Formosa Journal of Multidisciplinary Research (FJMR)
Vol. 4, No. 4, 2025: 1893-1912

The Influence of Credit Risk Level, Liquidity Risk on Profitability with Operational Efficiency Level as an Intervening Variable (Case Study on Conventional Commercial Banks KBMI 3 and KBMI 4 Listed on the IDX in 2021-2024)

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A R T I C L E I N F O
Keywords: Credit Risk, Liquidity Risk, Profitability, Operational Efficiency Level

Received : 15, March
Revised : 29, March
Accepted: 26, April

A B S T R A C T
The goal of this study is to assess the impact of credit risk and liquidity risk on profitability with the level of operational efficiency as an intervening variable, at Conventional Commercial Banks Bank Group Based on Core Capital3 and Bank Group Based on Core Capital4 listed on the IDX in 2021-2024. Data obtained from secondary data from annual reports of financial institution companies listed in 2021-2024. This research method uses the SEM-PLS 4.0 analysis technique. This study's hypothesis is based on past research and a variety of supporting theories. The findings of this study show that credit risk (gross and net NPL) has no meaningful effect on profitability. Credit risk (gross NPL) has a positive and large impact on operational efficiency, whereas net NPL has no meaningful effect. Liquidity risk has no substantial effect on profitability, but it does have a positive and considerable impact on operational efficiency. The level of operational efficiency has a negative and significant effect on profitability. The level of operational efficiency has a negative and considerable mediating influence on profitability of both credit risk (gross NPL) and liquidity risk. However, operational efficiency has no substantial effect on profitability when compared to credit risk (net NPL).

DOI: https://doi.org/10.55927/fjmr.v4i4.155
ISSN-E: 2829-8896
https://npaformosapublisher.org/index.php/fjmr

INTRODUCTION

Law Number 10 of 1998 mentions banks as a commercial organization that is tasked with collecting funds from the community in the form of demand deposits, savings, deposits the money are subsequently distributed to the community in the form of credit or other forms to help many individuals better their level of living. The bank acts as a financial intermediary between parties having excess funds (surplus of funds) and those in need of funds. Bank Indonesia and the Financial Services Authority, as bank supervisory agencies, play a key role in ensuring that risk management is implemented in each bank by using the Risk Based Bank Rating (RBBR) technique to assess the bank's health. The national banking risk profile is at a controlled level with a low non-performing loan ratio and fairly high liquidity.

Profitability is defined as the result of profit that will be obtained from the company's sales results. The company's financial performance improves as its level of profitability increases. Profitability is also called rentability, namely the ability of a company to generate profit during a certain period. To determine the level of bank financial performance, namely by measuring Return on Asset (ROA) serves as a proxy for profitability. The goal of profitability analysis is to determine a company's ability to earn profits over a given time period.

The indicator used in calculating credit risk is Non-Performing Loan (NPL) which is a comparison of total non-performing loans with total loans given. The higher the NPL of a bank indicates that credit management in the bank is not optimal which results in the credit risk experienced by the bank being high, so that the losses incurred to profitability due to non-performing loans are greater. The indicator used to measure The Loan to Deposit Ratio is a measure of liquidity. Liquidity risk is a bank's failure to fulfill maturing responsibilities through cash flow funding sources or high-quality liquid assets that can be employed without impacting the bank's operations and financial situation (Mambu et al., 2022). A company is said to be in a liquid condition if it has the ability to fulfill its short-term obligations on time.

The operational efficiency level indicator occurs due to errors in the operational process. Every company faces operational risk. Operational risk is caused by a variety of variables, including human resources, internal procedures, system failures, and external influences. Operational risk can also occur due to internal problems in the company, which are caused by the weakening of the company's internal management control system. The higher the percentage of the operational efficiency level (BOPO) indicates the poor ability of the bank to reduce its operational costs, resulting in inefficient costs (Jahrotunnupus & Manda, 2021). The degree of operational efficiency using the BOPO indicator compares operational expenses and operational income to determine the level of efficiency and the bank's capability to carry out its operational tasks; the lower the BOPO ratio, the better because the bank in question can cover operational expenses with operational income.

The decrease in the NPL ratio value has a good impact on the profitability and liquidity of the bank. Because a low NPL value can indicate that the bank can determine the eligibility of prospective debtors who qualify for credit by

allowing them to anticipate the risk of poor creditworthiness (Agustini et al., 2017).

Surveillance Report in general, banking resilience in the fourth quarter of 2023 is quite well maintained, reflected in the level of bank capital which is quite solid and supported by the provision of enough money. However, it is necessary to be aware of the increase in credit risk, decreased profitability and liquidity and the level of operational efficiency that increases in the following year which can be caused by the increasingly weak global economic conditions. This is what motivates academics to perform research on Conventional Commercial Banks, Bank Group Based on Core Capital3, and Bank Group Based on Core Capital 4 for the years 2021-2024.

Based on this phenomenon, the researcher presented several results of previous studies which found inconsistencies in their research results related to the relationship between each variable used in this study.

The results of the research on credit risk on profitability conducted (Asysidiq & Sudiyatno, 2022) resulted in the conclusion that Non-Performing Loans (NPL) do not have a significant and negative effect on Return on Assets (ROA), and the research results (Wayan et al., 2016) stated that NPL has no significant and positive effect on ROA. Meanwhile, the results of the research conducted(Abbas et al., 2019; Made et al., 2016)found that Non Performing Loans (NPL) had a significant negative effect on Return on Assets (ROA) and the results of the study(Claudia M & Yusbardini, 2022; Hediati et al., 2021) states that credit risk (NPL) has a significant positive effect on profitability (ROA). This shows that there are still differences of opinion or research gaps in research findings.

The results of the research on liquidity risk on profitability conducted by (Abbas et al., 2019; Mambu et al., 2022; Wayan et al., 2016) in his research found that the Loan-to-Deposit Ratio (LDR) has a beneficial impact on Return on Asset. While the results of the research conducted by(Asysidiq & Sudiyatno, 2022; Mambu et al., 2022; Ramadanti & Setyowati, 2022) found that the Loan to Deposit Ratio (LDR) did not have a significant effect on Return On Asset (ROA). This shows that there are still differences of opinion or research gaps in the research findings.

The results of the research on the level of operational efficiency towards profitability carried out (Hasmiana et al., 2022) stated that the level of operational efficiency (BOPO) has a significant effect on profitability (ROA). According to the findings of (Hediati et al., 2021), operational efficiency (BOPO) has a considerable negative impact on profitability (ROA).

Based on several previous research results that have been described, the author is interested in re-examining the relationship between variables by conducting research entitled " the impact of credit risk and liquidity risk on profitability in relation to operational efficiency as an intermediary variable (case study on Conventional Commercial Banks Bank Group Based on Core Capital3 and Bank Group Based on Core Capital4 Period 2021-2024listed on the IDX).

LITERATURE REVIEW

Agency Theory

Agency theory defines a relationship formed as a result of a contract between the principle and another party known as the agent, in which the principal delegated a task to the agent (Jensen & Meckling, 1976). The agency relationship was proposed by (Jensen & Meckling, 1976) explains that this relationship is often applied in research in the fields of economics, finance, social, and politics. Agency theory is a theory that underlies business practices that have been used so far.

Credit Risk

In this study, the banking credit risk indicator is represented by Non-Performing Loan (NPL). NPL is a method that can be used to assess the performance of a bank regarding banking credit risk. NPL is measured by comparing loans that have matured with total loans.(Jahrotunnupus & Manda, 2021). NPL consists of three categories, namely substandard (KL), doubtful (D), and loss (M). NPL consists of two, namely gross NPL and net NPL.

According to Circular Letter 9/SEOJK.03/2020 by the Republic of Indonesia's Financial Services Authority, the gross NPL calculation compares Total non-performing loans compared to total loans provided.

$$\text{Gross NPL} = \frac{\text{Total Non-Performing Loans}}{\text{Total Credit Given}} \text{ X } 100\%$$

Figure 1 Gross NPL formula
Source: SEOJK No. 9/SEOJK.03/2020

Total credit is credit provided, governed by the financial services regulator regulations regarding the assessment of general bank asset quality, excluding credit to other banks.

Total non-performing loans are loans with bad quality, loans with doubtful quality, and loans with substandard quality, governed by the financial services regulator regulations regarding the assessment of the asset quality of commercial banks, excluding loans to other banks.

According to Financial Services Authority of the Republic of Indonesia Regulation Number 15/POJK.03/2017, If the risk of non-performing loans (NPL Net) or the ratio of non-performing financing (NPF Net) surpasses 5% (five percent) of total credit or total financing, the bank may struggle to collect its receivables, threatening the bank's commercial operations.

$$\text{Net NPL} = \frac{\text{(Non-performing loans - CKPN Non-performing loans)}}{\text{Total Credit Given}} \text{ X } 100\%$$

Figure 2 Net NPL formula
Source: POJK No. 15/POJK.03/2017

Net NPL refers to the number of non-performing loans in a bank's loan portfolio after credit loss allowances have been deducted. The larger the net NPL, the bigger the bank's credit risk.

Liquidity Risk

Indicators for measuring liquidity risk using the Loan to Deposit Ratio (LDR). LDR is commonly used by companies to determine the level of liquidity of a bank. A high LDR shows that more funds are being disbursed to debtors than to deposits or savings of the community (Sudarmanto et al., 2021). Circular letter of the Financial Services Authority of the Republic of Indonesia number 9/SEOJK.03/2020 the formula for LDR is as follows:

$$\text{LDR} = \frac{\text{Total Credit Disbursed}}{\text{Third-party funds}} \text{ X } 100\%$$

Figure 3 LDR Formula
Source: SEOJK No. 9/SEOJK.03/2020

Circular letter of the Financial Services Authority of the Republic of Indonesia number 9/SEOJK.03/2020 concerning transparency and publication of conventional commercial bank reports. Credit is the provision of funds or the like that is binding between the Banks and other parties who compel the borrower to pay off their obligations within a certain period of time and plus interest. Deposits make up third party money, current accounts, and savings (which do not come from other banks).

Profitability

There are several ratios used when measuring bank profitability, One of these is Return on Assets. Researchers use ROA in this study. ROA calculates how effective a company is in gaining profits through owned assets and to gain profits from invested capital (Van Horne & Wachowicz, 2009).

Circular letter from the Republic of Indonesia's Financial Services Authority number 9/SEOJK.03/2020, the formula for ROA is as follows:

$$\text{ROA} = \frac{\text{Profit before tax}}{\text{Average total assets}} \text{ X } 100\%$$

Figure 4 ROA Formula
Source: SEOJK No. 9/SEOJK.03/2020

The average total assets are calculated by dividing Divide each month's total assets by the number of months.

Operational Efficiency Level

The level of operational efficiency is the ratio of operational costs to operational income. The level of operational efficiency is used to measure the bank's ability to carry out its operational activities. The higher the level of

operational efficiency, the smaller or decreasing the banking financial performance. In contrast, if operational efficiency is decreasing, it might be stated that banking financial performance is rising or increasing.

Operating costs are expenses incurred by a bank to carry out its primary business activities, such as interest, labor, marketing, and other operating costs. While operational income is the bank's primary source of income, it also generates interest income from credit and other placements.

Operational expenses are costs incurred for the operational costs of a company. Every business action carried out by the bank should be considered or prepared ahead of time so that the resources used can be correctly utilized later on. The low operational expenses incurred by the bank will have an impact on increasing the profit (profitability) received by the bank.

Circular letter of the Financial Services Authority of the Republic of Indonesia number 9/SEOJK.03/2020 to calculate the level of operational efficiency as follows:

$$\text{BOPO} = \frac{\text{Total operating expenses}}{\text{Total operating income}} \text{ X } 100\%$$

Figure 5 BOPO Formula

Source: SEOJK No. 9/SEOJK.03/2020

Figures are calculated per position (not annualized).

Previous Research

In the results of previous research by (Putri & Wahyudi, 2023) on the influence of credit risk, liquidity risk, and operational efficiency level on bank profitability. The results of this study show that credit risk shows a negative and significant direction on bank profitability, a positive influence of liquidity risk on bank profitability, while the level of operational efficiency significantly affects profitability.

Previous research revealed that liquidity has a detrimental impact on profitability (Dang, 2019). Maintaining strong liquidity restricts profitable investments. Other research has indicated that the usage of liquidity differs across Asian countries and the United States. In the post-crisis period, liquidity has a favorable impact on profitability in Asian banks and a negative impact on profitability in American commercial banks (Abbas et al., 2019). Banks with more liquid assets are more profitable because they minimize liquidity and funding costs. Other researchers discovered that CAR, NPL, and LDR had no significant effect on bank profitability (Bintoro et al., 2021). Previous studies' findings disagree, indicating that there is a study gap in the relationship between liquidity and banking profitability.

Hypothesis Development

The Effect of Credit Risk (Gross NPL) On Profitability (ROA)

Research result (Agustini et al., 2017) credit risk from operating income in the form of loan interest cannot be obtained in accordance with the agreement or

agreement that has been set. When the credit risk is high, it will have an impact on the decline in credit provided by the bank, resulting in the bank losing the opportunity to get income from the credit distributed and profitability also decreases. As a result, the bank's profitability decreases as credit risk increases. As a result, credit risk as measured by non-performing loans (NPLs) has a negative impact on profitability as assessed by the ROA ratio.

The results of this study are supported by several previous studies such as (Abbas et al., 2019; Agustini et al., 2017; Ambarawati & Abundanti, 2018; Choerudin et al., 2016; Fatimah & Kusumah, 2018; Made et al., 2016; Permatasari et al., 2019) gives the result that credit risk has a negative and significant effect on profitability. Based on these results, the following hypothesis can be drawn:
H1. Credit risk (gross NPL) has a significant negative effect on profitability (ROA).

The Influence of Credit Risk (gross NPL) on the Level of Operational Efficiency (BOPO)

In research conducted by (Yuliana & Listari, 2021) shows that BOPO has a negative and significant effect on NPL. So the following hypothesis can be drawn:
H2. Credit risk (gross NPL) has a significant negative effect on the level of operational efficiency (BOPO).

The Influence of Credit Risk (Net NPL) on Profitability (ROA)

In Research (Murtiningrum & Yohanes, 2024) shows that NPL has a significant negative effect on ROA. So the following hypothesis can be drawn:
H3. Credit risk (net NPL) has a significant effect on profitability (ROA).

The Influence of Credit Risk (Net NPL) on the Level of Operational Efficiency (BOPO)

Ramadanti and Setyowati (2022) investigated the impact of NPL, LDR, BOPO, and NIM on ROA at PT. Bank Mandiri (Persero) Tbk. The study's findings show that NPL and LDR have a moderate effect on ROA, whereas BOPO and NIM have a considerable effect.
H4. Credit risk (Net NPL) does not have a significant effect on the level of operational efficiency (BOPO).

The Effect of Liquidity Risk (LDR) on Profitability (ROA)

Research by (Abbas et al., 2019; Fatimah & Kusumah, 2018)) produces liquidity (LDR) which has a positive and significant effect on profitability (ROA). So, the following hypothesis can be drawn:
H5. Liquidity risk (LDR) has a significant positive effect on profitability (ROA).

The Effect of Liquidity Risk (LDR) on the Level of Operational Efficiency (BOPO)

In research conducted by (Yuliana & Listari, 2021) shows that LDR does not have a significant effect on ROA.

H6. Liquidity risk (LDR) has a significant effect on the level of operational efficiency (BOPO)

The Effect of Operational Efficiency Level (BOPO) on Profitability (ROA)

Risk Management in Financial Institutions presents risk management, including operational risk, and how efficient risk management can have a positive impact on financial performance, including profitability (Kaplan & Garrick, 1981). So the following hypothesis can be drawn:

H7. The level of operational efficiency (BOPO) will have a direct impact on profitability (ROA)

The Level of Operational Efficiency (BOPO) Mediates the Effect of Credit Risk (Gross NPL) on Profitability (ROA)

Study (Anggraini et al., 2022) regarding the influence of Credit Risk on the relationship between the level of operational efficiency and profitability. The study found that credit risk is able to moderate the relationship between the level of operational efficiency and profitability. The study(Simanihuruk et al., 2024) found thatNPL is unable to moderate the effect of BOPO on ROA. Research So the following hypothesis can be drawn:

H8. The level of operational efficiency (BOPO) can mediate the effect of gross NPL credit risk on profitability (ROA)

The Level of Operational Efficiency (BOPO) Mediates the Effect of Credit Risk (Net NPL) on Profitability (ROA)

H9. The level of operational efficiency (BOPO) can mediate the influence of credit risk (Gross NPL) on profitability (ROA)

Operational Efficiency Level (BOPO) Mediates the Effect of Liquidity Risk (LDR) on Profitability (ROA)

H10. The level of operational efficiency (BOPO) can mediate the effect of liquidity risk (LDR) on profitability (ROA).

METHODOLOGY

The sort of research used in this study is classified as quantitative. Quantitative research methods are those whose specifications are systematic, planned, and explicitly defined from start to finish, including the research design. The unit of analysis for this study is a general banking company that has complete financial reports during the research period from 2021-2024 and Conventional General Banks Bank Group Based on Core Capital3 and Bank Group Based on Core Capital 4 registered in Indonesia Stock Exchange (IDX)period 2021-2024. There are 3 independent variables in this study, namely gross NPL credit risk (X1), net NPL credit risk (X2), and LDR liquidity risk (X3), which will be analyzed for their effect on ROA profitability (Z) with the level of BOPO operational efficiency as an intervening variable in conventional commercial banks Bank Group Based on Core Capital3 and Bank Group Based on Core Capital 4 listed on Indonesia Stock Exchange (IDX). In this study, non-

probability sampling, or purposeful sampling, was used. The purposive sampling technique is a technique by determining certain criteria on the sample.

This analysis utilizes secondary data from the yearly financial reports of conventional commercial banks Bank Group Based on Core Capital 3 and Bank Group Based on Core Capital 4 listed on the Indonesia Stock Exchange (IDX) from 2021 to 2024.obtained from the bank's website and published reports. All operating banks publish financial reports quarterly and annually.

RESEARCH RESULT

Descriptive Statistics

As for Descriptive statistics of the research variables can be seen in Table 1.

Table 1 Descriptive Statistics of Research Variables

	N	Minimum	Maximum	Mean	Std. Dev
NPL GROSS	44	0.97	3.70	2.43	0.76
NPL NET	44	0.20	2.56	0.83	0.54
LDR	44	60.96	98.31	82.43	10.22
BOPO	44	41.70	90.10	70.63	12.66
ROA	44	0.70	4.22	2.33	1.05

Based on Table 4.1 Descriptive Statistics of Research Variables, the Gross NPL value has an average of 2.43 with a standard deviation of 0.76. The highest value of 3.70 was found in BBNI in 2021 and BBTN in 2021, while the lowest value of 0.97 was recorded in BMRI in 2024. Meanwhile, Net NPL has an average of 0.83 with a standard deviation of 0.54, with the highest value of 2.56 in BNII in 2021, and the lowest value of 0.20 in BDMN in 2022-2024.

Loan to Deposit Ratio(LDR), the average value is 82.43 with a standard deviation of 10.22, where BNII in 2022 has the highest value of 98.31, while MEGA in 2021 has the lowest value of 60.96. Operating Costs to Operating Income (BOPO) shows an average of 71.63 with a standard deviation of 12.35, with the highest value of 90.10 in BNLI in 2021, and the lowest value of 41.70 in BBCA in 2024. Finally, Return on Assets (ROA) has an average of 2.33 with a standard deviation of 1.05, where the highest value of 4.22 was found in MEGA in 2021, while the lowest value of 0.70 was recorded in BNLI in 2021.

SEM-PLS Analysis Results

Table 2 Structural Model Test Results

Hypothesis	Path	Coefficient	Std. error	t-stat	p-value
H1	Gross NPL -> ROA	-0.066	0.129	0.515	0.607
H2	Gross NPL -> BOPO	0.571	0.112	5,090	0,000
H3	Net NPL -> ROA	-0.019	0.060	0.320	0.749
H4	Net NPL -> BOPO	0.089	0.099	0.900	0.369
H5	LDR -> ROA	0.083	0.079	1,050	0.294
H6	LDR -> BOPO	0.265	0.110	2,416	0.016
H7	BOPO -> ROA	-0.878	0.087	10,069	0,000

Hypothesis	Path	Coefficient	Std. error	t-stat	p-value
H8	Gross NPL -> BOPO -> ROA	-0.501	0.109	4,581	0,000
H9	Net NPL -> BOPO -> ROA	-0.078	0.090	0.869	0.385
H10	LDR -> BOPO -> ROA	-0.233	0.104	2,228	0.026

Source: SmartPLS Output

In Hypothesis 1 (Gross NPL → ROA), a coefficient of -0.066, a t-statistic value of 0.515, and a p-value of 0.607 are obtained, indicating that this relationship is not significant. The same thing happens in Hypothesis 3 (Net NPL → ROA), where a coefficient of -0.019, a t-statistic of 0.032, and a p-value of 0.749 indicate that Net NPL does not have a significant effect on ROA. Thus, the ratio of non-performing loans in both gross and net forms does not directly impact bank profitability.

On the other hand, in Hypothesis 2 (NPL Gross → BOPO), a coefficient of 0.571, t-statistic of 5.09, and p-value of 0.000 is obtained, indicating that NPL Gross has a positive and significant effect on BOPO. This indicates that the higher the NPL Gross, the greater the operational costs on the bank's operating income, reflecting a decrease in operational efficiency. However, in Hypothesis 4 (NPL Net → BOPO), it shows an insignificant relationship with a coefficient of 0.089, t-statistic of 0.9, and p-value of 0.369, which means that NPL Net does not have a direct impact on operational efficiency (BOPO).

In Hypothesis 5 (LDR → ROA), a coefficient of 0.083, t-statistic of 1.05, and p-value of 0.294 is obtained, indicating that LDR has no significant effect on ROA. In contrast, Hypothesis 6 (LDR → BOPO) shows a significant relationship, with a coefficient of 0.265, t-statistic of 2.416, and p-value of 0.016, indicating that an increase in LDR contributes to an increase in BOPO. In other words, the higher the LDR, the higher the operating costs to operating income, which has the potential to reduce bank efficiency.

The most significant relationship is seen in Hypothesis 7 (BOPO → ROA), with a coefficient of -0.878, t-statistic of 10.069, and p-value of 0.000, indicating that BOPO has a very significant negative effect on ROA. In other words, the higher the BOPO, the lower the bank's profitability. This indicates that operational efficiency plays a very crucial role in determining bank profitability.

In the mediation effect analysis, Hypothesis 8 (Gross NPL → BOPO → ROA) shows significant results, with a coefficient of -0.501, t-statistic 4.581, and p-value 0.000. This indicates that BOPO is a significant mediator in the relationship between Gross NPL and ROA. In other words, Gross NPL does not have a direct impact on ROA, but through an increase in BOPO, which ultimately reduces bank profitability.

On the other hand, in Hypothesis 9 (Net NPL → BOPO → ROA), the results show an insignificant relationship with a coefficient of -0.078, t-statistic of 0.869, and p-value of 0.385, which means BOPO does not mediate the relationship between Net NPL and ROA. Meanwhile, Hypothesis 10 (LDR → BOPO → ROA)

has a coefficient of -0.233, t-statistic of 2.228, and p-value of 0.026, which shows that BOPO acts as a mediator in the relationship between LDR and ROA significantly.

The results of the determination coefficient in the structural model above can be seen in Table 4.3.

Table 3 Coefficient of Determination

	R Square	Adjusted R-Square
BOPO	0.537	0.502
ROA	0.811	0.792

Source: SmartPLS Output

Table 4.3 shows the level of determination coefficient (R^2), which measures the ability of exogenous variables to explain endogenous variables in this research model. The R^2 value for the BOPO variable of 0.537 indicates that 53.7% of the variation in BOPO can be explained by Gross NPL, Net NPL, and LDR, while the remaining 46.3% is influenced by other factors outside the model. This shows that factors such as Gross NPL, Net NPL, and LDR have a significant influence on bank operational efficiency (BOPO). Meanwhile, the adjusted R-square value shows the adjustment correction caused by the large number of exogenous variables in the model, so that its value is smaller than R-square.

The R^2 value for the ROA variable of 0.811 indicates that 81.1% of the variation in bank profitability (ROA) can be explained by Gross NPL, Net NPL, LDR, and BOPO used in the model, while the remaining 18.9% is influenced by external factors not included in this study.

Furthermore, the results of the effect size analysis (f2) can be seen in Table 4.

Table 4 Coefficient of Determination

Variables	BOPO	ROA
BOPO		1,893
LDR	0.1400	0.029
Gross NPL	0.536	0.012
NPL net	0.013	0.002

Source: SmartPLS Output

Table 4 indicates the relative contribution of each exogenous variable to the endogenous variable. The BOPO variable has the largest effect size on ROA (f^2 = 1.893), which indicates that BOPO is the most dominant factor in determining bank profitability. In other words, bank operational efficiency has a very large influence on its level of profitability, which is in line with the theory that the higher the BOPO ratio, the lower the profitability generated by the bank.

In addition, Gross NPL has an effect size of 0.536 on BOPO, which indicates that non-performing loans significantly increase the BOPO ratio. This can be interpreted that the higher the Gross NPL, the greater the operational burden that must be borne by the bank, so that operational efficiency decreases. However, the effect of Gross NPL on ROA is relatively small (f^2 = 0.012),

indicating that the effect of non-performing loans on profitability occurs indirectly through BOPO as a mediating variable.

Meanwhile, the LDR variable has an effect size of 0.14 on BOPO and 0.029 on ROA, which indicates that the effect of LDR on operational efficiency is relatively small to moderate, while its effect on profitability is very small. This indicates that although bank liquidity can affect operational efficiency, its impact on profitability is not that significant.

On the other hand, Net NPL has a very small effect size on BOPO (f^2 = 0.013) and ROA (f^2 = 0.002), which indicates that non-performing loans after provisioning do not have a significant impact on operational efficiency or bank profitability in this model. This may be due to the provisioning policy that has been implemented by the bank to reduce credit risk, so that the direct impact on financial performance is not too significant.

Overall, the results of this analysis indicate that operational efficiency (BOPO) is the main factor in determining banking profitability (ROA), while credit risk (Gross NPL) has a greater impact on operational efficiency than directly on profitability. Therefore, banking strategies that focus on controlling operational efficiency and managing non-performing loans (Gross NPL) can have a significant impact on increasing profitability. By considering the results of this study, banking management should prioritize optimal BOPO management and implement more effective credit risk mitigation strategies to improve financial performance sustainably.

The overall relationship between variables can be seen in Figure 1.

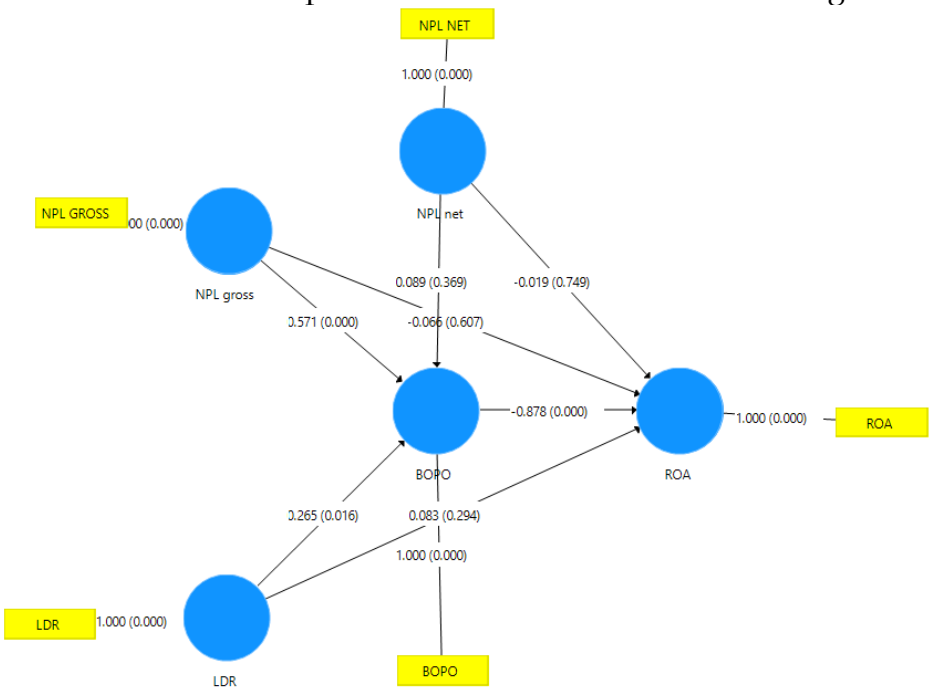

Figure 6. Path Diagram

Figure 6 path diagram results demonstrate that BOPO has a negative and substantial influence on ROA, with a path coefficient of -0.878 (p = 0.000), demonstrating that the bank's profitability decreases as its operating costs increase. Gross NPL has a positive and significant effect on BOPO (0.571; p =

0.000), but does not directly affect ROA, but rather through an increase in BOPO which then reduces profitability. Net NPL has no significant effect on BOPO or ROA, indicating that the impact of non-performing loans has been minimized by risk reserves. LDR has a positive effect on BOPO (0.265, p = 0.016) but not directly on ROA, indicating that the higher the credit distribution ratio, the greater the operating costs, which ultimately reduces profitability. In addition, the mediation effect of BOPO in the relationship between Gross NPL → BOPO → ROA (-0.501, p = 0.000) and LDR → BOPO → ROA (-0.233, p = 0.026) indicates that BOPO is the main intermediary factor in reducing ROA. Therefore, the main strategy in increasing bank profitability is to control BOPO and manage Gross NPL more efficiently, in order to ensure operational effectiveness and mitigate negative impacts on ROA.

DISCUSSION

The Effect of Credit Risk (Gross NPL) on Profitability (ROA)

The study's findings show that credit risk (Gross NPL) has no meaningful impact on profitability (ROA), with a coefficient of -0.066 and a p-value of 0.607. This finding contradicts research conducted by Eltweri et al. (2024), Haris et al. (2024), Gadzo et al. (2019) which found that NPL has a significant negative impact on bank profitability. This may be due to banking policies in managing non-performing loans through loan loss provisions, so that the negative impact of Gross NPL on profitability is insignificant.

The Influence of Credit Risk (Gross NPL) on the Level of Operational Efficiency (BOPO)

The study's findings demonstrate that Gross NPL has a positive and substantial effect on BOPO (coefficient = 0.571, p-value = 0.000), implying that the higher the non-performing loan percentage, the higher the banking operational costs. This finding is in line with research conducted by Dwinanda & Sulistyowati (2021) which shows that credit risk has a negative impact on banking stability, where one of the main factors affected is operational efficiency. This result is also supported by research by Simanihuruk et al. (2024) which found that BOPO has a significant effect on NPL.

The Effect of Credit Risk (Net NPL) on Profitability (ROA)

The results of the study show that Net NPL has no significant effect on ROA with a coefficient of -0.019 and a p-value of 0.749, which means that the level of non-performing loans after deducting credit reserves does not directly affect profitability. This result is contrary to research by Jefitra (2018), Gadzo et al. (2019) and Haris et al. (2024) which found that NPL has a negative impact on profitability. This difference in results may be caused by banking strategies in managing credit risk, such as credit restructuring and strong reserve policies.

The Effect of Credit Risk (Net NPL) on the Level of Operational Efficiency (BOPO)

The results of the study indicate that Net NPL has no significant effect on BOPO with a coefficient of 0.089 and a p-value of 0.369, indicating that banking

has succeeded in controlling the impact of non-performing loans on operational efficiency. This finding supports the results of research conducted by Ramadani (2025), which states that NPL has no significant impact on profitability and operational efficiency.

The Effect of Liquidity Risk (LDR) on Profitability (ROA)

The study's findings revealed that LDR had no significant effect on ROA (coefficient = 0.083, p = 0.294). These results are in line with research by Jihan Aprilia & Siti Ragil Handayani (2018) and Simanihuruk et al. (2024) which also found that LDR had no significant effect on profitability. This may indicate that banking policies in distributing credit have been managed well so that LDR fluctuations do not have a direct impact on profitability.

The Effect of Liquidity Risk (LDR) on the Level of Operational Efficiency (BOPO)

The results of the study show that LDR has a positive and significant effect on BOPO with a coefficient of 0.265 and a p-value of 0.016, which means that the higher the LDR, the greater the bank's operational costs. This finding is in line with the results of research by Dwinanda & Sulistyowati (2021) which shows that an increase in LDR can increase the bank's operational risk, thereby contributing to an increase in BOPO.

The Effect of Operational Efficiency Level (BOPO) on Profitability (ROA)

The results of the study show that BOPO has a negative and significant effect on ROA with a coefficient of -0.878 and a p-value of 0.000, which means that the higher the banking operating costs, the lower the profitability. This finding is consistent with the research of Bintoro et al. (2021), Simanihuruk et al. (2024) and Cheng et al. (2020) which found that BOPO has a negative impact on profitability. This result is also supported by Hasmiana et al. (2022) which shows that operational efficiency plays an important role in increasing bank profitability.

The Mediation Effect of BOPO on the Influence of Credit Risk (Gross NPL) on Profitability (ROA)

The results of the study show that BOPO mediates the effect of Gross NPL on ROA with a coefficient of -0.501 and a p-value of 0.000, which means that credit risk indirectly affects profitability through increased operating costs. This finding supports the research of Simanihuruk et al. (2024) which found that credit risk moderates the relationship between BOPO and profitability. This result is also in line with the research of Anggraini et al. (2022) which states that BOPO acts as an intermediary variable in the relationship between credit risk and profitability.

The Mediation Effect of BOPO on the Influence of Credit Risk (Net NPL) on Profitability (ROA)

The results of the study indicate that BOPO does not mediate the effect of Net NPL on ROA with a coefficient of -0.078 and a p-value of 0.385, which means

that the impact of credit risk after provisioning on profitability is not through operational costs. This finding is contrary to the research of Haris et al. (2024) and Ramadani (2025) who found that credit risk can have an impact on bank profitability through operational efficiency.

The Mediation Effect of BOPO in the Influence of Liquidity Risk (LDR) on Profitability (ROA)

The results of the study show that BOPO mediates the effect of LDR on ROA with a coefficient of -0.233 and a p-value of 0.026, which means that banking liquidity can affect profitability through operational efficiency. This finding is consistent with the research of Dwinanda & Sulistyowati (2021) which found that liquidity risk has an impact on banking financial stability. In addition, this result is also in line with the research of Hasmiana et al. (2022) which found that operational efficiency mediates the relationship between financial risk and bank profitability.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Based on the research results, it is possible to deduce that:

1. Credit risk (Gross NPL) has no significant effect on profitability (ROA). This result shows that even though credit risk increases, banks have risk management mechanisms that can reduce its impact on profitability.
2. Credit risk (Gross NPL) has a favorable and significant influence on the degree of operational efficiency (BOPO). This means that the higher the ratio of non-performing loans, the higher the bank's operational costs, because the bank must allocate more resources to handle non-performing loans.
3. Credit risk (Net NPL) There is no major impact on profitability (ROA). This shows that after credit provisioning, credit risk no longer has a direct impact on profitability.
4. Credit risk (Net NPL) does not significantly affect the level of operational efficiency (BOPO). This result indicates that the reserve policy implemented by the bank is able to reduce the impact of Net NPL on operational efficiency.
5. Liquidity risk (LDR) has no substantial impact on profitability (ROA). This shows that even though banks have a high level of liquidity, it does not necessarily contribute directly to increasing profitability.
6. Liquidity risk (LDR) has a favorable and considerable impact on the level of operational efficiency (BOPO). This implies that the greater the credit level distribution (LDR) the higher the bank's operating costs. The level of operational efficiency (BOPO) has a negative and significant effect on profitability (ROA). The higher the BOPO, the lower the bank's profitability, indicating that increasing operational efficiency is an important factor in increasing profitability.
7. BOPO mediates the effect of Gross NPL on ROA negatively and significantly. This means that credit risk has an impact on profitability through increased operating costs.

8. BOPO does not significantly mediate the effect of Net NPL on ROA. This indicates that credit reserves have reduced the negative impact of credit risk on operational efficiency and profitability.
9. BOPO mediates the effect of LDR on ROA negatively and significantly. This means that liquidity risk can have a detrimental influence on profitability if they are not managed properly in bank operational efficiency.

Recommendation

Based on the results of the description above, the following suggestions can be made for bank management and further research:

1. Bank management needs to improve operational efficiency to reduce the negative impact of high operating costs (BOPO) on profitability.
2. Credit risk management strategies must be tightened, especially in reducing the level of non-performing loans (Gross NPL) so as not to burden operational efficiency.
3. Banks need to optimize credit distribution while maintaining a good liquidity balance (LDR) so as not to increase excessive operational burdens.
4. Strengthening credit reserve policies can be a risk mitigation strategy to reduce the negative impact of NPLs on bank profitability.

ADVANCED RESEARCH

Further research could add moderating variables such as capital structure or revenue diversification to see how these factors can strengthen or weaken the connection between credit risk, liquidity, operational efficiency, and profitability.

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