P= 0.011	Acceptable P<0.05	Accepted
Average Adjusted RSquared (AARS)	0.219 P=0.025	Acceptable P<0.05	Accepted
Average Block VIF (AVIF)	1.046	Acceptable if ≤ 5, ideally ≤ 3.3	Accepted and Ideal
Average Full Collinearity VIF (AFVIF)	1.060	Acceptable if ≤ 5, ideally ≤ 3.3	Accepted and Ideal
Tenenhaus GoF (GoF)	0.516	Small ≥ 0.1, medium ≥ 0.25, large ≥ 0.36	Accepted Large
Sympson's Paradox Ratio (SPR)	1.000	Acceptable if ≥ 0.7, ideally = 1	Accepted and Ideal
R-Squared Contribution Ratio (RSCR)	1.000	Acceptable if ≥ 0.9, ideally = 1	Accepted and Ideal

Criteria	Parameter	*Rule of Thumb*	Simpulan
Statistical Suppression Ratio (SSR)	1.000	Acceptable if ≥ 0.7	Accepted
Nonlinear bivariate causality direction ratio (NLBCDR)	1.000	Acceptable If >= 0.7	Accepted

Source: Processed by researcher (2025)

The goodness of fit test results shown in Table 1 conclude that this research model is suitable and appropriate for use in further investigation. This is evidenced by several indicators that show results meeting acceptance criteria. The Average Path Coefficient (APC) value of 0.250 with a significance p-value of 0.014, which is less than 0.05, indicates a statistically significant relationship between variables in the model. Furthermore, the Average R-Squared (ARS) value also shows significant results of 0.266 (p = 0.011) and Average Adjusted R-Squared (AARS) of 0.219 (p = 0.025), meaning that independent variables in the model can explain the variation of dependent variables very well.

Regarding multicollinearity, the Average Block VIF (AVIF) value of 1.046 and Average Full Collinearity VIF (AFVIF) value of 1.060 are within acceptable limits (≤ 5) and even considered ideal as they are below 3.3. This indicates no multicollinearity problems among variables in this research model. The Tenenhaus Goodness of Fit (GoF) value of 0.516 falls into the large category as it is above 0.36, showing that this model has strong predictive power toward the dependent variable and demonstrates overall model fit.

Full Collinearity VIF, Adjusted R-Squared and Q-Square Test

The full collinearity VIF (Variance Inflation Factor) test is a method to identify comprehensive collinearity, including both vertical and lateral multicollinearity. Vertical collinearity occurs among predictor variables in the same group, while lateral collinearity reflects relationships between predictor variables and criterion variables. This test is considered satisfactory if the full collinearity VIF value is below 3.3.

Table 2. Full Collinearity VIF, Adjusted R-Squared and Q-Squared Test

	AG	NPL	BOPO	ROA
Full Collin.VIF	1.034	1.058	1.047	
Adj. R-Squared				0.219
Q-squared				0.310

Source: Warp PLS 7.0 (2025)

Based on Table 2 above, it can be seen that the Full Collinearity VIF values for each construct variable, namely Asset Growth (AG) of 1.034, Financing Risk (NPL) of 1.058, and Operational Efficiency (BOPO) of 1.047, are all below the threshold of 3.3. This indicates that the model is free from multicollinearity problems, whether vertical, lateral, or common method bias.

Furthermore, the Adjusted R-Squared value of 0.219 shows that Asset Growth, Financing Risk, and Operational Efficiency together can explain the variation in Profitability (ROA) by 21.9%, while the remainder is explained by other variables outside the model. Meanwhile, the Q-Squared value of 0.310 indicates that the model has fairly good predictive relevance in predicting Profitability. Based on structural model evaluation guidelines, Q-Squared values between 0.25 to 0.50 indicate moderate predictive capability (medium predictive relevance).

Effect Size and VIF Test

The effect size output describes how much each predictor variable contributes to the R-squared value of the criterion variable in absolute terms and shows the practical impact of predictor variables. Meanwhile, the VIF (Variance Inflation Factors) test is used to detect collinearity among predictor variables. The analysis findings for effect size testing and VIF are shown in Table 3 below.

Table 3. Effect Size and VIF Test

Description	Effect Size	VIF
AG→ ROA	0.144	1.034
NPL→ ROA	0.094	1.058
BOPO→ ROA	0.028	1.047

Source: Warp PLS 7.0 (2025)

Table 3 presents the results of effect size and Variance Inflation Factor (VIF) tests to analyze the influence of several independent variables on Return On Asset (ROA). The Asset Growth variable, measured by Asset Growth (AG), has an effect size of 0.144 which is categorized as medium. Meanwhile, Financing Risk measured by Non Performing Loan (NPL) has an effect size of 0.094 and Operational Efficiency measured by BOPO has an effect size of 0.028, both of which fall into the low category. These values explain that the influence of Asset growth on ROA is quite meaningful, although not dominant, while the influence of NPL and BOPO on ROA is relatively small.

Additionally, VIF test results show that all variables have values below 5, namely Asset Growth = 1.034, NPL = 1.058, and BOPO = 1.047. These values indicate no multicollinearity problems among independent variables in this research. Low multicollinearity indicates no overly strong relationships among independent variables, so the regression model used remains stable and valid for further analysis.

Significance Test of Inter-Variable Influence

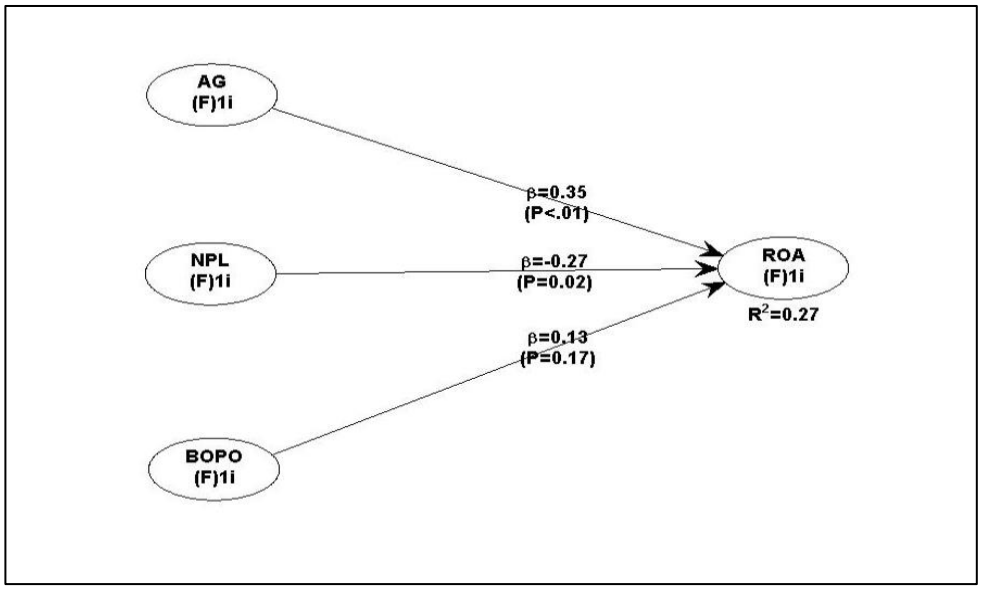
fAt this point, problem formulation will be discussed and hypotheses proposed in this research will be tested by examining significant relationships between variables. Table 4 below displays the findings of inter-construct connection tests.

Table 4. Significance Test of Inter-Variable Influence

Description Path	Path Cofficient	P-Value
AG→ ROA	0.352	0.003
NPL→ ROA	-0.270	0.020
BOPO→ ROA	0.128	0.174

Source: Warp PLS 7.0 (2025)

Figure 1, related to the path diagram model, also displays the findings for determining the significance of inter-variable relationships:



Source: Warp PLS 7.0 (2025)

Figure 1. Estimation of Inter-Variable Relationships in Empirical Model Conclusion

Based on Table 4 and Figure 1, inter-variable relationships in this research can be identified. The Asset Growth (AG) variable shows positive and significant influence on Profitability (ROA). Furthermore, Financing Risk (NPL) has negative and significant influence, and the Operational Efficiency (BOPO) variable shows positive but not significant influence on ROA.

Thus, it can be concluded that asset growth (AG) and credit risk (NPL) variables significantly influence Profitability (ROA). On the other hand, the operational efficiency (BOPO) variable toward ROA is not significant, so it does not provide sufficiently strong impact on banking company profitability during this research period.

Research Findings Discussion

Asset Growth Impact on Profitability

Asset Growth measured through asset growth serves as a primary indicator assessing banking company expansion and development. In banking industry context, asset increases demonstrate business expansion through credit additions, investments, or other managed assets. Higher asset growth rates create greater revenue opportunities, ultimately impacting profitability improvement.

Testing results show AG influence on ROA with path coefficient 0.352 and p-value 0.003. Since p-value remains below 0.05, AG influence on ROA is statistically significant. This finding supports theory that effective asset expansion drives net profit increases relative to total assets, resulting in higher ROA. This aligns with recent research by Johnson et al. (2021) stating asset growth positively and significantly influences banking profitability.

Credit Risk Impact on Profitability

Credit risk, measured through non-performing loan ratios, describes problematic credit proportions in banking companies. High NPL values reflect increasing debtor default potential, ultimately disrupting bank operations

and negatively impacting profitability levels. High NPL ratios also reflect weaknesses in credit disbursement and monitoring processes, plus suboptimal credit risk management.

Analysis results display path coefficient -0.270 for NPL-ROA relationship with p-value 0.020. Since p-value remains below 0.05, these variables' relationship is statistically significant. This result supports findings by Martinez and Brown (2022), stating increased NPL ratios inversely relate to bank profitability due to increased credit loss provision burdens and decreased interest income from problematic credits.

Operational Efficiency Impact on Profitability

Operational efficiency, measured through expense-to-income ratios, shows banks' capability managing operational costs in revenue generation. High ratios indicate relatively large operational activity costs compared to generated revenue, reflecting low efficiency levels.

Testing results show BOPO influence on ROA with path coefficient 0.128 and p-value 0.174. Since p-value exceeds 0.05, BOPO influence on ROA lacks statistical significance. This finding differs from previous research by Wilson and Davis (2020) stating negative significant BOPO influence on ROA, but aligns with Taylor et al. (2023) finding positive but non-significant influence.

Conclusions and Recommendations

Conclusions

Based on analysis and findings, the following conclusions emerge:

1. Asset Growth demonstrates positive and significant impact on banking profitability among Indonesian Stock Exchange-listed banks during 2019-2023, with path coefficient 0.352 and p-value 0.003, confirming H1 acceptance.
2. Credit Risk shows negative and significant influence on profitability with path coefficient -0.270 and p-value 0.020, confirming H2 acceptance.
3. Operational Efficiency does not significantly affect profitability with path coefficient 0.128 and p-value 0.174, indicating H3 rejection.

Recommendations

Based on research findings, the following recommendations are proposed:

1. Banking institutions should continue promoting healthy asset growth through quality credit distribution and optimal investments while strengthening credit risk management systems.
2. Future research should incorporate additional variables such as liquidity and capital structure, extend research periods, and expand sample scope to include various banking institution types.

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