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Capital Adequacy, Credit Risk, Operational Efficiency and Profitability: Liquidity as an Intervening Variable in National Private Commercial Banks

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Abstract

The purpose of this study is to analyze the effect of capital adequacy on liquidity, identify the impact of credit risk on liquidity, measure the effect of operational efficiency on liquidity, analyze the relationship between profitability and liquidity, identify the role of liquidity as an intervening variable and provide strategic recommendations for bank management. The research method used is quantitative research. Quantitative research methods can be interpreted as methods based on the philosophy of positivity, used to research certain populations or samples, data collection using research instruments, statistical data analysis. The results of the study show that capital adequacy has a positive and significant effect on liquidity., There is no significant effect between Credit Risk on liquidity, Operational efficiency has a significant effect on liquidity., There is no significant effect between capital adequacy on profitability, Credit Risk has a significant effect on Profitability, Operational efficiency has a significant effect on the Profitability variable, There is no significant effect between liquidity on Profitability, Liquidity is unable to mediate the effect of capital adequacy on Profitability, Liquidity is unable to mediate the effect of credit risk on Profitability and Liquidity is unable to mediate the effect of operational efficiency on Profitability.

1. Introduction

Banks play an important role in the national economy because they function as financial intermediaries. Banks collect and distribute funds by making various kinds of goods for consumers. According to Arthesa (Nugrahanti et al., 2018), banks play an intermediary role, which means they regulate the flow of funds from parties who have larger funds but cannot use

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them to parties who do not have funds but can develop them in the form of businesses or enterprises.

In order for a bank to maintain its survival, the bank is required to always perform well. The performance of the bank can be reviewed from the profitability obtained. So that understanding the factors that determine profitability becomes a very important and crucial issue.(Agbeja et al., 2015). According to Hutagalung in(Agustini et al., 2017)profitability is the most appropriate indicator used to measure the performance of a bank. Profitability is the company's ability to earn profits in relation to sales, total assets and equity. According to Chatarine in(Agustini et al., 2017)High bank profitability reflects that the bank has a good system for risk management, credit checks, and risk monitoring which is expected to reduce bank risk.

Table 1. Performance of Conventional Commercial Banks

Tahun	CAR (%)	LDR (%)	BOPO (%	NPL (%)	ROA (%)
2017	23.18	90.04	78.64	2.59	2.45
2018	22.97	94.78	77.86	2.37	2.55
2019	23.40	94.43	79.39	2.53	2.47
2020	23.89	82.54	86.58	3.06	1.59
2021	25.66	77.49	83.55	3.02	1.85
2022	25.60	78.98	78.70	2.44	2.45

Based on empirical data, the CAR ratio has tended to increase since the last 4 (four) years (2019-2022) compared to 2018 along with the decline in LDR. ROA decreased in 2020 and increased again in 2021-2022. The Covid-19 pandemic that has hit since early 2020 has also affected the increase in the NPL Ratio which has gradually improved starting in 2021-2022. Meanwhile, efficiency showed an increase in 2020 and began to decline gradually in 2021-2022. In terms of liquidity (LDR), there was a decrease from 2020 to 2021 and a slight increase in 2022.

The issue of banking performance is also interesting to researchers. Several previous researchers have investigated various factors that can affect profitability. The findings show that profitability can be affected bygfactorinternal and external factors. The influence of internal factors is caused by NPL (Juliani 2022, Santoso 2021, Abiyunus 2020, Purnamasari 2019, LDR (Abiyunus 2020, Purnamasari, 2019.) BOPO (Juliani 2022, Santoso 2021, Abiyunus 2020) Bank Size and Deposit Ratio (Juliani 2022, Abiyunus 2020) Meanwhile, based on external factors, profitability is influenced by the BI Rate (Purnamasari 2019).

Profitability is believed to be influenced by Capital Adequacy, Credit Risk, and Operational Efficiency because capital adequacy determines the Bank's capacity to bear risk and Bank growth. Adequate capital also supports expansion that can contribute to revenue growth and profitability. Credit Risk is the main risk in banking, with good credit risk management, the Bank can reduce potential losses and improve portfolio quality in credit distribution so that it can generate interest income that can increase profitability. With good credit risk management, banks can reduce losses caused by non-performing loans which are in line with efficient operational cost management can increase profits for the Bank. Meanwhile, operational efficiency is closely related to the operational costs incurred by the Bank. The Bank can manage its operational costs efficiently so that it can increase profitability. Capital adequacy, well-managed credit risk, and operational efficiency can contribute to better management of income and costs. Good management of these three factors can increase the bank's resilience in facing market challenges and achieving better profitability results.

The experience of the financial and economic crisis that occurred in various countries in 2008 showed that even though the Bank's capital is adequate, if it does not have sufficient liquidity to face pressure or stress, it can disrupt the Bank's business continuity.

Several studies have shown inconsistent results, namely that Capital Adequacy has a positive and insignificant effect on Profitability according to Rinovah (2022), but the results of other studies show that there is a significant relationship between the capital adequacy ratio and bank profitability which is supported by research.(Agbeja et al., 2015) (Putri et al., 2018),(Juwita et al., 2018)as well as(Sari & Endri, 2019). Meanwhile, Firmanilla's research (2023) shows that the Capital Adequacy Ratio (CAR) has a negative and significant effect on Return On Assets which is supported by Anisa and Anwar (2021), Kristini (2020) and Kusuma (2017). Different from the research results of Juliani and Tanwijaya (2022), Komarati (2021),(Permatasari & Filianti, 2020), and Rufo Riviera (2017) which showed that CAR had a negative and insignificant effect on Return On Assets (ROA).

The results of the study related to the influence of liquidity on profitability also showed several differences, namely that liquidity had a negative and insignificant influence on profitability.(Rinofah et al., 2022)which is supported by research by Juliani and Tanwijaya (2021), (Komarawati, 2021)And(Qonitatillah, 2021), however, the research results of Firmanilla (2023), Amane and Alemu (2019) and Husaeni (2017) are different, namely that LDR has a positive and significant effect on profitability. Other studies show that Liquidity has no effect on profitability(Permatasari & Filianti, 2020)and Sari, 2020).

To face the uncertain conditions in the global financial market and the domestic economy, the Bank continues to maintain capital resilience from possible risks because the capital aspect is one of the main elements in the banking business, so the structure and size of the bank's capital determine how much strength and capacity the bank has in carrying out its intermediation function, as well as being a benchmark for the bank's resilience in anticipating potential risks faced, supporting future growth, and maintaining public trust in the Bank's condition (Segara et al., 2019: 186). Capital in banks has a very important role. Capital adequacy can be measured using the Capital Adequacy Ratio (CAR).

It is important for management to pay attention to the amount of capital adequacy they have so that the bank does not lack funds and also does not have excess funds. Capital is the main source of financing for bank operational activities and also acts as a buffer against the possibility of risk of loss. The greater the capital owned, the stronger the bank is in facing unexpected risks so that the bank can increase public trust (Septiani and Lestari, 2016). However, if a bank has a Capital Adequacy Ratio (CAR) that is too high, it can cause idle funds, namely the large amount of funds that are still idle or have not been used in productive allocations by the bank's management. In accordance with Financial Services Authority Regulation No. 11/POJK.03/2016, banks are obliged to provide a minimum capital of 8% of Risk Weighted Assets (RWA). However, the more capital a bank has, the better the bank's growth will be even though the bank's capital has exceeded the minimum provisions set by the authorities.

From this statement, it can be concluded that the higher the Capital Adequacy Ratio (CAR), the better the bank's capital strength. Research by(Rinofah et al., 2022)shows that capital adequacy has a positive and insignificant effect on profitability. Research by(Agbeja et al., 2015)as well as(Amene & Alemu, 2019) shows that capital adequacy has a positive and significant effect on profitability. This is different from the results found by Inda(Komarawati, 2021)And(Mendoza & Rivera, 2017)states that CAR has a negative and insignificant effect on ROA, also supported by Julianti & Tanwijaya (2022) and(Permatasari & Filianti, 2020). Meanwhile, research(Firmanila, 2023),(Kristina, 2020), Anisa (2021) shows that CAR has a negative and significant effect on ROA.

Banks with high CAR can increase public trust in banks and be willing to save their money in the bank and the credit distributed will be greater, so it is hoped that non-performing loans (NPL) will decrease.(Kusuma & Haryanto, 2017). This is because the large amount of reserves obtained by banks can reduce non-performing loans (NPL).

Credit risk is a risk resulting from the customer's inability to repay the loan and interest within the specified time period.(Siamat, 2005). The indicator used to measure credit risk is Non-Performing Loan (NPL). NPL is the ratio of the comparison between problematic loans and the

amount of credit. NPL reflects a bank's ability to control its problematic loans. A high NPL ratio indicates the bank's increasingly poor credit quality, which causes the number of problematic loans or bad loans experienced by the bank to increase.(Hafiz et al., 2019). Thus, if credit risk cannot be managed properly by the bank, it will affect the decline in the bank's financial performance.

Based on previous research, namely(Rinofah et al., 2022)supported by Juliani (2022), Sari (2019) showed that NPL had a negative and significant effect on ROA, but this was different from the research results of Firmanilla (2023) and(Permatasari & Filianti, 2020)) which shows that NPL does not have a significant effect on profitability. In addition to credit risk and capital adequacy, another factor that banks must pay attention to is operational efficiency. Operational efficiency is the company's efficiency in using all its assets to generate sales, so that costs can be minimized and maximum profit will be achieved.(Bukian, 2016). Operational efficiency aspects can be measured using the ratio of Operating Costs to Operating Income (BOPO). BOPO is a ratio used to measure the operational efficiency of a bank in an effort to control operational costs against operational income. A low BOPO ratio reflects the bank's increasingly good performance, this is because the bank can manage its operational costs efficiently.

Conversely, a high BOPO reflects that the bank is less efficient in managing its sources of funds and assets to make a profit, where this can erode the bank's capital, so that the bank's health can be disrupted.(Haryanto, 2016). This is in accordance with Julianti's research (2022),(Paramita, 2021)And(Kristina, 2020), the results of which concluded that BOPO had a negative and significant effect on ROA. The same results were also found by Sari and Endri (2019) and(Juwita et al., 2018)which found that BOPO had a negative and significant effect on ROA. While the results of the study(Firmanila, 2023)And(Permatasari & Filianti, 2020); reveals something different, namely that efficiency does not affect profitability.

Adequate liquidity allows banks to act as effective financial intermediaries, channeling funds from surplus sectors to deficit sectors. In a dynamic economic condition, this function becomes crucial to maintain economic growth and stability. Banking liquidity problems in Indonesia have occurred in various periods, especially when the financial system faced pressure from internal and external factors. The incidents in question include the monetary crisis in 1997-1998 which was caused by a massive devaluation of the rupiah exchange rate against the US dollar, a decline in confidence in the domestic banking sector and many debtors failed to pay their debts due to high interest rates and rupiah depreciation. This had an impact on bank liquidity due to massive withdrawals of deposits by customers (bank run), many banks closed and the government had to form the National Bank Restructuring Agency (BPPN) to stabilize the banking sector. Another external factor that affects banking liquidity in Indonesia is the Covid pandemic in 2020 which caused a decline in economic activity due to social restrictions causing a decline in credit demand, Banks face pressure because many customers delay credit payments (credit restructuring), this has an impact on Third Party Funds (DPK) increasing sharply because people are holding back consumption, while credit distribution slows down, causing overliquidity. Bank Indonesia again loosens GWM to increase liquidity in the market.

Indonesia's banking liquidity conditions in 2024 show significant dynamics, influenced by various economic factors and monetary policies. Based on information from financial bisnis.com, Bank Indonesia (BI) ensures that banking liquidity remains adequate although there are challenges that require strategic adjustments by banks. Strict supervision and appropriate policies from monetary authorities as well as adaptation by banks are key to maintaining the stability of the national financial system. This is reflected in the stable ratio of Liquid Assets to Third Party Funds (AL/TPF). In October 2024, the AL/TPF ratio was recorded at 25.58%, indicating the bank's ability to meet its short-term obligations.

National private commercial banks have an important role in the Indonesian financial system. However, in carrying out their functions, banks are often faced with various challenges such as maintaining capital adequacy, managing credit risk, increasing operational efficiency, and ensuring optimal profitability levels. One important aspect that influences the relationship between these variables is liquidity, which supports bank stability and sustainability.

Various previous studies have shown that the influence of capital adequacy, credit risk, and operational efficiency on profitability produces similar findings but the influence is still weak. This may be due to previous studies ignoring other variables, especially intervening variables. In research on capital adequacy, credit risk, operational efficiency, and profitability, the use of intervening variables can provide a deeper understanding of the relationship between these variables and clarify the possible mechanisms. Intervening variables can help explain the causal relationship between the independent variables (capital adequacy and credit risk) and the dependent variable (profitability) and by involving intervening variables allows researchers to measure the direct and indirect impacts of the independent variables on the dependent variable. For example, capital adequacy and credit risk can have a direct impact on profitability, while operational efficiency can moderate or strengthen the effect through internal mechanisms. In addition, the results of research that includes intervening variables can provide a basis for further intervention and improvement in the context of policy or managerial.

In the context of this study, Liquidity is believed to play a role in mediating the influence of capital adequacy, credit risk, operational efficiency on profitability. These three independent variables can directly affect profitability and can also indirectly affect profitability, namely through liquidity first. Liquidity is a crucial factor in bank operations and can act as a bridge connecting several key aspects in the banking sector, such as capital adequacy, credit risk, operational efficiency, and profitability.

Liquidity in Banks describes the bank's ability to provide sufficient funds to meet all its obligations. The liquidity indicator used in this study to measure a bank's liquidity is the Loan to Deposit Ratio (LDR). LDR is a ratio to measure the extent to which a bank can repay funds that have been invested by customers with credit that has been given to debtors.(Martono, 2002). The higher LDR reflects the increasing credit channeled by the bank, which means that the bank's intermediation function is running well. The increasing credit channeled, the increasing bank income from interest, so that it has a positive impact on the bank's financial performance. This is in accordance with research(Firmanila, 2023),(Paramita, 2021),(Yuniari & Badjra, 2019)as well as(Juwita et al., 2018)the results of which show that LDR has a positive and significant effect on ROA. However, this is different from the research of Rinovah (2022), Juliani & Tanwijaya (2022) who found that LDR has a negative and insignificant effect on ROA.

Liquidity can also be a mediator of the relationship between credit risk and profitability. High levels of credit risk will affect bank liquidity, this is caused by cash that should increase bank liquidity not occurring and then the bank is unable to meet short-term obligations. So that it loses its ability to generate optimal profits. In order for a bank to survive, it must maintain its liquidity level by balancing credit provision and short-term obligations.(Agustini et al., 2017).

Based on previous research conducted by Firmanilla (2023), it shows that LDR can mediate the effect of CAR on Profitability, but LDR cannot mediate the effect of NPL and BOPO on Profitability. Meanwhile, research(Rinofah et al., 2022)shows that Liquidity is unable to mediate the relationship between Capital Adequacy and Credit Risk on Profitability, This underlies researchers to be able to find novelty in this study by making liquidity proxied by LDR as an intervening variable. Liquidity is one of the key factors in the banking industry that has a significant impact on bank profitability. When a bank has a high level of liquidity, it means that the bank can meet its financial obligations more easily, such as paying customer deposits or overcoming a liquidity crisis. Conversely, low liquidity can hinder a bank's ability to generate stable income and profits. Therefore, liquidity is often used as an intervening or intermediary variable in relation to a bank's profitability.

Capital adequacy, credit risk, and operational efficiency are factors that can affect a bank's financial performance, both directly and indirectly. To encourage mediating variables to have a direct impact on changes or formation of independent-dependent variable bonds, the mediating variable acts as an intermediary between the independent and dependent variables. This allows for a more accurate analysis of the relationship between the two data sets. The variable that acts as a mediator in this study is Liquidity (LDR). If a bank's liquidity is high, the risk of non-receivable loans experienced by the bank is also high, so this will result in large non-performing loans and the bank will suffer losses.(Astrini et al., 2019)

The object of observation of this study is the National Private Commercial Bank (BUSN) listed on the Indonesia Stock Exchange for the period 2017-2022. The selection of the BUSN object in this study is because BUSN is a bank whose capital is mostly from the private sector, its deed of establishment was established by the private sector and its profit sharing is also intended for the private sector, so that in order to obtain healthy financial performance, banks must always maintain their profitability and maintain public trust.

2. Methods

The research used is quantitative research. Quantitative research methods can be interpreted as methods based on the philosophy of positivity, used to research certain populations or samples, data collection using research instruments, statistical data analysis, with the aim of testing the established hypothesis. The data used in the research is secondary data sourced from the official OJK website "www.ojk.go.id" 2017 to 2022.

The research population in this study is National Private Commercial Banks with a period of 2017 to 2022 and registered on the Indonesia Stock Exchange totaling 29 Banks. The sample is based on a certain number and criteria, representing the population so that it can be studied, in order to describe the population in general (Cooper & Schindler, 2014).

3. Results and Discussion

Results

Hypothesis Testing (Panel Data Linear Regression)

Multiple linear regression analysis of panel data is an analysis used to measure the strength of the relationship between two or more variables, also showing the direction of the relationship between the independent variable and the dependent variable. The following are the results of the multiple linear regression analysis of panel data presented in the table below.

Table 2. ResultsMultiple Linear Regression Model 1

Variable	Coefficient	Std. Error	t-statistic	Prob.
C	92.14	10.64	8.66	0.00
X1	0.45	0.08	5.69	0.00
X2	-0.43	1.34	-0.32	0.75
X3	-0.19	0.09	-2.03	0.04

Source: Eviews 9 Data Processing Results

Based on the results of the multiple linear regression analysis in the table above, the following regression model was obtained:

$$Z = 92.141 + 0.451X_1 - 0.428X_2 - 0.192X_3$$

Where :
Z = LDR
X1 = CAR
X2 = NPL
X3 = BOPO

On the multiple linear regression model above, the following information was obtained.

1. The constant is 92.141, which means that if there is no change in the value of the independent variables (CAR, NPL, and BOPO), then the value of the dependent variable (LDR) is 92.141.
2. The regression coefficient on the CAR variable (X1) is 0.451 and is positive, meaning that if the CAR variable increases by 1 point significantly, and other independent variables remain constant. Then the CAR variable will increase the value of the LDR variable by 0.451. In addition, a sig. value of 0.0000 is obtained, this value is <0.05, this means that there is a significant influence between the CAR variable and LDR. (H1 is accepted)
3. The regression coefficient on the NPL variable (X2) is 0.428 and is negative, meaning that if the NPL variable increases by 1 point significantly, and other independent variables remain constant. Then the NPL variable will decrease the value of the LDR variable by 0.428. In addition, a sig. value of 0.749 is obtained, this value is > 0.05, this means that there is no significant influence between the NPL variable and LDR. (H2 Rejected)
4. The regression coefficient on the BOPO variable (X3) is 0.192 and is negative, meaning that if the BOPO variable increases by 1 point significantly, and other independent variables remain constant. Then the BOPO variable will decrease the value of the LDR variable by 0.192. In addition, a sig. value of 0.042 is obtained, this value is <0.05, this means that there is a significant influence between the BOPO variable and LDR. (H3 is Accepted).

Table 3. ResultsMultiple Linear Regression Model 2

Variable	Coefficient	Std. Error	t-statistic	Prob.
C	-0.26	0.53	-0.48	0.63
X1	0.00	0.00	0.27	0.78
X2	-0.22	0.05	-4.32	0.00
X3	0.01	0.00	2.35	0.20
Z	0.00	0.00	0.42	0.68

Source: Eviews 9 Data Processing Results

Based on the results of the multiple linear regression analysis in the table above, the following regression model was obtained:
Y=-0.2563+0.0009X_1-0.2240X_2+0.0089X_3+0.0015Z
Where :
Y = ROA
Z =LDR
X1 = CAR
X2 = NPL
X3 = BOPO

Simultaneous Test (F Test)

Simultaneous testing is carried out to determine the influence of several independent variables simultaneously on one dependent variable. The basis for making decisions for this F test is as follows:

· If the Sig. value < 0.05 then the independent variable has a simultaneous effect on the dependent variable.

· If the Sig. value > 0.05 then the independent variable does not have a simultaneous effect on the dependent variable.

The following are the results of the f-test presented in the table below:

Table 4.Simultaneous Test Results of Model 1

R-squared	0.22	Mean Dependent Var	59.95
Adjusted R-squared	0.20	SD Dependent Var	33.26
SE of Regression	29.67	Sum- Squared resid	118818.5
F-Statistic	12.85	Durbin Watson Stat	1.57
Prob (F-Statistic)	0.00		

Source: Eviews 9 Data Processing Results

Based on the table above, the information obtained is a significance value of 0.0022 <0.05, which means that the independent variables in the form of CAR, NPL, BOPO, LDR have an effect on the dependent variable ROA. Thus, it can be concluded that there is a significant simultaneous effect of the independent variables in the form of CAR, NPL, BOPO, and LDR on the dependent variable in the form of ROA.

Coefficient of Determination

The coefficient of determination is used to measure how far the model is in explaining the variance of the dependent variable (Ghozali, 2018). The value of the coefficient of determination is between zero and one. If the coefficient of determination is closer to 1, then the influence of the independent variable on the dependent variable is higher. The following are the results of the coefficient of determination (R2) presented in the table below:

Table 6. ResultsCoefficient of Determination of Model 1

R-squared	0.22	Mean Dependent Var	59.94
Adjusted R-squared	0.20	SD Dependent Var	33.26
SE of Regression	29.67	Akaike info Criterion	118818.5
F-Statistic	12.85	Durbin Watson Stat	1.57
Prob (F-Statistic)	0.00		

Source: Eviews 9 Data Processing Results

Based on the results of the determination coefficient test above, the R2 (R Square) value of the regression model is used to determine how much the independent variable is able to explain the dependent variable. Based on the table above, it is known that the R2 value is 0.22, this means that 22.00% of the variation in the dependent variable LDR can be explained by the variation of the three independent variables, namely CAR, NPL, and BOPO. While the rest (100% - 22.21% = 77.79%) is influenced by other variables outside this study.

Table 7. ResultsCoefficient of Determination of Model 2

R-squared	0.44	Mean Dependent Var	0.01
Adjusted R-squared	0.23	SD Dependent Var	1.24
SE of Regression	1.09	Akaike info Criterion	3.25
Sum- Squared resid	119.46	Black Criterion	4.07
Log likelihood	-186.70	Hannan- Quinn Criter	3.58
F-Statistic	2.06	Durbin Watson Stat	2.28
Prob (F-Statistic)	0.00		

Source: Eviews 9 Data Processing Results

Based on the results of the determination coefficient test above, the R2 (R Square) value of the regression model is used to determine how much the independent variable is able to explain the dependent variable. Based on the table above, it is known that the R2 value is 0.4393, this means that 43.93% of the variation in the dependent variable ROA can be explained by the variation of the four independent variables, namely CAR, NPL, BOPO, and ROA. While the rest of (100% - 43.93% = 56.07%) is influenced by other variables outside this study.

Intervening Test or Sobel Test

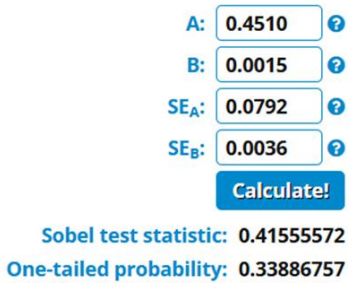
The Sobel test is a statistical method used to test the significance of the mediation effect in a model. The mediation effect occurs when the independent variable (X) affects the dependent variable (Y) through the mediator variable (M). The Sobel test calculates whether the indirect effect through the mediator is significant. Testing the significance of the mediation effect is carried out using the Sobel test method. Basically, the Sobel test is a special t-test that tests the effect of including an intervening variable in a model, whether it really has a statistically significant effect or not. Decision making is based on the sig. value compared to 0.05, if the sig. value <0.05 then it can be concluded that there is a mediation effect (Ghozali, 2016). Here is the calculation:

1. *Calculating the Effect of CAR on ROA through LDR*

CAR Effect Mediation→LDR→ROA

To find out the effect of CAR on ROA through LDR, see the calculation below.

a. Calculating the Sobel Test
   a = 0.4510 Sa = 0.0792
   b = 0.0015 Sb = 0.0036
b. Calculation of the Sobel test using the Sobel Test Calculation for Significance of Mediation application

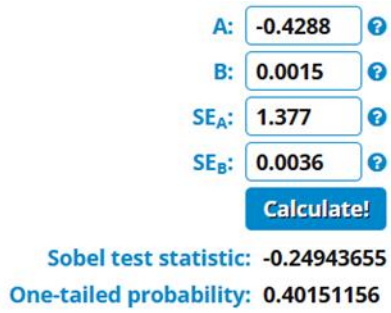


2. *Calculating the Effect of NPL on ROA through LDR*

Mediation Effect of NPL→LDR→ROA

To find out the effect of NPL on ROA through LDR, see the calculation below.

a. Calculating the Sobel Test
   a = -0.4288 Sa = 1.337
   b = 0.0015 Sb = 0.0036
b. Calculation of the Sobel test using the Sobel Test Calculation for Significance of Mediation application



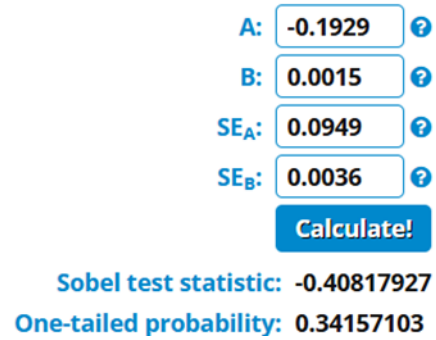
Based on the calculation results above, it is obtained information that the significance value is 0.4015, the value is > 0.05. This shows that the LDR variable is not able to mediate the effect of NPL on ROA. Thus, it can be concluded that there is no effect of NPL on ROA through the LDR variable (H9 Rejected)

3. Calculating the Effect of BOPO on ROA through LDR

Mediation Effect of NPL➔LDR➔ROA

To find out the effect of BOPO on ROA through LDR, see the calculation below.

a. Calculating the Sobel Test
   a = -0.1929 Sa = 0.0949
   b = 0.0015 Sb = 0.0036
b. Calculation of the Sobel test using the Sobel Test Calculation for Significance of Mediation application



Based on the calculation results above, it is obtained information that the significance value is 0.341, the value is > 0.05. This shows that the LDR variable is not able to mediate the effect of BOPO on ROA. Thus, it can be concluded that there is no effect of BOPO on ROA through the LDR variable (H10 is rejected)

Next, here is a summary of the results of the hypothesis testing:

Table 8. Summary of Hypothesis Testing Results

Hypothesis	Details	Test Results	Information
H1	Capital adequacy has a positive influence on liquidity	Capital adequacy has a positive and significant influence on the liquidity variable.	H1 accepted

Hypothesis	Details	Test Results	Information
H2	Credit Risk has a negative impact on Liquidity	There is no significant influence between the NPL variable and Liquidity	H2 rejected
H3	Operational Efficiency has a negative impact on Liquidity	Operational efficiency has a significant negative effect on the liquidity variable	H3 accepted
H4	Capital adequacy has a positive influence on profitability	There is no significant influence between Capital Adequacy and Profitability	H4 rejected
H5	Credit Risk has a negative impact on Profitability	Credit Risk has a significant impact on Profitability	H5 accepted
H6	Operational Efficiency has a negative impact on Profitability	Operational Efficiency has a significant effect on the Profitability variable	H6 accepted
H7	Optimal Liquidity has a positive effect on Profitability	There is no significant influence between liquidity variables and profitability.	H7 rejected
H8	Liquidity is able to mediate the influence of capital adequacy on profitability.	There is no influence of CAR on ROA through the LDR variable.	H8 rejected
H9	Liquidity is able to mediate the influence of credit risk on profitability	There is no influence of NPL on ROA through the LDR variable	H9 rejected
H10	Liquidity is able to mediate the influence of operational efficiency on profitability.	There is no influence of BOPO on ROA through the LDR variable	H10 rejected

4. Discussion

Capital Adequacy Has a Positive Influence on Liquidity

The test results show that there is a significant influence between the CAR variable and LDR. According to the Capital Buffer Theory of Banking (Repullo, 2004), banks with higher capital (high CAR) tend to be more aggressive in distributing credit, which has an impact on increasing LDR. Banks with strong capital have greater flexibility in credit expansion without having to worry about liquidity risks or regulations related to minimum capital limits. When CAR increases, banks have a greater capacity to distribute credit, so that LDR also increases. This is in line with research conducted by(Firmanila 2023 and Rinovah 2022)which states that Capital Adequacy has a significant effect on Liquidity. Based on table 4.1, it can be seen that the standard deviation of CAR (35.127) The standard deviation value is greater than the mean value (34.125), this is indicates that the CAR data has very high variation or there is a significant difference between one data and another or the CAR value in the observed sample is unstable and has large fluctuations.

Credit Risk has a negative impact on Liquidity

Based on the test results, it shows that there is no significant influence between the NPL variable and LDR. This shows that even though the NPL ratio increases or decreases, the Bank does not directly adjust its credit policy significantly, extensive funding sources and product diversification allow the bank to maintain credit expansion even though the NPL ratio increases. Theoretically, according to the Risk-Return Tradeoff Theory in banking, banks with high NPLs should be more careful in providing credit to avoid increasing greater credit risk.

Thus, the increase in NPL should affect LDR, because banks will be more selective in distributing credit. However, from the test results, it can be interpreted that the Bank has a good credit risk mitigation strategy, so that the increase in NPL does not directly reduce liquidity or hinder credit distribution. The Bank also has income from sources other than credit (for example, investments in securities or fee-based income), so even though the NPL increases, the Bank still has sufficient liquidity capacity. This research is in line with previous research(Firmanila, 2023)which concluded that NPL and BOPO did not have a significant effect on LDR and contradicted the test results conducted by Rinovah, 2022, namely that credit risk had a negative and significant effect on Liquidity.

It can be seen that the standard deviation of NPL of 2.041 is smaller than the mean value, meaning that the data distribution is small and is around the average value. The average NPL observed is still within safe limits (<5%), so the effect on LDR is likely not too large.

Operational Efficiency has a negative impact on Liquidity

The test results show that there is a significant influence between the BOPO variable and LDR. Banks with high efficiency have more controlled costs, so they are better able to manage liquidity without having to rely on expensive external funding. Conversely, if a bank experiences operational inefficiency (high BOPO), then its operational costs are greater than the income generated.Andcan reduce profits, thereby suppressing the availability of liquid funds. Inefficient banks are more vulnerable to liquidity problems because they have to allocate more funds for operational costs than for liquidity reserves. This is in line with previous research(Anisa, 2021)which concluded that BOPO had an effect on FDR liquidity but contradicted the research results of Firmanila, 2023 that NPL and BOPO did not have a significant effect on LDR.

In theory, the Efficiency Structure Hypothesis states that better operational efficiency allows banks to be more aggressive in distributing credit. If a bank has a high BOPO (high operating costs compared to operating income), then the bank can be encouraged to increase the LDR in order to obtain higher interest income and cover the high operating costs. However, inefficient banks can also face obstacles in credit expansion due to lack of profitability, increased credit risk, and limited liquidity. Therefore, the direction of the influence of BOPO on LDR can vary depending on the banking strategy implemented.

Operational efficiency plays an important role in a bank's credit expansion strategy. High BOPO can drive an increase in LDR as a bank's effort to cover large operational costs, but it can also be a signal of the need for increased efficiency so that credit growth does not increase the risk of liquidity and bad debts.

Capital adequacy has a positive influence on profitability

The test results show that there is no significant influence between the CAR variable and ROA, which can be interpreted that the level of capital adequacy does not directly determine the Bank's profitability. In theory, high CAR is often associated with better profitability because banks

have sufficient capital reserves for business expansion and facing financial risks, but the Trade-Off Theory states that although larger capital increases stability, excess capital that is not optimized for credit expansion can actually hinder profitability. Idle capital or allocated in less productive assets will reduce the Bank's profit margin.

Banks that have high CAR but rely on short-term funding with high interest rates may experience profitability pressure, so that ROA does not increase significantly. This is in line with research(Rinoval, 2022; Komarawati, 2021; Juliani & Tanwijaya, 2022; Sari & Endri, 2019; Husaeni, 2017)which states that the CAR ratio does not have a significant effect on Profitability. However, this is contrary to the research results of Amene & Alemu (2019) and Husaeni (2017).

The results of the study that showed no significant influence between CAR and ROA can be explained by various factors, including bank business strategy, operational efficiency, banking regulations, and optimization of capital use. High capital does not always mean high profitability, especially if the capital is not used productively in business activities.

Credit Risk has a negative impact on Profitability

The test results show a significant influence between the NPL variable and ROA. In theory and empirically, NPL has a negative effect on ROA, meaning that the higher the NPL ratio, the lower the ROA level. due to increasing provisioning expenses and decreasing interest income. According to Agency Theory (Jensen & Meckling, 1976) explains that ineffective management in managing credit risk can lead to an increase in NPL, which ultimately reduces bank profitability. Non-performing loans hinder interest payments by debtors, so that bank interest income decreases, an increase in credit loss provisions (CKPN) increases operational costs, which ultimately reduces net profit and causes a decrease in ROA.

Therefore, effective credit risk management is a key factor in maintaining banking profitability. This is in line with research conducted(Rinovah, 2022; Ruvo & Riviera, 2017; Putri, et all, 2018; Sari & Endri, 2019; Bukian and Sudhiarta, 2016).

Operational Efficiency has a negative impact on Profitability

The test results state that there is a significant influence between the BOPO variable and ROA. BOPO is a ratio that describes the operational efficiency of a bank which is calculated by comparing operational costs with operational income. Simply put, BOPO measures how much the bank spends to generate operational income.

According to the Market Efficiency Theory, companies that are more efficient in managing costs will tend to have better performance, including in terms of profitability. By optimizing BOPO, banks can increase net profit and increase ROA. In general, operating efficiency has a negative relationship with ROA, meaning that the higher the operating efficiency (the lower the BOPO ratio), the higher the bank's profitability (ROA increases). If the Bank can reduce operating costs, the profit margin will increase, which has a positive impact on ROA.

This is in line with research conducted(Komarawati, 2021; Putri, et all, 2018; Kristina, 2020; Husaeni, 2017; Juwita, 2018; Firmanilla, 2023; Yuniari & Badjira 2019; (Rinovah, 2022; Ruvo & Riviera, 2017; Putri, et all, 2018; Sari & Endri, 2019; Bukian and Sudhiarta, 2016).

Optimal Liquidity has a positive effect on Profitability

The test results are:there is no significant influence between the variablesLDRon ROA. This may mean that changes in the loan to deposit ratio (LDR) do not have a significant or reliable impact on the company or bank's ability to generate profits based on its total assets, which may be caused by, among other things:n there isother factors that are more dominant in influencing profits than LDR.Each bank has a different strategy in managing liquidity and loans. Some banks may focus more on improving operational efficiency or reducing costs, which may be more

significant in increasing ROA than simply changing LDR. Banks with high liquidity levels, for example, having lots of cash or other current assets, may feel secure in meeting short-term obligations. However, too much liquidity can mean that the company is not allocating funds optimally to more profitable investments.

Holding too much cash or current assets can cause the company to miss out on higher profitability opportunities through investment or expansion. On the other hand, companies with low liquidity levels may be forced to find ways to tap their long-term assets to fund operations or expansion. Ideally, companies need to balance liquidity and profitability. Having enough liquidity to run day-to-day operations and weather financial uncertainties, but still using existing resources efficiently to generate long-term profits. The results of the study above are in line with the research conducted(Rinovah, 2022; Septiano, 2020; Kristina, 2020; HSari & Endri, 2019; Permatasari & Filianti, 2018; Firmanilla, 2023; Yuniari & Badjira 2019; (Rinovah, 2022; Ruvo & Riviera, 2017; Putri, et all, 2018; Sari & Endri, 2019; Bukian and Sudhiarta, 2016)However, this is contrary to the research results of Amene & Alemu (2019) which stated that liquidity and Bank Size significantly and positively affect bank performance (ROA, ROE and EVA).

The Role of Liquidity in Mediating the Effect of Capital Adequacy, Credit Risk and Operational Efficiency on Profitability

To test the significance of the mediation effect in a model using the Sobel Test, a significance value was produced for each variable (CAR, NPL and BOPO) with a value >0.05, so that in this study using the Sobel test/intervening test, it was produced that:

a. The LDR variable is not able to mediate the effect of CAR on ROA
b. LDR variable is not able to mediate the influence of NPL on ROA
c. The LDR variable is not able to mediate the effect of BOPO on ROA

This means that LDR does not function as a significant mediator in the relationship between the three factors and ROA. This means that LDR does not play an important role in transforming or strengthening the influence of CAR, NPL, and BOPO on ROA. Changes in CAR, NPL, and BOPO do not affect ROA through LDR, or in other words, LDR does not mediate the relationship. This is due to, among other things, other factors (such as management quality or investment strategy) that are more influential in influencing bank profitability than LDR.

The results of this study are supported by previous studies. (Anisa & Anwar, 2021; Sari & Septiano, 2020 and Rinovah, 2022)However, this is contrary to Firmanila's research (2023), namely that LDR can mediate the effect of CAR on profitability.

5. Conclusion

The following are the findings of the testing and analysis results at National Private Commercial Banks listed on the IDX in the 2017-2022 period, as follows:

1. Capital adequacy has a positive and significant impact on liquidity.
2. There is no significant influence between Credit Risk and liquidity
3. Operational efficiency has a significant impact on liquidity.
4. There is no significant influence between capital adequacy and profitability.
5. Credit Risk has a significant impact on Profitability
6. Operational Efficiency has a significant effect on the Profitability variable
7. There is no significant influence between liquidity and profitability.
8. Liquidity is unable to mediate the effect of capital adequacy on profitability.
9. Liquidity is unable to mediate the effect of credit risk on profitability.
10. Liquidity is unable to mediate the effect of operational efficiency on profitability.

References

Abiola, I., & Olausi, A.S. (2014). The Impact Of Credit Risk Management On The Commercial Banks Performance In Nigeria. International Journal Of Management And Sustainability, 3(5), 295–306.

Achmad, A., & Kristijadi, E. (2021). The Effect of Credit Risk on Capital with Efficiency as an Intervening Variable. Journal Of Business And Banking, 10(2), 213–231.

Agbeja, O., Adelakun, O. J., & Olufemi, F. I. (2015). Capital Adequacy Ratio And Bank Profitability In Nigeria: A Linear Approach. International Journal Of Novel Research In Marketing Management And Economics, 2(3), 91–99.

Agustini, NLP, Wiagustini, NLP, & Purbawangsa, IBA (2017). The Effect of Capital Adequacy and Credit Risk on Profitability: Liquidity as a Mediator in Rural Credit Banks in Badung Regency. E-Journal of Economics and Business, Udayana University, 6(2), 2161–2192.

Amene, TB, & Alemu, GA (2019). Determinants Of Financial Performance In Private Banks: A Case In Ethiopia. Full Length Research Paper, 13(9), 291–308.

Astrini, KS, Suwendra, IW, & Suwarna, IK (2019). The Effect of CAR, LDR, and Bank Size on NPL in Banking Institutions Listed on the Indonesia Stock Exchange. Bisma: Journal of Management, 4(1), 34–41.

Barus, AC, & Erick. (2016). Analysis of Factors Affecting Non Performing Loans at Commercial Banks in Indonesia. Jurnal Wira Ekonomi Mikroskil: Jwem, 6(2), 113–122.

Bukian, NMWP (2016). The Effect of Asset Quality, Liquidity, Profitability and Operational Efficiency on Capital Adequacy Ratio. E-Journal of Management Unud, 5(2), 1189–1221.

Chanaba, J. C. (2020). Impact Of Credit Risk In Profitability Ratios On Commercial Banks In Ecuador. La Jolla, California.

Firmanila, F. (2023). The Effect of Capital Adequacy, Credit Risk, and Operational Efficiency on Profitability with Liquidity as an Intervening Variable at Regional Development Banks in Indonesia. Indonesian Journal of Strategic Management, 6(1), 13–27.

Hafiz, MS, Radiman, SM, & Jufrizen. (2019). Analysis of Determinant Factors of Return on Assets in State-Owned Banks Listed on the Indonesia Stock Exchange. Journal of Management and Finance, 8(2), 107–122.

Haryanto, S. (2016). Determinants of Bank Capital Through Profitability, Risk, Company Size, Efficiency and Asset Structure. Journal of Economics and Business, 19(1), 117–138.

Jannati, NB, & Budiarti, L. (2022). The Effect of Credit Distribution on the Profitability of Public Banks During the Pandemic with Credit Risk as a Moderating Variable. Menara Ilmu, 15(1), 76–89.

Jensen, M. C., & Meckling, W. H. (1976). Theory Of The Firm: Managerial Behavior, Agency Cost And Ownership Structure. Journal Of Financial Economics, 3(4), 305– 360.

Juwita, S., Raga, PDJ, Prasetyo, FI, & Rimawan, E. (2018). Effect Of Car (Capital Adequacy Ratio), Bopo (Operational Costs On Operational Revenues) And Ldr (Loan To Deposit Ratio) To Roa (Return On Assets) At Bank Pasar Bogor City. International Journal Of Innovative Science And Research Technology, 3(6), 305–309.

Kristina. (2020). The Influence of Capital Adequacy Ratio, Operating Costs on Operating Income, and Loan to Deposit Ratio on Return on Assets (Empirical Study of Banking Sub-Sectors Registered on the IDX in 2015-2018). Muhammadiyah University of Surakarta.

Kusuma, EC, & Haryanto, AM (2017). Analysis of the Influence of Bank Performance Variables (CAR, ROA, BOPO and LDR), as well as Credit Growth and Credit Quality on Non Performing Loans (NPL). Diponegoro Journal of Management, 5(4), 108–120.

Martono. (2002). Banks and Other Financial Institutions. Yogyakarta: Ekonosia.

Mendoza, R., & Rivera, J. P. R. (2017). The Effect Of Credit Risk And Capital Adequacy On The Profitability Of Rural Banks In The Philippines. Scientific Annals Of Economics And Business, 64(1), 83–96.

Nugrahanti, P., Tanuatmodjo, H., & Purnamasari, I. (2018). The Effect of Capital Adequacy on Profitability in Islamic Commercial Banks. Journal of Business Management Education (Jbme), 3(3), 136–144.

Paramita, EA (2021). The Effect of Liquidity, Asset Quality, Market Sensitivity and Efficiency on Profitability at National Private Foreign Exchange Commercial Banks. Perbanas Surabaya College of Economics.

Permatasari, GM, & Filianti, D. (2020). Analysis of Profitability Determinants in the Islamic Banking Industry for the Period 2011-2018 Auto Regressive Distributed Lag (Ardl) Approach. Journal of Islamic Economics Theory and Application, 7(6), 1102–1117.

Putri, NKAP, Wiagustini, LP, & Abundanti, NN (2018). The Influence of NPL, CAR and BOPO on Profitability at BPR in Denpasar City. E-Journal of Management Unud, 7(11), 6212 – 6238.

Qonitatillah, M. (2021). The Influence of Non Performing Loan (NPL), Liquidity, Profitability, Operational Efficiency and Sensitivity to the Capital Adequacy Ratio (Case Study of Banks Listed on the Indonesia Stock Exchange 2017-2019. Islamic University of Malang.

Rinofah, R., Sari, PP, & Widyastuti, ML (2022). The Effect of Capital Adequacy and Credit Risk on Profitability in Banking with Liquidity as an Intervening Variable. E-Jurnal Ecobisma: Journal of Economics, Business and Management, 9(1), 101–117.

Sari, FN, & Endri, E. (2019). Determinants Of Return On Assets (Roa) On Conventional Banks Listed On Indonesian Stock Exchange (Idx) Period 2013 - 2017. Iosr Journal Of Business And Management (Iosr-Jbm), 21(4), 52–62.

Sari, L., & Septiano, R. (2020). Effects Of Intervening Loan To Deposit Ratio On Profitability. Journal Of Accounting And Financial Management, 1(2), 239–252.