

# Determinants Of Total Loans Disbursed By Rural Banks In Indonesia

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Submitted 22-05-2024 Reviewed 11-07-2024 Revised 17-07-2024 Accepted 18-07-2024 Published 31-07-2024

**Abstract:** The financial sector can influence the process of economic development, one of which is through banking by carrying out its intermediary function. One of the banks that have the function of channelling credit and collecting public funds is the Rural Bank. By using the VECM (Vector Error Correction Model) approach model, this study was conducted to determine the long-term and short-term effects of external factors such as Inflation and BI rate and also on internal factors such as the amount of deposits and non-performing loan rates on the amount of credit in the period 2008 - 2022. The results showed both in the long and short term that the internal factors of deposits and non-performing loans had a significant and negative effect on the amount of credit disbursed. External factors such as Inflation and BI rates do not affect the loan disbursed.

**Keywords:** Lending; Third Party Fund; Non-Performing Loan; Inflation; Interest Rate.

**Abstrak:** Sektor keuangan dapat memberikan pengaruh kepada proses perkembangan perekonomian salah satunya melalui perbankan dengan menjalankan fungsi intermediasinya. Salah satu bank yang memiliki fungsi menyalurkan kredit dan himpunan dana masyarakat ialah Bank Perkreditan Rakyat. Dengan menggunakan model pendekatan VECM (Vector Error Correction Model), penelitian ini dilakukan untuk mengetahui pengaruh jangka panjang dan jangka pendek dari faktor eksternal seperti inflasi dan BI rate dan juga pada faktor internal seperti jumlah dana pihak ketiga dan tingkat kredit macet terhadap jumlah kredit pada periode tahun 2008 – 2022. Hasil penelitian menunjukkan baik dalam jangka panjang maupun pendek bahwa pada faktor internal dana pihak ketiga dan tingkat kredit macet berpengaruh signifikan dan negatif terhadap jumlah kredit yang disalurkan. Sedangkan pada faktor eksternal tingkat inflasi dan juga suku bunga BI rate tidak berpengaruh terhadap kredit yang disalurkan.

**Kata Kunci:** Penyaluran Kredit; Dana Pihak Ketiga; Kredit Macet; Inflasi; Suku Bunga.

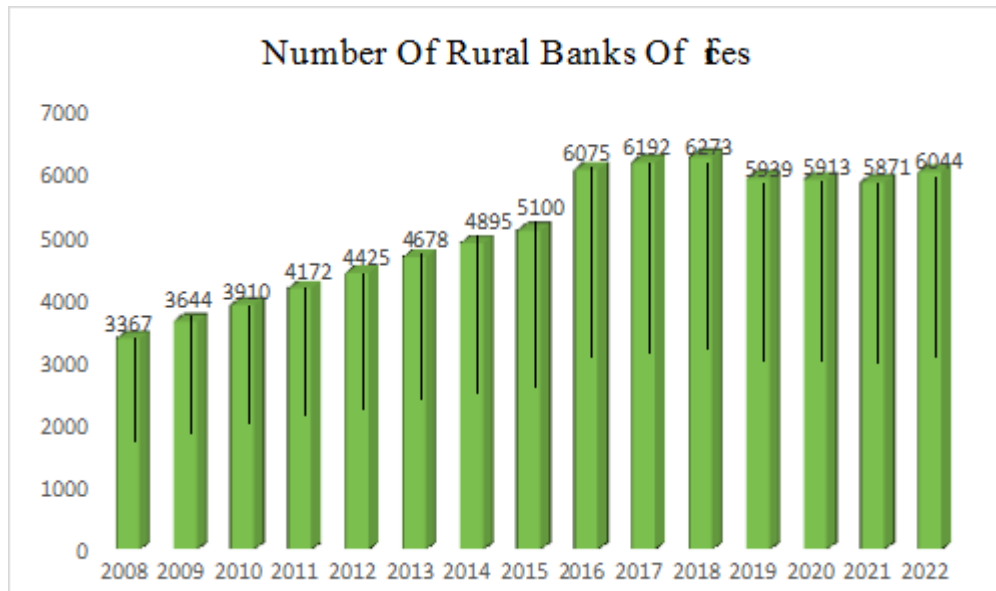
## INTRODUCTION

In Indonesia, the economic growth process will remain separate from the role of the financial sector (Nissa, 2021). The financial sector can influence economic development through banking. Banks carry out an intermediary function in encouraging the economy to be more dynamic and efficient. Banks connect two parties, those with extra money and those needing money, by performing the intermediation function. This includes collecting and distributing funds and various banking services such as payment services and financial transactions (Almi & Aziz, 2023). In addition, banks also play a role in supporting the implementation of national development to increase equality in development and its outcomes, supporting economic growth, and maintaining national stability. All of this is directed at improving the overall quality of life of the community (OJK, 2017).

Banks are business entities authorised under the Law of the Republic of Indonesia Number 10 of 1998 to collect funds from the public or customers in various forms, including cash and non-cash deposits. The money can then be returned to the community by banks in



the form of credit or other initiatives that will benefit many people (Gayo et al., 2022). There are several types of banks in Indonesia, and one of them is the rural bank. Rural banks support local economic development, particularly in Indonesia's rural and small urban areas. Along with economic growth and the community's need for inclusive financial services, rural banks have expanded by opening more offices in various regions. The increase in rural bank offices includes new locations and improves service quality. An even distribution of rural banks, especially in rural areas or small towns, will significantly help the community gain more accessible access to financial services.



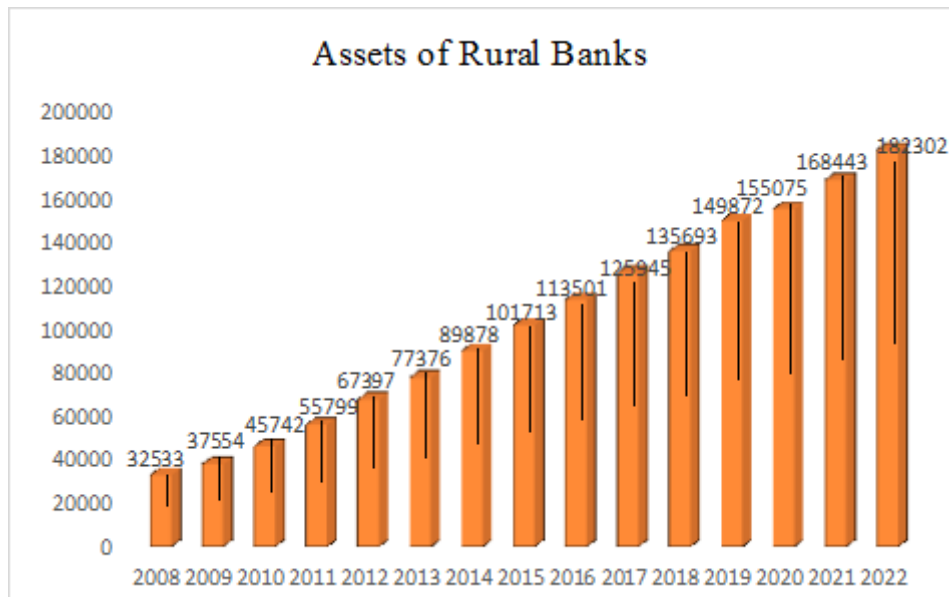
**Figure 1.** Number of Rural Banks Offices in Indonesia

Source : Research Data, Otoritas Jasa Keuangan, 2022

In **Figure 1**, based on the Indonesian Banking Statistics report data, the number of rural bank offices spread throughout Indonesia has increased. Although 2019 the number of offices decreased slightly, rural banks showed an increase in the number of offices again in 2022. In 2008, the number of rural bank offices reached 3367 and continued to increase until 2018, amounting to 6273. In 2019, the number of rural bank offices decreased to 5939. However, in 2022, the number of rural bank offices again increased to 6044. The increase in rural bank offices signifies a strong commitment to expanding financial inclusion and supporting inclusive and sustainable economic development in Indonesia. With more rural bank offices spread across the country, it is expected that access to financial services can be expanded, economic disparities can be reduced, and people's welfare can be improved.

Although smaller than commercial banks, rural banks play an equally important role. According to data, the total assets held by rural banks in Indonesia continue to increase along with the demand for inclusive financial services. This increase reflects the importance of rural banks in supporting regional economic development.





**Figure 2.** The Amount of Assets Owned by Rural Banks

Source : Research Data, Otoritas Jasa Keuangan, 2022

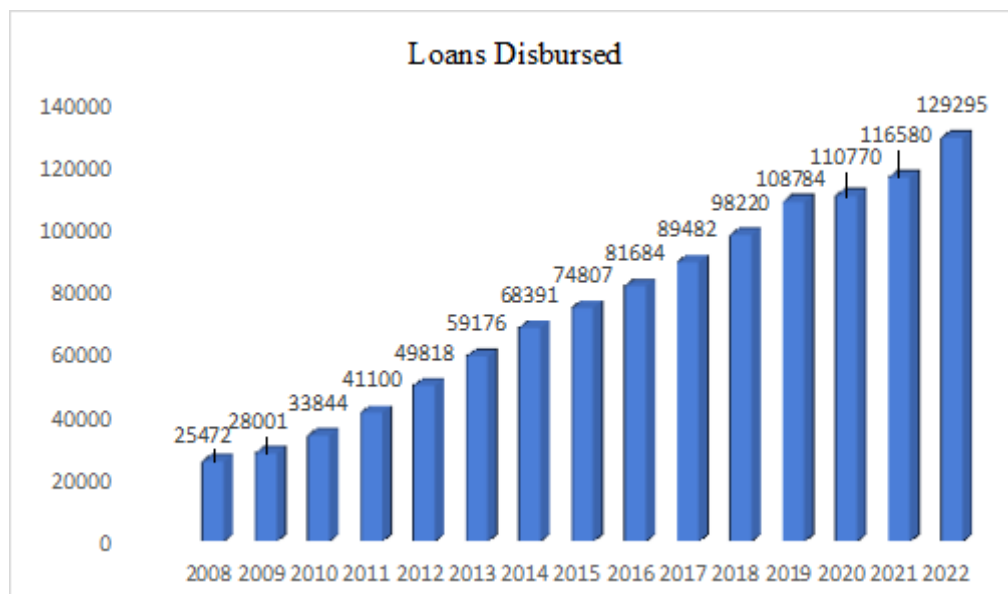
**Figure 2.** Based on data from the Indonesian Banking Statistics report, the amount of assets owned by rural banks in Indonesia continues to increase yearly. In 2008, the total assets owned by rural banks amounted to Rp 32,533,000,000 and continued to increase until 2022, when the total assets owned amounted to Rp 182,302,000,000. The increasing number of assets owned by rural banks signifies increased community access to inclusive financial services and confidence in rural banks' role in advancing the local economy. With the increase in assets, rural banks have more resources to extend credit to small and medium enterprises and individuals in rural or remote areas who may have previously found it challenging to access capital.

In Indonesia, rural banks are especially crucial to the growth of the local economy in rural and small urban regions. However, the activities of rural banks are more limited than those of commercial banks. This is due to the prohibition of rural banks from providing insurance, engaging in foreign exchange activities, and accepting demand deposits. These restrictions make rural banks focus more on their primary function of providing credit to their customers. (Otoritas Jasa Keuangan, 2017)

Lending is the primary activity in the banking intermediation function. This activity is the backbone of banks. Banking becomes very important to businesses because it carries out the intermediary function. The credit disbursed has a vital role in economic growth because the credit is used for the consumptive and productive activities of the community (Sofyan, 2019). This reviews that the community's economic development activities are reviewed from the smooth lending activities. Lending activities are also very instrumental in creating income or profits for banks. This is because the most significant income for banks is interest income obtained from lending activities (Indriati et al., 2018).

Lending is an essential activity in supporting a country's economic growth. Rural banks primarily lend to the community, and these activities are also their primary source of income.





**Figure 3.** Total Loans Disbursed by Rural Banks in Indonesia  
 Source : Research Data, Otoritas Jasa Keuangan, 2022

**Figure 3.** shows the total loans disbursed by rural banks in Indonesia from 2008 to 2022. The amount of credit disbursed by rural banks has increased. Even though it went through an economic crisis like the one that occurred in 2008 and 2020 due to the COVID-19 pandemic, the number of loans disbursed continued to increase even though it was relatively minor or slow. However, during this period, the distribution of rural bank loans experienced an upward trend. This can illustrate that there is also an increase in economic activity regionally or locally. The level of trust in the community can also be increased.

In carrying out lending activities to customers, rural banks can be influenced by several factors, both external and internal. External factors that can affect the level of lending to rural bank banks include the inflation rate and interest rate that uses the BI rate. Inflation is a general and continuous price increase of goods and services within a certain period (Bank Indonesia, 2020). When a country experiences a high inflation rate, the desire of people to make loans to banks tends to decrease. This is because the interest they get is minimal, and they still have to pay administrative fees (Eltania, 2022). Research (Jufriadi et al., 2022) states that Inflation negatively influences lending. However, there are differences in the research results (Pinto et al., 2020), which state that Inflation has a significant positive effect on lending.

The BI rate is an interest rate set by Bank Indonesia that reflects Bank Indonesia's monetary policy that affects overall economic activity (Bank Indonesia, 2016). In bank lending, the BI rate will affect bank interest rates, both loan and fund interest rates. This is a consideration for people borrowing money from banks or channelling their funds to banks (Naro et al., 2021). Research (Pulungan & Muslih, 2020) states that the BI rate significantly negatively affects lending. However, there are different results in research (Ramandhana et al., 2018), which state that credit is significantly positively affected by the BI rate.

Then, the lending activities carried out by rural banks can also be influenced internally. These internal factors include third-party funds and non-performing loans. In line with the intermediary function, third-party funds in banks, which come from the public, must be collected back by the bank and sent to the public. Loan distribution is a priority for banks distributing their funds (Amrozi & Sulistyorini, 2020) (Sinurat et al., 2020). Their



research stated that third-party funds positively affect credit, which means that if more funds exist, the number of loan disbursements will also increase. However, there are different results in research conducted (Wau, 2019) that read that third-party funds can significantly negatively affect credit.

NPL is a way to calculate the number of non-performing loans. When NPLs are high, many loans must be fulfilled, which can harm the bank's health and reduce its income from interest and loan payments. (Said, 2018), Moreover, (S Wardani et al., 2018) in their research state that NPL has a significant negative effect on the level of lending. However, in contrast, research conducted (Pinto et al., 2020) states that the NPL variable has an influence on credit in a significant positive way.

The novelty of this research includes using rural bank credit as the research object. This is because previous studies using Rural Banks as the object of research still need to be bigger in number, especially when compared to research with other commercial bank research objects. In addition, based on the background previously described and the differences in research results conducted by previous researchers, researchers want to conduct more in-depth research to get the latest results regarding the factors that influence lending to rural banks. Researchers also want to conduct research using external and internal banking variables, such as Inflation, BI rate, third-party funds, and NPL. In contrast to previous studies that tend to use multiple linear regression, this study uses the VECM method to identify the long-term and short-term effects of external and internal banking factors that have never been done in previous studies.

## **THEORETICAL REVIEW**

**Credit.** Credit is a form of channelling funds to parties who need funds from those who have excess funds based on the trust of both parties (Sinaga & Masdjojo, 2022). Based on Law No. 10 of 1998, credit refers to providing funds or bills with a value equivalent to the amount of these funds. This is done based on a loan agreement between the parties involved, where the borrower must return the borrowed funds along with the agreed interest within a certain period (L. Sari et al., 2021).

(Andrianto, 2020) argues that credit is required for delivering products, cash, or services in exchange for a mutually agreed-upon settlement period and return for additional principal from one party (credit provider) to another (credit recipient). Fund distribution activities include making a profit, helping the government, and assisting customers. Therefore, banks' lending activities strongly support the community's economic activities and provide benefits for banks through credit interest (Gayo et al., 2022).

The objectives of credit for debtors (customers) and creditors (banks) include generating profits, which is the primary concern for banks in maximising revenue. This includes interest levied by the bank in service fees and administrative fees charged to the customer. The credit helps the customer's company; this loan can be in the form of operating or investment funds, which help expand operations and support local companies. In addition, it also supports the government in carrying out development initiatives. (MSMEs) Moreover, (SMEs) can be developed using credit, thus ensuring the supply of goods and services to meet the wider community's needs (L. M. Sari et al., 2020).

**Inflation.** According to Keynes' theory, Inflation occurs when individuals desire a higher level of living than they can afford. Individuals desire to obtain more goods and services. Since there is a greater demand for goods than supply, prices will be higher (Simanungkalit, 2020).





A widespread increase in prices for goods and services over an extended period is known as Inflation. An increase in prices on one or two goods alone cannot be considered an inflationary condition unless the price increase is widespread, which can cause price increases in the prices of other goods and services (Bank Indonesia, 2020). Inflationary conditions can be caused by an increase in the demand greater than the supply provided, which impacts increasing prices. In addition, the supply side can also cause Inflation with increased production costs that impact price increases (cost-push Inflation) (Susanto & Pangesti, 2020).

When the cost of goods and services rises, there tends to be a decrease in demand for credit loans. This phenomenon arises due to the diminished purchasing power within the community, leading individuals to hesitate to seek loans from banks. (Jufriadi et al., 2022). Within this study, it can be hypothesised that Inflation will negatively influence lending. This assertion aligns with the findings of (Jufriadi et al., 2022). Conversely, this hypothesis contradicts the outcomes of research by (Ramandhana et al., 2018) and (Riyantowo et al., 2021), both indicating that Inflation does not impact credit, as well as (Pinto et al., 2020), which suggests a positive correlation between Inflation and credit.

**Third Party Funds.** Third-party funds are generally obtained from the public and are vital assets for banks in carrying out their operational activities. A bank's success is often measured by its ability to finance its operations through this source of funds (Parenrengi & Hendratni, 2018).

Individuals can deposit money in banks in various ways, including savings accounts, current accounts, and deposits. This money is known as third-party funds. One of the banks' growth can be seen from third-party funds, which means that if the third-party funds are higher, the bank's opportunity to channel financing is also more excellent (Siregar, 2021). If a bank manages to collect or collect a large amount of third-party funds, it will encourage lending at a significant level. On the contrary, when there is a limitation in the amount of third-party funds collected, it directly affects the bank's liquidity, potentially leading to a decrease in the availability of lending. (Pratiwi & Prajanto, 2020). The hypothesis that can be formulated suggests a positive correlation between Third-Party Funds and lending. This proposition is supported by the findings of (Handayani, 2018), (Alfaini & Amin, 2023).

**Non-Performing Loan.** (Kasmir, 2018) argues that NPLs are loans caused by two factors: credit analysis carried out by banks and customer failure, both intentional and unintentional, in fulfilling payment commitments (Abdurrohman et al., 2020).

NPL is a term used to describe banking loans that have failed to make payments according to a predetermined schedule for a certain period. NPL refers to the risk associated with the level of customer inability to fulfil or pay off their obligations or the risk that arises when the debtor cannot fully pay their debts (Wahyu, 2020). NPL reflects credit risk, with the smaller NPL number indicating that the credit risk that the bank must bear is also getting smaller (Khamisah et al., 2020). If the bank's NPL level has an upward trend or is high, the loan disbursed will tend to decrease and vice versa. So, this study hypothesises that NPL has a negative effect on lending. This aligns with research (S Wardani et al., 2018), (Said, 2018).

**BI Rate.** According to classical thinking, the interest rate is essential in regulating the amount of savings and investment in an economy. This is because the amount of savings generated when the economy is at the maximum resource utilisation level will always be balanced with the investment businesses make. The concept of the Fisher Equation Effect highlights that the interest rate can change due to two factors: changes in the real interest rate or changes in the inflation rate (Senen et al., 2020).



It is an interest rate set by Bank Indonesia that reflects Bank Indonesia's monetary policy. This interest rate is announced to the public and is used as one of the tools to control interest rates in the market and influence overall economic activity (Bank Indonesia, 2016). At each monthly meeting of the Board of Governors of Bank Indonesia, the BI Rate is announced and then implemented through monetary operational actions taken by BI. Implementing the BI Rate is done through the regulation of liquidity in the money market, aiming to achieve the operational targets of monetary policy that have been set (Darmawan et al., 2020). The high level of BI rate can cause a decrease in the number of customers interested in taking credit because, generally, bank lending rates will also increase. So, this study hypothesises that the BI rate has a negative effect on lending. This hypothesis aligns with research (Pulungan & Muslih, 2020).

## METHODS

The research adopts a quantitative research design to examine factors associated with the extent of credit extended by rural banks in Indonesia, covering the period from 2008 to 2022. Using the flow of loans disbursed by rural banks as the object of research and the subject of research is the influencing factors, including Inflation, deposits, NPL, and BI rate.

Rural Banks have an essential role in contributing to state revenue and the economy because they have the main activity of lending to the community. Compared to commercial banks whose activities align with the intermediary function and other banking activities, rural banks only carry out activities that focus on the bank's intermediary function. Therefore, lending is the primary source of income earned by rural banks. From year to year, the number of loans disbursed by rural banks also continues to increase. In addition, the amount of assets owned by rural banks continues to increase from the previous years. The increase in the number of assets owned and loans disbursed indicates that the level of public trust in rural banks has increased, and rural banks have also begun to be in demand by the public. Based on this description, the researcher chose rural banks in Indonesia as the object of research.

The data collection method involves gathering secondary time series data from the Indonesian Banking Statistics report provided by the Financial Services Authority. In addition, data is also obtained from Bank Indonesia data and the Indonesian Central Bureau of Statistics with the time brackets of the data used, namely in the period 2008 to 2022, using monthly data.

This study uses a research period from 2008 to 2022. This vast period covers the period before, during and after the global financial crisis in 2008 and 2020. During this period, there were economic fluctuations and changes in monetary policy. Choosing a period that includes both the crisis and recovery can provide insights into how rural banks have adapted to the changing economy. Looking at the upward trend in loan growth during this period can help identify factors that influence lending by rural banks.

The following procedure is used in this study's research technique to assess the long and short-run relationships between variables using the Vector Error Correction Model (VECM):

**Stationary Test.** This is done using the Augmented Dickey-Fuller (ADF) test to determine whether the data used is stationary by looking at the probability value of each variable. Testing can start from the level, the first difference, etc. If the value is greater than 0.050, it is not stationary, and vice versa. If it is smaller than 0.050, it is stationary, and testing can continue.



$$Y_t = \delta Y_{t-1} + U_t \dots\dots\dots (1)$$

If you subtract  $Y_{t-1}$  from the left and right sides, you get:

$$Y_t - Y_{t-1} = \delta Y_{t-1} - Y_{t-1} + U_t \dots\dots\dots (2)$$

$$\Delta Y_t = (\delta - 1)Y_{t-1} + U_t \dots\dots\dots (3)$$

Alternatively, it can be stated as follows:

$$\Delta Y_t = \beta Y_{t-1} + U_t \dots\dots\dots (4)$$

Based on equation 4, it is hypothesised that if  $\beta$  is greater than 0.050, then it is not stationary, and vice versa it is smaller than 0.050, then it is stationary.

**Optimal Lag Length Test.** Conducted to determine how long the lag will be used in the next test. This study used the smallest Akaike Information Criterion (AIC) value. With the following formula:

$$\ln(\text{AIC}) = \ln \dots\dots\dots (5)$$

The above equation states that  $k$  describes the total squared residuals,  $n$  describes the number of observations, and  $k$  describes the independent variables.

**The Optimal Lag Stability** test determines whether the selected lag level is stable for further tests. In the optimal lag stability test results, the lag is considered stable if the root value has a modulus smaller than one.

**Cointegration Test.** This test determines whether there is cointegration between the variables used. If cointegration is found, it signifies the relationship's stability in the long run and indicates that the VECM test can proceed.

**Granger Causality Test.** This test is conducted to see the causal relationship or causality between the variables used. This test is used to see whether the variables have a one or two-way relationship. With the following hypothesis, if it is greater than 0.050, then there is no causality. Whereas if it is smaller than 0.050, there is causality

**VECM Test.** This test is conducted to analyse the relationship between variables in the long and short term. In this study, we will look at the causality relationship between the level of credit, third-party funds (DPK), non-performing loan (NPL), Inflation and interest rate (BI rate) with the following equation:

$$KRDT = C_1 + a_{1i} \sum_{i=1}^k INF_{t-k} + a_{1i} \sum_{i=1}^k DPK_{t-k} + a_{1i} \sum_{i=1}^k NPL_{t-k} + a_{1i} \sum_{i=1}^k BIRT_{t-k} + \varepsilon_1 \dots\dots\dots (6)$$

In equation (6), the credit variable (KRDT) is the dependent variable, with Inflation (INF), DPK, NPL, and the BI rate (BIRT) as independent variables that will affect KRDT.

$$INF = C_2 + a_{2i} \sum_{i=1}^k KRDT_{t-k} + a_{2i} \sum_{i=1}^k DPK_{t-k} + a_{2i} \sum_{i=1}^k NPL_{t-k} + a_{2i} \sum_{i=1}^k BIRT_{t-k} + \varepsilon_2 \dots\dots\dots (7)$$





In equation (7), the inflation variable (INF) becomes the dependent variable, with the credit variable (KRDT), DPK, NPL, and BI rate (BIRT) as independent variables that will affect INF.

$$DPK = C_3 + a_{3i} \sum_{i=1}^k KRDT_{t-k} + a_{3i} \sum_{i=1}^k INF_{t-k} + a_{3i} \sum_{i=1}^k NPL_{t-k} + a_{3i} \sum_{i=1}^k BIRT_{t-k} + \varepsilon_3 \dots \dots \dots (8)$$

Equation (8) looks at the influence of the credit variable (KRDT), Inflation (INF), NPL, and the BI rate (BIRT) on the level of deposits in rural banks.

$$NPL = C_4 + a_{4i} \sum_{i=1}^k KRDT_{t-k} + a_{4i} \sum_{i=1}^k INF_{t-k} + a_{4i} \sum_{i=1}^k DPK_{t-k} + a_{4i} \sum_{i=1}^k BIRT_{t-k} + \varepsilon_4 \dots \dots \dots (9)$$

Equation (9) looks at the influence of the credit variable (KRDT), Inflation (INF), DPK, and the BI rate (BIRT) on the level of NPL in rural banks.

$$BIRT = C_5 + a_{5i} \sum_{i=1}^k KRDT_{t-k} + a_{5i} \sum_{i=1}^k INF_{t-k} + a_{5i} \sum_{i=1}^k DPK_{t-k} + a_{5i} \sum_{i=1}^k NPL_{t-k} + \varepsilon_5 \dots \dots \dots (10)$$

Equation (10) looks at the level of influence of the credit variable (KRDT), Inflation (INF), DPK, and NPL on the BI rate (BIRT).

## RESULTS

The study used VECM to determine the long-term and short-term effects of external and internal banking factor variables. VECM testing goes through the stages of testing.

**Stationary Test.** The stationary test determines that the data is stationary by looking at the probability value. If the probability is greater than 0.050, it is not stationary, and vice versa. This test is also carried out at the first and second difference levels until the data is stationary.

**Table 1.** Stationary Test Results

| Variable        | Level       |                | 1 <sup>st</sup> difference |             |
|-----------------|-------------|----------------|----------------------------|-------------|
|                 | Probability | Information    | Probability                | Information |
| Lending [KRDT]  | 0.995       | Non-stationary | 0.000                      | Stationary  |
| Inflation [INF] | 0.096       | Non-stationary | 0.000                      | Stationary  |
| Deposits [DPK]  | 0.999       | Non-stationary | 0.000                      | Stationary  |
| [NPL]           | 0.112       | Non-stationary | 0.001                      | Stationary  |
| BI Rate [BIRT]  | 0.203       | Non-stationary | 0.000                      | Stationary  |

Source: Research Data, 2023

**Table 1** shows that the probability level values of all variables show non-stationary conditions. This is because the resulting probability value exceeds the significance level of 0.050. Therefore, further stationarity testing is required at the first difference.

The stationary test using ADF at the first Difference level shows that each variable has a probability value of less than 0.050. The KRDT, INF, DPK, and BIRT variables have a probability value 0.000, while the NPL variable has a probability value 0.001. Thus, this research is stationary at the first difference.



**Optimal Lag Length Test.** The optimal lag length test determines the most appropriate number of lags to be included in the model. This study uses the AIC value criterion, with the smallest value taken.

**Table 2.** Optimal Lag Length Test Results

| Lag | LogL      | LR      | FPE       | AIC            | SC      | HQ      |
|-----|-----------|---------|-----------|----------------|---------|---------|
| 0   | -3107.136 | NA      | 4.42e+09  | 36.399         | 36.491* | 36.437  |
| 1   | -3043.138 | 123.505 | 2.80e+09  | 35.943         | 36.494  | 36.167* |
| 2   | -3015.778 | 51.201* | 2.73e+09* | <b>35.916*</b> | 36.926  | 36.326  |
| 3   | -3002.517 | 24.041  | 3.14e+09  | 36.053         | 37.523  | 36.649  |
| 4   | -2992.783 | 17.076  | 3.76e+09  | 36.231         | 38.160  | 37.014  |
| 5   | -2974.540 | 30.939  | 4.09e+09  | 36.310         | 38.699  | 37.280  |
| 6   | -2962.319 | 20.011  | 4.79e+09  | 36.460         | 39.308  | 37.615  |
| 7   | -2948.746 | 21.432  | 5.54e+09  | 36.594         | 39.901  | 37.935  |
| 8   | -2932.534 | 24.649  | 6.24e+09  | 36.696         | 40.463  | 38.225  |

Source: Research Data, 2023

**Table 2** shows the results of the optimal Lag Length Test that will be used for further research to overcome autocorrelation. Based on the criteria used, namely the smallest value of the results (AIC), the optimal lag length is selected, namely the second lag with the smallest AIC value of 35.916. Therefore, the following testing process will use the second lag length.

**Optimal Lag Stability Test.** The optimal lag stability test determines the level of lag selected in a stable condition to be used for the next test.

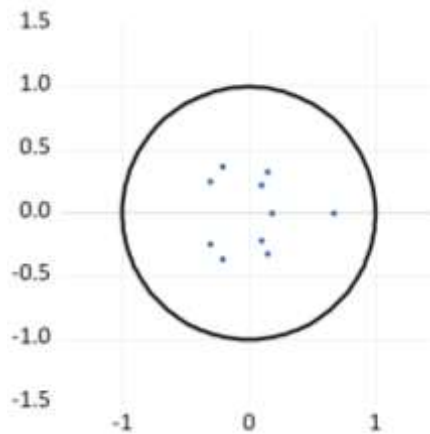
**Table 3.** Optimal Lag Stability Test Results

| Root            | Modulus |
|-----------------|---------|
| 0.675           | 0.675   |
| -0.209 - 0.368i | 0.423   |
| -0.209 + 0.368i | 0.423   |
| -0.303 - 0.250i | 0.393   |
| -0.303 + 0.250i | 0.393   |
| 0.152 - 0.327i  | 0.360   |
| 0.152 + 0.327i  | 0.360   |
| 0.103 - 0.217i  | 0.240   |
| 0.103 + 0.217i  | 0.240   |
| 0.1831          | 0.183   |

Source: Research Data, 2023

After obtaining the optimal lag length test results at the second lag, conduct the optimal lag stability test. **Table 3** shows that all root values have a modulus value smaller than one. This means the optimal lag length used in the next test is stable. Testing the stability of the optimal lag can also be done with diagrams.





**Figure 4.** Inverse Roots of AR Characteristic Polynomial

Source: Research Data, 2023

**Figure 4** shows the results of the inverse roots AR characteristic polynomial value at the second lag length, where each point describing the root's value is entirely inside the circle line. This can mean that the root's modulus value is less than one and is stable and feasible for further testing.

**Cointegration Test.** The cointegration test is conducted to see whether or not there is a cointegration relationship between variables. If there is cointegration, it indicates a long-term relationship. Moreover, the VECM test can be performed.

**Table 4.** Cointegration Test Result

| Unrestricted Cointegration Rank Test (Tance)              |                           |            |                 |             |                  |
|---|---------------------------|------------|-----------------|-------------|------------------|
| Hypothesised  | Hypothesised No. of CE(s) | Eigenvalue | Trace Statistic | 0.050 Value | Critical Prob.** |
| None *  |                           | 0.336      | 255.593         | 69.819      | 0.000            |
| At most 1 *   |                           | 0.317      | 183.411         | 47.856      | 0.000            |
| At most 2 *   |                           | 0.253      | 116.222         | 29.797      | 0.000            |
| At most 3 *   |                           | 0.219      | 64.913          | 15.495      | 0.000            |
| At most 4 *   |                           | 0.115      | 21.407          | 3.842       | 0.000            |
| Unrestricted Cointegration Rank Test (Maximum Eigenvalue) |                           |            |                 |             |                  |
| Hypothesised  | Hypothesised No. of CE(s) | Eigenvalue | Trace Statistic | 0,050 Value | Critical Prob.** |
| None *  |                           | 0.336      | 72.181          | 33.877      | 0.000            |
| At most 1 *   |                           | 0.317      | 67.189          | 27.584      | 0.000            |
| At most 2 *   |                           | 0.253      | 51.309          | 21.132      | 0.000            |
| At most 3 *   |                           | 0.219      | 43.506          | 14.265      | 0.000            |
| At most 4 *   |                           | 0.114      | 21.407          | 3.8415      | 0.000            |

Source: Research Data, 2023

After testing the stability of the optimal lag, we proceed with cointegration testing. **Table 4** shows the cointegration test results conducted using the Johansen cointegration test. From the test results, the probability value in row none, most 1-4 both from the Tance test results and the maximum Eigenvalue of 0.000 is smaller than 0.050. This implies that the variables used are cointegrated in the long run. Therefore, VECM testing can proceed.



**Granger Causality Test.** The Granger causality test is conducted to see the causal relationship between two variables by looking at the probability value. If it is greater than 0.050, then there is no causality. Conversely,

**Table 5.** Granger Causality Test Results

|      | Null Hypothesis        |      | Obs | F-Statistic | Prob. |
|------|------------------------|------|-----|-------------|-------|
| INF  | does not Granger Cause | KRDT | 178 | 0.579       | 0.562 |
| KRDT | does not Granger Cause | INF  |     | 1.362       | 0.260 |
| DPK  | does not Granger Cause | KRDT | 178 | 4.054       | 0.019 |
| KRDT | does not Granger Cause | DPK  |     | 4.264       | 0.016 |
| NPL  | does not Granger Cause | KRDT | 178 | 3.773       | 0.025 |
| KRDT | does not Granger Cause | NPL  |     | 1.255       | 0.288 |
| BIRT | does not Granger Cause | KRDT | 178 | 0.266       | 0.767 |
| KRDT | does not Granger Cause | BIRT |     | 4.090       | 0.018 |
| DPK  | does not Granger Cause | INF  | 178 | 0.705       | 0.495 |
| INF  | does not Granger Cause | DPK  |     | 2.113       | 0.124 |
| NPL  | does not Granger Cause | INF  | 178 | 0.671       | 0.513 |
| INF  | does not Granger Cause | NPL  |     | 0.479       | 0.620 |
| BIRT | does not Granger Cause | INF  | 178 | 2.457       | 0.089 |
| INF  | does not Granger Cause | BIRT |     | 8.950       | 0.000 |
| NPL  | does not Granger Cause | DPK  | 178 | 4.579       | 0.012 |
| DPK  | does not Granger Cause | NPL  |     | 2.671       | 0.072 |
| BIRT | does not Granger Cause | DPK  | 178 | 1.877       | 0.156 |
| DPK  | does not Granger Cause | BIRT |     | 1.693       | 0.187 |
| BIRT | does not Granger Cause | NPL  | 178 | 1.063       | 0.348 |
| NPL  | does not Granger Cause | BIRT |     | 2.654       | 0.073 |

Source: Research Data, 2023

**Table 5** shows the Granger Causality Test Results, which explain that the INF variable has no significant effect on the KRDT variable, with a probability value of 0.562. Likewise, the KRDT variable does not significantly affect the INF variable, indicated by a probability value of 0.259. Therefore, it can be concluded that there is no two-way causality relationship between the two variables.

The DPK variable significantly impacts credit, as indicated by a probability value of 0.019. Simultaneously, the credit variable is statistically proven to influence the level of deposits, with a probability value of 0.016. Hence, a mutual causality relationship exists between the level of deposits and credit, signifying a two-way influence.

The NPL variable, with a probability value of 0.0250, is known to have a considerable impact on credit; however, credit has no statistically significant effect on the NPL level, with a probability value of 0.288. The NPL and credit variables are causally related in a one-way fashion.

Because the probability value is 0.767, it is recognised that the BI rate variable has no discernible impact on credit. Nonetheless, with a probability value of 0.018, the credit variable significantly affects the BI rate variable. As a result, there is a one-way causal relationship between the BI rate variable and credit, with credit influencing the BI rate.

It is known that the DPK variable and Inflation do not significantly influence each other. This is because the Prob. The value of DPK's effect on Inflation is 0.495, and vice versa; the effect of Inflation on DPK is the Prob. The value is 0.124. Thus, it can be interpreted that there is no two-way causality between the DPK variable and Inflation.

It is known that the NPL variable has no significant effect on Inflation, with a Prob value of 0.513. Moreover, vice versa, the inflation variable has no significant effect on NPL,





with a prob value of 0.620. Therefore, there is no two-way causality between these two variables.

Based on the test results, a probability value 0.089 shows that the BIRT has no discernible effect on the inflation rate. However, as the probability value 0.000 indicates, the inflation rate significantly affects the BIRT. Thus, the BIRT and Inflation have a unidirectional relationship in which variations in the inflation rate impact the BIRT.

It is known that the NPL variable has a significant influence on the DPK variable, with a prob value of 0.012. However, the DPK variable does not significantly influence NPL, with a prob value of 0.072. This means there is a one-way causality between these two variables, with NPL influencing DPK.

It is known that the BI rate has no effect on DPK with a prob. value of 0.156, and vice versa; the DPK variable has no significant effect on the BI rate with a prob value of 0.187. Thus, there is no two-way causality between these two variables.

It is established that the BI rate variable does not substantially impact NPL, as indicated by the probability value of 0.348. On the other hand, the NPL variable does not affect the BI rate, with a Probability value of 0.732. This means that between the two variables, there is no two-way causality.

**VECM Test.** In VECM testing, to see whether the independent variable has a significant or insignificant influence on the dependent variable, it is seen from the t statistic value, which is greater or less than the t table value. In this study, the t-table value was obtained (1.974). If smaller than the t table, the independent variable has no significant effect on the dependent variable. Moreover, vice versa, if the t statistic is greater than the t table, then the independent variable has a significant effect on the dependent variable.

**Table 6.** Long-Term VECM Test Result

| VECM long-term<br>CointegratingEq: | D(KRDT(-1)) | D(INF(-1))                        | D(DPK(-1))                    | D(NPL(-1))                        | D(BI_RATE(-1))                    | C        |
|------------------------------------|-------------|-----------------------------------|-------------------------------|-----------------------------------|-----------------------------------|----------|
| CointEq1                           | 1.000       | -285.935<br>(148.383)<br>[-1.927] | -0.189<br>(0.076)<br>[-2.476] | -744.128<br>(281.041)<br>[-2.648] | -634.634<br>(405.844)<br>[-1.564] | -504.126 |

Source: Research Data, 2023

**Table 6** explains that Inflation does not significantly influence the lending level in the long run. Inflation has a t statistic value of -1.927, smaller than the t table (1.974).

The BI rate does not significantly influence lending levels. This is because the BI Rate has a t statistic value of -1.564, smaller than the t table (1.974).

DPK has a significant effect on lending, with a t statistic value of -2.476, greater than 1.974, and also has a negative effect on lending of -0.189. Thus, DPK significantly negatively affects rural bank lending.

Then NPL significantly affects lending with a t statistic value of -2.648, greater than 1.974, and also has a negative effect on credit of -744.128. Therefore, the NPL variable significantly affects rural bank lending in the long run.

**Table 7.** Short-Term VECM Test Result

| VECM Short-Term<br>Error Correction: | D(KRDT,2)                     | D(INF,2)                       | D(DPK,2)                     | D(NPL,2)                          | D(BIRT,2)                         |
|--------------------------------------|-------------------------------|--------------------------------|------------------------------|-----------------------------------|-----------------------------------|
| CoinEq1                              | -1.292<br>(0.171)<br>[-7.561] | 0.000<br>(9.4E-05)<br>[ 1.985] | 0.515<br>(0.207)<br>[ 2.492] | 7.03E-05<br>(6.6E-05)<br>[ 1.059] | 6.68E-05<br>(2.6E-05)<br>[ 2.594] |



|               |                                   |                                   |                                   |                                    |                                    |
|---------------|-----------------------------------|-----------------------------------|-----------------------------------|------------------------------------|------------------------------------|
| D(KRDT(-1),2) | -0.055<br>(0.133)<br>[-0.416]     | -0.000<br>(7.3E-05)<br>[-1.858]   | -0.440<br>(0.161)<br>[-2.733]     | -1.55E-05<br>(5.2E-05)<br>[-0.299] | -3.24E-05<br>(2.0E-05)<br>[-1.618] |
| D(KRDT(-2),2) | -0.087<br>(0.078)<br>[-1.111]     | -9.30E-05<br>(4.3E-05)<br>[-2.23] | -0.245<br>(0.095)<br>[-2.586]     | 3.27E-05<br>(3.0E-05)<br>[ 1.076]  | -9.84E-06<br>(1.2E-05)<br>[-0.834] |
| D(INF(-1),2)  | -95.217<br>(135.682)<br>[-0.702]  | -0.295<br>(0.075)<br>[-3.950]     | 25.966<br>(164.140)<br>[ 0.158]   | 0.011<br>(0.053)<br>[ 0.213]       | 0.052<br>(0.020)<br>[ 2.521]       |
| D(INF(-2),2)  | -222.875<br>(133.393)<br>[-1.671] | -0.334<br>(0.0733)<br>[-4.548]    | -106.529<br>(161.371)<br>[-0.660] | 0.023<br>(0.052)<br>[ 0.449]       | 0.0279<br>(0.020)<br>[ 1.388]      |
| D(DPK(-1),2)  | -0.173<br>(0.064)<br>[-2.704]     | 1.69E-05<br>(3.5E-05)<br>[ 0.481] | -0.566<br>(0.078)<br>[-7.298]     | -3.52E-05<br>(2.5E-05)<br>[-1.416] | -8.86E-06<br>(9.7E-06)<br>[-0.918] |
| D(DPK(-2),2)  | 0.0124<br>(0.062)<br>[ 0.202]     | 4.04E-05<br>(3.4E-05)<br>[ 1.195] | -0.297<br>(0.074)<br>[-3.989]     | 4.55E-05<br>(2.4E-05)<br>[ 1.905]  | 6.36E-06<br>(9.3E-06)<br>[ 0.687]  |
| D(NPL(-1),2)  | -433.288<br>(195.909)<br>[-2.212] | 0.068<br>(0.108)<br>[ 0.634]      | 40.232<br>(237.000)<br>[ 0.170]   | -0.647<br>(0.076)<br>[-8.498]      | 0.006<br>(0.030)<br>[ 0.187]       |
| D(NPL(-2),2)  | -189.728<br>(178.583)<br>[-1.062] | 0.044<br>(0.098)<br>[ 0.449]      | 362.463<br>(216.040)<br>[ 1.678]  | -0.438<br>(0.069)<br>[-6.319]      | -0.000<br>(0.027)<br>[-0.005]      |
| D(BIRT(-1),2) | -724.951<br>(509.570)<br>[-1.423] | 0.243<br>(0.280)<br>[ 0.869]      | 1644.010<br>(616.450)<br>[ 2.667] | 0.247<br>(0.198)<br>[ 1.245]       | -0.368<br>(0.077)<br>[-4.792]      |
| D(BIRT(-2),2) | -182.273<br>(510.437)<br>[-0.357] | -0.130<br>(0.281)<br>[-0.462]     | 274.764<br>(617.499)<br>[ 0.445]  | 0.577<br>(0.198)<br>[ 2.909]       | -0.083<br>(0.077)<br>[-1.080]      |
| C             | 3.742<br>(84.808)<br>[ 0.044]     | -0.006<br>(0.047)<br>[-0.131]     | 8.211<br>(102.596)<br>[ 0.080]    | -0.002<br>(0.032)<br>[-0.066]      | 0.0032<br>(0.013)<br>[ 0.254]      |

Source: Research Data, 2023

**Table 7** explains that Inflation does not significantly influence the lending level in the short term. Inflation has a t statistic value of -0.702, smaller than the t table (1.974).

DPK has a significant effect on lending, with a t statistic value of -2.704 greater than 1.974, and also has a negative effect on lending of -0.173. Thus, DPK significantly negatively affects rural bank lending.

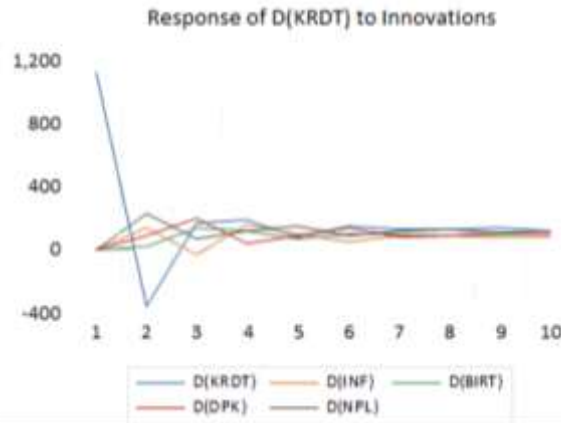
Then, NPL significantly affects lending with a t statistic value of -2.212, greater than 1.974, and it also has a negative effect on credit of -433.288. Therefore, the NPL variable significantly affects rural bank lending in the long run.

The BI rate does not significantly influence the level of lending. This is because the BI rate has a t statistic value of -0.702, smaller than the t table (1.974).

#### Impulse Response Test (IR).

The IR test measures the response of variables in the model to changes in shocks from other variables.





**Figure 5.** Impulse Response Test Results  
Source: Research Data, 2023

**Figure 5** shows the response of KRDT to the effects of shocks given by INF, BIRT, DPK, and NPL. In the first period, KRDT was not given any shocks by INF, BIRT, DPK, or NPL. In the second period, the shock caused by KRDT decreased dramatically. While INF, BIRT, DPK, and NPL began to give shocks, KRDT responded positively or increased. In the third period, the response of KRDT itself increased due to its influence. Then, the shocks on BIRT and DPK increased, but on INF and NPL, they decreased. Furthermore, until period 7, the shocks fluctuate; in period 8, KRDT begins to respond to the influence given stably until the next period.

**Variance Decomposition Test (VD).** s conducted to identify how much each variable contributes to fluctuations or changes in other variables over some time.

**Table 8** Variance Decomposition Test Results

| Period | D(KRDT) | D(INF) | D(BIRT) | D(DPK) | D(NPL) |
|--------|---------|--------|---------|--------|--------|
| 1      | 100.000 | 0.000  | 0.000   | 0.000  | 0.000  |
| 2      | 94.395  | 1.442  | 0.030   | 0.574  | 3.560  |
| 3      | 90.426  | 1.415  | 1.234   | 3.233  | 3.692  |
| 4      | 87.666  | 2.808  | 2.062   | 3.138  | 4.325  |
| 5      | 85.398  | 3.312  | 2.275   | 3.521  | 5.494  |
| 6      | 83.564  | 3.345  | 2.787   | 4.514  | 5.790  |
| 7      | 81.790  | 3.737  | 3.286   | 4.759  | 6.428  |
| 8      | 80.145  | 4.042  | 3.585   | 5.087  | 7.142  |
| 9      | 78.649  | 4.264  | 3.977   | 5.585  | 7.534  |
| 10     | 77.175  | 4.510  | 4.348   | 5.924  | 8.044  |

Source: Research Data, 2023

**Table 8** explains Variance Decomposition test results where, in period 1, KDRT is influenced by itself by 100 per cent. In the second period, KRDT is still dominated by the influence of itself by 94 per cent, followed by INF at 1.440 per cent, BIRT at 1.230 per cent, DPK at 3.230 per cent, and NPL at 3.560 per cent. For period three and the following periods, the influence given to KRDT is still dominated by KRDT itself but somewhat decreased. The influence given by INF, BIRT, DPK, and NPL is small, but the contribution of the influence is increased.



## DISCUSSION

**External factors.** This study used external variables, such as Inflation and BI rate. The VECM test results show that these variables have no significant effect on rural bank loans.

**The Effect of Inflation on Credit Disbursement of Rural Banks.** In this study, the inflation variable has a negative effect but not significantly both in the short and long term. If there is an increase in Inflation, it will be able to reduce rural bank lending, but the effect is not significant. This result is inversely proportional to the hypothesis that Inflation has a significant negative influence. However, these findings are the results of the findings conducted (Arsyad & Haeruddin, 2022), which state that Inflation has a negative and insignificant effect on lending.

**The Effect of BI Rate on Credit Disbursement of Rural Banks.** Like the Inflation variable results, in this study, the benchmark interest rate also had a negative effect but not significantly both in the short and long term. It can be interpreted that an increase in the BI rate can reduce RURAL BANK lending, but the effect caused is not significant. This result is inversely proportional to the hypothesis that has been described that the BI rate has a significant level of influence negatively. However, this study's results align with research conducted (Kurniati & Putri, 2020), which states that the BI rate has a negative and insignificant effect on lending.

**Internal Factors.** Internal factor variables in this study consist of third-party funds and non-performing loans. The results of the VECM test show that the variables of third-party funds and non-performing loans significantly influence rural bank loans in both the long and short term.

**Effect of NPL on Lending of Rural Banks.** NPL significantly negatively influences the level of RURAL BANK lending, both in the long and short term. This can be interpreted as any increase in the level of NPL will be able to reduce the distribution of Rural Bank loans. This result is in line with the theory that NPLs have a negative effect on bank lending. Having a high NPL level indicates that the credit risk that the bank must bear is also getting higher. This can later affect banks' lending procedures (Kusumawardani, 2023). Banks will be more careful when lending to customers. Banks tend to reduce customer loans because this can reduce the risk whenever third parties withdraw funds from the bank (Jufriadi et al., 2022). The high level of NPL owned by the bank can also reduce customer confidence. Because of this, the level of credit disbursed can decrease. The findings of this study align with previous research conducted by (Said, 2018) and (S Wardani et al., 2018), which state that NPL has a significant adverse effect on the level of lending.

**Effect of Third Party Fund on Lending of Rural Banks.** It is obtained that the variable Third Party Fund has a significant but negative impact on the level of lending in Rural Banks both in the long and short term. This finding contradicts the theory, which states that the Third Party Fund should positively impact the level of credit disbursed. However, this can happen because, in this research period, the level of deposits in rural banks is experiencing an upward trend but is also accompanied by NPL rates that tend to be high. BI regulation No. 17/11/PBI/2015 states that the ideal bank NPL rate is a maximum of 5 per cent. However, in this research period, the NPL level of rural banks was dominated by more than 5 per cent. Therefore, even though bank deposits have increased, by having an NPL level that tends to be high, banks will be more careful in carrying out lending activities because the risk of default still tends to be high. Moreover, the study's results show





that the level of deposits significantly negatively affects lending. These results align with research (Wau, 2019), which states that third-party funds negatively affect bank lending.

## CONCLUSION

Based on the results of the VECM test, external factors consisting of inflation variables and the BI benchmark interest rate do not influence the level of lending carried out by rural banks in the short and long term. Rural bank lending activities are influenced by internal factors, namely third-party funds and non-performing loans (NPL). Both variables have a significant but negative effect on credit. In the non-performing loan variable, the increase in the level of NPL owned by the bank indicates that the risk of bank loans will also be high. Banks will tend to reduce the amount of credit disbursed. In addition, the level of customer confidence in the bank will also decrease. So that the level of credit disbursed has decreased. Meanwhile, third-party funds have a negative effect because the level of deposits in rural banks is on an upward trend but is also accompanied by a predominantly high NPL rate above 5 per cent. Under such conditions, banks will generally be more careful in lending activities, so the study's results can produce the level of third-party funds to significantly influence the amount of credit channelled by rural banks.

With the results of this study, it is suggested or expected that rural banks can improve their ability in credit risk management, which is expected to reduce the high level of NPL ownership. Rural banks can develop marketing strategies and bank services and products in the hope that having more innovative products can increase customer interest in credit products. Conduct socialisation of financial education programs to improve the community's or customers' financial literacy. The government can also strengthen supervision and regulations on rural banks to ensure that existing banks can meet the applicable regulatory standards. With better regulations, it can help prevent crises. For future researchers, conducting a more in-depth study of rural bank lending is recommended to help refine the shortcomings of this study and provide deeper insights. Researchers can also develop this research by comparing it with other rural banks and adding variables to provide a better understanding.

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