湖南大学学报（自然科学版）
Journal of Hunan University (Natural Sciences)

第 50 卷 第 2 期
2023 年 2 月

Available online at http://jonuns.com/index.php/journal/index

Vol. 50 No. 2
February 2023

Open Access Article

https://doi.org/10.55463/issn.1674-2974.50.2.10

Factors Influencing Non-Performing Loans: An Empirical Study on Commercial Banks in Indonesia

Taswan, Listyorini Wahyu Widati, Arief Himmawan Dwi Nugroho, Bambang Sudiyatno*

Department of Management, Universitas Stikubank, Semarang, Indonesia

* Corresponding author: bsud@edu.unisbank.ac.id

Received: December 6, 2022 ▪ Review: January 2, 2023 ▪ Accepted: February 13, 2023 ▪ Published: February 27, 2023

Abstract: This study examines the factors that determine non-performing loans at commercial banks listed on the Indonesia Stock Exchange (IDX). The research variables used are non-performing loans as the dependent variables, with return on assets, net interest margin, loan-to-deposit ratio, and bank size as independent variables. To test the effect of return on assets, loan-to-deposit ratio, net interest margin, and bank size on non-performing loans, 25 commercial banks were taken with 144 N samples. We used the purposive sampling method and analyzed the data using path analysis. The results of the analysis show empirical evidence that the net interest margin has a positive effect on return on assets, while the loan-to-deposit ratio and bank size have no effect. Return on assets and loan-to-deposit ratio have a negative effect on non-performing loans, while net interest margin and bank size have no effect. The novelty of this research is to place the return on assets as an intermediate variable that plays a double role as the dependent and independent variable. By placing ROA as the mediating variable, it is found that the effect of net interest margin on non-performing loans is not a direct effect but through ROA.

Keywords: bank size, loan-to-deposit ratio, net interest margin, non-performing loan, return on asset.

影响不良贷款的因素：对印度尼西亚商业银行的实证研究

摘要：本研究考察了决定在印度尼西亚证券交易所(IDX)上市的商业银行不良贷款的因素。研究变量以不良贷款为因变量，以资产收益率、净息差、存贷比、银行规模为自变量。为了检验资产收益率、存贷比、净息差和银行规模对不良贷款的影响，选取了 25 家商业银行的 144 否个样本。我们使用有目的的抽样方法，并使用路径分析来分析数据。分析结果表明，实证证据表明净息差对资产收益率有正向影响，而存贷比和银行规模没有影响。资产收益率和存贷比对不良贷款有负面影响，而净息差和银行规模没有影响。本研究的新颖之处在于将资产回报率作为一个中间变量，它起着因变量和自变量的双重作用。将资产回报率作为中介变量，发现净息差对不良贷款的影响不是直接的，而是通过资产回报率。

关键词：銀行規模，存貸比，淨息差，不良貸款，資產收益率.

1. Introduction

The global economic crisis during the Covid-19 pandemic has not yet ended, and the 2019-2021 crisis has had a huge impact on global economic activity, including the banking sector. The banking sector as a pillar of economic growth must be able to encourage and create opportunities for the public to obtain loans and convince the public to save their funds in the form of savings, time deposits, and demand depositsFor this reason, banks must gain high trust from the public so that banks can conduct their functions as financial intermediary institutions that play a role in increasing economic growth. Economic growth can be achieved through investment activities, so banks as financial intermediaries must encourage investment so that economic growth increases. As stated by Alhassan and Asare [1], which states that in any economy, financial intermediation by banks encourages investment and increases productivity. With investment activities and increased productivity, the community's economic activities will increase and have an impact on increasing economic growth.

Commercial banks as financial intermediary institutions are responsible for increasing cash flow to the capital market through mobilizing public funds stored in banksTo create a stable banking system, an efficient financial intermediary is needed to channel excess public funds into investment to encourage economic expansion [2]. Disbursing funds to the public during the Covid-19 pandemic is not an easy problem because global economic conditions are experiencing a crisis. Banks must still be guided by the principle of prudence, lest the funds channeled in the form of credit fail to pay off from their borrowers, causing a liquidity crisis. Banks must maintain non-performing loans (NPL) in accordance with the provisions stipulated by Bank Indonesia as the highest authority for Indonesian banking, namely, a maximum of 5%. Banks must be able to maintain non-performing loans (NPL) of less than 5% so that non-performing loans do not become a problem that can disrupt financial market stability and the survival of the banking industry.

The global economic crisis because of the Covid-19 pandemic and the Russia – Ukraine war caused an economic tragedy that was felt by almost all countries in the world, including Indonesia. This tragedy could threaten the default of loan repayments by investors to banks, and this problem cannot be tolerated because it will impact increasing bank non-performing loans (NPLs). These non-performing loans are a pressure for banks, the public, investors, and economic activity in general. Banking will be negatively affected by an increase in non-performing loans (NPL), namely, a decrease in bank income. Therefore, banks must be more selective in providing loans to reduce credit risk because of the possibility of bad credit or default on the part of the borrowers. Thus, credit risk becomes a challenge as well as an important commercial function for banks because it impacts the continuity of bank operational activities.

Issues related to credit risk or non-performing loans (NPL) include bank-specific internal factors, and external or macroeconomic factors. Long et al. [3] in their research in Vietnam used the previous year's NPLs, bank size, return on assets (ROA), capital structure, and credit growth as bank internal factors. While those related to macroeconomics use the inflation rate, the growth rate of gross domestic product, and the interest rate. However, in this study, only a few banks internal variables were used by placing return on assets (ROA) as a mediating variable in influencing non-performing loans (NPL). The selection of bank internal factors is conducted with the consideration that the bank's internal factors can be controlled by management, and there are still differences in empirical findings from previous research results. Therefore, investigations into bank internal factors are still relevant and important for further study by modifying the model used.

The main income of the bank is from interest on loans given to the public or credit customers, so that if there is bad credit or non-performing loans (NPL) that are out of control, it will not only impact decreasing bank income but will also impact the entire banking system and economy. High non-performing loans (NPLs) will hamper the work of banks, especially in relation to refinancing customers who have defaulted on their payments because customers who have defaulted will fall into the category of low productivity circles. Such customers will not receive priority in bank financing, because banks will potentially experience high credit risk if banks are forced to finance such customers. In this case, the bank will provide more stringent requirements to reduce the occurrence of default on loans provided, so that credit risk can be reduced.

Several studies related to non-performing loans (NPL) still produce different empirical evidence, and these differences can occur due to factors that have a direct and indirect influence on non-performing loans (NPL). The results of research from Morakinyo and Sibanda [4] and Long et al. [3] found empirical evidence that return on assets (ROA) has a negative effect on non-performing loans (NPL), while Khan et al. [5] found no such effect. Long et al. [3] in their research found that size has a positive effect on non-performing loans (NPL), while Dao et al. [6] did not find this effect. Research from Khafid et al. [7] found no empirical evidence of the effect of net interest margin (NIM) on non-performing loans (NPL). Meanwhile, research from Kartikasary et al. [8] found that the loan-to-deposit ratio (LDR) had a positive effect on non-performing loans (NPL), but Mahyoub and Said [9] did not find this effect. Therefore, the

problem of this research is explored from the existence of research gaps in previous research, by identifying the factors that influence non-performing loans (NPL), both those that have a direct or indirect effect.

2. Literature Review

2.1. Basic Concepts of Non-Performing Loans

Non-performing loans (NPL) are defined by Bank Indonesia as substandard, doubtful, and loss loans. Thus, a non-performing loan refers to a condition where the debtor cannot pay his obligations to the bank in the form of installments promised at the time of the credit agreement, and the debtor cannot fulfill his schedule for 90 days or more. Provisions regarding non-performing loans have been regulated through Bank Indonesia Regulation Number 23/2/PBI/2021. Regulations regarding the NPL/NPF ratio requirement, namely that the NPL/NPF ratio for total credit/financing on a gross basis is less than 5%.

Badar and Javid [10] explained that the gap between assets and liabilities creates liquidity risk for banks, which worsens the bank's overall credit rating, including its image or good intentions. A bad credit rating will increase non-performing loans, which are often used as an indicator of a bank's health. A high non-performing loan indicates a low level of soundness of a bank because a bank can experience liquidity difficulties. Non-performing loans also impact bank income; the maturity gap between assets and liabilities is a major component of a bank's business, thereby threatening the efficiency of the bank. If this condition is not addressed immediately, it could impact systemic risks to the banking industry, which could lead to a national financial crisis.

2.2. Effect LDR on ROA and NPL

Sources of bank funds originating from the public in the form of demand deposits, savings, and deposits as well as other sources of funds will be channeled by banks to the public in the form of credit. The ratio between the total volume of credit extended by banks and the total receipt of funds from various sources is called the loan-to-deposit ratio (LDR). The loan to deposit ratio is used to measure a bank's liquidity risk, the greater the loan to deposit ratio, the greater the bank's risk. Banks will not distribute all their funds in the form of credit because banks must maintain their liquidity position. If the amount of funds disbursed by banks for excessive credit is not balanced with the amount of public deposit funds that enter, the bank can experience a liquidity crisis. On the one hand, banks must maintain their liquidity, and on the other hand, banks must increase income from their lending business.

In line with the increase in the loan-to-deposit ratio, the bank's income will also increase, and this increase in income will impact increasing bank profitability or return on assets (ROA). An increase in the loan-to-deposit ratio also can cause problem loans, especially if the loan disbursement is not accompanied by strict conditions, and this will increase non-performing loans. However, if an increase in the loan-to-deposit ratio is accompanied by effective and efficient credit management, an increase in LDR will not be followed by an increase in NPL. Previous research related to the loan-to-deposit ratio and return on assets was conducted by [11-15]. Meanwhile, research related to the loan-to-deposit ratio and non-performing loans was conducted by [2, 4, 7-9].

H_1: The loan-to-deposit ratio has a positive impact on ROA.

H_2: Loan to deposit ratio influences NPL.

2.3. Effect NIM on ROA and NPL

The bank's main income is from loan interest income that is distributed to borrowers. The ratio of net interest income to average earning assets is called the net interest margin (NIM). Therefore, this ratio is used to measure the ability of bank management to manage its productive assets to generate net income. Net interest income is calculated from the difference between interest income and interest expense paid to depositors. The greater the difference between the loan interest charged to customers and the interest on deposits paid to customers, and this condition has the potential for greater bad loans, which impacts increasing non-performing loans (NPL).

Previous research regarding the effect of net interest margin on return on assets was carried out by [11-15]. Meanwhile, research related to the relationship between net interest margin and non-performing loans was conducted by Khafid et al. [7].

H_3: Net interest margin has a positive impact on ROA.

H_4: Net interest margin has a positive impact on NPL.

2.4. Effect Bank Size on ROA and NPL

The size of the bank reflects the scale of the bank's business, as indicated by the size of the assets owned by the bank. Large-scale banks have large assets and can form a differentiated portfolio of assets to be channeled in the form of credit to borrowers. Banks with large business scales can also benefit from the economies of scale owned by these banks because with these large assets, the bank can expand operations, which can reduce the average cost of operations. Low operating costs allow banks to extend loans at lower interest costs than competitors, thereby increasing the demand for credit. From the perspective of liquidity risk and credit risk, banks with large-scale businesses are also considered capable of meeting short-term and long-term obligations to avoid the possibility of a

liquidity crisis.

The results of previous research regarding the relationship between bank size and return on assets (ROA) were conducted by Parhusip and Cakranegara [14] who found a positive effect, while Nguyen et al. [16] found empirical evidence of a negative influence. While the results of research from Long et al. [3] and Islam et al. [17] found empirical evidence of a positive effect between bank size on non-performing loans, and research results from Chalid et al. [18] found a negative effect, but the results of research from [6, 9, 19-21].

H_5: Bank size has a positive impact on ROA.

H_6: Bank size has a significant effect on NPL.

2.5. Effect ROA on NPL

Return on assets (ROA) shows the ability of a bank to generate profits by using all the assets it has. This ratio is also known as the profitability ratio, which is used to measure a bank's performance during a certain period. The size of this ratio depends on how much bank income is generated using the assets it owns. The greater the bank's income, the greater the return on assets, and this shows that bank management works effectively and efficiently. Research related to the relationship between return on assets (ROA) and non-performing loans [3, 4, 6, 20, 22] found empirical evidence that return on assets (ROA) has a negative effect on non-performing loans (NPL). Meanwhile, the results of research [5] and [8] did not find this effect.

H_7: Return on assets has a negative impact on NPL.

3. Methods of Research

3.1. Data Collection

This research is an applied study of 25 commercial banks operating in Indonesia during the 2016-2021 period with a total of 144 N samples. The selection of commercial banks as the research object is based on the consideration that commercial banks play an important role in the national economic system, so that if non-performing loans occur at commercial banks, they can have a systematic impact on the national economy. Thus, the limitation of the application of the results of this study only occurs in conventional commercial banks.

Sampling using the purposive sampling method, for that sample is selected based on certain considerations according to the needs of researchers. Data are taken from secondary data sources of commercial bank annual financial reports published through the Indonesia Stock Exchange (IDX). The research variables to test the hypothesis are calculated from financial data derived from the bank's financial statements.

3.2. Variable Measurement

Calculations for determining and measuring research variables are presented in Table 1.

Table 1 Calculations of the variable measurement

Variables	Required data	Previous studies
NPL	Total bad debts/Total loans	[4, 7, 23]
ROA	Net profits/Total asset	[4, 5, 24]
NIM	Interest income/Average earning assets	[7, 12]
Bank Size	Natural logarithm of total assets	[7, 12]
LDR	Loans provided/Total funds received	[2, 7]

3.3. Data Analysis

Data analysis to test the effect of loan to deposit ratio, net interest margin, bank size, on return on assets, and test loan to deposit ratio, net interest margin, bank size, and return on assets on non-performing loans is used using 2 regression equations. The multiple regression analysis model is formulated as follows:

$$ROA = \alpha + \beta_1 LDR + \beta_2 NIM + \beta_3 SIZE + e \quad (1)$$

$$NPL = \alpha + \beta_1 LDR + \beta_2 NIM + \beta_3 SIZE + \beta_4 ROA + e \quad (2)$$

where:
ROA - return on assets;
LDR - loan-to-deposit ratio;
NIM - net interest margin;
SIZE - bank size;
NPL - non-performing loan;
α - constanta;
e – error.

3.4. Sobel Test

Return on assets (ROA) has a dual role, namely, as the dependent variable and independent variable. This role places return on assets as an intervening variable that will mediate the effect of the loan deposit ratio, net interest margin, and bank size on non-performing loans. The mediation test is carried out using the Sobel test, if the z test and value of the $z > 1.96$ with a significance of 5%, then the return on assets act as a mediating variable.

4. Results

4.1. Descriptive Statistics

Table 2 provides an overview of the descriptive statistics of the research variables used in the model.

Table 2 Descriptive statistics

Variables	N	Minimum	Maximum	Mean	Std. Deviation
NPL	144	0.00	5.65	2.63	1.19
ROA	144	0.07	4.22	1.76	1.06
LDR	144	29.67	163.00	84.37	20.51
NIM	144	0.47	12.00	5.23	1.76
SIZE	144	28.49	415.40	49.47	61.85
Valid N (listwise)	144				

Table 2 shows that non-performing loans have a mean of 2.63 with a standard deviation of 1.19. These results show that non-performing loans fluctuate low among commercial banks operating in Indonesia, although there are banks whose non-performing loans are greater than 5.00. The minimum non-performing loan is 0.00 and the maximum is 5.6; in this case, there are banks whose non-performing loans exceed the limit set by Bank Indonesia of 5 percent. Return on assets (ROA) varies in the range of 0.07 minimum ROA to 4.22 maximum ROA with a mean of 1.76 and a standard deviation of 1.06. Thus, the return on assets fluctuates a bit high among commercial banks operating in Indonesia. The minimum loan-to-deposit ratio (LDR) is 29.67 and the maximum is 163.00 with a mean of 84.37 and a standard deviation of 20.51. Therefore, the loan-to-deposit ratio fluctuates less because the standard deviation is much lower than the mean. The results of the descriptive statistics show that several banks violate the NPL and LDR provisions, namely 4 banks have an NPL greater than 5 percent and 9 banks have an LDR greater than 110 percent. The minimum net interest margin is 0.47 and the maximum is 12.00 with a mean of 5.23 and a standard deviation of 1.76. Thus, the net interest margin fluctuates low, ranging from 0.47 percent to 12.00 percent. The minimum bank size is 28.49 and the maximum is 415.40 with a mean of 49.47 and a standard deviation of 61.85. The size of the bank fluctuates very much because the standard deviation value is much greater than the mean value, which means that the value of bank assets differs greatly among commercial banks operating in Indonesia.

4.2. Regression Analysis

This study investigates the effect of loan-to-deposit ratio, net interest margin, bank size, and return on assets on non-performing loans, both direct and indirect effects. The analysis was carried out using 2 multiple regression equation estimators with the SPSS program. Table 3 shows the results of regression Equation 1, analyzing the effect of the loan-to-deposit ratio, net interest margin, and bank size on return on assets.

Table 3 Regression Equation 1

	Unstandardized	Coefficients		
Model	**B**	**Std. Error**	**t**	**Sig-t**
(Constanta)	-0.517	0.347	-1.492	0.138
LDR	0.003	0.003	0.976	0.331
NIM	0.361	0.041	8.850	0.000***
SIZE	0.002	0.001	1.837	0.068*

Notes: Dependent variable - ROA; *** p < 0.01; ** p < 0.05; * p < 0.1

From Table 3, the results of the analysis show that the loan-to-deposit ratio has no effect on return on assets. The net interest margin has a positive effect at a significant level of less than 1 percent, while bank size has a positive effect at a significant level of less than 10 percent. Thus, hypothesis 1 is rejected, and the loan-to-deposit ratio has no impact on increasing the return on assets. While hypothesis 3 is accepted, the net interest margin can significantly increase the return on assets. Hypothesis 5 is also rejected; bank size has no impact on return on assets.

Table 4 shows the results of regression equation 2, analyzing the effect of the loan-to-deposit ratio, net interest margin, bank size, and return on assets on non-performing loans.

Table 4 Regression Equation 2

	Unstandardized	Coefficients		
Model	**B**	**Std. Error**	**t**	**Sig-t**
(Constanta)	3.751	0.455	8.245	0.000
ROA	-0.490	0.110	-4.453	0.000
LDR	-0.010	0.005	-2.105	0.037
NIM	0.088	0.066	1.330	0.186
SIZE	0.002	0.002	1.262	0.209

Table 4 presents the results of the second regression equation, which shows empirical results that the loan-to-deposit ratio has a negative effect at a significance of less than 5 percent. An increase in the loan-to-deposit ratio impacts a significant decrease in non-performance loans, so hypothesis 2 is accepted. The net interest margin has a positive but not significant effect, and an increase in NIM does not an increase in non-performing loans, so hypothesis 4 is rejected. Likewise, bank size has a positive but not significant effect, so hypothesis 6 is rejected. Return on assets has a negative effect on a significance of less than 1 percent, so hypothesis 7 is accepted, the higher the return on assets, the lower the non-performing loan.

From Table 2 and Table 3 the regression results show that the value of the regression coefficient of LDR to ROA is 0.003 and to NPL is -0.010 with standard errors of 0.003 and 0.005. The significance value of LDR to ROA is 0.33 (not significant) and to NPL is 0.037 (significant), and the significance value of ROA to NPL is 0.000 (significant). The results of the Sobel test calculation show that the value of Z = -0.98 so that the value of Z > -1.96 means that ROA cannot mediate the relationship between the influence of LDR on NPL. Thus, the effect of LDR on NPL is a direct effect.

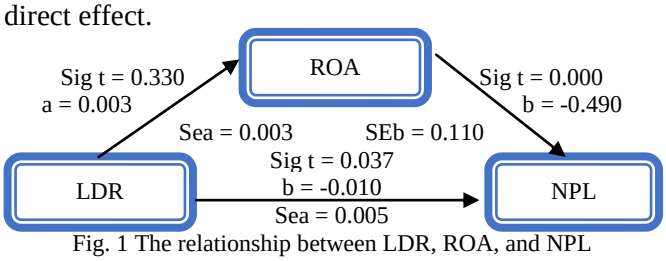

Fig. 1 The relationship between LDR, ROA, and NPL

The regression results shown in Table 3 and Table 4 also show that the NIM regression coefficient for ROA is 0.361 and for NPL is 0.088 with standard errors of 0.041 and 0.066. The significance value of NIM to

ROA is 0.000 (significant) and to NPL is 0.186 (not significant), and the significance value of ROA to NPL is 0.000 (significant). The results of the Sobel test calculation show that the value of Z = -3.97 so that the value of Z < -1.96, is statistically significant so that ROA can mediate the relationship between the effect of NIM on NPL. In the path analysis, the influence of NIM on NPL is absolutely an indirect effect; this effect is mediated through ROA so that ROA plays a role in mediating the effect of NIM on NPL. The greater the NIM, the greater the ROA, and the greater the ROA, the lower the NPL.

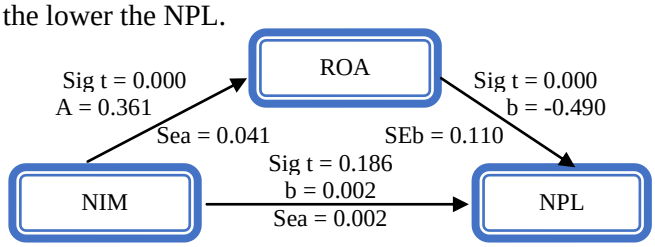

Fig. 2 The relationship between NIM, ROA, and NPL

According to tables 3 and 4, the regression results show that the regression coefficient value of SIZE on ROA is 0.002 and on NPL is 0.002 with standard errors of 0.001 and 0.002. The significance value of SIZE to ROA is 0.068 (significant at a level of less than 5 percent) and to NPL is 0.209 (not significant), and the significance value of ROA to NPL is 0.000 (significant). The results of the calculation of the Sobel test show that the value of Z = -1.82 so that the value of Z > -1.96 means that ROA cannot mediate the relationship between the influence of SIZE on NPL because the Sobel test results show that the value of Z > -1.96 is not statistically significant.

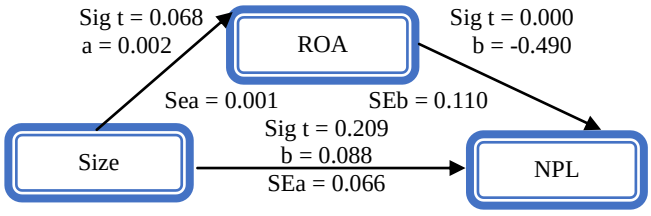

Fig. 3 The relationship between SIZE, ROA, and NPL

5. Discussion

The results of this study did not find empirical evidence of the influence of the loan-to-deposit ratio on return on assets in commercial banks operating in Indonesia, so that it is not in accordance with the concept of lending to earn interest as the main source of bank income. The results of this study do not support research from Soares and Yunanto [11], Alaziz [12], and Puspitasari et al [15], which found LDR to have a negative effect on ROA. However, this is in line with research findings from Liyana & Indrayani [13], and Parhusip and Cakranegara [14] who did not find this effect.

Regarding the relationship between net interest margin (NIM) and return on assets, the results of this study found empirical evidence that net interest income has a positive effect on return on assets. This finding is consistent with the concept of a bank's income system, the greater the loan interest income, the higher the level of bank profitability (ROA). This study supports research findings from Soares and Yunanto [11], Liyana and Indrayani [13], Puspitasari et al. [15], and Parhusip and Cakranegara [14]. However, this is not in line with the empirical results of research from Alaziz [12] who found empirical evidence of a negative effect of NIM on NPL.

Another empirical finding from this research is that bank size has a positive effect on ROA at a significance of 0.068 or less than 10 percent. Although statistically with a significance of 5 percent the hypothesis of the effect of bank size on ROA is rejected, this study provides empirical evidence that bank size has a positive effect at a significance of less than 10 percent. The findings of empirical evidence from this study support the empirical findings of Parhusip and Cakranegara [14] who found a positive effect, but do not support the empirical findings of Nguyen et al. [16] who found a negative effect of bank size on ROA.

The results of this study also provide empirical evidence that the loan-to-deposit ratio has a negative effect on non-performing loans. The findings of this study support the empirical findings of research from Rachman et al [22], Dao et al [6], and Long et al [3] that found that credit growth has a negative effect on NPL, as well as research from Chalid [18], which found FDR-negative effect on NPL. However, the empirical findings from this study do not match the results of research from Firmansyah [19], Khafid et al. [7], Kartikasary et al [8], and [2], which found a positive effect, while Morakinyo and Sibanda [4] who did not find this effect. Net interest margin has no impact on non-performing loans, so NIM is not a determining factor for NPLs. The results of this study support research from Khafid et al [7], which also found no empirical evidence of the effect of NIM on NPL.

Another finding from this study is that bank size has no effect on non-performing loans, so large-scale banks do not necessarily have high NPLs. The results of this study are in accordance with research from Firmansyah [19], Prawira and Wiryono [20], Dao et al [6], Mahyoub & Said [9], and Ersoy [21], which also found no empirical evidence of the effect of bank size on NPLs. Meanwhile, the results of research from Long et al [3] and Islam et al. [17] found a positive effect, while Chalid [18] found a negative effect.

Regarding return on assets, the results of this study provide empirical evidence that return on assets has a negative effect on non-performing loans. The findings of empirical evidence from this study support the results of research from Morakinyo & Sibanda [4],

Rachman et al. [22], Dao et al. [6], Prawira and Wiryono [20], and Long et al. [3], which also found a negative effect. Meanwhile, the research results from Kartikasary et al. [8] and Khan et al. [5] did not find empirical evidence of the effect of ROA on NPL.

The novelty of this research is to place the return on assets as an intermediate variable that plays a double role as the dependent and independent variable. Return on assets as a mediating variable relates the effect of net interest margin to non-performing loans. By placing ROA as the mediating variable, it is found that the effect of net interest margin on non-performing loans is not a direct effect but rather through ROA.

6. Conclusions and Implications

6.1. Conclusion

The findings of this study are that the loan-to-deposit ratio and return on assets have a direct effect on non-performing loans. Meanwhile, the net interest margin has an indirect effect, but through the mediation of return on assets, return on assets is central to determining non-performing loans. Bank size has a significant effect on return on assets at a significant level of less than 10%, but has no effect on non-performing loans. Thus, the loan-to-deposit ratio and return on assets are internal factor variables that need to be considered to reduce the possibility of credit risk occurring.

An important finding of this study is that the loan-to-deposit ratio has no effect on return on assets but has a direct effect on non-performing loans. This condition must be addressed by bank management in deciding on credit expansion by establishing more stringent credit requirements to reduce the occurrence of bad loans, which will impact increasing non-performing loans. Based on the results of this analysis, it can be concluded that the loan to deposit ratio and return on assets are key variables that play an important role in influencing non-performing loans. Compared to previous studies, this study succeeded in identifying the role of return on assets in determining non-performing loans, namely, having an absolute role as an intermediate variable bridging the effect of net interest margin on non-performing loans.

6.2. Implications, Limitations, and Future Research

The implications of the findings of this study related to the management strategy in managing credit to minimize the occurrence of non-performing loans are the following.

First, banks must improve the quality of credit management. Bank management must focus on increasing the net interest margin by being more selective in extending credit to customers.

Second, banks must make a credit classification matrix based on credit ratings in accordance with the stipulated requirements, so that credit potential can be identified that can maximize the net in the interest margin to get special attention. Banks must also maximize the usage of assets owned to support the credit expansion to increase bank revenues while maintaining the bank's prudential principles.

Finally, banks must be able to improve bank performance (ROA) through increasing net interest margins, for this reason, banks must be more selective in lending. The important thing in suppressing the occurrence of non-performing loans is to minimize the occurrence of bad loans, which result in default, so that the loan selection process becomes a critical factor in lending.

This research is limited only to the use of internal data that are used as variables and included in the model, so that external factors are not represented, even though external factors such as inflation, interest rates, and economic growth are also important factors that can impact the chance of problem loans. This limitation results in relatively low R-square values, namely 37.20% for the first regression model and 16.10% for the second regression model. Therefore, in future research, it is recommended to include macrovariables originating from outside the bank, such as inflation, interest rates and economic growth. The extent to which these external variables affect non-performing loans, either directly or indirectly.

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