JURNAL LOCUS: Penelitian & Pengabdian
Volume 5 No. 10 October 2026, pp 8996-9007
E-ISSN 2829-7334
DOI: 10.58344/locus.v5i10.6257

Dynamic Effect of BI Rate on Non-Performing Loans in Indonesian Banking

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Keywords:
Non-Performing Loans; Production Index; BI Rate; Exchange Rate; Credit.

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Abstract

This study aimed to analyze the effects of the BI Rate, Production Index, exchange rate, and bank credit on nonperforming loans (NPLs) in the Indonesian banking sector from January 2020 to June 2025. A quantitative research approach was employed using the autoregressive distributed lag (ARDL) model to examine the short-run and long-run relationships among the variables. The study utilized monthly secondary data obtained from Bank Indonesia, the Financial Services Authority (OJK), and Statistics Indonesia (BPS). The findings revealed that, in the long run, the BI Rate and exchange rate had positive and statistically significant effects on NPLs, whereas the Production Index and bank credit did not exhibit statistically significant effects. In the short run, only certain variables demonstrated statistically significant relationships with NPLs. These findings suggested that monetary policy, particularly changes in the BI Rate, and exchange rate movements played important roles in determining bank loan quality in Indonesia. Meanwhile, the Production Index and bank credit were not identified as significant determinants of NPL fluctuations during the observation period. The study highlighted the importance of prudent credit risk management, particularly during periods of monetary tightening. Furthermore, the findings underscored the need for Bank Indonesia to consider the potential implications of higher policy interest rates for borrowers' repayment capacity and banking sector credit quality when formulating monetary policy.

INTRODUCTION

Bank profitability reflects a bank's ability to generate earnings from its assets, operations, and equity over a specified period (Chandra & Setyawan, 2023). Banks are financial institutions that play a crucial role in national economic development by mobilizing public savings and channeling funds into productive activities through lending. Through their financial intermediation function, banks contribute to economic growth and improvements in public welfare. Ermaini et al. (2021) emphasized that profitability is essential for maintaining banking operations and supporting dividend distributions. Bank lending also enables individuals and businesses to finance investment, business operations, and household expenditures.

The banking sector contributes to economic development by collecting funds from the public and redistributing them through loans to support economic activities and improve societal welfare (Siagian, 2020). Third-party funds collected through savings accounts, time

deposits, and checking accounts constitute a major source of bank funding and support lending operations. However, lending activities expose banks to credit risk because borrowers may fail to fulfill their repayment obligations. Consequently, effective credit risk management is essential for maintaining banking stability and minimizing the occurrence of nonperforming loans (NPLs) (Kurniasari et al., 2020; Widayati & Herman, 2019).

The nonperforming loan (NPL) ratio is an important indicator of bank asset quality and credit risk (Gaur & Gupta, 2023; Ofianti et al., 2026; Putra et al., 2024; Shittu & Abdulkadir, 2023). A high NPL ratio indicates deteriorating loan quality and may adversely affect a bank's liquidity, profitability, and solvency. Increasing NPLs can also constrain banks' lending capacity by increasing loan-loss provisions and other credit-related expenses. Pinasti (2018) stated that higher NPLs increase provisioning requirements and operational costs, potentially weakening overall bank performance (Widyastuti & Aini, 2021). NPLs may be influenced by bank-specific characteristics, borrower conditions, and external macroeconomic factors (Agustiningtyas, 2018; Ginting, 2017; Muljaningsih & Wulandari, 2019; Setya Wijaya, 2019). In this study, the Production Index, BI Rate, exchange rate, and bank credit were examined as potential determinants of NPLs in the Indonesian banking sector (Dwihandayani, 2017).

The BI Rate serves as a monetary policy benchmark in Indonesia and can influence commercial banks' lending rates (Dwihandayani, 2017). An increase in the BI Rate may encourage banks to raise lending rates, potentially increasing borrowers' debt-servicing costs and default risk. As Indonesia's central bank, Bank Indonesia establishes monetary policy interest rates to maintain price stability and support macroeconomic stability. Changes in the policy rate are transmitted through financial markets and banking institutions, although adjustments in commercial lending rates may occur gradually. Higher lending rates can increase borrowers' repayment burdens, particularly for variable-rate loans, thereby potentially weakening repayment capacity and increasing credit risk. Conversely, lower interest rates may reduce borrowing costs and support credit demand.

Higher debt-servicing obligations may weaken borrowers' repayment capacity, particularly among households with fixed incomes and businesses operating in interest-rate-sensitive sectors. Monetary tightening may also reduce economic activity and borrowers' cash flows, further increasing the probability of loan delinquency and default. Banks with greater exposure to high-risk borrowers may be more vulnerable to these developments than institutions maintaining diversified and conservatively managed loan portfolios. Conversely, effective credit risk assessment and monitoring can help banks mitigate the adverse effects of rising interest rates on loan quality. Higher lending rates may also reduce credit demand, whereas lower rates generally encourage borrowing and investment activities (Pardosi et al., 2024).

Based on the theoretical framework and previous empirical findings, the BI Rate was expected to influence NPLs in Indonesia. An increase in the policy interest rate may lead to higher commercial lending rates, increasing borrowers' repayment obligations and potentially reducing their ability to service outstanding debt. As repayment capacity deteriorates, the probability of loan delinquency and default may increase, contributing to a higher NPL ratio. However, the magnitude of this relationship depends on factors such as loan contract characteristics, borrowers' financial conditions, and the speed of monetary policy transmission.

Previous studies have examined the relationship between the BI Rate and NPLs. Pardosi et al. (2024) identified a positive relationship between the BI Rate and NPLs, and other studies have examined the BI Rate together with other macroeconomic variables (Ginting, 2017; Muljaningsih & Wulandari, 2019; Setya Wijaya, 2019). These studies suggest that the relationship between monetary policy interest rates and banking credit risk requires further empirical investigation. In particular, differences between short-run and long-run effects warrant examination using more recent observations and econometric approaches capable of capturing dynamic adjustments.

Accordingly, this study proposed the hypothesis that the BI Rate positively affects NPLs in the Indonesian banking sector. The hypothesis was based on the expectation that higher policy interest rates increase borrowing costs, weaken debt-servicing capacity, and potentially increase loan defaults. Therefore, the BI Rate was considered a potentially important macroeconomic determinant of banking credit quality.

Figure 1 illustrates the movements in NPLs and the BI Rate from January 2020 to June 2025. Based on the reported trends, both variables exhibited fluctuations throughout the observation period, with periods of declining and increasing values. The NPL series began at approximately 7% in early 2020, declined and remained relatively stable from 2021 to early 2022, and subsequently increased to above 12% by mid-2025. These movements suggested changes in banking credit risk during the observation period. The observed fluctuations may have reflected economic disruptions associated with the COVID-19 pandemic and subsequent changes in borrowers' financial conditions, although these relationships require empirical verification. Meanwhile, the BI Rate was approximately 5% in early 2020, declined during 2021–2022, and subsequently increased during the monetary tightening cycle. Changes in the BI Rate may have affected bank funding costs, lending rates, credit demand, and borrowers' repayment capacity. However, the simultaneous movements of the two variables did not necessarily establish a causal relationship. Therefore, further econometric investigation was required to determine whether changes in the BI Rate significantly affected NPLs after accounting for other relevant macroeconomic factors. To address this issue, the study, titled "Dynamic Effect of BI Rate on Non-Performing Loans in Indonesian Banking," employed an autoregressive distributed lag (ARDL) model using monthly data from January 2020 to June 2025.

METHOD

Data

This study employed a quantitative research approach using monthly secondary data obtained from Statistics Indonesia (BPS), the Financial Services Authority (OJK), and Bank Indonesia (BI), covering the period from January 2020 to June 2025. The variables examined included nonperforming loans (NPLs), the Production Index (IP), the BI Rate (BIR), the exchange rate, and bank credit (KR).

Table 1. Variabel

Variabel	Definition	Quantity
Non-Performing Loan (NPL)	A non-performing credit ratio that shows the debtor's ability to meet payment obligations to the bank.	Percent (%)
Production Index (IP)	An indicator that shows changes in the level of production of goods and services in a country's economy.	Billion Rupiah
BI Rate (ONE)	The benchmark interest rate is set by Bank Indonesia as a guideline in monetary policy.	Percent (%)
Exchange Rate	The exchange rate of a country's currency against the currency of another country.	Rupiah
Credit (KR)	Loans of funds provided by banks to customers based on an agreement to be repaid within a certain period of time.	Billion Rupiah

Method ARDL dan Bound Test Cointegration

The Autoregressuve Distributed Lag (ARDL) method was first introduced by Pesaran and Shin (1998). This method is designed to analyze the relationships between variables in the context of cointegration, using an approach known as Bound Test Cointegration. ARDL combines elements from the Autoregressive (AR) and Distributed Lag (DL) models, which makes it possible to see the relationships between each of its variables in the long and short term. In general, the ARDL method can be formulated as follows:

$$\emptyset(L)yt=a0+a1t+\beta'xt+\Sigma\beta\Delta xt-j-\emptyset*(L)\ \Delta yt+j*'q-1i=0\mu t \qquad (1)\ [DY2.1]$$

Where $\emptyset(L)yt=1-\Sigma\emptyset jLjpj=1$, and $\beta(L)=\Sigma\beta jLj,ytqj=0$ is the dependent variable (Y), xt is the independent variable, and L is the lag operator. To achieve long-term equilibrium, the ECM ARDL model requires short-term error adjustment and correction methods to see long-term equilibrium outcomes. Or it can also be written as:

$$\Delta Yt = \beta 0 + \beta 1Yt-1 + \beta 2Xt + \beta 3Xt-1 + \varepsilon t \qquad (2)$$

Where Δyt is the change of the dependent variable in the period t, Yt-1 is the dependent variable in the previous period, Xt is the independent variable in the period t, Xt-1 is the independent variable in the previous period, and Et is the Term Error. This study develops a trivariate model in the dynamic relationship between variables that have an influence on the banking sector such as Production Index, BI Rate, Exchange Rate, and Credit. The equation of the trivariate model can be written as follows:

$$NPLt=a0+a1lnIPt+a2BIRt+a3lnKURSt+a4lnKRt+\varepsilon t \qquad (3)$$

Where lnNPL is a variable of Non Perfroming Loan; lnIPt is a variable of the Production Index; lnBIR is a variable of BI Rate; and lnKR is a Credit variable. Whereas (ln) shows data transformed into natural logarithms. (ln); _1, _2, _3, and _4 are the coefficient values; _0 is a constant value and _t is an error term. Below is the formula for the ARDL error correction model:

$$\Delta NPLt=a0+\Sigma a1\Delta NPLt-1n1i=1+\Sigma a2\Delta lnIPt-1n1i=1+\Sigma a3\Delta BIRt-1n1i=1+\Sigma a4\Delta lnKURSt-1$$
$$n1i=1+\Sigma a5\Delta lnKRt-1n1i=1+\delta 1\Delta NPLt-1+\delta 2\Delta lnIPt-1+\delta 3\Delta BIRt-1+\delta 4\Delta lnKURSt-1+\delta 5\Delta l$$
$$nKRt-1+\mu t \qquad (4)$$

Where _t, i = 1, 2, 3, 4, 5 is the long-term multiplier, while the function parameter _1, a1,a 2,a 3,a 4,a 5 is the short-term coefficient of the ARDL model. The statistical F-value was used in the cointegration test of the ARDL model. The first hypothesis suggests that cointegration does not occur (H_0: δ_1=δ_2=δ_3=δ_4=δ_5=0). On the other hand, the alternative hypothesis suggests that cointegration occurs between variables. Once cointegration

has occurred, the next step is to interpret long-term and short-term adjustments. To evaluate the stability of the trivariate model, residual values were tested using the CUSUM and CUSUMQ approaches.

RESULTS AND DISCUSSION

Descriptive Statistical Test

This descriptive statistical test is used to present a comprehensive picture related to the characteristics of the existing data. Some of the measures used in this test include mean, median, and standard deviation. This analysis also includes the highest and lowest values that on each indicate the upper and lower limits of the data. In this case, the probability indicates the likelihood of a particular event occurring based on the distribution of the data already available. All of these measures are applied to summarize and understand patterns or trends in the data as a whole.

In the NPL variable in Table 1, the Mean value reaches 9.114091. This is due to the economic crisis caused by the Covid-19 pandemic that hit the world, which disrupted all economic activities, the stock market plummeted, and business actors also experienced stagnation and the value of the rupiah plummeted. The economic downturn that occurred in 2020 and continued until 2021 caused most people to experience financial difficulties in accessing credit loans, so this could trigger bad loans. Covid-19 itself is a dangerous situation, which makes many debts unresolved due to the economic crisis, resulting in a high NPL risk in 2020 (Tiwu, 2020).

In the BI Rate variable, the Mean value shows the number 4.395833 which is caused by a declining economy due to the Covid-19 pandemic in 2020, so that income also decreases. Changes in the BI Rate value can affect the lending interest rate charged by banks. Therefore, the value of the BI Rate must be regulated so that the amount of money in circulation remains in a stable condition. When interest rates are low, the debtor's interest in borrowing money is greater, and vice versa.

Table 2. Descriptive Statistical Results

Variabel	*Non-Performing Loan*	Production Index	BI Rate	COURSE	CREDIT
Mean	9.114091	147.5618	4.821970	11878.65	6888577.
Median	8.380000	149.4100	4.875000	10514.76	1627720.
Maximum	12.73000	168.9900	6.250000	16856.00	3.23E+08
Minimum	6.720000	104.0200	3.500000	9132.240	1431955.
Observations	66	66	66	66	66

Unit root test

This study applied unit root tests with the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) approaches to ensure that the model used to meet the basic assumptions required to produce valid estimates. The unit root test applies "Trend and Intercept" as the unit root test with "Trend" and implements "Intercept" as the unit root test with "No Trend". The results of the root test of ADF and PP units are presented in Table 2.

Stationarity Test

The stationarity test is one of the initial stages in analyzing monthly data. This study applied the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) methods to test stationarity and detect the presence of unit roots in the data, including heteroscedasticity

problems. The root test of this unit involved two models, namely the trend and intercept models and the untrended intercept model. And the results of the ADF and PP tests will be compared with critical values to determine whether the data is stationary or not. Table 2 shows the results of the stationary testing using the ADF and PP methods. In the ADF and PP tests at level 1(0), only the Credit variables were stationary, while the NPL, Production Index, BI Rate, and KURS [DY7.1] variables showed non-stationary results. Therefore, when the variables are proven to be non-stationary, ADF and PP testing needs to be performed at the First Difference level. At the First difference level 1(1), all variables in the ADF and PP methods showed stationary results. All variables at the first difference level 1(1) show (***), so this study does not need to test the root of the unit in model 1(2) so as not to produce false regression.

Table 3. Root Test Results of ADF and PP Units

Variabel	ADF		PP	
	Trend	**No Trend**	**Trend**	**No Trend**
			Level	
NPL	0.8566	0.9799	0.8763	0.9851
Production Index	0.0000***	0.1046	0.0000***	0.0043***
BI Rate	0.6146	0.7404	0.4481	0.7741
COURSE	0.7600	0.8295	0.7361	0.8229
Credit	0.0000***	0.0000***	0.0000***	0.0000***
			First Diff	
Δ NPL	0.0000***	0.0000***	0.0000***	0.0000***
Δ Production Index	0.0000***	0.0000***	0.0001***	0.0000***
Δ BI Rate	0.0084***	0.0013***	0.0084***	0.0013***
Δ COURSE	0.0000***	0.0000***	0.0000***	0.0000***
Δ Credit	0.0000***	0.0000***	0.0001***	0.0001***

Cointegrity Test

This test was conducted to test the stability of the long-term relationship of the bound approach through the use of boundary tests. The optimal lag obtained from the model shows a lag value of (4, 3, 2, 0). The results of this cointegrity test show that the F-Statistic values calculated with the model used in this case are balanced over a long period of time. Based on the results of the cointegration test with the bound test approach, it is known that the F-Statistics value is 2.509521 with an optimal lag distributed lag (4, 0, 3, 2, 0). These values, when compared to critical values at the significance levels of 10%, 5%, 2.5%, and 1%, show that F-Statistics are between lower bound and upper bound at some level of significance. This condition indicates that the test results are in the category of inconclusive or inconclusive.

Thus, it can be said that the long-term relationship between the variables in the model cannot be firmly ascertained based on the results of this test. Although there are indications of a relationship between variables, the results of the bound test have not provided sufficient evidence to conclusively conclusively integrate the variables.

Table 4. Cointegration Test Analysis Bound test analysis

F-Statistics	%	Lower Bound I(0)	Upper Bound I(1)
	Distributed lag (4, 0, 3, 2, 0)		
2.509521	10%	2.2	3.09
	5%	2.56	3.49
	2.5%	2.88	3.87
	1%	3.29	4.37

Classic Assumptions

Normality Test[DY9.1]

The normality test was performed to evaluate whether the regression model of the independent variable was normally distributed or not. This assessment is important to know whether the data already collected has a normal distribution or comes from a normal population. Based on the test results, it can be seen that the probability value of the Jarque-Bera statistic is recorded at 0.033662. Meanwhile, the probability value in the test shows a number of 0.983310 which means that the value is higher than the significance level of 0.05 (5%). In this case, it can be concluded that the normality test has been met.

Autocorrelation Test

Autocorrelation tests are performed to analyze data with the aim of determining whether there is a relationship in the model. This test is performed in a linear regression model to see if there is a relationship between the error in the t-period and the error in the t-1 period. Based on the results of the autocorrelation test in Table 4, it can be seen that the Chi-Square probability value is obtained which shows the number 0.6814. This number has a higher value compared to the significance value (0.6814>0.05). So, it can be concluded that this model has no problems in the autocorrelation test.

Table 5. Autocorrelation Test Results

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.339715	Prob. F(2,56)	0.7134
Obs*R-squared	0.767184	Prob. Chi-Square(2)	0.6814

Heteroscedasticity Test

This test was carried out to see if heteroscedasticity could be detected using the White Test, and in this test it was considered that there was no heteroscedasticity if there was a significance value of more than 0.05. Based on the test results shown in Table 5, it can be seen that the Chi-Square probability has a value of 0.8023 which means that the value of the Chi-Square probability is higher than the significance level (0.8023>0.05). This shows that in the heteroscedasticity test the data does not have problems.

Table 6. Heteroscedasticity Test Results

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.437703	Prob. F(5,58)	0.8204
Obs*R-squared	2.327103	Prob. Chi-Square(5)	0.8023
Scaled explained SS	3.878938	Prob. Chi-Square(5)	0.5670

Stability Test

To assess the resilience in the long-term relationship between the Production Index, BI Rate, Exchange Rate, and Credit to Non-Performing Loans (NPLs), this study used the

CUSUM and CUSUMQ methods. In the CUSUM and CUSUMQ tests, it is carried out by checking the amount of residue accumulation that is repeated; The estimate is considered stable. If the CUSUM and CUSUMQ charts show significant results at 5% or remain at the upper and lower limit lines, then the results of the estimate are considered unstable. The test results from CUSUM and CUSUMQ in Figure 3 show that the model used did not cross the 5% value limit and did not go outside the upper and lower limit lines. This shows that the model used for testing is stable.

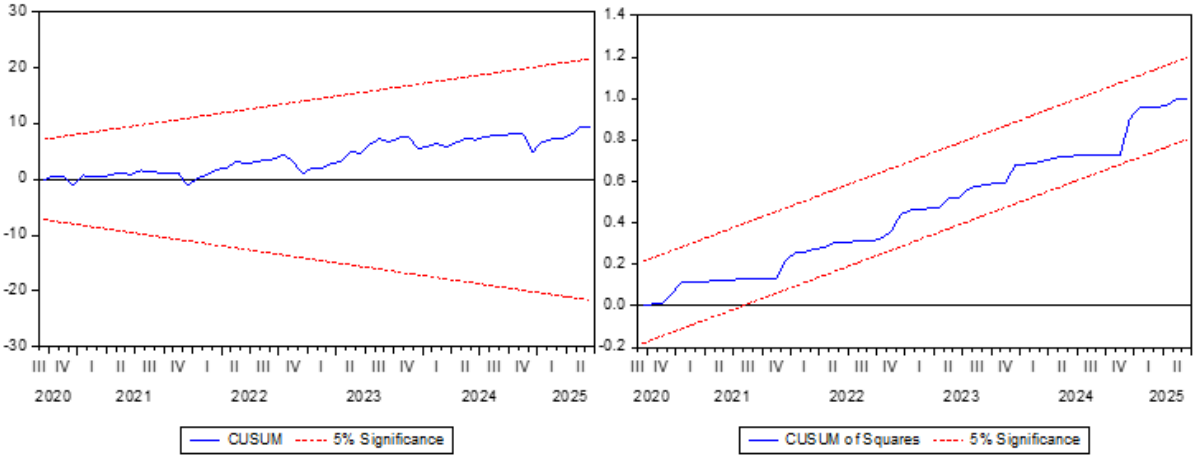


Figure 1. CUSUM and CUSUMQ Stability Test

ARDL Estimates

The economic test using the ARDL approach aims to find the relationship both in the long and short term in each variable, as well as evaluate how the impact of independent variables on dependent variables is. The results of the analysis regarding the impact of independent variables on dependent variables can be presented as shown in Table 6. The results of the ARDL model estimation (4, 0, 3, 2, 0) show that there is a long-term relationship between the dependent variable and the independent variable used in the study. This is evidenced by a negative and significant error correction value of -0.237709, which means that around 23.77% of short-term imbalances will be adjusted towards long-term equilibrium in the next period. In long-term relationships, the variables X2 and X3 had a positive and significant effect on Y, while the variables X1 and X4 had no significant effect. Based on the short-term test results in table 6, the variables D(Y(-3)) and D(X2(-2)) showed a significant influence on Y.[DY10.1]

Table 7. Long Run Form Test and Bound Test

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Production Index	-0.000193	0.018910	-0.010201	0.9919
Bi Rate	1.127596	0.274076	4.114176	0.0002*
Course	0.000342	8.93E-05	3.832351	0.0004*
Credit	-1.99E-11	4.38E-09	-0.004548	0.9964
C	-0.083812	2.232966	-0.037534	0.9702

The Effect of Non-Performing Loans on the Production Index

In this study, it is shown that the production index does not affect Non-Performing Loans (NPLs) in both the short and long term. When the production index increases, it will increase the output level of the production index and show a good economy so that it will increase the debtor's income. With high income, debtors will fulfill their obligations to repay their loans so that the potential for Non-Performing Loan risks is reduced. On the other hand, if the Production Index decreases, it will affect the economy to be slower, which causes many debtors, especially those engaged in the industrial sector, to have difficulty in paying their obligations, which causes high Non-Performing Loans. Stricter bank policies and better monitoring of the portfolio can help the occurrence of Non-Performing Loan (NPL) risks. The production index is one of the macroeconomic indicators that shows signals to the market as an approach to measuring output. The existence of good industrial conditions will reflect a good economy and encourage banks in providing credit. The increase in the production index will get a good response from banks to the distribution of credit to debtors.

The Effect of Non-Performing Loans on BI Rate

The results of the study show that the BI Rate has a positive effect on NPLs because banks will raise lending rates if the BI Rate increases. This causes the burden given to debtors to increase so that the higher the risk of default affecting NPLs. Rising interest rates cause debtors to struggle to meet their debt obligations. The BI Rate itself has a direct impact on credit quality in the banking system. This is in line with the results of the study (Fahmi et al., 2025) where interest rates have a significant and direct relationship with the increase in the NPL ratio. This shows that interest rate hikes tend to be followed by an increase in the number of non-performing loans in the banking sector. Conceptually, this phenomenon occurs due to the increased interest burden that must be borne by the debtor, thereby increasing the risk of inability to make payments. After the government raised interest rates against BI, conventional banks also raised their lending rates along with higher interest rates. As a result, interest rates become positive and NPL ratios increase as debtors have to pay more credit installments to creditors. This positive and significant relationship is also influenced by internal and external factors as it can affect NPL ratios, which can cause the credit launched by banks to be less good.

The Effect of Non-Performing Loans on Exchange Rates

Based on the results of the study, the exchange rate has been proven to have a significant effect on NPLs. This shows that changes in the rupiah exchange rate have an impact on the debtor's ability to fulfill their credit obligations. When the rupiah weakens, the payment burden of debtors who have obligations in foreign exchange or who depend on imported raw materials will increase. This condition causes the debtor's cash flow to be depressed and the risk of default is even greater, so NPLs tend to increase. Thus, the exchange rate is one of the important factors that need to be considered in maintaining the stability of banking credit quality in Indonesia. This is in line with research by Sucipto (2020) who said that the weakening of the currency value will have a bad impact on debtors who have loans in foreign currencies, because the value of the loan will increase relatively due to the weakening of the exchange rate so that it will result in a decrease in the debtor's ability to pay, which ultimately causes the debtor to default, so that NPLs have the potential to increase.

The Effect of Non-Performing Loans on Credit

Based on the results of the study, the credit variable did not have a significant effect on NPL. This shows that the disbursement of large amounts of credit is not always followed by an increase in non-performing loans. This condition can occur because banks have applied the principle of prudence in the credit disbursement process, so that the risk of default can be controlled. In addition, NPLs are more influenced by other factors such as macroeconomic conditions, debtors' capabilities, and the quality of credit supervision. Thus, the credit variable was not the main determinant in explaining the change in NPLs in this study. This is in line with research by Sari et al. (2021), The ability of a company to distribute credit to the public is not influenced by the size of the level of non-performing loans (NPLs) owned. Credit offerings will decrease due to the high NPL ratio value. Kusumawardani (2023) said high NPLs will force banks to set aside more money as write-off reserves, thereby reducing the amount of money that can be used for credit disbursement. Alfonso's research (2023) said that the loans disbursed had a significant negative influence on NPLs during the covid-19 pandemic. With the conditions that occurred during the pandemic, it not only caused a decrease in the number of credit disbursements to the public, but also caused an increase in the number of bad loans which resulted in poor quality of NPL ratios.

CONCLUSION

This study analyzed the determinants of nonperforming loans (NPLs) in the Indonesian banking sector from January 2020 to June 2025 using the autoregressive distributed lag (ARDL) model. The findings revealed that the BI Rate had a positive and statistically significant effect on NPLs, suggesting that higher policy interest rates increased borrowers' debt-servicing burdens and potentially heightened credit default risk. The exchange rate also exhibited a statistically significant relationship with NPLs, indicating that depreciation of the Indonesian rupiah could increase borrowers' financial obligations, particularly those denominated in foreign currencies, thereby increasing the risk of default.

Meanwhile, the Production Index and bank credit did not exhibit statistically significant effects on NPLs during the observation period. These findings suggested that variations in industrial production and bank lending were not significant predictors of NPL fluctuations within the estimated model. Overall, the study highlighted the importance of monetary conditions, particularly policy interest rate movements and exchange rate stability, in maintaining banking sector credit quality in Indonesia. The findings also emphasized the need for prudent monetary policy and effective credit risk management to mitigate potential deterioration in loan quality.

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