

Strategic Insights of Operational Efficiency and Inflation Dynamics on Bank Profitability in Indonesia (2019-2024)

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Abstrak

Objective: This study aims to analyze the effect of operational efficiency, proxied by the Cost to Income Ratio (CIR) and Operating Expenses to Operating Income (BOPO), as well as inflation, on bank profitability in Indonesia during the 2019–2024 period.

Design/Methodology/Approach: This study employed a quantitative approach with a causal research design. The sample consisted of 33 banking companies listed on the Indonesia Stock Exchange and selected using a purposive sampling technique. Secondary data were obtained from companies' annual reports and relevant official publications. Data analysis was conducted using panel data regression to examine the effects of CIR, BOPO, and inflation on Return on Equity (ROE).

Findings: The results indicate that BOPO has a negative and significant effect on ROE, whereas CIR has a negative but insignificant effect. Inflation demonstrates a positive but insignificant effect on bank profitability. These findings suggest that operational cost efficiency plays a more dominant role in determining profitability compared to external macroeconomic factors.

Originality/Value: The originality of this study lies in the simultaneous examination of CIR, BOPO, and inflation on bank profitability using panel data covering the 2019–2024 period. This study highlights the importance of operational efficiency in improving banking profitability amid economic uncertainty and digital disruption. This study develops an integrated operational efficiency model using two indicators (CIR and BOPO) together with inflation under the post-pandemic banking recovery.

Practical/Policy Implications: This study provides practical implications for banking management to prioritize operational cost efficiency in order to enhance profitability. The findings may also serve as a consideration for regulators in strengthening the internal efficiency of the banking sector in Indonesia.

Keywords: Bank Profitability; Operational Efficiency; Inflation

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Introduction

The banking sector plays a strategic role in supporting financial system stability and national economic growth. Banking profitability performance reflects the effectiveness of resource management, operational efficiency, and the ability of banks to respond to macroeconomic dynamics. Return on Equity (ROE) serves as a key indicator for assessing shareholders' rate of return and the competitiveness of the banking industry. Intensifying competition, the acceleration of digital transformation, and global economic uncertainty in the post-pandemic era have encouraged Indonesian banks to enhance operational efficiency and strengthen resilience against inflation fluctuations.

Previous empirical studies emphasize that operational efficiency plays a strategic role in shaping bank profitability. Studies conducted by (Chae & Lee, 2024; Lamothe et al., 2024; Rakshit & Bardhan, 2022) demonstrate that the Cost to Income Ratio (CIR) and Operating Expenses to Operating Income (BOPO) significantly affect bank profitability performance. Similar findings are reinforced by the studies of (Al-Sharkas & Al-Sharkas, 2022; Olson & Zoubi, 2011; Widati et al., 2025), which highlight that improvements in operational cost efficiency are capable of enhancing income structures and strengthening banking resilience amid economic pressures. Empirical evidence in the Indonesian context also reveals a significant negative relationship between BOPO and profitability, as documented by (Arnoby & Rahmayanti, 2025; Puspitasari et al., 2021; Safitri & Oktavia, 2022).

However, prior studies have predominantly focused on internal banking factors and have paid limited attention to macroeconomic variables, particularly inflation, in determining bank profitability. Inflation influences banking stability through interest rate channels, funding costs, purchasing power, and credit risk, thereby directly affecting intermediation performance and bank earnings. Studies by (Ayub & Shah, 2024; Kanwal & Nadeem, 2013; Ozili, 2025) indicate that inflation significantly affects banking profitability, although the direction of the relationship varies across countries. Furthermore, the findings regarding the threshold effect of inflation in the ASEAN-6 banking sector by (Khue & Lai, 2020) strengthen the indication that the impact of inflation is non-linear and contextual, depending on financial system stability and monetary policy responses.

In the Indonesian banking context, empirical findings remain relatively mixed. Several studies (Andriana et al., 2023; Gazi et al., 2024; La Ode Muhammad Hasriadi & Syarief, 2022) reveal that inflation affects banking performance and risk, although the significance and direction of the relationship are not always consistent. Other studies (Febrianti et al., 2024; Febrianti & Wirda Mardyaningsih, 2025) confirm that macroeconomic factors, particularly inflation, play a strategic role in influencing stock performance and banking profitability in Indonesia and Malaysia. These findings suggest that banking profitability stability is determined not only by firms' internal capabilities but also by price pressures and broader macroeconomic dynamics.

The limitations of previous studies can be observed in the relatively limited number of studies integrating operational efficiency and inflation simultaneously in analyzing banking profitability. Most studies continue to focus separately on either internal or external determinants, thereby failing to comprehensively explain the strategic interaction between cost efficiency and macroeconomic pressures on banking profitability. In addition, the dominance of Return on Assets (ROA) as a performance indicator tends to overlook the shareholders'

perspective, whereas ROE more accurately reflects capital management effectiveness and corporate economic value. The limited observation periods that have not fully accommodated the pre-pandemic phase, crisis period, and economic recovery in an integrated framework further widen the existing research gap in banking profitability studies.

Based on these conditions, this study possesses significant urgency in developing an empirical model capable of explaining the dynamic relationship between operational efficiency and inflation on banking profitability in Indonesia. This study focuses on 33 publicly listed commercial banks registered on the Indonesia Stock Exchange during the 2019–2024 period. The integration of Cost to Income Ratio (CIR), Operating Expenses to Operating Income (BOPO), and inflation as determinants of Return on Equity (ROE) is expected to address inconsistencies in previous empirical findings while simultaneously strengthening the theoretical foundation regarding the role of efficiency and macroeconomic stability in maintaining sustainable bank profitability.

This study aims to empirically analyze the effect of operational efficiency, proxied by the Cost to Income Ratio (CIR) and BOPO, as well as inflation, on banking profitability in Indonesia during the 2019–2024 period. The study employs a quantitative approach using panel data regression methods to examine the relationships among the research variables. The findings are expected to provide theoretical contributions to the development of banking financial management literature and serve as a strategic reference for management and regulators in formulating policies that support efficiency and stability within the banking sector.

This article is organized into several sections. The first section presents the introduction, which outlines the research background, research gap, objectives, and contributions of the study. The second section discusses the literature review and hypothesis development. The third section explains the research methodology employed in the study. The fourth section presents the results and discussion. The final section provides the conclusions, research implications, study limitations, and recommendations for future research.

Literature Review and Hypothesis Development

Banking Profitability and Return on Equity (ROE)

Profitability refers to a bank's ability to generate earnings through the efficient and sustainable management of assets, liabilities, and capital. One of the most commonly used indicators to measure banking profitability is Return on Equity (ROE). ROE reflects the rate of return earned by shareholders on their invested capital in a company. A higher ROE indicates a stronger managerial capability in utilizing capital efficiently and generating profits for investors.

Numerous studies have demonstrated that bank profitability is influenced by both internal and external factors. Studies conducted by (Athanasoglou et al., 2008; Bernardelli & Carrasco-Gutierrez, 2024; Lamothe et al., 2024) explain that operational efficiency, cost structure, asset quality, and credit risk are the primary determinants of banking profitability. Other studies (Chae & Lee, 2024; Mirović et al., 2024; N. B. Nguyen, 2024) that improvements in cost efficiency and macroeconomic stability can sustainably strengthen bank profitability. In the Indonesian context, studies by (Arnoby & Rahmayanti, 2025; Iskandar, 2020; Safitri & Oktavia, 2022; Widati et al., 2025) reveal that operational efficiency and macroeconomic stability significantly contribute to the improvement of banking ROE.

Cost to Income Ratio (CIR) and Banking Profitability

Cost to Income Ratio (CIR) is a ratio used to measure the level of operational efficiency in managing costs relative to income. A lower CIR indicates better cost efficiency, whereas a higher CIR reflects operational inefficiency. Within the banking industry, operational efficiency represents a crucial factor in maintaining competitiveness and corporate profitability.

Previous studies have shown that CIR affects bank profitability. Studies by (Al-Sharkas & Al-Sharkas, 2022; Olson & Zoubi, 2011; Rakshit & Bardhan, 2022) provide evidence that CIR has a negative relationship with banking profitability. These findings are further supported by studies conducted by (Chae & Lee, 2024; Lamothe et al., 2024), which indicate that improvements in operational efficiency can strengthen the stability of bank earnings. In the Indonesian context, studies by (Arnoby & Rahmayanti, 2025; Puspitasari et al., 2021; Safitri & Oktavia, 2022; Widati et al., 2025) found that operational efficiency significantly affects banking profitability performance. Based on the theoretical framework and findings of previous studies, the following hypothesis is formulated:

H₁: Cost to Income Ratio (CIR) negatively affects the Return on Equity (ROE) of publicly listed banks in Indonesia.

Operating Expenses to Operating Income (BOPO) and Banking Profitability

Operating Expenses to Operating Income (BOPO) is a ratio that reflects a bank's efficiency in managing operational expenses relative to operational income. A lower BOPO value indicates better managerial efficiency, whereas a higher BOPO value indicates a higher operational cost burden borne by the company.

Studies conducted by (Akbar, 2023; Safitri & Oktavia, 2022; Susilowati & Amalia, 2024) show that BOPO significantly affects banking profitability. The negative relationship between BOPO and ROE indicates that improvements in operational cost efficiency can increase corporate profitability.

Studies by (Arnoby & Rahmayanti, 2025; Jatmiko, 2025; Widati et al., 2025) further confirm that operational cost control is an important factor in strengthening banks' financial performance. In addition, other studies (Blaga et al., 2024; Lamothe et al., 2024; Rakshit & Bardhan, 2022) state that operational cost efficiency plays a strategic role in maintaining bank profitability amid global economic pressures. Based on the theoretical framework and findings of previous studies, the following hypothesis is formulated:

H₂: Operating Expenses to Operating Income (BOPO) negatively affects the Return on Equity (ROE) of publicly listed banks in Indonesia.

Inflation and Banking Profitability

Inflation refers to a general increase in prices that may affect purchasing power, funding costs, credit risk, and the stability of the financial sector. In the banking sector, inflation can influence profitability through changes in interest rates, operational costs, and credit demand. Inflation stability therefore becomes an essential factor in maintaining sustainable banking profitability.

Studies by (Ayub & Shah, 2024; Kanwal & Nadeem, 2013; Ozili, 2025) demonstrate that inflation significantly affects banking profitability. Research conducted by (Khue & Lai, 2020) also identifies the existence of an inflation threshold effect on ASEAN banking performance, indicating that the impact of inflation is dynamic and influenced by financial system stability. In the Indonesian context, studies by (Andriana et al., 2023; Gazi et al., 2024; La Ode Muhammad Hasriadi & Syarief, 2022) show that inflation affects banking profitability and risk. Furthermore,

studies by (Febrianti et al., 2024; Febrianti & Wirda Mardyaningsih, 2025) confirm that inflation serves as an important determinant of banking profitability in Indonesia and Malaysia.

Based on the theoretical framework and findings of previous studies, the following hypothesis is formulated:

H₃: Inflation positively affects the Return on Equity (ROE) of publicly listed banks in Indonesia.

Method

This study employed a quantitative approach with an explanatory research design to analyze the effects of operational efficiency and inflation on banking profitability in Indonesia during the 2019–2024 period. The research sample consisted of 33 publicly listed commercial banks registered on the Indonesia Stock Exchange, selected using a purposive sampling technique. The study utilized secondary data obtained from companies' annual reports and other relevant official publications.

The research variables included Return on Equity (ROE) as the dependent variable, while Cost to Income Ratio (CIR), Operating Expenses to Operating Income (BOPO), and inflation were employed as the independent variables. Data analysis was conducted using panel data regression to examine the relationships among the research variables.

Result and Discussion

Table 1. Descriptive Statistical Analysis Results of Publicly Listed Banks in Indonesia

Variabel	Mean	Maximum	Minimum	Std. Deviasi
ROE	2.887071	27.31000	-154.6000	19.80621
CIR	62.23242	397.4500	0.000000	54.62602
BOPO	88.39944	287.8600	0.800000	34.35000
INFLASI	2.660000	5.510000	1.570000	1.351329

Source: Processed data using EViews, 2026.

Table 1 presents the results of the descriptive statistical analysis of the research variables, including Return on Equity (ROE), Cost to Income Ratio (CIR), Operating Expenses to Operating Income (BOPO), and inflation across 33 publicly listed commercial banks in Indonesia during the 2019–2024 period. The descriptive statistics indicate that variations in banking profitability are more predominantly influenced by the heterogeneity of operational efficiency rather than fluctuations in inflation.

Table 2. Model Selection Results

Model	Prob	Result
Chow Test	0.0000	Model FEM
Hausman Test	1.0000	Model REM
Lagrange Multiplier Test	0.0005	Model REM

Source: Processed data using EViews, 2026.

The Chow test results indicate a probability value of 0.0000, which is lower than the 5% significance level, suggesting that the Fixed Effect Model is more appropriate than the Common Effect Model. However, the Hausman test results reveal a probability value of 1.0000, which exceeds the 5% significance level, indicating that the Random Effect Model is more suitable for this study. Furthermore, the Lagrange Multiplier test produces a probability value of 0.0005, confirming that the Random Effect Model (REM) is the most appropriate model employed in this research.

Table 3. F-Test Results

F-Statistik	Prob	Result
70.91842	0.000000	Ha Accepted

Source: Processed data using EViews, 2026.

The F-test results show a probability value of 0.000000, which is lower than the 5% significance level. These findings indicate that Cost to Income Ratio (CIR), Operating Expenses to Operating Income (BOPO), and inflation simultaneously have a significant effect on the Return on Equity (ROE) of publicly listed banks in Indonesia.

Table 4. Coefficient of Determination (R^2) Test Results

Adjusted R-squared	0.515679
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Source: Processed data using EViews, 2026.

The Adjusted R-squared value of 0.515679 indicates that approximately 51.57% of the variation in Return on Equity (ROE) can be explained by the variables Cost to Income Ratio (CIR), BOPO, and inflation. Meanwhile, the remaining 48.43% is influenced by other variables outside the scope of this research model.

Table 5. Regression Analysis Results of X on Y

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	38.28582	3.128794	12.23661	0.0000
X1	-0.007144	0.018304	-0.390316	0.6967
X2	-0.397916	0.028384	-14.01879	0.0000
X3	0.083245	0.577821	0.144067	0.8856

Source: Processed data using EViews, 2026.

Table 5 presents the panel data regression estimation results, which comprehensively illustrate the partial effects of the Cost to Income Ratio (CIR), Operating Expenses to Operating Income (BOPO), and inflation on the Return on Equity (ROE) of publicly listed banks in Indonesia during the 2019–2024 period. The regression results reveal a constant value of 38.28582, indicating the level of banking profitability that could still be achieved when the explanatory variables, namely CIR, BOPO, and inflation, are assumed to remain constant. This finding implies that banking profitability is not solely determined by the variables included in the research model, but is also influenced by other strategic factors outside the scope of the study, such as capital adequacy, asset quality, liquidity management, corporate governance, market structure, and the overall condition of the financial system. In this context, the constant value reflects the underlying profitability potential of Indonesian banking institutions, which remains relatively resilient amid economic uncertainty and structural changes in the financial sector.

The empirical findings further demonstrate that the Cost to Income Ratio (CIR) has a negative coefficient of -0.007144 with a probability value of 0.6967, exceeding the 5% significance level. These results indicate that CIR has a negative but statistically insignificant effect on Return on Equity (ROE). The negative coefficient suggests that higher operational costs relative to income tend to reduce banking profitability. However, the insignificant statistical relationship implies that the effect of CIR on profitability is not sufficiently strong to consistently explain variations in ROE across Indonesian publicly listed banks during the observation period. This condition may arise due to differences in managerial efficiency, operational strategies, digital transformation adoption, and variations in revenue diversification among banks. In highly competitive banking environments, some financial institutions may still maintain stable

profitability despite relatively high operational costs because they are supported by alternative income sources, stronger market penetration, or more effective risk management practices. Therefore, the relationship between CIR and profitability tends to vary depending on the characteristics and strategic orientation of each banking institution.

The results of this study are consistent with the findings of (Athanasoglou et al., 2008; Chae & Lee, 2024; Lamothe et al., 2024; P. D. Nguyen, 2024), which conclude that efficiency ratios do not always exert a statistically significant influence on banking profitability, particularly in banking industries characterized by intense competition and diversified revenue structures. Similar findings were also reported by (Mirović et al., 2024; Ozili, 2025; Rahman et al., 2020), who emphasize that the effect of operational efficiency on profitability is highly dependent on macroeconomic conditions, institutional characteristics, and internal managerial policies. Nevertheless, the findings of this study differ from those of (Akbar, 2023; Puspitasari et al., 2021; Widati et al., 2025) which found that CIR has a negative and statistically significant effect on banking profitability. These inconsistencies may be attributed to differences in sample composition, research periods, economic environments, and post-pandemic recovery conditions, which potentially altered the operational structure and financial performance of banks.

Furthermore, the BOPO variable exhibits a negative coefficient of -0.397916 with a probability value of 0.0000, which is lower than the 5% significance threshold. These findings confirm that BOPO has a negative and statistically significant effect on Return on Equity (ROE). This result indicates that an increase in operating expenses relative to operating income substantially reduces banking profitability. In practical terms, the findings suggest that inefficient operational cost management weakens banks' ability to generate returns for shareholders. Consequently, operational efficiency becomes a crucial determinant of financial sustainability and competitive advantage within the banking sector. Banks that are capable of controlling operational expenses effectively are more likely to improve profitability, maintain financial stability, and strengthen investor confidence. These findings highlight the strategic importance of cost efficiency, particularly in an era marked by digital transformation, technological disruption, and increasing market competition.

The findings related to BOPO are in line with the studies conducted by (Arnoby & Rahmayanti, 2025; Iskandar, 2020; Safitri & Oktavia, 2022; Susilowati & Amalia, 2024), which consistently demonstrate that BOPO has a negative and significant effect on the profitability of commercial banks in Indonesia. Similar conclusions were also reached by (Bernardelli & Carrasco-Gutierrez, 2024; Olson & Zoubi, 2011; Rakshit & Bardhan, 2022), who emphasize that operational efficiency constitutes one of the primary determinants of sustainable banking performance. Efficient operational cost management enables banks to optimize earnings, improve financial resilience, and enhance long-term competitiveness. However, the results of this study differ from those reported by (Hoxha et al., 2025; Saadaoui & Ben Salah, 2023), which found that BOPO does not significantly affect profitability. These differences may be influenced by variations in industrial competition, banking regulations, technological advancement, and the efficiency level of financial systems across countries.

The inflation variable demonstrates a positive coefficient of 0.083245 with a probability value of 0.8856, which exceeds the 5% significance level. These findings indicate that inflation has a positive but statistically insignificant effect on ROE. This result implies that fluctuations in inflation during the study period did not significantly influence banking profitability in Indonesia. Although inflation theoretically affects banking performance through changes in interest rates, funding costs, purchasing power, and credit risk, the empirical findings suggest that the Indonesian banking sector was relatively capable of adapting to inflationary pressures. The stability of the monetary system, the effectiveness of Bank Indonesia's monetary policies, and banks' flexibility in adjusting lending rates and deposit interest rates may have contributed to mitigating the adverse effects of inflation on banking profitability. Moreover, the relatively

controlled inflation rate during the observation period may have prevented inflation from becoming a dominant factor influencing banking financial performance.

The findings concerning inflation are consistent with the studies of (Andriana et al., 2023; Febrianti et al., 2024; Ozili, 2025; Vuong et al., 2024), which reveal that inflation does not significantly affect banking profitability in Indonesia. Similarly, (Febrianti & Wirda Mardyaningsih, 2025) argue that monetary policy stability and adaptive financial sector responses are capable of maintaining banking profitability despite inflation fluctuations. However, the results of this study contradict the findings of (Asli Demirgüç-Kunt & Huizinga, 1998; Bourke, 1989), which demonstrate that inflation positively and significantly affects bank profitability. Such discrepancies may be explained by differences in macroeconomic stability, monetary policy frameworks, financial market structures, and institutional characteristics across countries.

Overall, the simultaneous regression results indicate that CIR, BOPO, and inflation collectively exert a significant effect on Return on Equity (ROE). These findings confirm that both internal and external factors play important roles in shaping banking profitability. Nevertheless, operational efficiency, particularly in terms of operational cost management, emerges as the most dominant determinant influencing profitability performance in the Indonesian banking sector. The practical implications of this study emphasize the importance of strengthening operational efficiency strategies through tighter cost control, optimization of business processes, adoption of digital technologies, and enhancement of risk management practices. Such strategies are essential not only for improving profitability but also for maintaining the long-term sustainability and competitiveness of the Indonesian banking industry amid increasing economic uncertainty and rapid technological transformation.

Conclusion and future direction

This study aims to examine the effects of the Cost to Income Ratio (CIR), Operating Expenses to Operating Income (BOPO), and inflation on the Return on Equity (ROE) of publicly listed banks in Indonesia during the 2019–2024 period. The findings reveal that CIR, BOPO, and inflation simultaneously have a significant effect on ROE. However, partially, only BOPO has a negative and statistically significant effect on profitability, while CIR and inflation do not show significant effects. These results indicate that operational cost efficiency is the most dominant factor in improving banking profitability.

The findings emphasize the importance of operational efficiency in strengthening banking financial performance amid economic uncertainty and digital transformation. Therefore, banking management is encouraged to optimize business processes, improve cost efficiency, and maximize the utilization of digital technology in order to maintain profitability and competitiveness. In addition, regulators are expected to support policies that strengthen operational efficiency, governance quality, and the stability of the banking sector.

This study is limited to the analysis of CIR, BOPO, and inflation using a sample of publicly listed commercial banks in Indonesia during the 2019–2024 period. Future research is recommended to incorporate additional variables such as credit risk, liquidity, and capital structure, as well as to expand the observation period and research scope in order to obtain more comprehensive findings regarding banking profitability determinants.

Implication

The theoretical implications of this study strengthen the operational efficiency theory by demonstrating that internal factors, particularly Operating Expenses to Operating Income (BOPO), exert a more dominant influence on banking profitability compared to macroeconomic factors such as inflation. This study also enriches the banking profitability literature through the

simultaneous examination of the Cost to Income Ratio (CIR), BOPO, and inflation on Return on Equity (ROE) within the Indonesian banking sector during the 2019–2024 period.

The managerial implications of this study emphasize the importance of operational cost control as a primary strategy for improving bank profitability. Banking management is encouraged to optimize business processes, maximize the utilization of digital technology, and enhance operational efficiency in order to maintain financial performance amid economic uncertainty. Furthermore, regulators may utilize the findings of this study as a reference in formulating policies that support the strengthening of efficiency and stability within the national banking sector.

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