

Non-Performing Loans' Impacts on the Banking Industries' Loan Loss Provisions

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Abstract

Non-performing loans can impact the loan loss provisions of the banking industry. This study explored the moderating effect of foreign exchange rates (USD against Rupiah) on the influence of the capital adequacy ratio and interest rates on Non-Performing Loans. The sample of this research was collected from three banks: PT Bank Negara Indonesia (Persero) Tbk, PT Bank Rakyat Indonesia (Persero) Tbk, and PT Bank Mandiri (Persero) Tbk, for the period of 2013-2018. There were 72 data, 24 from each of the banks. The analysis was carried out using multiple linear regression and Sobel path analyses. The results showed that Capital Adequacy Ratio had a significant positive effect on Non-Performing Loans. Interest rates did not significantly affect Non-Performing Loans. Non-Performing Loans did not significantly affect Loan Loss Provision. Capital Adequacy Ratio had a significantly positive effect on Loan Loss Provision. Interest rates did not significantly affect Loan Loss Provision. Foreign exchange rates (USD against Rupiah) did not significantly moderate the positive effect of the Capital Adequacy Ratio on the Loan Loss Provision. USD exchange rates significantly moderated the negative effect of Non-Performing Loans on Loan Loss Provision. The interaction between the USD exchange rate and Non-Performing Loans negatively affected Loan Loss Provision. Foreign exchange rates did not significantly or positively moderate the effect of interest rates on Loan Loss Provision. Non-Performing Loans significantly mediated the positive effect of Capital Adequacy Ratio on the Loan Loss Provision. In other words, the positive effect of the Capital Adequacy Ratio on Loan Loss Provision is more positive when Non-Performing Loans increase, and vice versa. Non-Performing Loans did not significantly mediate the negative effect of interest rates on Loan Loss Provision, or the negative effect of interest rates on the Loan Loss Provision would be more negative when the Non-Performing Loans decreases, and vice versa.

Keywords: capital adequacy ratios, interest rates, non-performing loans, exchange rate

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We have no known conflict of interest to disclose.

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Non-Performing Loans' Impacts on the Banking Industries' Loan Loss Provisions

Credit is a financial facility that allows a person or business entity to borrow money to buy products. In practice, credit loans are usually stated in the form of a written agreement. In this case, the institution that usually distributes large amounts of credit is in the banking sector. Therefore, banking competition, especially lending, is getting tougher. The more advanced economic development certainly brings greater opportunities and risks, and one of the risks experienced in the banking world is credit risk. Effective credit disbursement is expected to be able to support development in various economic sectors such as the infrastructure sector, consumer sector, trade sector, food and beverage industry, agribusiness sector, and Micro and Small Enterprises sector (MSEs). Some time ago, OJK (Financial Services Authority) data showed that the ratio of Non-Performing Loans (NPLs) in the banking sector increased. In October 2017, the NPL was recorded at 2.96%, an increase from the previous month which was recorded at 2.93%. The NPL ratio is obtained from the total NPL divided by the total credit (Setiawan, 2017, 2018). To anticipate credit risk due to debtor default, banks are required to establish and set aside funds to cover the risk of loss on loans extended to customers. In this case, the bank must establish a Loan Loss Provision or LLP. One of the factors affecting the Loan Loss Provision is NPL which was stated by OJK was still increasing until the first semester of 2016 banking reserves. One of the reasons was the ratio of bad loans or gross NPL before the deduction of the relatively increasing reserves (Yudistira, 2016, 2018a, 2018b, 2018c).

Non-performing loan risk is influenced by several internal factors, some of which are the capital adequacy ratio (CAR), interest rates, and external factors such as the Rupiah exchange rate (Bank Indonesia, 2015). This will be transferred to loan interest rates which will reduce the customer's ability to pay. Therefore, banks must be careful in raising loan

interest rates so that they do not affect the NPL too much. The Rupiah exchange rate continued to weaken until it penetrated the Indonesian Rupiah (IDR) of 14,000 per dollar. The continued weakening of the Rupiah could affect bank debtors in terms of payment of debt installments which in turn affects the bank's NPL (Setiawan, 2018). As with credit in foreign currency, if the Rupiah exchange rate continues to weaken, it is feared that the installments of foreign currency debtors to banks could be disrupted. Paul Sutaryono, a banking observer, stated that if this situation continues, it will increase the ratio of NPL of loans in foreign currencies (Tiatmodjo, 2017). Wen (2017) in his research shows that interest rates have a significant and positive relationship with the ratio of Non-Performing Loans to total loans. The positive impact of interest rates on NPL reflects that higher interest rates make borrowers have to work hard to repay their loans, which leads to a default rate for higher loans and vice versa.

Based on the above description of the problem and the phenomenon, this study raised the question: "Do the foreign exchange rates moderate the effect of the capital adequacy ratio, and interest rate toward Non-Performing Loans that impact bank loan loss provision?" The objectives of this research were to examine and analyze the moderating effect of foreign exchange rates and the mediating effect of Non-Performing Loans on the effect of capital adequacy ratios, and the effect of interest rates on the reserve for impairment losses in the banking industry.

Literature Review

Capital Adequacy Ratio

Capital Adequacy Ratio (CAR) is the ratio of a bank's capital with its risk-weighted assets and current liabilities. It is decided by central banks and bank regulators to prevent commercial banks from taking excess leverage and becoming insolvent in the process (What

is 'Capital Adequacy Ratio', 2021). CAR can show the condition of bank assets that can still be covered by available bank equity. The higher the CAR, the better the condition of the bank. In other words, CAR is the ratio of bank performance to capital adequacy owned by banks to support assets that contain or generate risks, such as lending. The CAR formula is stated as the ratio of bank capital to total risk-weighted assets (What is 'Capital Adequacy Ratio', 2021).

Exchange Rate

According to Case et al. (2017), the exchange rate is the ratio at which two currencies are traded. It is the price of one country's currency in terms of another country's currency or the ratio at which two currencies are traded for each other. The decline in the domestic currency exchange rate reflects the declining role of the national economy; due to increased demand for foreign currency, if the domestic currency exchange rate strengthens, the performance in the money market shows improvement. An unstable exchange rate causes uncertainty in the business world, especially those directly related to foreign trade transaction activities, both through export and import mechanisms, both for the sale of goods and services and for the supply of raw or finished materials in the country.

Interest Rate

Interest rates can be interpreted as remuneration provided by banks based on conventional principles to customers who buy or sell their products (Kasmir, 2008). Interest rates are also the price that customers have to pay to the bank. Therefore, if there is an unreasonable increase in interest rates it will make it difficult for the business world as it will increase the company's burden and directly reduce the company's profit. The company can also experience difficulties in making loan payments to the bank which results in bad credit.

In general, it can be said that lower interest rates will increase economic growth due to the increased flow of funds (Sitanggang & Munthe, 2019).

Non-Performing Loans

Ammann (2001) defines credit risk as the possibility that a contractual counterparty does not meet its obligations as stated in the contract, thereby causing the creditor a financial loss. According to Hull (2018), credit risk is the risk that counterparties in loan transactions and derivative transactions will default. Credit risk is present in all the activities of counterparties, issuers, and browsers. Credit risk arises from the possibility that loans from banks cannot be repaid because not all debtors can pay their credit installments on time; therefore there is a classification of credit collectability in banking. According to Bank Indonesia Regulation (Peraturan Bank Indonesia/PBI), PBI No. 17/11/PBI/2015, the credit risk ratio in this study is interpreted as Non-Performing Loans (problem loans) because problem loans can measure the extent to which Non-Performing Loans can be covered with a bank's productive assets. According to PBI No. 17/11/PBI/2015, the ratio of Non-Performing Loans to total loans refers to the ratio between the total number of loans with less-than-current, doubtful, and bad quality loans to total loans, and under BI regulations, a bank should keep its problem loans below 5%.

Loss Loan Provision

According to the revision of PSAK 55 of 2006, the term PPAP was changed to Loss Loan Provision (LLP) in the Indonesian language known as *Cadangan Kerugian Penurunan Nilai* and abbreviated into LLP. In the Loss Loan Provision, the formation and provision of funds are assessed from the results of the debtor's credit evaluation carried out by the bank, and usually, the results of the evaluation of the debtor's credit are based on the policy decisions of each bank in establishing reserves and credit. According to Bank Indonesia

Regulation No. 14/15/PBI/2012, the allowance for impairment losses is: “an allowance is made if the carrying amount of a financial asset after impairment is less than the initial carrying amount” (Bank Indonesia, 2012). The calculation of loan loss provision/LLP is more complicated, but the credit review can be detailed for each debtor so that credit control can be carried out effectively. The control is expected to reduce the occurrence of credit risk in banks.

Thinking Framework and Hypothesis Development

The Influence of Capital Adequacy Ratio on Non-Performing Loans

The capital adequacy ratio (CAR) is a capital ratio that shows the ability of a bank to provide funds for business development as well as for accommodating the risk of loss caused by bank operations so that CAR can show the extent to which a bank's capital capacity is to bear the risk of credit failure. The effect of the capital adequacy ratio on Non-Performing Loans is also obtained from two previous studies by Wood and Skinner (2018) in Barbados and Vatansever and Hepşen (2013), where the value of the CAR ratio has a positive influence on the value of Non-Performing Loans. The hypothesis H1 is postulated as follows:

H1: Capital Adequacy Ratio has a positive effect on the level of Non-Performing Loans.

The Influence of Interest Rates on Non-Performing Loans

Under certain conditions, a bank is required to raise interest rates. When interest rates rise, it will affect the demand for credit loans to banks and also especially affect customers who have taken credit loans. Customers find it difficult to pay credit because high-interest rates will increase the value of Non-Performing Loans. The effect of interest rates on Non-Performing Loans is also obtained from four previous studies by Wood and Skinner (2018), Adeola and Ikpesu (2017), Berti et al., (2017), and Wen (2017). The studies showed a positive

effect on the level of Non-Performing Loans. But the research results of Žiković et al. (2015) found that interest rates have mixed implications on Non-Performing Loans for both categories depending on the duration of the observation period. In the long term, a positive relationship was found between interest rates and the ratio of Non-Performing Loans. In the short term, a negative relationship was found between interest rates and the ratio of Non-Performing Loans. So that the hypothesis H2 is postulated as follows:

H2: Interest rates have a positive effect on the level of Non-Performing Loans.

The Influence of Non-Performing Loans on Loan Loss Provision

Non-Performing Loans in a bank is the value of the allowance for funds that must be made by a bank to anticipate credit risk due to debtors experiencing problems in credit payments. The effect of Non-Performing Loans on loan loss provision was also obtained from two previous studies by Lim et al. (2013), and Sitanggang and Munthe (2019) which showed positive results. Thus, the hypothesis H3 is postulated as follows:

H3: Non-Performing Loans have a positive effect on Loan Loss Provision.

The Influence of Capital Adequacy Ratio on Loan Loss Provision

The Capital Adequacy Ratio is a reflection of the company's capital. It can be interpreted that a bank that has a high CAR level already has sufficient capital to support the bank's needs and overcome the risks that arise. Every fund disbursed by a bank carries a risk of loss due to the default of the debtor for this matter. It is necessary to establish an allowance for impairment loss to maintain a bank in a stable condition. This statement is reinforced by research conducted by Yeh (2010), which states that the capital adequacy ratio has a positive effect on the loan loss provision. Based on this description, the following hypothesis H4 is postulated:

H4: Capital Adequacy Ratio has a positive effect on Loan Loss Provision.

The Influence of Interest Rate on Loan Loss Provision

The interest rate can be interpreted as the price that must be paid by the customer to the bank in the event that the customer obtains a loan. The loan loss provision is the amount of funds that must be prepared by a bank to face losses in the event of bad credit. Lim et al. (2013) in their research provided information that market credit interest rates show a negative and insignificant relationship with loan loss provision. Based on this information, the hypothesis H5 in this study is formulated as follows:

H5: Interest rates have a negative effect on Loan Loss Provision.

The Foreign Exchange Rate Moderates the Effect of Capital Adequacy Ratio on Loan Loss Provision

Yeh (2010) revealed that the capital adequacy ratio has a positive effect on loan loss provision. In Indonesia, banking and financial reporting are converted into Rupiah currency if the original currency is a foreign currency. The exchange rate can strengthen the effect of the capital adequacy ratio on the loan loss provision. The more the foreign exchange rate appreciates against the Rupiah, the higher the capital adequacy ratio causes the higher loan loss provision. For this reason, the research hypothesis H6 in this study can be postulated as follows:

H6: The positive effect of the capital adequacy ratio on loan loss provision will be more positive when the foreign exchange rate strengthens.

The Foreign Exchange Rate Moderates the Effect of Non-Performing Loans on Loan Loss Provision

Berti, Engelen, and Vašíček (2017) stated that there is a positive relationship between the foreign exchange rate of the euro or all foreign currencies with the ratio of Non-Performing Loans. Adeola and Ikpesu (2017) found that inflation and exchange rates have a

positive relationship with Non-Performing Loans. The research findings of Lim et al. (2013) and Sitanggang and Munthe (2019) showed positive results between non-performing loans and loan loss provision. The appreciation of foreign exchange rates can affect the value of Non-Performing Loans and the loan loss provision of a bank. For this reason, the research hypothesis H7 in this study can be postulated as follows:

H7: The positive effect of Non-Performing Loans on loan loss provision will be more positive when the foreign exchange rate strengthens.

The Foreign Exchange Rate Moderates the Effect of Interest Rates on Loan Loss Provision

Lim et al. (2013) suggested that market credit interest rates show a negative and insignificant relationship with loan loss provision. In financial reporting in Indonesia, banks report in Rupiah. If the loan loss is in the form of foreign currency and the foreign exchange rate appreciates, the value of the loan loss provision will increase. On several occasions, there have been policies taken by banks to increase interest rates due to the weakening of the Rupiah against foreign currencies, so that the increasing exchange rate will increase interest rates. For this reason, the research hypothesis H8 in this study can be postulated as follows:

H8: The negative effects of interest rates on loan loss provision will be more negative when foreign exchange rates strengthen.

Non-Performing Loans Mediate the Effect of Capital Adequacy Ratio on Loan Loss Provision

The capital adequacy ratio is a capital ratio that shows the ability of a bank to provide funds for business development as well as to accommodate the risk of loss caused by bank operations so that capital adequacy ratio can show the extent to which a bank's capital capacity is to bear the risk of credit failure. The effect of the capital adequacy ratio on Non-Performing Loans is also obtained from two previous studies by Wood and Skinner (2018)

and Vatansever and Hepşen (2013) which showed the value of the capital adequacy ratio has a positive influence on the value of Non-Performing Loans. This statement is reinforced by research conducted by Yeh (2010) which stated that the capital adequacy ratio has a positive effect on the loan loss provision. Based on their studies, the research hypothesis H9 in this study can be postulated as follows:

H9: The positive effect of the capital adequacy ratio on loan loss provision will be more positive when Non-Performing Loans increase.

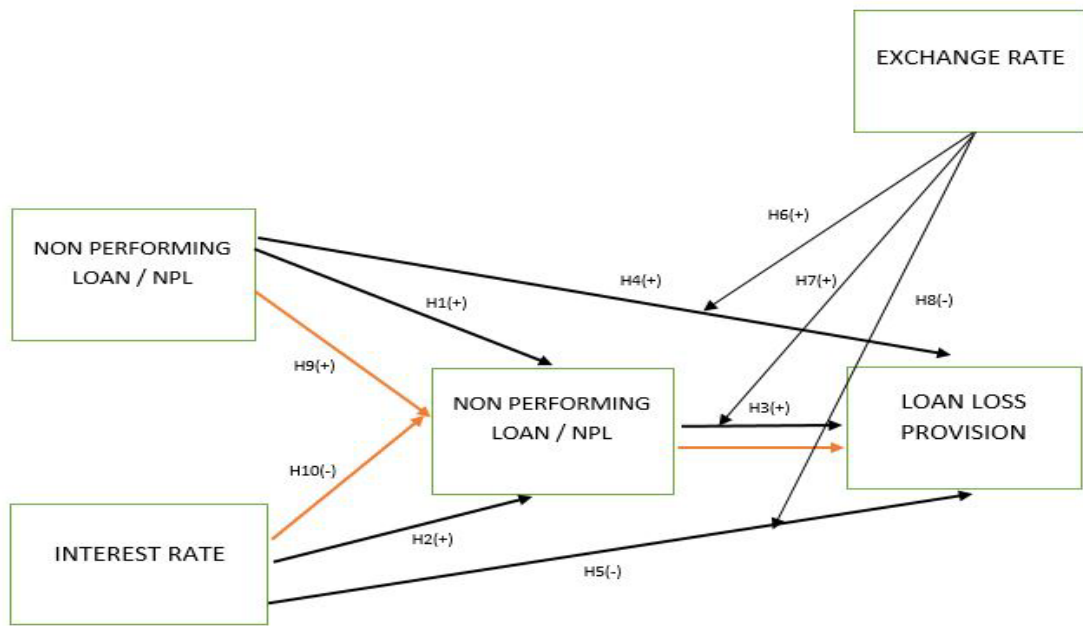
Non-Performing Loans Mediate the Effect of Interest Rates on Loan Loss Provision

The interest rate can be interpreted as the price that must be paid by the customer to the bank when the customer obtains a loan. The loan loss provision is the amount of funds that must be prepared by a bank to face losses in the event of bad credit. Lim et al. (2013) in their research provided information that market credit interest rates show a negative and insignificant relationship with loan loss provision. The effect of the Non-Performing Loans on loan loss provision is also obtained from two previous studies by Lim et al. (2013) and Sitanggang and Munthe (2019) which showed positive results. Based on their studies, the research hypothesis H10 in this study can be postulated as follows:

H10: The negative effect of interest rates on loan loss provision will be more negative when Non-Performing Loans increase.

Figure 1

Research Thinking Framework



Methods

In this study, the dependent variable was the loan loss provision, known as *Cadangan Kerugian Penurunan Nilai* in the Indonesian language and abbreviated into LLP. The independent variables were Capital Adequacy Ratio (CAR), and Interest Rate (INT). The mediating variable in this study was Non-Performing Loans (NPL), while the Foreign Exchange Rate (KURS) as a moderator variable was measured by the USD exchange rate against the Indonesian Rupiah.

The data collection method used in this research was the documentation study method of obtaining data in the form of quarterly reports that had been published by the banks from 2013 to 2018 on the Bank Indonesia website (www.bi.go.id) and the banks' websites. Literature studies through textbooks, scientific journals, articles, and magazines as well as other written sources related to the required information were also used as sources of data collection. The samples were taken from each of these banks, 24 data per bank, with a total of

72 data. The analysis was carried out using multiple linear regression analysis and path analysis.

Data Analysis Technique

To perform tests using multiple regression analysis, the following structural equation models are used:

$$\text{Equation (1): } NPL = \beta_1.CAR + \beta_2.INT + \epsilon_1$$

$$\text{Equation (2): } LLP = \alpha_1.CAR + \alpha_2.INT + \alpha_3.NPL + \alpha_{12}.CAR \times KURS + \alpha_{22}.INT \times KURS + \alpha_{32}.NPL \times KURS + \epsilon_2$$

Results and Discussion

The following Table 1 shows the results of the goodness of the fit model (F-test) of both equations.

Table 1

The F test of Structural Equation 1

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.317 ^a	.101	.074	.00620	.266

a. Predictors: (Constant), INT, CAR

b. Dependent Variable: NPL

F-value = 3.856 with sig (F) = 0.026

Table 1 shows that the R Square 0.101 explains that the 10.1% variation in the level of the ratio of Non-Performing Loans (NPL) can be explained by the variables of the Capital Adequacy Ratio (CAR) and the Interest Rate (INT). The rest is explained by other factors outside of the regression model. Table 1 shows the ANOVA significance value of 0.026

which is smaller than 0.05 so that the regression model is feasible to be used to predict the NPL variable based on variables CAR and INT.

Table 2

The F test of Structural Equation 2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.789 ^a	.623	.588	.29920	0.241

a. Predictors: (Constant), NPL_KURS, CAR, NPL, INT, INT_KURS, CAR_KURS

b. Dependent Variable: LLP

F-value = 17.915 with sig (F) = 0.000

Table 2 shows that the R Square 0.623 explains that the 62.3% variation in loan loss provision (LLP) can be explained by the variables of the Capital Adequacy Ratio (CAR), Interest Rate (INT), Non-Performing Loans (NPL), and the moderated variables by the foreign exchange rate (KURS). The rest is explained by other factors outside of the regression model, with sig (F) of 0.000 which is smaller than 0.05, so that the regression model can be said to be fit or feasible to be used to predict the LLP variable based on independent variables CAR, INT, NPL, and KURS as moderator variables.

Test the Significance of Each Regression Coefficient (T-Test)

The test results of each regression coefficient can be seen in Tables 3 and 4 as below:

Table 3

The T-Test of Coefficients: Structural Equation 1

Model	Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics	
	B	Std. Error	Beta	t	Tolerance	VIF

1	(Constant)	.007	.010		.659	.512		
	CAR	.091	.040	.323	2.304	.024	.665	1.503
	INT	4.851E-5	.001	.010	.069	.945	.665	1.503

a. Dependent Variable: NPL_t

Table 3 shows that CAR has a significant positive effect on NPL with a sig (t) value of 0.024 which is smaller than 0.05. Thus, the research hypothesis H1 is accepted. The CAR has a positive significant effect on NPL. The higher the capital adequacy ratio, the higher the non-performing loan. Banks that have a high capital adequacy ratio will be able to deal with an increasing level of NPL. So a bank usually predicts the value of the capital adequacy ratio well in order to be able to cope with the increasing value of NPL. While the interest rate (INT) with a sig (t) value of 0.945 is greater than 0.05, the interest rate does not have a significant positive effect on NPL. The research hypothesis H2 is rejected because there is not enough evidence that the interest rate has a positive effect on NPL. The increase in interest rates does not always make NPL rise because interest rates have hybrid implications, especially the term of loans.

Table 4

The T-Test of Coefficients: Structural Equation 2

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Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	13.768	.537		25.621	.000		
CAR	16.067	2.215	.765	7.253	.000	.522	1.916
INT	-.020	.038	-.054	-.527	.600	.543	1.841
NPL	1.294	6.903	.017	.187	.852	.697	1.436
CAR_KURS	.151	.287	.279	.525	.601	.021	48.720
INT_KURS	.007	.007	.453	1.024	.310	.030	33.767
NPL_KURS	-3.739	1.878	-.851	-1.991	.049	.032	31.542

a. Dependent Variable: LLP

Table 4 shows empirical evidence at the 5% level of significance, that the significant factors that influence the Loan Loss Provision (LLP) are Capital Adequate Ratio (CAR), which has a positive effect on LLP, and NPL with USD Exchange Rate (NPL-KURS), which has a negative effect. These results imply that the research hypotheses H4 and H7 are accepted. These findings prove that the greater capital adequacy ratio leads the greater loan loss provision, and vice versa. If the Capital Adequacy Ratio (CAR) increases, it means a bank has a provision of funds for lending to the public which will make the value of the LLP increase. And the USD exchange rate negatively and significantly moderates the effect of Non-Performing Loans on loan loss provision. The positive effect of NPL on loan loss provision will decrease when the USD appreciates, while the variables of INT and NPL, and the interaction variables of CAR-KURS and INT-KURS, have no significant effect on Loan Loss Provision (LLP). These results imply the rejection of the research hypotheses H5 and H6. These findings show that there is not enough evidence to prove that the loan loss

provision is partially affected by the variables of INT and NPL. The findings showed that the interaction between the moderator variable (USD exchange rate toward IDR) and the variables of capital adequacy ratio and interest rate does not significantly affect the loan loss provision.

Path Analysis

Path analysis was used to determine the direct or indirect effect where the Non-Performing Loans (NPL) become an intervening variable that mediates the effect of capital adequacy ratio (CAR) and interest rate (INT) on the loan loss provision (LLP).

Table 5

Path Analysis of Intervening Variable Testing

Effect	CAR → NPL → LLP	INTEREST → NPL → LLP
Direct	0.765 ^{*)}	-0.054
Indirect	0.323 x 0.017 = 0.005491	0.01 x 0.017 = 0.00017
Total	0.770491	-0.05383

Note: ^{*)} significant at a 5% level of significance (tested by Sobel test).

Table 5 shows that the Non-Performing Loans (NPL) significantly mediates the positive effect of the capital adequacy ratio (CAR) on loan loss provision (LLP). Thus, the research hypothesis H9 is accepted. The positive effect of capital adequacy ratio (CAR) on loan loss provision (LLP) will be more positive when the Non-Performing Loans (NPL) increases, and vice versa. Table 5 also shows that the non-performing loan (NPL) does not significantly mediate the negative effect of interest rates (INT) on loan loss provision (LLP). Therefore, the research hypothesis H10, which stated the negative effect of interest rates on loan loss provision will be more negative when the non-performing loan decreases, is rejected.

Conclusion

The results of this study provide several conclusions and suggestions which at the same time answer the research questions of this study. The capital adequacy ratio has a significant positive effect on Non-Performing Loans, while interest rates have no significant effect on Non-Performing Loans. Non-Performing Loans have no significant effect on the loan loss provision. The capital adequacy ratio has a very significant positive effect on the loan loss provision. However, the interest rate does not significantly affect the loan loss provision. The USD exchange rate does not significantly moderate the positive effect of the capital adequacy ratio on the loan loss provision. The USD exchange rate significantly moderates the negative effect of Non-Performing Loans on loan loss provision. The positive effect of Non-Performing Loans on loan loss provision will be more positive when the USD depreciates against IDR, and vice versa. However, the USD exchange rate does not significantly moderate the positive effect of the interest rate on the loan loss provision. Finally, Non-Performing Loans significantly mediate the positive effect of the capital adequacy ratio on the loan loss provision. The positive effect of the capital adequacy ratio on loan loss provision will be more positive when the Non-Performing Loans increases, and vice versa. However, the Non-Performing Loans do not significantly mediate the negative effect of interest rates on the loan loss provision.

The results of the path analysis in this study reveal that the non-performing loan positively mediates the effect of the capital adequacy ratio on loan loss provision. So it can be suggested that increasing the loan loss provision through increased capital adequacy ratio should be done when the Non-Performing Loans increase. Likewise, the findings reveal that the positive effect of Non-Performing Loans on the loan loss provision will be negative when the USD appreciates against IDR. So, it can be recommended to decrease loan loss provision.

Decreasing Non-Performing Loans should be done when the foreign exchange rate (USD) against Indonesia Rupiah (IDR) is strengthening.

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