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The Effect of Bank-Specific Factors on the Profitability of Conventional Banks Listed on the Indonesia Stock Exchange

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ABSTRACT

This study aims to analyze the effect of Capital Adequacy Ratio (CAR), Non-Performing Loan (NPL), bank size, and Cost to Income Ratio (CIR) on the profitability of conventional banks listed on the Indonesia Stock Exchange for the period 2020–2024. Profitability is measured using Return on Equity (ROE). This study uses secondary data obtained from the annual reports of 41 conventional banks selected through purposive sampling. The analysis method used is panel data regression with the Fixed Effects Model (FEM) approach using E-Views. The results show that bank size has a positive effect on ROE, while NPL and CIR have a negative effect on ROE. Meanwhile, CAR has no significant effect on bank profitability. These findings indicate that operational efficiency and control of non-performing loans are key factors in improving bank profitability. This study has implications for bank management to improve cost efficiency, maintain credit quality, and optimize asset utilization in order to improve profitability performance.

Keywords: Bank Size; Capital Adequacy Ratio; Cost-To-Income Ratio; Non-Performing Loan Ratio; Profitability Bank.

ABSTRAK

Penelitian ini bertujuan untuk menganalisis pengaruh *Capital Adequacy Ratio (CAR), Non-Performing Loan (NPL),* ukuran bank, dan *Cost to Income Ratio (CIR)* terhadap profitabilitas bank konvensional yang terdaftar di Bursa Efek Indonesia periode 2020–2024. Profitabilitas diukur menggunakan *Return on Equity (ROE).* Penelitian ini menggunakan data sekunder yang diperoleh dari laporan tahunan 41 bank konvensional dengan total 205 observasi yang dipilih melalui teknik purposive sampling. Metode analisis yang digunakan adalah regresi data panel dengan pendekatan *Fixed Effects Model (FEM)* menggunakan *E-Views.* Hasil penelitian menunjukkan bahwa ukuran bank berpengaruh positif terhadap ROE, sedangkan NPL dan CIR berpengaruh negatif terhadap ROE. Sementara itu, CAR tidak berpengaruh signifikan terhadap profitabilitas bank. Temuan ini menunjukkan bahwa efisiensi operasional dan pengendalian kredit bermasalah menjadi faktor utama dalam meningkatkan profitabilitas bank. Penelitian ini memberikan implikasi bagi manajemen bank untuk meningkatkan efisiensi biaya, menjaga kualitas kredit, serta mengoptimalkan pemanfaatan aset dalam rangka meningkatkan kinerja profitabilitas.

Kata Kunci: Profitabilitas Bank; Rasio Biaya Pendapatan; Rasio Kecukupan Modal; Rasio Pinjaman Bermasalah; Ukuran Bank.

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INTRODUCTION

The banking industry constitutes one of the core pillars of the financial system, and serves as one of the primary drivers of a country's economic development and financial stability (Chand S, Kumar R, Stauvermann P, & Shahbaz M, 2024). Banks perform the function of financial intermediation, as they contribute to the improvement of economic growth by channeling funds from surplus units to the productive (deficit) units of the economy (Dahal & Panthi Dhungana, 2025). Poor management of credit risk will tend to increase costs of credit, lower the quality of the assets, and less the portion of the net income that is available for the shareholders (Kumar & Dayal, 2022).

Profitability of banks is very important considering that it is a performance of operational management since it indicates the ability to manage and sustain profits over a period of time (Batekele & Maseka, 2025). How profitability is assessed can be through the following: Return on Equity (ROE), Return on Assets (ROA), and Net Interest Income (NII) (Mirović V, Kalas B, Milenkovic N, 2024a). In line with the aforesaid, Dahal & Panthi Dhungana (2025), argue and defend their validity of such position by stating that ROE can be utilized as a tool in measuring the performance in credit risk management and in creating shareholder value. This, therefore, justifies using ROE as the index of profitability in this research. Hence, the dependent variable, which is the profitability of the bank as measured by ROE is analyzed with the independent ones, which are the Capital Adequacy Ratio (CAR), Non-Performing Loan Ratio (NPLR), and the Size of the Bank.

Maintaining an optimal CAR is key to the financial soundness of banks since it reduces the level of risk exposure on credit (Oyasor, 2025). Sufficient capital on the banks serves a protective function to the funds of depositors in the banks and also protects the banks from losing profitability, especially in times of asset risk (Abusharbeh, 2025). As outlined by (Hussain A, Kijkasiwat P, Ijaz B, Deari F, 2022), it is these banks that, as measured by CAR, have a satisfactory level of capital adequacy that maintain a sound and stable financial position by meeting their depositors and also keeping their loan portfolio open. Also, a high CAR is also a sign that a bank can withstand some market risks without having to give up its profitabilitiy (Batekele & Maseka, 2025)**.** In addition, capital adequacy plays a crucial role in safeguarding banking institutions from financial distress, as a stronger capital base provides greater protection for creditors and enables banks to absorb potential losses without leading to insolvency. Furthermore, the Capital Adequacy Ratio (CAR) is widely recognized as an important indicator of a bank's financial strength and stability in the banking industry (Muhammad & Rinawati, 2025)

There is no question as to why a lot of the media and the academia is discussing Non-Performing Loans (NPL), and more specifically the NPL Ratio (NPLR). Because of the banks' role as primary credit intermediaries, they are very vulnerable to issues of credit. This is a significant problem, as the state of the loan portfolio reflects directly on the possible net profit (Karim R, Roshid M, Shamme F, & Hasan M, 2023). Dung D, Salimi Z, Linh T, Phuong N, Anh B, Xuan L, & Thy V (2024) were able to establish the NPLR as a variable that is detrimental to bank profitability. Detrimental impact to profitability has also been identified (Veizi & Çelo, 2024). The financial institutions' tension of having high-risk lending is that it will also enable to limit the profitability of the institution as more non-performing loans are added to the system (Nurfitria N, Putri A, Lestari H, & Leon F, 2023). NPLR is positively correlated to credit quality. Credit risk arises when borrowers fail to meet their repayment obligations, potentially leading to financial losses and reduced bank stability. Therefore, effective management of NPL is essential to mitigate credit risk exposure and sustain profitability.(Kandel, 2024).

Banks' total assets and potential for operational efficiencies and cost savings are taken into account when measuring size by Total Assets Log (Dahal & Panthi Dhungana, 2025). Larger banks are often better equipped to diversify their holdings and provide liquidity, which lowers the risk of excessive credit Haris, M., Yao, H. X., & Fatima, H., (2024). However, due to increasing operational complexity, an excessively high bank size may result in inefficiencies (Blatter & Fuster, 2022). Regarding bank size and profitability, the most indications of financial performance are the bank size, which means the efficiency in assets utilization for bank to deliver operational profitability and sustainable profits (Bortoluzzo A, Ciganda R, & Bortoluzzo M, 2024).

The inclusion of the Cost to Income Ratio (CIR) variable in this study represents a novelty, particularly in the context of conventional banks listed on the Indonesia Stock Exchange, as prior studies on bank profitability have predominantly emphasized credit risk indicators rather than operational efficiency. CIR reflects the level of operational efficiency, measuring the proportion of operating expenses relative to operating income. According to (Batekele & Maseka, 2025) CIR significantly affects profitability by highlighting the importance of cost efficiency in achieving optimal bank performance. Similarly, (Kusuma & Budhidharma,

2025) found that a higher CIR reduces Return on Equity (ROE), as increased operational expenses diminish the net income available to shareholders. Furthermore, (Al-Sharkas & Al-Sharkas, 2022) demonstrated that in developing countries, elevated operational costs negatively impact ROE, underscoring the importance of controlling operating expenses to sustain profitability. From a business perspective, inefficient cost management increases the income burden of banks, weakens financial performance, and ultimately reduces shareholder returns.

This research aims to evaluate how the Capital Adequacy Ratio (CAR), Non-Performing Loan Ratio (NPLR), Size of the Bank, and Cost to Income Ratio (CIR) affect the Return on Equity (ROE) as a measure of profitability of the conventional banks listed on Indonesia Stock Exchange in the period 2020-2024. This study is expected to improve the understanding of the factors determining bank profitability. Furthermore, the findings of this research are expected to provide practical implications for bank management in improving financial performance, enhancing operational efficiency, and managing credit risk more effectively. In addition, this study may contribute to the banking literature by providing empirical evidence regarding the determinants of bank profitability in Indonesia.

LITERATURE REVIEW

Agency Theory

Agency Theory explains the relationship between principals (shareholders) and agents (management) in a company. In the banking sector, shareholders delegate authority to management to manage company resources in order to maximize profitability. However, differences in interests between principals and agents may create agency problems that influence managerial decisions and firm performance (Jensen & Meckling, 1976). In the context of banking, these conflicts may arise when managers prioritize their own interests rather than maximizing shareholder value, which may negatively affect financial performance. Therefore, effective monitoring mechanisms and prudent financial management are necessary to ensure that managerial decisions align with the interests of shareholders and support the achievement of optimal financial performance (Nguyen, 2021).

Bank Profitability

Profitability is one of the major indicators of the success of any business and measure of resource utilization efficiency (Tomak, 2024). Return on Equity (ROE) is one of the commonly used indicators of profitability in which net profit is compared to the total equity of the stakeholders (Do, H. L., Ngo, T. X., & Phung, Q. A. 2020). It is presumed that a higher level of equity would lower the cost of funding, as credit risk of the bank would lessen and the bank would become more financially stable. Research suggest banks that have higher equity to assets ratio also have lower reliance on external funding (Orkaido Deyganto, K., Kumari, D., & Professor, A. 2019).

Capital Adequacy Ratio

The ability of a bank to honor its obligations, withstand economic shocks, and the overall magnitude of the bank's financial and economic resources are all parameters that are measured using the Capital Adequacy Ratio (Kandel, 2024). This ratio demonstrates how well the bank can endure challenging economic times while continuing to run its business (Sifrain, 2025). CAR is said to positively and significantly affect Return on Equity (ROE) based on studies conducted by Luh Shintya Anggari & Made Dana (2020). Also, the research shows that a positive CAR is a factor that attracts investor confidence, is positively correlated with ROE and positively enhances the bank's risk-bearing ability (Luh, N., Agustini, P., Putu, N., Astiti, Y., Made, N., Mentari, I., & Denpasar, U. M, 2024).

Non-Performing Loans

The Non-Performing Loan Ratio serves as a substantial indicator of a bank's credit risk and is commonly applied to evaluate risks across the banking sector (Batekele & Maseka, 2025). This parameter reflects the risk-loans in the portfolio of the bank that are non-performing and in gross amounts. In this case, a low NPLR value translates to the asset quality being decent, the non-performing loans being hardly a few, and credit risk being minimal, thus the bank's profitability as measured in ROE is likely to perform better (Stanley Isanzu, 2017). In the case of (Odebode et al., 2024) research, the investment of NPLs was shown to greatly impair ROE. Such observations were also documented by Arthur-Sam (2025) who noted that the increase of NPLs was, in every case, detrimental to the profitability of a bank due to a substantial risk of insolvency stunting the

growth of equity and resulting in a lack of resiliency.

Bank Size

The total assets that a bank possesses can describe that bank's operational strength and capabilities, and are measured using standard of total assets. Such institutions typically demonstrate operational efficiency while sustaining elevated levels of liquidity and overall efficiency (Guidi, 2025). (Alzwi et al., 2025) emphasize that larger banks are capable of maintaining high operational efficiency, along with strong liquidity and efficiency. For instance, Bortoluzzo, A. B., Ciganda, R. R., & Bortoluzzo, M. M (2024) identify a positive association between bank size, diversification, and return on equity (ROE), as extensive asset diversification bolsters the stability of the bank's earnings. Mirović, V., Kalaš, B., Milenković, N., Andrašić, J., & Đaković, M. (2024b) however notes that excessive growth of size of a bank can reduce its managerial efficiency thus leading to poor performance from the bank resulting to reduce the level of ROE. Large banks generally have a stronger brand image, so they often receive attention and protection from regulators through the concept of too-big-to-fail. In addition, their large operational scale allows these banks to achieve economies of scale in their business activities, thereby potentially generating higher profit margins than smaller banks (Rahman & Martiningtiyas, 2021).

Cost of Income Ratio

Operational efficiency is gauged through the Cost-to-Income Ratio (CIR) (Batekele & Maseka, 2025). How much banks spend to earn income is what this assortment. Although this ratio level reflects operational control over expenditure, a lower operational expenditure ratio indicates efficiency in operational activities (Kusuma & Budhidharma, 2025). Al-Sharkas & Al-Sharkas (2022) indicate that operating expenses have a marked negative influence on profitability, as they erode net profits and reduce the return on equity. Stability in financial performance (credit risk) is explained by cost efficiency, which is also found by Twairesh & ALserhan, (2025). Research by Sirait, A. S., Azhar, I., Lubis, N., Ekonomi, F., Bisnis, D., & Samudra, U (2025) also focuses on the profitability impacts as well as the competitiveness banks would obtain in the financial sector by lower operational costs, thus lower CIR, in which profitability in the financial sector.

Although previous studies have examined the determinants of bank profitability, including Capital Adequacy Ratio (CAR), Non-Performing Loan Ratio (NPLR), bank size, and Cost to Income Ratio (CIR), the empirical findings remain inconsistent. Some studies reported that these variables have a significant influence on bank profitability, while other studies found different or insignificant results. In addition, limited studies examine the combined effect of CAR, NPLR, bank size, and CIR on the profitability of conventional banks in Indonesia. Therefore, this study attempts to fill this gap by analyzing the influence of these variables on bank profitability measured by Return on Equity (ROE) in conventional banks listed on the Indonesia Stock Exchange during the period 2020–2024.

Conceptual Framework

Economic growth is highly dependent on the availability of adequate capital, some of which comes from people's savings (Lestari & Mardiana, 2022). As a financial intermediary, banks recruit public assets and reallocate them as loans to earn interest while safeguarding customers' funds (Kandel, 2024). The extent to which a company effectively manages and deploys its resources can differ, with profitability serving as a key indicator of its overall success (Tomak, 2024). Dahal & Panthi Dhungana (2025) examine how the Capital Adequacy Ratio (CAR), Non-Performing Loan Ratio (NPLR), bank size, and additional variables such as the Cost-to-Income Ratio (CIR) influence the profitability of banks operating in Nepal.

Research by Batekele & Maseka (2025) demonstrate that the Capital Adequacy Ratio (CAR) exerts a positive influence on bank profitability, implying that higher levels of capital adequacy empower banks to handle risks more effectively and derive greater profits from them. Similar findings were also put forward by Kandel (2024) who stated that CAR positively impacts ROE. Findings supporting this claim from Natufe & Evbayiro-Osagie (2023) which states that CAR positively influences ROE. Meanwhile, Nurfitria et al. (2023) ndicated that the added risk of a large portfolio of loans would increase the level of non-productive loans (NPL) and, accordingly, profitability of the bank. In line with that, Kandel (2024) also found that Non-Performing

Loan Ratio (NPLR) was a deterrent to profitability considering that high amounts of non-productive loans would increase the amount of reserves that must be held, reducing profitability.

Bank Size Also Affects Bank Profitability. Anantiputeri, D. D., Azizah, W. W., & Leon, F. M. (2023) argue that large banks have more total assets and as a result have a greater ability to control credit risk and operationalize efficiency. Also Haris et al. (2024) states that total assets in log form (as a proxy to indicate the size of the bank) positively and significantly affects the ROE which in turn indicates that more assets profitability also increases. Research results Mijoč, I., Kuzmić, M., & Vujanić, M. (2025) reveal that LNTA positively affects ROE. On the other hand, Batekele & Maseka (2025) discovered that the Cost-to-Income Ratio (CIR) has a negative impact on ROE, highlighting the necessity for cost balance to achieve efficiency and ensure sustainable strong financial performance, which is also in agreement with Twairesh & ALserhan (2025) that states as the CIR decreases, the operational efficiency of the bank increases which positively correlates with the ROE.

Based on the previous studies and theoretical explanations, it can be argued that several internal factors influence bank profitability. Capital Adequacy Ratio (CAR) reflects the bank's ability to absorb financial risk, which may support higher profitability. Meanwhile, a high Non-Performing Loan Ratio (NPLR) indicates poor credit quality that can reduce bank profits. Bank size, measured by total assets, may improve profitability because larger banks tend to benefit from economies of scale and better operational capabilities. In contrast, a higher Cost-to-Income Ratio (CIR) indicates lower operational efficiency, which may negatively affect bank profitability. Therefore, this study examines the influence of CAR, NPLR, bank size, and CIR on bank profitability measured by Return on Equity (ROE).

Based on the preceding explanations, the conceptual framework for this study can be outlined as follows:

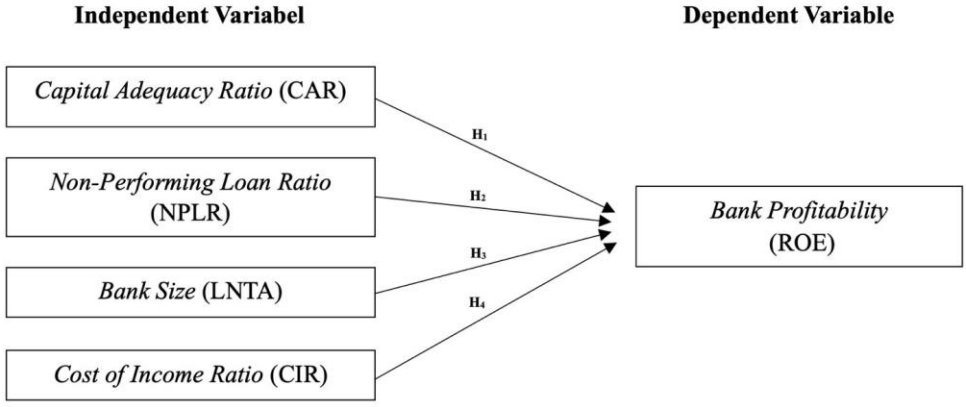

Figure 1.
Conceptual Framework Diagram

Source: Data Processed, 2025

The Effect of Capital Adequacy Ratio on Bank Profitability

According to Signaling Theory, financial indicators such as the Capital Adequacy Ratio (CAR) provide signals to investors and stakeholders regarding the financial strength and stability of banks. Batekele & Maseka (2025) demonstrates that the Capital Adequacy Ratio (CAR) exerts a positive influence on the profitability of banks. In line with Kandel (2024), CAR positively affects ROE. Such findings suggest that maintaining adequate capital levels and effectively managing credit risks are essential for improving bank profitability. In contrast to Haeril & Albar (2021), who indicated that CAR has a positive significant relationship with ROE. However, Eltweri et al. (2024) discovered that CAR negatively impacts ROE, as surplus capital diminishes equity efficiency and adversely affects the bank's profitability.

The explanation above leads to the following hypothesis:

H_1: Capital Adequacy Ratio Positively affects Bank Profitability

The Effect of Non-Performing Loans on Bank Profitability

According to Credit Risk Theory, a higher level of non-performing loans reflects poor credit quality and increases the risk faced by banks, which can negatively affect profitability. Empirical studies support this argument. Research conducted by Dahal & Panthi Dhungana (2025) i suggests that NPLR has a profitability loss as evidenced by ROE. Following research from Stephen Kingu, P., Macha, D. S., & Gwahula, D. R. (2018) An analysis of Tanzania's commercial banks reported that NPLs negatively impact ROE. Research results by Batekele & Maseka (2025) indicates that NPLR negatively influences ROE. Research conducted by Sigdel & Deswal (2025) demonstrates that NPLs negatively impact ROE. This suggests that an increase in NPLs will decrease the profitability of banks, indicating that more effective management of credit risks is necessary to avoid risk while improving profitability.

The explanation above leads to the following hypothesis:

H_2: Non-Performing Loans Ratio Negatively affects Bank Profitability

The Effect of Bank Size on Bank Profitability

According to Economies of Scale, larger firms can operate more efficiently due to lower average costs and greater operational capacity. Empirical studies provide mixed evidence regarding the relationship between bank size and profitability. Research conducted by Dahal & Panthi Dhungana (2025) assessed the gains of LNTA on profitability and observed favorable results. Nguyen (2023) also investigated bank size variable proxied through log of total assets and identified a detrimental effect on ROE which means that have a large is not a guarantee of higher profitability. Also, Haris et al. (2024) confirmed that LNTA positively contributes to ROE. This means that large bank size enhances performance through economies of scale, diversified operational activities, and increased operational flexibility.

The explanation above leads to the following hypothesis:

H_3: Bank Size Positively Affects Bank Profitability

The Effect of Cost of Income Ratio on Bank Profitability

According to Efficiency Theory, operational efficiency plays an important role in determining a firm's financial performance. The Cost-to-Income Ratio (CIR) reflects how efficiently a bank manages its operating costs relative to its operating income. Empirical evidence supports this relationship. Batekele & Maseka (2025), reported in their study that the Cost-to-Income Ratio (CIR) has a negative effect on bank profitability, underscoring the importance of cost effectiveness for sustaining profitability. This is consistent with the findings of Sirait et al. (2025), who observed that CIR exerts a negative and statistically significant influence on Return on Equity (ROE) profitability. In another study, Al-Sharkas & Al-Sharkas (2022) reported similar outcomes to CIR which evidenced that CIR affects profitability negatively thus attain an undesirable ROE (return on equity) that results from a disproportionate increase of operational costs to operational income.

The explanation above leads to the following hypothesis:

H_4: Cost of Income Ratio Negatively affects Bank Profitability

RESEARCH METHODS

This study employs a hypothesis-testing approach to examine the effects of independent variables namely, the Capital Adequacy Ratio (CAR), Non-Performing Loan Ratio (NPLR), Bank Size, and Cost-to-Income Ratio (CIR), on the dependent variable of Bank Profitability (ROE). The analysis covers a five-year period from 2020 to 2024 and includes data from 41 banks listed on the Indonesia Stock Exchange. Utilizing E-Views for panel data regression, the research incorporates these variables into its framework.

The econometric model used in this study is specified as follows:

$$\mathbf{ROEit = \beta_0 + \beta_1 CAR_{it} + \beta_2 NPLR_{it} + \beta_3 LNTA_{it} + \beta_4 CIR_{it} + \varepsilon_{it}}$$

Where:
β = Koefisien
ROE = Return on Equity

CAR = Capital Adequacy Ratio
NPL = Non-Performing Loan Ratio
LNTA = Bank Size
CIR = Cost to Income Ratio
ε = error term.

Table 1. Measurement of Variables

Variable Types	Variable Name	Symbol	Rumus	Reference
Dependent Variable	Bank Profitabiliy (Return on Equity)	ROE	$\frac{Net\ Income}{Total\ Equity}$	Dahal & Panthi Dhungana (2025)
Independent Variables	Capital Adequacy Ratio	CAR	$\frac{Tier\ 1 + Tier\ 2}{risk\ weighted\ assets}$	Muhammed et al. (2024)
	Non-Performing Loan Ratio	NPLR	$\frac{Non\ Performing\ Loans}{Total\ Loans}$	Dung et al. (2024)
	Bank Size	LNTA	The natural logarithm of total assets serves as a proxy for bank size.	Dahal & Panthi Dhungana (2025)
	Cost to Income Ratio	CIR	$\frac{Operating\ Expense}{Operating\ Income}$	Batekele & Maseka (2025)

Source: Data Processed, 2025

Sampling Methods

This research employs purposive sampling as its sampling technique. Quantitative secondary data serve as the primary data collection method. The data were obtained from company websites and the Indonesia Stock Exchange (www.idx.co.id). The study encompasses financial statements from 41 banks over a five-year period (2020-2024), resulting in 205 observation periods.

Table 2. Results of sample selection using purposive sampling

Description	Amount
Banks listed on the IDX during the 2020-2024 period	47
Banks with incomplete data in their financial statements and annual reports	(2)
Islamic banks listed on the Indonesia Stock Exchange for the five-year period (2020–2024)	(4)
Total units for research analysis	**41**
Total observations across five years	**205**

Source: Data Processed,2025

Data Analysis Methods

Regression analysis of the collected data was conducted using E-Views software, incorporating panel data methods. To select the most suitable panel data regression model, three tests were applied: the Chow Test, the Hausman Test, and the Lagrange Multiplier (LM) Test.

The Chow Test facilitates the choice between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). Additionally, the Hausman Test aids in determining whether the Fixed Effect Model (FEM) is preferable to the Random Effect Model (REM). If the initial two tests do not yield conclusive results, the Lagrange Multiplier (LM) Test is utilized to decide between the Random Effect Model (REM) and the Common Effect Model (CEM).

In the banking industry, each bank has specific characteristics such as management quality, risk appetite, and operational strategy that may influence financial performance. These characteristics are relatively constant over time but differ across banks. Therefore, the Fixed Effects Model is considered more appropriate because it controls for unobserved heterogeneity across individual banks.

A probability value (p-value) at a 5% significance level guides the selection of the appropriate model. Following this, hypothesis testing is performed, including partial tests (t-test) and simultaneous tests (F-test), along with the coefficient of determination (R^2), to evaluate the extent to which independent variables influence the dependent variable.

RESULTS AND DISCUSSION

Chow Test

The Chow Test was employed to determine the optimal panel data regression model, comparing the Fixed Effect Model (FEM) and the Common Effect Model (CEM). This test uses cross-sectional Chi-square probabilities to assess differences (or heterogeneity) among observed units. If the cross-sectional Chi-square value exceeds 0.05 (at a 5% alpha level), the CEM is deemed appropriate. Otherwise, H_0 is rejected in favor of H_a, necessitating the use of FEM. Emphasizing fixed effects can enhance estimate precision by accounting for variations across banks in the relationship between variables.

The test yielded a cross-sectional Chi-square value of 0.0000 < 0.05, leading to the rejection of H_0 and the adoption of the Fixed Effect Model (FEM) as the most suitable for this study.

Hausman Test

Given that the Chow Test indicated the Fixed Effect Model (FEM) as appropriate, the Hausman Test was subsequently conducted to ascertain whether the Random Effect Model (REM) or FEM should be selected. This test is typically applied to any previously chosen regression model. Decisions hinge on the cross-sectional random values: if the probability value is ≥ 0.05 (at a 5% alpha level), H_0 is accepted, favoring REM; conversely, if it is < 0.05, H_0 is rejected, and FEM is selected.

The Hausman Test output, as shown in Table 2, produced a cross-sectional random p-value of 0.0011, which is less than 0.05, resulting in the acceptance of H_a and the confirmation of FEM as the chosen model.

Data Analysis Methods

Determinant Coefficient Test (R^2)

The determinant coefficient test serves as a method to evaluate the extent to which the independent variables in the model account for variations in the dependent variable.

Table 3. Coefficient Determination Testing (R^2)

R^2	Adjusted R^2
0.699119	0.630243

Source: Data Processed,2025

From the outcomes of the Determination Coefficient (R^2) test, an adjusted R^2 value of 0.630243 was obtained. This indicates that the independent variables namely, CAR, NPLR, LNTA, and CIR, account for 63.0243% of the variations or changes in the dependent variable, Bank Profitability (ROE). Conversely, the remaining 36.9757% represents unexplained variations attributable to other factors influencing bank profitability that the model did not incorporate.

F Test

The F test, also known as the simultaneous test, is utilized to determine whether the independent variables collectively exert a significant impact on the dependent variable. The hypotheses tested are as follows:

H_0: $b_1 = b_2 = b_3 = b_4 = b_5 = b_6 = b_7 = 0$, implying no collective effect of the independent variables on the dependent variable, while

H_a: suggests that at least one independent variable significantly affects the dependent variable.

Table 4. F Test (Simultaneous Test)

F-statistic	Prob (F-statistic)
10.15037	0.000000

Source: Data Processed, 2025

The F test yielded a p-value of 0.000000 < 0.05, leading to the rejection of H_0 and acceptance of H_a. Consequently, it can be inferred that at least one independent variable substantially influences bank profitability.

Descriptive Statistical Analysis

From a descriptive statistical analysis of 205 data bank profitability variable (ROE) has an average of 0.0309. The maximum was 0.2094, belonged to the bank PT Bank Mega Tbk (MEGA) 2021, and the minimum was -0.7949, belonging to PT Bank KB Bukopin Tbk (BBKP) 2024. The median of 0.0375 shows that the majority of the banks have a low return on equity. The standard deviation of 0.1184 reflects considerable variability in bank profitability levels, coupled with a low average profitability, thereby highlighting notable disparities among the banks.

Regarding the CAR variable, the data reveal a mean value of 0.3665, with the highest recorded at 2.8388 by PT Krom Bank Indonesia Tbk (BBSI) in 2022 and the lowest at 0.1047 by PT Bank Mayapada Internasional Tbk (MAYA) in 2024. A median of 0.2583 suggests moderate disparities in capital adequacy across most banks. Furthermore, the standard deviation of 0.3092, which approximates the mean, points to substantial variation in the capital adequacy ratios of the banks.

For the NPLR variable, the mean stands at 0.0328, with a maximum of 0.2227 observed for PT Bank Pembangunan Daerah Banten Tbk (BEKS) in 2020 and a minimum of 0.0001 for PT Allo Bank Indonesia Tbk (BBHI) in 2022. The median value of 0.0282 indicates that the majority of banks maintain low NPL ratios. Additionally, the standard deviation of 0.0265, slightly lower than the mean, suggests relative uniformity in the NPL ratios across the banks.

Bank size, as measured by the natural logarithm of total assets (LNTA), averages 31.5622. The maximum value of 35.4255 was recorded by PT Bank Mandiri (Persero) Tbk (BMRI) in 2024, while the minimum of 27.9965 belongs to PT Krom Bank Indonesia Tbk (BBSI) in 2020. A median of 31.0364 implies that most sampled banks possess moderate asset sizes. The standard deviation of 1.7225, being lower than the mean, indicates a relatively homogeneous distribution of bank sizes in the sample.

In terms of the CIR variable, the average value is 0.8801, with the highest at 13.0042 for PT Bank JTrust Indonesia Tbk (BCIC) in 2020 and the lowest at 0.1794 for PT Krom Bank Indonesia Tbk (BBSI) in 2024. The median of 0.6734, alongside a standard deviation of 1.1042 that exceeds the mean, reveals considerable variation in operational efficiency among the banks.

Table 5. Descriptive Statistics

	ROE	CAR	NPLR	LNTA	CIR
Mean	0,030957	0,366457	0,032757	31,56215	0,880114
Median	0,037452	0,258310	0,028213	31,03642	0,673405
Maximum	0,209358	2,838783	0,222658	35,42552	1,300423
Minimum	-0,794874	0,104719	0,000128	27,99652	0,17941
Std. Dev.	0,118375	0,309166	0,026548	1,722458	1,104227

Source: Data Processed, 2025

T Test

The T test assesses the individual significance of each independent variable in relation to the dependent variable. Acceptance criteria dictate that a p-value from the T test below 0.05 signifies a significant influence of the independent variable on the dependent variable. Conversely, if the p-value exceeds 0.05, it implies that the independent variable does not exert a notable effect on the dependent variable.

The Effect of Capital Adequacy Ratio on Bank Profitability

An analysis of the influence exerted by the capital adequacy ratio on return on equity produced a coefficient estimate of -0.005353 and a p-value of 0.8393 ($p > 0.05$). Therefore, there was evidence that CAR did not have a negative effect on ROE. This is in contrast to Dahal & Panthi Dhungana (2025), which concluded that CAR positively and significantly affects profitability of Nepalese banks, particularly because high capital is associated with more risk and thus, more profitability. However, the present study's findings align with those of Rosyidah & Handayani (2024), who reported a negative effect of CAR on ROE. Such a result may stem from banks maintaining elevated capital adequacy ratios without productively deploying a substantial portion of these funds in lending activities. CAR is an indicator of conservativeness with regards to risk, but if a high CAR is a result of excess capital that is not going to be used in lending, thus it will negatively affect the banks' capacity to create a profit. As stated in the OJK report, a number of banks in Indonesia seem to be keeping large capital balances in order to preserve their health ratio, thus the impact on their profitability is not significant.

The Effect of Non-Performing Loan Ratio on Bank Profitability

As per the NPLR variable, there is a negative impact on the profit that the Bank makes, with a coefficient correlated to -0.617916, with an even smaller p-value than the previous, in this case, p-value = $0.0254 < 0.05$. Therefore, NPLR has a negative impact on the organization's ROE. This is supported by the findings of Dahal & Panthi Dhungana (2025) That NPLR is a negative ROE. This can occur because the higher the NPLR, the greater the loss reserves banks must set aside to cover potential defaults. This condition reduces interest income and lowers net income, thereby decreasing bank profitability. Moreover, a large amount of NPL is a sign of deteriorated asset quality, which has an impact on the overall financial potential of a given institution. Economically, the coefficient suggests that a 1% increase in NPLR may reduce ROE by approximately 0.62%, indicating that credit risk has a substantial impact on bank profitability. Higher levels of non-performing loans require banks to allocate larger loan-loss provisions, which reduces interest income and ultimately lowers net profit. In the Indonesian banking system, regulators such as Bank Indonesia and the Financial Services Authority (OJK) closely monitor the NPL ratio to maintain financial stability and ensure good asset quality.

The Effect of Bank Size on Bank Profitability

In evaluating the relationship between bank size and profitability, the LNTA variable yielded a coefficient of 0.016089 and a p-value of $0.0020 < 0.05$. This leads to the conclusion that LNTA positively influences ROE. This finding receives support from Dahal & Panthi Dhungana (2025), which showed that LNTA positively impacts profitability. This implies that larger banks have a greater ability to achieve operational efficiency and to diversify their operations and market share. Large corporate size is also an indicator of enhanced financial solidity and strong public confidence, which can lead to increased profitability of the bank. Economically, this result suggests that larger banks tend to generate higher profitability due to economies of scale, better operational efficiency, and greater diversification of financial activities. In addition,

larger bank size reflects stronger financial capacity and higher public trust, which can support improved profitability.

The Effect of Cost of Income Ratio on Bank Profitability

An assessment of the CIR variable's impact on bank profitability revealed a coefficient of -0.028595, and a p-value of 0.0000 < 0.05. Accordingly, CIR is found to negatively affect ROE. This aligns with the study by Batekele & Maseka (2025), who state that CIR has a negative effect on ROE. The rationale lies in the fact that a high cost-to-income ratio undermines operational efficiency, thereby impairing a bank's profit generation. These results provide evidence for the need to manage a bank's operational costs and efficiency. Economically, the coefficient suggests that a higher cost-to-income ratio is associated with lower profitability. An increase in CIR reflects higher operational costs relative to income, which reduces the bank's operational efficiency and ultimately lowers profit generation. Therefore, banks with better cost management and higher operational efficiency tend to achieve better profitability.

Table 6. T-test (Partial Test)

Variable	Coefficient	Prob.	Conclusion
CAR	-0.005353	0.8393	No significant affects on ROE
NPLR	-0.617916	0.0254	Has a significant negative affects on ROE
LNTA	0.016089	0.0020	Has a significant positive affects on ROE
CIR	-0.028595	0.0000	Has a significant negative affects on ROE

Source: data processing using E-views, 2025

Regression Model Research

The findings from the panel data support the following regression equations:

$$\mathbf{ROE_{it} = -0.429473 - 0.005353CAR_{it} - 0.617916NPLR_{it} + 0.016089LNTA_{it} – 0.028595CIR_{it}}$$

Where:
β = Konstanta
β_{1-4} = Koefisien
ROE = Return on Equity
CAR = Capital Adequacy Ratio
NPLR = Non-Performing Loan Ratio
LNTA = Log of Total Assets
CIR = Cost-to-Income Ratio
i = Intercept
t = Period (Time)

CONCLUSION AND RECOMMENDATIONS

This study contributes to the empirical literature on bank profitability by examining the effects of capital adequacy (CAR), credit risk (NPLR), bank size (LNTA), and operational efficiency (CIR) on the profitability of conventional banks in Indonesia during the period 2020–2024. The findings reveal that credit risk (NPLR) and operational inefficiency (CIR) negatively affect bank profitability, while bank size (LNTA) positively influences profitability. Meanwhile, capital adequacy (CAR) does not significantly affect profitability. These results provide additional empirical evidence to the banking intermediation literature by highlighting the importance of credit risk management and operational efficiency in determining bank performance.

This study also addresses the empirical gap in the literature concerning the determinants of bank profitability in emerging banking markets, particularly Indonesia. The insignificant effect of CAR suggests that maintaining high capital levels alone is not sufficient to improve bank profitability without effective asset utilization and operational management.

From a policy perspective, the findings provide important implications for banking regulators such as

the Financial Services Authority (OJK) and Bank Indonesia. Strengthening credit risk supervision and encouraging improvements in operational efficiency could help enhance the stability and profitability of the banking sector. Regulators may also consider policies that promote more effective asset management and risk monitoring among banks.

To gain a deeper understanding of liquidity's role in profitability, incorporating variables such as liquidity risk, measured via the Loans to Deposits Ratio (LDR), is recommended (Cangombe et al., 2025). Further, the recommendations would also entail improving the scope of the given time frame and sampling to include Islamic banks and thus enhance the comprehensiveness of the findings. Such enhancements in future research could better illuminate the determinants of bank profitability in Indonesia.

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