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The Effect of Operational Efficiency, Non-Performing Loans, and Capital Adequacy on Bank Profitability

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ABSTRACT

Introduction/Main Objectives: The objective of this research is to investigate key factors influencing the profitability of Indonesian banks, including capital adequacy and the level of non-performing loans, and operational efficiency, as well as to examine how these variables affect the stability and competitiveness of banking organizations in facing international economic challenges. **Background Problems:** The profitability performance of Indonesian banks exhibited variability during the period from 2019 to 2023, making it important to examine the extent to which operational efficiency, non-performing loans, and capital adequacy affect profitability in order to maintain the stability and competitiveness of the national banking sector. **Novelty:** This research offers a novelty by simultaneously examining the effect of operational efficiency (BOPO), non-performing loans (NPL), and capital adequacy (CAR) on bank profitability (ROA) in Indonesia, using panel data from 45 banks during the 2019–2023 period and employing a random effects model approach. **Research Methods:** By using the Random Effects (RE) model, this research examines the effect of operational efficiency (BOPO), non-performing loans (NPL), and capital adequacy (CAR) on profitability (ROA), employing a quantitative panel data approach based on financial reports. **Finding/Results:** The results of the analysis reveal that while non-performing loans have no significant impact on profitability, capital adequacy positively influences profitability, and operational efficiency exerts a negative effect. These findings suggest that enhancing capital strength and improving operational practices are essential strategies for promoting economic growth and reinforcing the stability of the financial sector, this research offers recommendations to banks on how to improve credit management and operational efficiency in order to enhance profitability. **Conclusion:** The findings of this study indicate that operational efficiency has a negative impact on bank profitability, whereas capital adequacy contributes positively. In contrast, non-performing loans are found to have no statistically significant effect. These results underscore the critical role of controlling operational expenses and ensuring sufficient capital reserves in enhancing banks' financial performance.

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1. Introduction

The banking sector plays a crucial role in collecting public funds and distributing them in the form of credit or other financial instruments to improve public welfare. However, the COVID-19 pandemic in 2019 caused the economy to contract by -2.07%, resulting in a decline in domestic demand and purchasing power (Andrian & Musdholifah, 2017). Banks serve as key financial intermediaries and are required to be more competitive, meaning their ability to generate profits depends on several factors, including the overall health of the institution (Anggraeni & Citarayani, 2022). A country's economy benefits from sound financial conditions, as a strong banking sector contributes to a healthier overall economy. As the health of the banking sector improves, public and customer trust in banks as safe places to store money also increases. With greater trust, banks are more likely to provide better services and carry out their intermediation functions, supporting national economic growth (Adawiyah & Suprihhadi, 2017). Return on Assets, which reflects profitability performance, is a reliable indicator of bank quality (Emi et al., 2022).

Figure 1. Development of ROA (%)

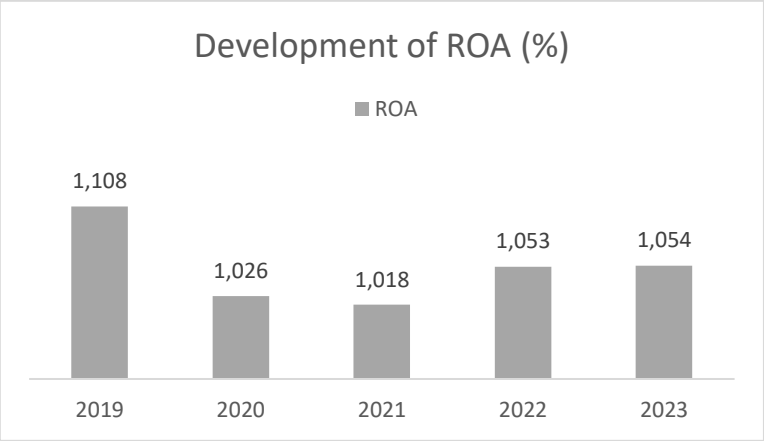

Figure 1 illustrates the Return on Assets (ROA) development between 2019 and 2023. The highest ROA value, 1.108%, was recorded in 2019, indicating very strong performance. However, the figure declined from 1.026% in 2020 to 1.018% in 2021. This decrease may have resulted from challenges faced by businesses, such as reduced operational efficiency or external economic effects. ROA began to recover in 2022, reaching 1.053%, and slightly increased to 1.054% in 2023. Despite signs of improvement, the figure remains below the level achieved in 2019. This condition reflects fluctuations in bank profitability as measured by ROA. The presence of such issues highlights the importance of improving asset management to enhance future profitability.

According to (Liode & Mangantar, 2019), profitability is a metric used to assess a bank's performance and profit-generating ability. A bank's profitability can reflect how well the bank manages its assets, especially when those assets have relatively low value. Conversely, a high level of profitability indicates that the bank's operational system is functioning properly (Fitriani & Maharani, 2024). Return on Assets (ROA), which is a ratio comparing profit before tax to the total assets owned by the bank, is one way to measure profitability (Dwiningsih & Ilhami, 2023). Return on Assets, as defined by (Dewi et al., 2017) represents the amount of return on all assets managed by the company. A low ROA indicates poor management and weak bank performance. In general, the economic condition of the banking industry and the level of maintained operational efficiency effect shifts in bank profitability.

The provision of services, including various financial offerings, through the effective and organized utilization of a bank's resources makes operational efficiency a crucial component in helping banks market financial products to debtors or new customers (Putri & Wahyudi, 2023). A bank's profitability is positively correlated with its level of operational efficiency, as indicated by the BOPO ratio. According to Bank Indonesia, an optimal BOPO ratio is 90% or less of total income; if it exceeds 90% or reaches 100%, the bank is considered to be operating inefficiently (Hartini, 2016). The BOPO ratio itself reflects how well a bank performs its daily operations. The more efficiently a bank uses its resources, the lower its BOPO ratio. Conversely, banks with high operational costs are considered less efficient, which usually results in lower Return on Assets (ROA) (Soejati & Mais, 2019). This is supported by the findings of (Yulianah & Aji, 2021) and (Hartini, 2016) which show that the BOPO ratio has a negative effect on profitability (ROA). However, this contrasts with the research by (Nugroho et al., 2019) which found that the BOPO ratio has no significant effect on profitability as measured by the ROA ratio.

Non-performing loans (NPL), or losses incurred by banks due to borrowers failing to make timely installment payments, represent one of the major challenges faced by banks. In fact, non-performing loans are among the most significant problems in bank operations (Sukma et al., 2019). The Non-Performing Loan (NPL) ratio, which reflects a bank's ability to manage credit default risk, is used to measure the magnitude of non-performing loans (Febriyanti & Aini, 2022). Bank profits are negatively correlated with non-performing loans. A higher NPL indicates poor credit management, leading to increased loan defaults and significant losses, which in turn reduce profitability (Sunaryo et al., 2021). This is in line with research showing that non-performing loans (NPL) have an adverse effect on profitability (ROA) (Sudarmawanti & Pramono, 2017), (Iklin, 2024). In contrast to these findings, the research by (Nugroho et al., 2019) menunjukkan bahwa ROA tidak dipengaruhi oleh variabel (NPL) shows that ROA is not effectd by the NPL variable.

The capital adequacy variable is one of the factors that effect profitability. It is a key component of bank profitability measured through the Capital Adequacy Ratio (CAR) (Muarif et al., 2021). The Capital Adequacy Ratio (CAR) is a metric that reflects how well a bank's capital supports risk-weighted assets, including loans extended to debtors. The equity-to-risk-weighted-assets (RWA) ratio can be used to calculate the CAR (Dwi Jayanti & Sartika, 2021). A higher CAR value indicates that a bank is more capable of covering potential losses from securities trading or non-performing loans and has sufficient capital to expand its portfolio. This condition positively affects the bank's Return on Assets (ROA) (Mukaromah & Supriono, 2020). The CAR ratio has an effect on profitability (ROA), according to (Noer Khoeriah & Suria Manda, 2021) and (Nugroho et al., 2019). Nevertheless, the study conducted by (Nanda et al., 2019) did not identify any significant correlation between the Capital Adequacy Ratio (CAR) and bank profitability. Based on this description, this study aims to determine how operational efficiency, bad debts, and capital adequacy affect the level of profitability of banks in Indonesia in the period 2019 - 2023, in order to provide an overview of the important factors that play a role in maintaining the stability and competitiveness of the banking industry.

2. Literature Review

Agency Theory

Performance, goal achievement, and overall bank performance are closely related to agency theory, which examines the relationship between managers (agents) and shareholders (principals). According to (N. L. Lestari, 2019) this theory highlights the interaction between two or more parties within an entity, where one party represents the interests of another. To address conflicts of interest

between managers (as agents) and business owners in terms of profit generation (ROA), this research applies agency theory. A competent manager will manage resources effectively to improve productivity, reduce costs, and increase revenue. However, if managers prioritize their own interests over organizational effectiveness, agency problems may arise. Non-performing loans may increase, profitability may decline, and conflicts with business owners may occur if managers take excessive credit risks to meet short-term targets. Managers must ensure sufficient capital to maintain financial stability and long-term income, as capital adequacy reflects a bank's capacity to withstand risk. In order for managers to act in alignment with the owners' goals namely, improving efficiency, managing credit risk effectively, and maintaining capital adequacy to support profitability growth agency theory emphasizes the need for proper oversight and appropriate incentives (Syakhrun et al., 2019).

Profitability

Profitability is expressed as a proportion of total profit. A bank's ability to generate profit over a specific period and to measure its capacity to earn income from its own assets is another way to define profitability (M. D. Lestari, 2021). Banks that can generate the highest profits have a promising future and are more likely to operate sustainably over the long term. ROA, or Return on Assets, serves as an indicator of a bank's profitability by assessing how efficiently it generates pre-tax income from its total assets. This ratio reflects how well a banking organization is managed (Setyaningsih et al., 2023). A bank's ability to generate profit while utilizing all its assets specifically, net income after tax is referred to as the Return on Assets (ROA) ratio. The rate of asset turnover, measured by the volume of sales, is also explained through ROA. Furthermore, Return on Assets (ROA) is used to assess how well a bank utilizes its resources to generate profit (Sukbekti & Wardana, 2022). In general, profit is derived from lending activities, but banks are also required to provide compensation to depositors. The higher the Return on Assets (ROA), the more income is generated from well-managed assets, which reduces both banking risk and problematic financing. The quality of asset management determines how high or low the ROA will be (Setyowati & Budiwinarto, 2017). (Rohmiati et al., 2019) state that a high Return on Assets (ROA) indicates strong financial performance, which maximizes returns. As a result, an increase in ROA signals an increase in bank profitability. It is therefore essential to focus on key areas of management namely, operational efficiency (BOPO), non-performing loans (NPL), and capital adequacy (CAR) to maintain or improve ROA (Iklin, 2024).

The Effect of Operational Efficiency on Profitability

A bank's ability to utilize its resources effectively to support its operational activities is referred to as operational efficiency. This affects the bank's ability to control its daily operating expenses, which is measured by the BOPO ratio (Firmanila, 2023). The operating expenses to operating income ratio, or BOPO, is used to determine how well a bank manages its operational costs. Thus, a lower BOPO ratio gives the bank a better opportunity to maximize its revenue by reducing operational expenses. All expenditures, including interest and other costs, are included in operating expenses (Fajari & Sunarto, 2017). Operational efficiency implies that transactions are completed with the minimum possible cost among all operational activities. It serves as a measure of how effectively a bank's management can control and organize its operational expenses (Lemiyana & Litriani, 2016).

Bank profitability is directly effectd by operational efficiency, as a more effective management system can reduce costs while increasing profits. In addition, cost-effectiveness and public deposit funds effect the profitability of banks in Indonesia. Efficiency management determines bank performance; therefore, a lower BOPO ratio indicates that the bank may generate more income if it

maintains operational efficiency (Dwi Cahyani et al., 2022). The success and effectiveness of management in utilizing each bank component are evaluated using the BOPO ratio. An optimally low BOPO ratio indicates optimal efficiency. According to Ridwan & Edward, (2024), this figure also serves as an indicator that explains the relationship between a bank's routine operating income and its operational costs. Based on this, the following research hypothesis is proposed:

H1: Operational efficiency has a positive effect on profitability.

The Effect of Non-Performing Loans on Profitability

Every loan disbursed by a bank carries the risk of becoming a non-performing loan (NPL), which arises when the borrower fails to repay according to the agreed schedule. This condition reduces the bank's earnings and negatively affects its overall performance (Nurkhofifah et al., 2019). Non-performing loans, as one of the key credit indicators, are inevitable risks that banks face when extending credit. According to Suryani et al., (2023), non-performing loans occur due to two main factors: deficiencies during the bank's credit evaluation process and the borrower's failure intentional or unintentional to fulfill their repayment obligations. If the amount of non-performing loans exceeds the total credit disbursed to borrowers, the bank will have a high NPL percentage. Since Indonesian banks currently only allow a maximum NPL ratio of 5%, an NPL value exceeding 5% results in a greater burden of bad loans for the bank, which in turn affects the overall health of the banking industry (Octaviani & Andriyani, 2018).

Bank performance can be disrupted by the rise of bad debt problems. According to (Akbar et al., 2018), these adverse consequences include an inability to transfer cash, a decline in the current ratio, an increase in fixed assets exceeding current assets, overexpansion of business activities, and delayed debt payments all of which can lead to liquidity issues and prevent banks from extending credit to customers. When banks experience a significant volume of non-performing loans, their profitability (ROA) is likely to decline, which negatively effects the overall health of the banking sector and society at large. The Non-Performing Loan (NPL) ratio reflects a bank's risk exposure to bad loans; the higher the ratio, the lower the credit quality. The comparison between bad debts and total loans is referred to as the Non-Performing Loan (NPL) ratio (Rafinur et al., 2023). Since a high NPL ratio is associated with lower profitability, it indicates that the bank may have a risky credit portfolio. The greater the NPL, the worse the financing performance, and the lower the ROA. However, if NPL decreases, ROA will increase, and the bank's financing performance will improve (Safitra & Kusno, 2023). The research by Iklin, (2024) shows that non-performing loans (NPL) negatively affect profitability. This finding is consistent with the negative effect of non-performing loans on profitability (Sudarmawanti & Pramono, 2017);Kurniawan et al., 2020). Based on this, the research hypothesis is as follows:

H2 = Non-performing loans (NPL) have a negative effect on bank profitability

The Effect of Capital Adequacy on Profitability

Capital adequacy refers to the amount of funds invested to start and grow a business in order to generate profit and increase wealth. In addition to providing protection and confidence for consumers and creditors, banks with adequate capital are able to operate smoothly (Chanifah & Budi, 2020). Therefore, capital adequacy is essential for banking operations, especially in terms of lending to the public. The Capital Adequacy Ratio (CAR) can be used to measure the level of a bank's capital adequacy. The Capital Adequacy Ratio (CAR), which compares a bank's capital to its risk-weighted assets, is a key measure of financial soundness. A CAR of at least 8% is typically regarded as a threshold for determining whether a bank maintains a healthy level of capital (Azizah, 2024).

The Capital Adequacy Ratio (CAR) reflects the degree of risk embedded in a bank's assets, such as loans, investments, securities, and receivables held across various institutions. A strong CAR level enhances a bank's capacity to sustain its financial performance. When the CAR value is higher, the public has greater trust in the bank, as it is seen as being capable of covering potential losses. (Nanda et al., 2019). A healthy bank must have sufficient capital adequacy to minimize the risk of losses caused by risky investments. The Capital Adequacy Ratio (CAR) is a crucial component that banks must consider to protect their reputation and ensure profitability. Adequate capital allows banks to minimize the risk of losses from financing activities and enhance their profitability (Azizah, 2024). This is supported by research findings from (Sitompul & Nasution, 2019) , (Hidayah et al., 2021), and (Parenrengi & Hendratni, 2018) These findings suggest that CAR contributes positively to bank profitability. As a result, higher CAR values are associated with improved financial performance. In line with this reasoning, the hypothesis of this study is stated as follows:

H3 = Capital adequacy (CAR) has a positive effect on bank profitability

3. Method, Data, and Analysis

This research employs a quantitative approach by collecting panel Data obtained from the financial reports of banks publicly traded on the Indonesia Stock Exchange (IDX). The data were gathered from secondary sources, specifically from the financial statement statistics accessible through the Financial Services Authority (Otoritas Jasa Keuangan), in the form of financial ratio reports. All 47 banks listed on the IDX from 2019 to 2023 constituted the population of this research. Purposive sampling was used to determine the research sample. Banks that were continuously listed from 2019 to 2023 met the sampling criteria. Based on annual reports, 45 banks were selected as the research sample. Since the research used quarterly data, The study comprised a total of 900 observations. In this analysis, operational efficiency, non-performing loans, and capital adequacy are treated as independent variables, whereas profitability—represented by the Return on Assets (ROA) ratio functions as the dependent variable. Operational efficiency is measured using the BOPO ratio. Non-performing loans (NPL) are used to assess loan default, and the Capital Adequacy Ratio (CAR) is used to determine capital adequacy. The conceptual framework of the variables and the measurement tools used as variable indicators were developed within this research.

Table 1. Operationalization of Variables

Variable	Concept	Indicator	Reference
Operational Efficiency (BOPO) (X1)	Operating Expenses to Operating Income Ratio (BOPO) is used to measure the bank's efficiency and its ability to manage operational activities.	$BOPO = \frac{\text{Operating Expenses}}{\text{Operating Income}} \text{ X } 100\%$	(Chandra & Anggraini, 2020)
Non-Performing Loans (NPL) (X2)	NPL ratio represents the level of non-performing loans, used to evaluate the credit quality of banks.	$NPL = \frac{\text{Total Non-Performing Loans}}{\text{Total Loans}} \text{ X}100\%$	(Febriyanti & Aini, 2022)

Capital Adequacy (CAR) (X3)	Capital Adequacy Ratio is used to reflect the adequacy of capital and to assess the financial health of a bank.	CAR =	$\frac{\text{Capital}}{\text{ATMR}}$	X 100%	(Chanifah & Budi, 2020)
Profitability (ROA) (Y)	Profitability ratio is used to assess the bank's ability to generate profit.	ROA =	$\frac{\text{Net Income}}{\text{Total Assets}}$	X100%	(Liode & Mangantar, 2019)

The analytical technique used in this research is the random effects model (RE), which assumes that variations among entities, such as banks or regions, are random and not fixed. This is because, rather than treating such variations as part of the model itself, the RE model considers the unique characteristics of each entity as part of the error term. This approach aims to identify general patterns that apply across the entire dataset without placing too much emphasis on the specific characteristics of individual entities (Yollanda & Ul Hasanah, 2023). This research evaluates The extent of linear association among multiple variables is examined through panel data regression analysis. Panel regression is applied through the following model:

$$ROAit = a + \beta1\ BOPOit + \beta2\ NPLit + \beta3\ CARit + e$$

The regression equation is used to estimate the return on assets (ROA) of banks at a specific point in time. This model defines ROA as a function of several factors, including a random error term (e), BOPO, NPL, and CAR. The regression coefficients (β1, β2, β3) of each independent variable indicate the extent of their effect on ROA, while a represents the constant term. BOPO, NPL, and CAR are used as predictors to assess their effect on bank profitability.

4. Result and Discussion

The purpose of this research is to identify the variables that effect the growth of profitability (ROA). Profitability (ROA) serves as the dependent variable in this research, while operational efficiency (BOPO), non-performing loans (NPL), and capital adequacy (CAR) are the independent variables. This study applies panel data multiple regression analysis utilizing the Random Effects (RE) model. The summary of the descriptive statistics is displayed in Table 2 below:

Descriptive Statistics

Descriptive statistical analysis is a summary of data that provides an overview of patterns, trends, and distributions within the research.

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Profitability (ROA)	900	1.0197	2.7762	-15.89	13.58
Operational Efficiency (BOPO)	900	89.6393	27.8792	25.71	306.48
Non-Performing Loans (NPL)	900	3.4152	2.5622	0.00	22.27
Capital Adequacy (CAR)	900	383.4189	220.4482	14.46	58.10

Source: Processed data using Stata 17

A total of 900 data points were analyzed in the descriptive statistics table, covering the variables of profitability, operational efficiency, Impaired loan portfolios and the sufficiency of bank capital. The profitability variable shows considerable variation, with values ranging from a minimum of -15.89 observed at PT to a maximum of 13.58 at Bank BTPN Syariah Tbk, followed by Bank Jago Tbk. The average profitability (ROA) is 1.02, with a standard deviation of 2.78, indicating that while some banks incurred significant losses, others achieved relatively strong profits. The operational efficiency variable (BOPO) has an average of 89.64 and a standard deviation of 27.88. Values range from 25.71 to 306.48, the lowest recorded at Bank KB Bukopin. This wide range suggests significant disparities in operational efficiency banks with higher BOPO ratios may be facing major operational inefficiencies, while those with lower ratios tend to have more effective cost management. For the non-performing loans (NPL) variable, The mean value is 3.42, accompanied by a standard deviation of 2.56. Several banks, such as Bank Jago Tbk and PT, recorded an NPL of 0.00, indicating no problematic loans during the period. The maximum value of 22.27 was recorded by Allo Bank Indonesia Tbk in the second and third quarters of 2022, highlighting substantial variation in credit risk management across institutions. Lastly, the capital adequacy (CAR) variable exhibits a very high average of 383.42, with a standard deviation of 220.45. The minimum and maximum CAR values 14.46 and 58.10, respectively suggest different levels of capital sufficiency across banks. The high standard deviation indicates a wide disparity in capital reserves, particularly among large-scale banks.

Correlation Matrix Test

The correlation matrix test aims to identify the relationship or correlation between one variable and another.

Table 3. Correlation Matrix Test

Variable	Profitability	Operational Efficiency	Non-Performing Loans	Capital Adequacy
Profitability	1.0000			
Operational Efficiency	-0.8141	1.0000		
Non-Performing Loans	-0.3667	0.4472	1.0000	
Capital Adequacy	0.1564	-0.0927	-0.0684	1.0000

Source: Processed data using Stata 17

Two independent variables operational efficiency (value: -0.8141) and non-performing loans (value: -0.3667) demonstrate a negative relationship with the dependent variable (profitability), as shown in the correlation matrix in Table 3. However, capital adequacy exhibits a positive association with profitability, as indicated by its correlation value of 0.1564.

Regression Test

Panel data analysis is used to predict bank profitability (ROA) based on three independent variables: operational efficiency, non-performing loans, and capital adequacy. The regression coefficients indicate the extent to which each factor effects profitability, incorporating both a constant term and a random error component within the model.

Table 4. Regression Test

Variable	Coefficient	Std. Error	z	P > z
Operational Efficiency	-0.0803	0.0021	-37.45	0.000
Non-Performing Loans	-0.0006	0.0233	-0.03	0.978
Capital Adequacy	0.0010	0.0002	4.23	0.000
_cons (Constant)	7.8251	0.2102	37.24	0.000

Source: Processed data using Stata 17

According to Table 4, the more efficient a bank is, the more profitable it becomes, as indicated by the operational efficiency coefficient of -0.0803. This highlights the inverse relationship between the bank's profitability ratio (ROA) and its operational efficiency ratio (BOPO), where a higher BOPO indicates lower efficiency and thus reduces profitability. Additionally, the coefficient for Non-Performing Loans (NPL) is -0.0006, which implies that for every one-unit increase in the NPL ratio, profitability decreases by 0.0006 units. However, in this model, the NPL variable does not have a statistically significant effect on profitability. The Capital Adequacy Ratio (CAR) shows a positive coefficient of 0.0010, meaning that for every one-unit increase in capital adequacy, profitability increases by 0.0010 units. These findings support the idea that maintaining sufficient capital can boost investor confidence and financial stability, both of which contribute to enhanced profitability.

Hypothesis Testing

The t-value for the operational efficiency variable stands at -37.45, which exceeds the critical value of 1.96 (in absolute terms) at a 5% significance level. Additionally, the associated p-value of 0.000 is well below the 0.05 threshold. These findings lead to the acceptance of the alternative hypothesis (Ha) and the rejection of the null hypothesis (H0), confirming that operational efficiency—represented by the BOPO ratio—has a statistically significant negative impact on profitability. More precisely, a one-unit increase in operational inefficiency results in a 0.0803 unit decline in Return on Assets (ROA). In contrast, the non-performing loan (NPL) variable yields a t-value of -0.03, which falls short of the critical value, and a p-value of 0.978, which exceeds 0.05. This suggests that NPLs do not exert a statistically significant influence on profitability. Consequently, Ha is rejected and H0 is retained for this variable. Meanwhile, the capital adequacy ratio (CAR) produces a t-statistic of 4.23, surpassing the 1.96 threshold, with a p-value of 0.000—indicating a significant positive effect on profitability. Accordingly, the alternative hypothesis is accepted, supporting the conclusion that capital adequacy contributes positively to bank profitability.

The Effect of Operational Efficiency on Profitability

The BOPO ratio is used in this research to measure the operational efficiency variable; the lower the BOPO value, the more positive its effect on profitability as measured by Return on Assets (ROA). This means that the more efficiently a bank operates, the more profit it can generate. A low BOPO ratio positively effects ROA because the more effectively the bank manages its operational costs, the lower the BOPO will be. Sound cost efficiency enables banks to earn higher profits. On the other hand, a high BOPO indicates that the bank's management is less effective in running its business, which will reduce earnings (Hartini, 2016). Bank profitability and Return on Assets (ROA) may decline if operational costs increase without a corresponding increase in revenue. This is in accordance with agency theory which states that managers as bank managers may not work efficiently if they are not properly supervised, which results in bloated operating costs and makes bank profits decline because managers do not carry out tasks in the interests of bank owners (Syakhrun et al., 2019). During

economic downturns, banks typically lay off employees, but to maintain the quality of human resources and improve output, this process must begin with a performance review. In order to control costs and improve the financial performance of banks, each work unit must also implement strategies to manage maximum spending limits (Dwi Cahyani et al., 2022).

Good bank efficiency allows for effective management of operational costs, which will increase operational income. Naturally, profitability is also measured by the increase in Return on Assets (ROA). However, a decline in operational income will lead to a decrease in profitability (ROA) (Fajari & Sunarto, 2017). Ineffective management of a bank's income is indicated by rising operational costs without a corresponding increase in operational revenue. A low BOPO ratio indicates that the bank is able to control operational risks from income, since operational costs—including labor, interest expenses, foreign exchange, depreciation, and others—have a direct effect on business operations. Therefore, to increase operational profit and utilize operational costs efficiently, the institution's financial management must plan accordingly. Furthermore, the policy of using a lower BOPO ratio serves as an objective benchmark to evaluate performance improvements and enhance bank profit. One method is to assess all of the bank's expenses to determine their necessity, set appropriate exchange rates, and avoid financial penalties imposed by Bank Indonesia (Yulianah & Aji, 2021).

The Effect of Non-Performing Loans on Profitability

Research examining the relationship between variables such as non-performing loans (NPL) and bank profitability (ROA) has found that NPLs do not have a statistically significant effect on ROA. It is not the presence of NPLs alone, but rather the associated costs and underlying causes that indirectly effect profitability. As the rate of non-performing loans increases, credit quality deteriorates, leading to a rise in bad debts. Consequently, banks incur operational losses, which reduce overall profitability (ROA). Credit risk and loan delinquency directly affect a bank's health rating and profitability (Nurkhofifah et al., 2019). This study shows that although the level of non-performing loans (NPL) is quite high, it does not directly affect bank profitability (ROA). This condition actually encourages bank managers to be more careful in lending to avoid future losses. In the perspective of Agency Theory, this reflects that managers have adjusted credit policies wisely to safeguard the interests of bank owners (principals), which indicates that the supervisory and incentive system has worked well (N. L. Lestari, 2019). In anticipation of future losses, banks often allocate a portion of their funds as loan loss provisions when NPLs rise. As a result, banks become more selective and conservative in granting credit. To minimize the risk of future default, banks may also restrict new loan disbursements, especially under uncertain economic conditions. This situation reflects a preventive strategy, where banks focus on maintaining performance stability by tightening lending policies and increasing reserves. These actions, while not immediately visible in the regression outcome, may indirectly suppress profitability (ROA) in response to persistently high levels of NPLs (Saputra et al., 2018)

Non-Performing Loans (NPL) have no significant effect on profitability (ROA) because the large banks included in the research sample were unable to manage credit effectively, resulting in lower profits. In other words, the growth rate of bank profits is not effectd by the level of the NPL ratio. Banks with low NPL ratios do not necessarily experience greater profit growth compared to banks with higher NPL ratios, which indicate moderate or weak credit quality. This finding contradicts the Moral Hazard Theory, which states that both creditors (banks) and debtors (borrowers) must be prepared to bear risks, particularly during crisis situations such as a pandemic (Febriyanti & Aini, 2022). Banks must thoroughly examine the debtor's qualifications in meeting banking standards, as the extension of credit increases the bank's receivables, which are a component of its assets. Furthermore, banks are

required to assess, evaluate, and secure collateral from debtors to mitigate credit risk. Therefore, banks have the right to liquidate collateral to recover outstanding balances or settle remaining loan obligations if the debtor is unable to repay the loan as agreed (Suryani et al., 2023).

The Effect of Capital Adequacy on Profitability

Profitability is positively effectd by the findings of this research regarding the capital adequacy factor, which uses the Capital Adequacy Ratio (CAR) as the measurement instrument. Sufficient capital within the banking industry functions as a buffer against unforeseen losses and provides a financial safeguard during times of banking distress or crisis. While a decline in the CAR value may result in decreased bank profitability, an increase in CAR can lead to enhanced profitability. High bank capital indicates that managers are working responsibly in accordance with the objectives of the owners (principals), namely maintaining the stability and growth of the bank in the long term, not just seeking momentary profits (Syakhrun et al., 2019). This is essential to preserve public trust in the banking system, safeguard client funds, and ensure compliance with Bank Indonesia's regulations (Muarif et al., 2021). Both regulators and the general public perceive banks with high CAR ratios as more stable and reliable, as they possess sufficient capital to manage a variety of risks. Furthermore, a high CAR enables banks to expand their lending capacity while upholding prudent banking standards. Therefore, increasing the CAR ratio is one of the main priorities in promoting operational sustainability and enhancing banking profitability, particularly in the face of stable economic conditions (Mukaromah & Supriono, 2020).

Capital adequacy represents a critical component necessary for all banks to ensure operational effectiveness and sustainability. Sufficient capital provides a strong foundation for managing various commercial activities. A higher level of capital adequacy enables banks to better withstand potential losses and responsibly expand their operations. Conversely, inadequate capital severely limits a bank's flexibility and its ability to operate effectively under such conditions (Azizah, 2024). According to research by Hidayah et al., (2021) A positive correlation exists between the Capital Adequacy Ratio (CAR) and the Return on Assets (ROA), indicating that higher capital adequacy is associated with improved profitability. When a bank's capital adequacy increases, it becomes better equipped to handle its various commercial operations. In addition, adequate capital is actively utilized to support operationally productive activities. With sound capital management, banks can optimize the use of available cash to generate profit. As a result of this profit growth, the bank's profitability level, as indicated by the ROA ratio, increases. Therefore, maintaining the overall financial health of the institution and enhancing the bank's profit growth strongly depends on capital adequacy.

5. Conclusion and Suggestion

Conclusion

The results of this study reveal that bank profitability, as measured by the Return on Assets (ROA), is primarily influenced by three factors: operational efficiency, non-performing loans, and capital adequacy. ROA is negatively associated with operational efficiency, as reflected by the BOPO ratio (operating expenses to operating income); a rise in this ratio signals inefficiency and leads to decreased profitability. On the other hand, the Non-Performing Loan (NPL) ratio does not exhibit a significant impact on ROA, indicating that bad debts do not directly influence profitability. In contrast, the Capital Adequacy Ratio (CAR) shows a positive and significant relationship with ROA, implying that banks with stronger capital positions are more capable of managing their financial resources efficiently, thereby boosting profitability. These results highlight the critical role of efficient capital deployment, prudent

credit risk management, and enhanced operational performance in strengthening a bank's profitability. It implies that in order to achieve strong financial performance, banks must focus on streamlining cost and revenue management while managing their resources efficiently.

Suggestion

To enhance profitability, Indonesian banks must improve their operational efficiency. High operational costs can reduce profits; therefore, it is crucial to manage expenditures effectively, for example, by improving employee performance and leveraging technology. In addition, banks must maintain adequate capital, as strong capital supports profitability. Banks should also exercise caution when issuing credit to minimize potential losses, even though non-performing loans did not show a significant effect in this research. The findings support the notion that bank managers play a vital role in controlling costs, risks, and capital to sustain bank profitability. Future research could include additional variables such as liquidity, bank size, and ownership structure, which may also effect bank earnings. To obtain more detailed results, various analytical techniques could be applied. Further studies could also be conducted on different types of banks, such as regional banks or Islamic banks, to determine whether the results remain consistent. This would enhance the explanatory power of theories in identifying the factors that affect bank profitability.

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