



DETERMINANTS OF BANK PROFITABILITY: EVIDENCE FROM CONVENTIONAL COMMERCIAL BANKS LISTED ON IDX

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ABSTRACT

This study examines the relationship between Capital Adequacy Ratio (CAR), Loan to Deposit Ratio (LDR), Non-Performing Loan (NPL), and Operating Expense to Operating Income Ratio (OER) and Return on Assets (ROA) among conventional commercial banks listed on the Indonesia Stock Exchange (IDX) during 2022–2024. A quantitative approach was employed using panel data from 34 conventional commercial banks, resulting in 102 firm-year observations. The Fixed Effects Model (FEM) was selected based on the Chow and Hausman tests. The results show that CAR has a negative and statistically significant relationship with ROA, while OER also has a negative and statistically significant relationship with ROA. In contrast, LDR and NPL do not exhibit statistically significant relationships with ROA. The simultaneous test indicates that CAR, LDR, NPL, and OER are jointly and significantly associated with ROA. The findings suggest that higher capital adequacy does not necessarily translate into higher profitability during the observation period, particularly when additional capital is not accompanied by proportionate asset utilization. Meanwhile, the negative association between OER and ROA highlights the importance of operational efficiency in bank profitability.

INTRODUCTION

The banking subsector plays a crucial role in a country's economy. According to a panel study conducted by Tsaurai (2023) on BRICS countries (1987–2020), the banking subsector was found to have a positive effect on the economies of BRICS countries.

Global economic uncertainty and geopolitical pressures have created a challenging environment for the financial sector (Financial Services Authority, 2023). Geopolitical tensions, global inflationary pressures, and tighter global monetary policy have contributed to tighter financial conditions and increased uncertainty in the banking sector. These developments may influence Indonesia's financial sector through changes in interest rates, liquidity conditions, lending activity, and credit risk. In response to global monetary tightening, Bank Indonesia increased the BI Rate to 6% in 2023 (DJKN Kemenkeu, 2023). Such changes in financial conditions are relevant to bank profitability because they may affect banks' liquidity management, credit allocation, capital management, and operating efficiency.

Despite these external pressures, Indonesia maintained economic growth of 5.05% in 2023 (Indonesian Central Statistics Agency, 2024). This condition indicates that the domestic economy remained relatively resilient, providing an important context for examining the performance and profitability of the banking sector during the post-pandemic period.

This resilience was also reflected in the banking sector, which recorded an increase in net profit during the 2022–2024 period based on data from the Indonesia Stock Exchange (2024) and Databoks (2025). This positive

performance provides a relevant context for examining the bank-specific determinants of profitability.

Against this backdrop, profitability becomes an important indicator of bank financial performance because it reflects a bank's ability to generate returns from its available resources (Thian, 2021). One commonly used measure of bank profitability is Return on Assets (ROA), which reflects a bank's ability to generate profit from its assets.

Table 1. Conventional Commercial Bank Internal Finance Ratio Rate 2022-2024

Tahun	ROA (%)	CAR (%)	LDR (%)	NPL (%)	OER (%)
2022	2,44	25,66	88,57	2,44	78,65
2023	2,74	27,65	83,83	2,19	78,92
2024	2,69	26,69	88,57	2,08	81,30

Source: Surveillance Report of OJK

Table 1 shows that ROA increased from 2.44% in 2022 to 2.74% in 2023 before declining slightly to 2.69% in 2024. During the same period, CAR increased in 2023 and declined in 2024, while LDR, NPL, and OER also showed different patterns. Previous studies have reported different relationships between bank-specific financial ratios and profitability. Regarding CAR, higher capital adequacy does not necessarily result in higher profitability because additional capital may not always be accompanied by proportional utilization of productive assets (Pratomo et al., 2025). For LDR, a higher level may support profitability through increased lending activity, but excessive lending may also increase liquidity risk (Eltweri et al., 2024). Similarly, higher NPL generally indicates deteriorating credit quality and may reduce profitability, although empirical findings have not always been statistically significant (Arhinful et al., 2025). In addition, a higher Operating Expense to Operating Income Ratio (OER) indicates lower operational efficiency and is generally associated with lower ROA (Irawan et al., 2025).

Although previous studies have examined the relationship between bank-specific financial ratios and profitability, empirical findings remain inconsistent, particularly regarding the role of capital adequacy and liquidity in explaining bank profitability. This inconsistency is important because a higher capital ratio theoretically strengthens a bank's capacity to absorb risk, but excessive or underutilized capital may also reduce the efficiency with which bank resources are transformed into earning assets. Recent evidence from Indonesian banks likewise remains mixed, with some studies reporting positive, insignificant, or negative relationships between CAR and ROA (Pratama et al., 2026; Purbadasuha & Prasetyono, 2024)

The present study addresses this unresolved empirical issue by examining conventional commercial banks listed on the IDX during 2022–2024, a period characterized by post-pandemic normalization, changing liquidity conditions, and continued attention to bank capital and operational efficiency. Rather than treating the use of panel regression or a recent observation period as the sole source of novelty, this study contributes by jointly examining whether the conventional theoretical expectations concerning capital adequacy, liquidity, credit quality, and operational efficiency remain consistent with observed profitability during this period. In particular, the study examines whether the relationship between CAR and ROA is consistent with the argument that higher capital does not automatically generate higher profitability when capital utilization is not accompanied by proportionate asset productivity.

Against this backdrop, the objective of this study is to examine the association of the Capital Adequacy Ratio (CAR), Loan to Deposit Ratio (LDR), Non-Performing Loan (NPL), and Operating Expense to Operating Income Ratio (OER) with Return on Assets (ROA) among conventional commercial banks listed on the IDX during the 2022–2024 period. By addressing the inconsistencies identified in previous studies, this research provides empirical evidence on the bank-specific factors associated with profitability during the post-pandemic period. The study examines both the individual and joint statistical associations of CAR, LDR, NPL, and OER with ROA.

LITERATURE REVIEW

Theoretical and Conceptual Background:

This literature review aims to formulate a conceptual framework that explains the relationship between the bank's financial ratios based on the CAMELS framework and the bank's profitability assessed by Return on Assets (ROA). The methodology used emphasizes the combination of financial theory and empirical data to support the

development of hypotheses in this study.

Profitability and Return on Assets

The Return on Assets (ROA) variable is based on the theory of profitability put forward by Brigham & Houston (2018) in *Fundamentals of Financial Management*, which explains that the efficient use of resources is a company's main goal in maximizing profitability. In the context of banking, ROA is used to measure management's ability to utilize assets to generate profitability. According to Saripurwanti (2015), it is explained that in measuring the ability and efficiency of assets in generating profitability, ROA is one of the main ratios. The more effective a bank is in utilizing its resources, the higher the profitability obtained, the better the performance of a bank.

Some findings from previous studies show that profitability is influenced by internal financial ratios. Findings from Yulia et al. (2025), found that financial ratios such as CAR, LDR, NPL, and OER are related to profitability. A Systematic Literature Review (SLR) study shows that profitability is significantly influenced by CAR, LDR, NPL, and OER significantly. This is strengthened by findings that show that CAR, LDR, NPL, and OER have an effect on profitability measured through ROA, although the direction of significance varies (Wardana & Setiadi, 2023).

CAMELS Framework as Theoretical Basis

The CAMELS framework provides a comprehensive framework for evaluating bank soundness and performance through six dimensions: Capital, Asset Quality, Management, Earnings, Liquidity, and Sensitivity to Market Risk.

In this study, the CAMELS framework is used as a theoretical basis for positioning the bank-specific financial indicators examined in relation to profitability. CAR, NPL, and LDR are directly associated with the Capital, Asset Quality, and Liquidity dimensions, respectively. OER is not treated as a separate formal CAMELS component; rather, it is positioned as an operational efficiency indicator that is conceptually related to the Management and Earnings dimensions because operating expenses reflect management's efficiency in utilizing resources and generating income. ROA represents the profitability outcome and is closely related to the Earnings dimension. This mapping enables the study to examine CAR, LDR, NPL, and OER as bank-specific indicators associated with ROA without implying that each variable represents a separate CAMELS dimension.

Based on this theoretical positioning, CAR, LDR, NPL, and OER are examined as bank-specific financial indicators that may be statistically associated with ROA. The CAMELS framework therefore provides the theoretical context for understanding how capital adequacy, asset quality, liquidity, management efficiency, and profitability are interconnected in the banking sector.

Empirical Review and Hypothesis:

Capital Adequacy Ratio

Within the CAMELS framework, CAR represents the Capital dimension and reflects the bank's capacity to absorb potential losses and maintain financial stability. Adequate capital is important for supporting banking operations and absorbing risks; however, a higher level of capital adequacy does not necessarily translate into higher profitability because profitability also depends on how effectively the available capital is utilized in productive activities.

From a profitability perspective, an increase in CAR may have either a positive or negative relationship with ROA. Higher capital can strengthen a bank's capacity to absorb risk and support sustainable operations, but excess or underutilized capital may reduce the efficiency of resource utilization. Previous empirical studies have reported mixed findings regarding the relationship between CAR and ROA, including positive, insignificant, and negative relationships (Pratama et al., 2026; Purbadasuha & Prasetyono, 2024)

H1 : CAR is significantly associated with ROA.

Loan to Deposit Ratio

LDR measures how effectively banks convert deposits into loans (Hery, 2019). From CAMELS' perspective, LDRs reflect liquidity and efficiency in lending. A bank's profitability will increase if credit distribution can be carried out optimally, so that the bank will get income in the form of high interest. However, a LDR that is too high will have an impact on decreasing liquidity and increasing the risk of default (bad loans).

Cross-country findings in *Asia Pacific Management* found that the company's internal efficiency and the productivity of an asset are important factors in increasing the profitability of a bank in Cambodia Wu Liao, et al. (2025). This is in line with the findings that explain that LDR has a significant effect on ROA (Puteh et al., 2016; Yuwono & Yuniarti, 2019).

- H2: LDR is significantly associated with ROA.

Non-Performing Loan

NPL reflects the quality of the bank's assets and the level of credit risk provided. NPLs within the

framework of CAMELS theory are a key indicator of asset quality. The increase in NPLs indicates that there are problems in credit that can reduce bank profits. The higher the NPL rate, the higher the losses resulting from bad loans which have an impact on profitability.

According to the findings of a study conducted by Setiawan et al. (2024), found that credit risk, as measured by the Non-Performing Loan (NPL) ratio, has a negative relationship with bank profitability, as measured by Return on Assets (ROA), indicating that higher credit risk is associated with lower profitability. Empirically, NPLs tend to have a significant negative influence on ROA (Ratnasari et al., 2025; Sutrisno et al., 2022).

- H3: NPL has a significant negative relationship with ROA.

Operating Expense to Operating Income Ratio

OER reflects the operational efficiency of the bank. In this study, OER refers to the *Biaya Operasional terhadap Pendapatan Operasional* (BOPO) ratio, also known as the Operating Expense to Operating Income ratio, which measures operational efficiency by comparing operating expenses with operating income. In the CAMELS theoretical model, this ratio relates to management and revenue aspects. In increasing profitability, OER is the main aspect because if a bank is not efficient in carrying out its operations, it will reduce the level of profitability received.

According to findings conducted by Irawan et al. (2025) in the Indonesian Education Journal, there are findings that the Operating Expense to Operating Income Ratio has a negative effect on profitability. Previous study findings found that OER has a significant effect and tends to have a negative effect on ROA (Jatmiko, 2025). This indicates that the higher the OER level, the more inefficient the bank is in carrying out its operational activities

- H4: OER has a significant negative relationship with ROA.

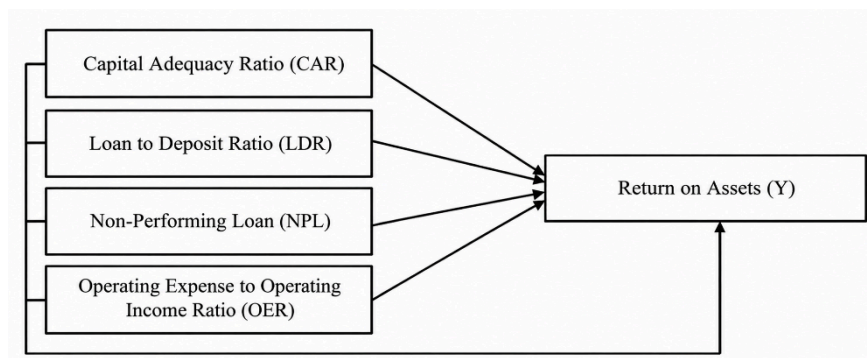


Figure 1. Research Conceptual Framework

Source: Authors (2026)

The theoretical framework in this research indicates that Return on Assets (ROA) as a profitability benchmark is influenced by Capital Adequacy Ratio (CAR), Loan to Deposit Ratio (LDR), Non-Performing Loan (NPL), and also Operating Expense to Operating Income Ratio (OER). This model is based on the CAMELS concept which examines the performance of banks from various financial perspectives.

CAR reflects the bank's capital adequacy and capacity to absorb risk, while its relationship with profitability may depend on how effectively capital is utilized. LDR describes how far banks are able to channel funds into credit, which is able to boost income and profitability. On the other hand, NPLs describe some non-performing loans that can thin profits, leading to bad implications for ROA. OER represents bank operational frugality, where higher values indicate large expenses that can reduce profitability. Therefore, these four variables are estimated to have an influence on ROA both separately and simultaneously. Based on the conceptual framework of the research, the hypotheses proposed in this study are:

- H1 : CAR is significantly associated with ROA.
- H2 : LDR is significantly associated with ROA.
- H3 : NPL has a significant negative relationship with ROA.
- H4 : OER has a significant negative relationship with ROA.
- H5 : CAR, LDR, NPL, and OER are jointly significantly associated with ROA.

RESEARCH AND METHODOLOGY

This study employed a quantitative research approach using an associative design. Understanding the relationship between independent and dependent variables is the primary goal of causal associative research (Sugiyono, 2019). The quantitative approach was chosen because it provides a framework for statistical hypothesis testing based on numerical data. The initial data collection and processing phase was conducted using Microsoft Excel 2024 for data accumulation and basic processing. More complex statistical analyses were conducted using EViews 13.

Table 2. Variable Operations

Variable	Operational Definition	Measurement	Scale	Data Sources
Return on Assets (ROA)	Bank profitability	$ROA = \frac{\text{Profit Before Tax}}{\text{Average Total Assets}} \times 100\%$	Ratio (%)	Annual Reports/IDX
Capital Adequacy Ratio (CAR)	Capital adequacy	$CAR = \frac{\text{Bank Capital}}{\text{Risk-Weighted Assets}} \times 100\%$	Ratio (%)	Annual Reports/IDX
Loan to Deposit Ratio (LDR)	Liquidity position	$LDR = \frac{\text{Total Loans to Third Parties}}{\text{Total Third-Party Funds}} \times 100\%$	Ratio (%)	Annual Reports/IDX
Non Performing Loan (NPL)	Credit risk	$NPL = \frac{\text{Non-Performing Loans}}{\text{Total Loans}} \times 100\%$	Ratio (%)	Annual Reports/IDX
Operating Expense to Operating Income Ratio (OER)	Operational Efficiency	$OER = \frac{\text{Total Operating Expenses}}{\text{Total Operating Income}} \times 100\%$	Ratio (%)	Annual Reports/IDX

Source: Authors, 2026

The dependent variable, ROA is evaluated within this research framework, with the CAR, LDR, NPL, and OER as independent variables. All conventional banking entities listed on the IDX between 2022 and 2024 form the population. A purposive sampling technique was applied to select the sample based on parameters relevant to the research objectives (Sugiyono, 2019). The detailed sample selection process and exclusion criteria are presented in Table 3:

Table 3. Sample Selection Process

Selection Criteria	Excluded	Remaining
Conventional commercial banks listed on IDX	-	43
Criteria		
Conventional commercial banks listed on IDX	3	40
Digital banks	3	37
Incomplete financial statements	1	36
Banks reporting losses	2	34
Final sample	9	34

Source: Authors, 2026

A cohort of 34 firms was ultimately selected pursuant to these stipulations, yielding 102 observations aggregated over three years (34 firms × 3 years). The exclusion of banks reporting losses was applied as part of the purposive sampling criteria used in this study, in line with the study's focus on conventional commercial banks with positive profitability during the observation period. However, this sampling decision may introduce selection bias because banks experiencing losses were not represented in the final sample, which may limit the generalizability of the findings. The observation period of 2022–2024 was selected to capture the post-pandemic normalization phase of the Indonesian banking industry and the changing conditions of the banking sector during this period. This period provides a relevant setting for examining variations in bank profitability and their relationships with capital adequacy, liquidity, credit risk, and operational efficiency. Nevertheless, the relatively short observation period may limit the generalizability of the findings to longer economic cycles. Secondary data were harnessed in this research, procured indirectly from authoritative repositories such as the Indonesia Stock Exchange website (www.idx.co.id) and individual banks' financial disclosures. Panel data regression analysis was adopted to interrogate the dataset across multiple cross-sections and temporal spans concurrently (Gujarati & Porter, 2020). The regression model formulation employed herein is expressed as follows:

$$ROA_{it} = \alpha + \beta_1(CAR)_{it} + \beta_2(LDR)_{it} + \beta_3(NPL)_{it} + \beta_4(OER)_{it} + \varepsilon_{it}$$

Description:

ROA_{it} : Return on Assets of bank (i) in time (t)

α : Constant term

β_1 - β_4 : Regression Coefficients of each independent variable

CAR : Capital Adequacy Ratio of bank (i) at time (t)

LDR : Loan to Deposit Ratio of bank (i) at time (t)

NPL : Non-Performing Loan of bank (i) at time (t)

OER : Operating Expense to Operating Income Ratio of bank (i) at time (t)

i : Cross-sectional unit (bank)

t : Time Period (2022–2024)

ε : Error term

Model selection was conducted using the Chow test to compare the Common Effects Model (CEM) and Fixed Effects Model (FEM), followed by the Hausman test to determine the appropriate specification between the Fixed Effects Model (FEM) and Random Effects Model (REM). The regression model was subsequently evaluated using diagnostic tests for normality, multicollinearity, heteroscedasticity, and serial correlation. Panel data regression was then employed to examine the statistical relationships between CAR , LDR , NPL , OER , and ROA .

RESULT AND DISCUSSION

Result

1. Model Estimation Test

Table 4. Model Estimation Test Result

Test	Hypothesis 0	Probability	Verdict	Selected Models
Uji Chow	CEM is better than FEM	0.0000	Reject H0	FEM
Uji Hausman	REM is better than FEM	0.0013	Reject H0	FEM

Sources: Data processed by researchers using EViews 13, 2026

The Fixed Effects Model (FEM) was declared superior to the Common Effects Model (CEM) through the Chow test findings in Table 4, as its probability value of 0.0000 was lower than 0.05. Additional support was

obtained from the Hausman test with a probability of 0.0013 (<0.05), which validated the FEM as the better option compared to the Random Effects Model (REM). For these reasons, this study implemented the Fixed Effects Model (FEM).

1. Classical Assumption Tests

Table 5. Classical Assumption Test Results

Test	Probability	Verdict
Normality Test	0.431168	Normal Distribution
Multicollinearity Test	< 0.85 for all variables	No multicollinearity Occurs
Heteroscedasticity Test (Glejser)	> 0.05 for all variables	No Heteroscedasticity Occurs
Autocorrelation Test (Durbin-Watson)	2.269661	Descriptive diagnostic

Sources: Data processed by researchers using EViews 13, 2026

Results of the classical assumption diagnostics, as presented in Table 5, affirm the data's suitability for subsequent regression scrutiny, given their conformity to requisite stipulations. Normality of the data is confirmed by the normality test, wherein the probability value stands at $0.431168 > 0.05$. No multicollinearity is discerned among variables, per the multicollinearity assessment, as correlation coefficients remain below 0.85: CAR-LDR at $0.139329 < 0.85$; CAR-NPL at $0.336762 < 0.85$; CAR-OER at $0.092030 < 0.85$; LDR-NPL at $0.121464 < 0.85$; LDR-OER at $-0.068775 < 0.85$; and NPL-OER at $0.081881 < 0.85$. These metrics preclude any multicollinearity concerns. Moreover, the Glejser heteroscedasticity test evinces an absence of heteroscedasticity across regression variables, with probability values for CAR, LDR, NPL, and OER all surpassing 0.05. Additionally, the autocorrelation diagnostic yields a Durbin-Watson (DW) statistic of 2.269661. However, because this study employs panel data, the Durbin-Watson statistic is reported only as a descriptive diagnostic and is not used as the primary basis for determining the presence or absence of serial correlation. Panel-specific tests, such as the Wooldridge test, are more appropriate for examining serial correlation in panel data. Therefore, no definitive conclusion regarding the absence of serial correlation is drawn from the Durbin-Watson statistic alone

3. Regression Estimation Results

Table 6. Regression Results of the Data Panel (Fixed Effects Model)

Fixed Effects Model (FEM)				
Variable	Coefficients	Std.Error	t-Statistic	Prob.
C	5.258442	0.449665	11.69412	0.0000
CAR	-0.015316	0.005757	-2.660561	0.0098
LDR	0.0000866	0.003476	0.024923	0.9802
NPL	-0.046721	0.031214	-1.496792	0.1394
OER	-0.038890	0.002835	-13.71928	0.0000
R-Squared	0.977225	Mean dependent var		1.507059
Adjusted R-Squared	0.964059	S.D. dependent variable var		1.120787
S.E. of regression	0.212481	Akaike info criterion		0.019075
Sum squared resid	2.889470	Schwarz criterion		0.997006
Log likelihood	37.02716	Hannan-Quinn criterion		0.415073
F-statistic	74.22025	Durbin-Watson stat		2.269661
Prob(F-statistic)	0.000000			

Description:

CAR: Capital Adequacy Ratio, LDR: Loan to Deposit Ratio, NPL: Non-Performing Loan, OER: Operating Expense to Operating Income Ratio, ROA: Return on Assets

Sources: Data processed by researchers using EViews 13, 2026

1. Regression Equation Analysis

Based on the test results in Table 6, the value of the panel data regression compression was obtained as follows:

$$ROA_{it} = 5.2584422 - 0.015316 CAR_{it} + 0.0000866 LDR_{it} - 0.046721 NPL_{it} - 0.038890 OER_{it} + e_{it}$$

From the regression equation of the panel data, it can be explained as follows:

- 1) The constant value in Table 6 shows a value of 5.258442. If the independent variables, namely CAR, LDR, NPL, and OER, have constant values or 0, then the ROA variable has a value of 5.258442.
- 2) The regression coefficient indicates that CAR variable in Table 6 shows a value of -0.015316. If the values of the other variables (LDR, NPL, and OER) are constant or 0 and the CAR variable increases by 1%, then the ROA variable will decrease by 0.015316
- 3) The regression coefficient indicates that LDR variable in Table 6 shows a value of 0.0000866. If the values of other variables (CAR, NPL, and OER) are constant or 0 and the LDR variable increases by 1%, then the ROA variable will increase by 0.000086.
- 4) The regression coefficient indicates that NPL variable in Table 6 shows a value of 0.046721. If the values of other variables (CAR, LDR, and OER) are constant or 0 and the NPL variable increases by 1%, then the ROA variable will decrease by 0.046721.
- 5) The regression coefficient indicates that OER variable in Table 6 shows a value of -0.038890. If the values of the other variables (CAR, LDR, and NPL) are held constant and the OER variable increases by 1 percentage point, ROA is associated with a decrease of 0.038890 percentage points.

2. Coefficient of Determination

The adjusted R-squared is 0.964059, indicating that the estimated model has a high explanatory fit. However, in a Fixed Effects Model, the reported R-squared should not be interpreted as indicating that 96.4059% of the variation in ROA is exclusively explained by CAR, LDR, NPL, and OER, because the model also accounts for bank-specific fixed effects.

3. Hypothesis Test (T Test)

Based on the results of the T Test in table 6, it shows that the influence of independent variables on dependent variables is partially as follows (Saluy et al. 2022).

- 1) The regression results showed that the CAR coefficient was -0.015316, which indicated a negative association with ROA. This means that an increase in CAR is associated with a decrease in ROA, although the magnitude of this association is relatively small economically. In addition, Prob value. The T-calculation of the CAR variable in the table shows a value of $0.0098 < 0.05$, so it can be concluded that the first hypothesis (H1) is accepted. This means that CAR has a statistically significant association with ROA.
- 2) The regression results showed that the LDR coefficient was 0.0000866, indicating a very small association with ROA. This indicates that changes in LDR have almost no economically meaningful association with bank profitability. In addition, Prob value. The T-calculation of the LDR variable in the table shows a value of $0.9802 > 0.05$, so it can be concluded that the second hypothesis (H2) is rejected. This means that LDR is not statistically significantly associated with ROA.
- 3) The regression results showed that the NPL coefficient was -0.046721, indicating a negative association with ROA. This indicates that higher NPL is associated with lower bank profitability, although the relationship is not statistically significant. However, Prob value. The T-calculation of the NPL variable in the table shows a value of $0.1394 > 0.05$, so it can be concluded that the third hypothesis (H3) is rejected. This means that NPL is not statistically significantly associated with ROA.
- 4) The regression results show that OER has a coefficient of -0.038890 with a probability value of 0.0000, which is below the 0.05 significance level. This indicates a negative and statistically significant relationship between OER and ROA. A higher OER means that operating expenses constitute a larger proportion of operating income, indicating weaker operational efficiency. Therefore, an increase in OER is associated with a decrease in ROA. Holding the other variables constant, a one-percentage-point increase in OER is associated with a 0.038890 percentage-point decrease in ROA. This finding indicates that operational efficiency is closely associated with bank profitability, as higher operating costs relative to operating income may reduce the portion of income available to generate returns on assets. The result is consistent with previous empirical studies reporting a negative relationship between operating expense ratios and bank profitability.

4. Hypothesis Test (F Test)

Based on the results of the F-test in Table 6 showing that the F-statistical Prob value is $0.000000 < 0.05$, the fifth hypothesis (H5) is accepted and it can be concluded that the variables CAR, LDR, NPL, and OER are jointly

and significantly associated with ROA.

Discussion

Conventional commercial banks listed on the IDX between 2022 and 2024 were evaluated for their relationship to ROA, CAR, LDR, NPL, and OER using EViews 13 within this research framework. The study justification is presented in this section. A total of 43 banks formed the population, while 34 samples were obtained through purposive sampling. Hypothesis five was derived using a panel data regression approach.

1. The Relationship between CAR and ROA

The regression results show that CAR has a coefficient of -0.015316 with a probability value of 0.0098, which is below the 0.05 significance level. This indicates a negative and statistically significant association between CAR and ROA. Holding the other variables constant, a one-percentage-point increase in CAR is associated with a 0.015316 percentage-point decrease in ROA. This finding suggests that higher capital adequacy does not necessarily correspond to higher profitability during the observation period.

One possible explanation is that excess capital may not be accompanied by a proportional increase in productive asset utilization, resulting in less efficient use of available capital. Thus, although adequate capital strengthens a bank's capacity to absorb risk, maintaining capital at a higher level does not automatically translate into greater profitability. This finding is consistent with Purbadasuha & Prasetyono (2024), who reported a negative and significant relationship between CAR and ROA among conventional commercial banks in Indonesia.

2. The Relationship between LDR and ROA

The results showed that LDR did not have a significant impact on ROA. This suggests that an increase in credit disbursement does not necessarily increase bank profits. Within the framework of CAMELS, LDRs reflect the liquidity element that relates to the bank's capacity to meet short-term obligations.

These findings are in line with Yudha et al., (2017) and Evadine (2025), but contradict the research of Hanif et al. (2024), which found a positive influence. This difference shows that efficiency in credit disbursement is more influenced by credit quality than quantity. From a theoretical point of view, these results indicate that the liquidity element in the CAMELS theory has limitations in explaining profitability, so its influence is contextual based on the economic situation and the bank's lending policies. In practice, banks should manage liquidity carefully and not only focus on increasing the amount of credit, but also consider the balance between risk and return.

3. The Relationship between NPL and ROA

The regression results show that NPL has a coefficient of -0.046721 with a probability value of 0.1394, which is above the 0.05 significance level. This indicates that NPL has a negative but statistically insignificant relationship with ROA during the 2022–2024 observation period. Although the coefficient is negative, the statistical evidence is insufficient to conclude that changes in NPL are systematically associated with changes in bank profitability. These findings are consistent with Hanif et al. (2024), but differ from the findings of Ayustina et al. (2023) and Maulani et al. (2024), which reported a significant negative relationship between NPL and ROA.

The absence of a statistically significant relationship does not necessarily indicate that banks effectively offset the consequences of NPL through risk management, because such an explanation would require additional variables or empirical tests. A possible explanation is that the relatively stable NPL conditions during the observation period may have limited the observable relationship between NPL and ROA. This interpretation should therefore be treated as a possible explanation rather than an empirical conclusion.

4. The Relationship between OER and ROA

The study's findings indicate that OER has a negative and statistically significant association with ROA. This implies that a bank's profitability is dependent on the efficiency of its operations. Within CAMELS, OER denotes the revenue component, particularly in terms of profit-generating efficiency.

This outcome is consistent with the findings of Joysinta (2026) and Nandani et al. (2026), which report a negative association between OER and ROA. This consistency underlines that the financial performance of a bank depends much on operational efficiency. These theoretical findings back up the idea that income is the most important part of the CAMELS hypothesis for figuring out how profitable banks are. On the practical front, banks have to raise operational effectiveness by means of cost control, streamlining of business processes, and the use of digital technology to enhance financial outcomes

5. The Joint Association of CAR, LDR, NPL, and OER with ROA

The F-statistic probability of 0.0000 (<0.05) was found from the simultaneous F-test execution in EViews 13, thus hypothesis H5 was confirmed. The simultaneous effect of CAR, LDR, NPL, and OER on ROA in conventional commercial banking entities on the IDX in 2022-2024 was proven statistically significant.

CONCLUSION AND IMPLICATION

1. Conclusion

This study examined the relationships between Capital Adequacy Ratio (CAR), Loan to Deposit Ratio (LDR), Non-Performing Loan (NPL), and Operating Expense to Operating Income Ratio (OER) and Return on Assets (ROA) among conventional commercial banks listed on the Indonesia Stock Exchange during 2022–2024. Using panel data from 34 banks and 102 firm-year observations, the Fixed Effects Model was selected based on the Chow and Hausman tests.

- 1) The results show that CAR has a negative and statistically significant relationship with ROA, with a coefficient of -0.015316 and a probability value of 0.0098 . This finding indicates that higher capital adequacy was associated with lower profitability during the observation period. The result does not imply that adequate capital is undesirable for bank soundness; rather, it suggests that higher capital was not necessarily accompanied by proportionate improvements in productive asset utilization.
- 2) LDR has a positive but statistically insignificant relationship with ROA ($\beta = 0.0000866$; $p = 0.9802$). Thus, changes in the proportion of loans relative to third-party funds were not statistically associated with changes in bank profitability during the observation period.
- 3) NPL has a negative but statistically insignificant relationship with ROA ($\beta = -0.046721$; $p = 0.1394$). Although the negative coefficient is consistent with the theoretical expectation that deteriorating credit quality can reduce profitability, the evidence is insufficient to conclude that NPL was statistically associated with ROA in the sample.
- 4) OER has a negative and statistically significant relationship with ROA ($\beta = -0.038890$; $p = 0.0000$). This finding indicates that higher operating expenses relative to operating income are associated with lower profitability, emphasizing the importance of operational efficiency in bank performance.
- 5) The joint F-test is statistically significant ($p < 0.001$), indicating that CAR, LDR, NPL, and OER are jointly associated with ROA. However, because the study uses observational panel data, this result should be interpreted as a statistically significant joint relationship rather than definitive evidence of causality.

2. Implication

The findings suggest that bank management should not evaluate capital adequacy solely from the perspective of regulatory compliance. Capital should also be utilized efficiently through productive assets and income-generating activities. The negative CAR–ROA relationship observed in this study indicates the importance of maintaining an appropriate balance between capital resilience and asset productivity.

The significant negative relationship between OER and ROA highlights the importance of operational efficiency. Bank management may therefore focus on cost control, process efficiency, technology utilization, and productivity improvements to strengthen profitability.

Although LDR and NPL were not statistically significant, their roles in liquidity and asset quality remain important for bank soundness. Therefore, the absence of statistical significance should not be interpreted as evidence that liquidity and credit risk can be disregarded.

Future research should extend the observation period, consider alternative sample specifications, and incorporate additional explanatory variables such as NIM, bank size, corporate governance, and macroeconomic indicators. Panel-specific robustness tests and alternative estimation approaches may also provide a more comprehensive understanding of the determinants of bank profitability.

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