# ANALYSIS OF THE INFLUENCE OF BANK INTERNAL FACTORS AND MACROECONOMIC CONDITIONS ON NON PERFORMING LOAN (NPL) OF COMMERCIAL BANKS IN INDONESIA

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**ABSTRACT**
The purpose of this study is to determine the impact of bank internal factors and macroeconomic conditions on non-performing loans (NPL). The variables used are the capital adequacy ratio (CAR), loan to deposit ratio (LDR), bank size, gross domestic product (GDP), inflation, and the BI rate. The method used is a quantitative method with secondary data in the form of financial statements of 5 banks as research objects. The data analysis technique used is panel data regression, hypothesis testing using the t-test to test the effect of variables partially and the F test to test the effect of variables simultaneously with a significant level of 5%. Based on these results it was concluded that partially the LDR and the BI Rate had a significant effect on NPL. Meanwhile, CAR, bank size, GDP and inflation have no significant effect on NPL. Simultaneously, all independent variables have a significant effect on the level of NPL influence.

**Keywords:** bank, macroeconomics, non-performing loans (NPL)

## INTRODUCTION

Banks are intermediary institutions that have a very vital role in the economy, especially in managing public funds. In the intermediary function, banks facilitate funding from parties who have excess funds and those who need funds (Mukhlis, 2015). Selling trust to customers is a form of banking in running its business, therefore banks attract as many customers as possible by providing maximum credit. For this reason, banks provide various kinds of credit facilities that can be distributed to the public. It is possible that from the large amount of credit extended to the public, a bank may experience problems in the form of bad credit to its customers. The occurrence of bad or problem loans is indicated by the Non Performing Loans (NPL) ratio. The five banks with the largest total assets represent lending to commercial banks in Indonesia. Based on total assets and credit distribution, it can be seen if the five banks have an important contribution to the banking sector and dominate the market share of funds in Indonesia. The total assets of large banks in Indonesia in the 2018-2022 period can be seen in Figure 1 below:
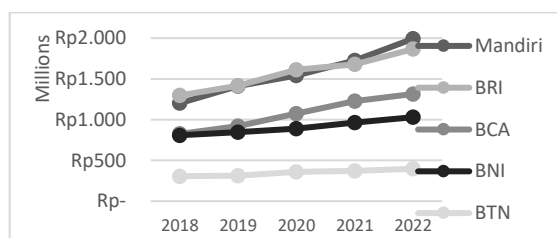


**Figure 1**. Total Assets of the Five Largest Banks in Indonesia
**Source: Financial Services Authority 2022 (processed)**

According to data obtained from Otoritas Jasa Keuangan, five commercial banks have dominated the banking industry in the last five years, namely PT. Bank Mandiri (Persero) Tbk, PT. Bank Rakyat Indonesia (Persero) Tbk, PT. Bank Central Asia Tbk, PT. Bank Negara Indonesia (Persero) Tbk, and PT. Bank Tabungan Negara (Persero) Tbk. Based on this graph, in the 2018-2022 period the total assets of these banks experienced an

uptrend. This shows that lending increases every year. Banks with large assets or assets have the possibility of obtaining greater profits and lending if followed by good managerial skills (Hamdani et al., 2018).

If a non-performing loan in a bank has a large ratio, it will have an impact on the bank in the form of not being received back the distributed funds causing losses (Wahyuningsih, 2021). Therefore, it is important to study the factors that influence NPLs, such as the internal and external factors of the bank. Credit given to customers is inseparable from risks. One of the risks in the banking sector is credit risk. This risk occurs because the debtor is unable to pay interest and loan funds that must be paid to the creditor bank. This risk is called the Non Performing Loan (NPL) or non-performing loan ratio. Non-Performing Loans are caused by internal and external bank elements such as economic conditions, inflation, etc. (Kasmir, 2013). Based on the NPL ratio, it is a ratio between the number of substandard, doubtful and loss loans to the total loans disbursed.
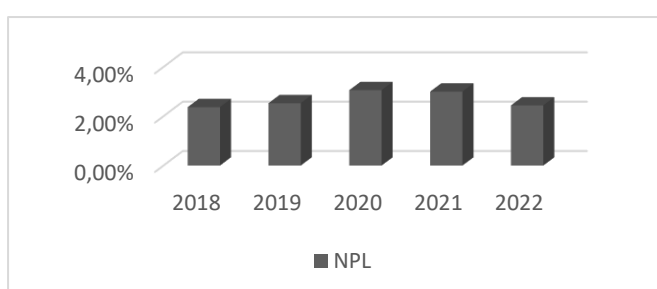


**Figure 2.** NPL data for commercial banks in Indonesia in 2018-2022
**Source: Otoritas Jasa Keuangan 2022**

Based on this graph, non-performing loans for commercial banks in Indonesia in 2018-2022 show a figure below 5%, which in this case is in accordance with Bank Indonesia regulations (Peraturan Otoritas Jasa Keuangan, 2017). Although the value of the NPL ratio is still below the predetermined limit, it is necessary to watch out for several reasons. The decline in a country's economic condition is one of the reasons for an increase in the NPL ratio (Palupi & Azmi, 2019).

Much research has been carried out on the Capital Adequacy Ratio (CAR), one of which is research by Umaternate & Mongid (2023) which shows that the CAR variable has a significant negative effect on non-performing loans (NPL). However, research conducted by Irawan & Syarif (2019) showed different results, namely CAR has no effect on NPL.

Research on loan to deposit ratio (LDR) has also been carried out by Astrini et al. (2018), the results show that LDR has a significant positive effect on NPL. Meanwhile, research conducted by Umaternate & Mongid (2023) shows that LDR has a non-significant negative effect on NPL.
Research on the effect of bank size on non-performing loans (NPL) was conducted by Gustriani et al. (2023) which shows that bank size has a negative effect on NPL. However, research conducted by Mahendra & Mahardika (2019) showed different results, in this study bank size had no effect on NPL.

Research on Gross Domestic Product (GDP) conducted by (Isnaini et al., 2019) shows that GDP has a significant effect on NPL. While different results were shown in the study of Kartikasary et al. (2020) where GDP has no effect on NPL. Research on the effect of macroeconomic variables on NPL conducted by Prasetyo (2020) shows that macroeconomic variables have a significant positive effect on bank NPL. Meanwhile, a different study by Isnaini et al. (2019) which shows that inflation has no effect on bank NPLs. Research on the BI rate conducted by Setya Wijaya (2019) shows that the BI rate has an effect on bank NPLs. Different research results were shown by Isnaini et al. (2019) where the BI rate has no effect on bank NPLs. Based on the background and gaps of previous research, the purpose of this study is to determine the impact of internal banking

factors and macroeconomic conditions on non performing loans commercial banks in Indonesia with case studies on the five commercial banks with the largest assets in Indonesia in the 2022 period.

## LITERATURE REVIEW

### Intermediation Theory
The intermediation theory discusses one of the banking functions as a supporter of the economy in a country. Through the intermediary function, the bank becomes an intermediary party that collects funds from those with excess funds and distributes them to those with a shortage of funds. Banks have an important role in a country's economy, namely, expediting the payment system, implementing monetary policy, maintaining financial stability so that banking conditions must be ensured to be stable so as not to affect the course of the economy (Triandaru & Budisantoso, 2006). This intermediary function is important so that the economy can run well and achieve economic stability. When a bank allocates funds to parties who need funds, the bank will receive credit interest income which becomes a profit for the bank.

### Banks as Supporters of the State Economy
The banking sector is one of the most important industries in a country's economy. Mukhlis (2015) considers a bank institution to be in line with a country's economic growth, the higher the country's economic growth, the greater the role of the bank institution. Banks are business entities that collect funds originating from the public in the form of savings and provide them to the public in the form of credit or other forms to improve people's living standards (Government Regulation, 1998). The Bank collects funds from parties who have excess funds in the form of deposits, demand deposits and other deposits for parties or the public who lack funds. According to Triandaru & Budisantoso (2006). The Bank has the function of being an agent of development, agent of trust, and agent of service. In carrying out the intermediary function, where collecting funds from the public requires an element of trust. In addition, the activities of collecting and distributing these funds are needed for the smooth running of economic development activities, such as production, distribution, etc. In addition, banks also provide services to the public in the form of banking services such as letters of credit, money transfers, ATMs, etc.

### Credit as Main Bank Income
According to Kasmir (2013) credit is a bill or provision of money based on an agreement or agreement between the debtor and creditor, where the debtor is required to pay predetermined credit interest. The source of bank income is interest income, this is also the main income for banks. In addition to interest income, the bank also obtains non-interest income sources from providing financial services and other non-operational activities. The amount of interest on credit is affected by interest on deposits, the greater the amount of interest on deposits, the greater the amount of interest on credit or loans. Therefore, collecting and distributing these funds is the main activity and income in a bank. Giving credit to debtors needs to be analyzed with 5C namely, character, capacity/capability, capital, collateral, dan condition. This needs to be done to minimize the occurrence of problem loans or non performing loan (NPL).

### Research Gap
Much research has been carried out on the Capital Adequacy Ratio (CAR), one of which is research by Umaternate & Mongid (2023) on the effect of macroeconomics and bank internal factors on NPL, showing that the CAR variable has a significant negative effect on non-performing loans (NPL). This means that when a bank's CAR is higher, the bank's credit risk will be lower. Other studies have shown similar results which state that CAR has a significant negative effect on NPL (Astrini et al., 2018). However, research conducted by Irawan & Syarif (2019) showed different results, namely CAR has no effect on NPL. If the CAR is higher, the greater the bank's ability to minimize problem loans with the capital reserves owned by the bank.

Research on loan to deposit ratio (LDR) has also been carried out by Astrini et al. (2018), the results show that LDR has a significant positive effect on NPL. This means that the higher the LDR, the NPL ratio will also increase in the bank, conversely if the LDR is lower, the NPL ratio will decrease. Meanwhile, research conducted by Umaternate & Mongid (2023) shows that LDR has a non-significant negative effect on NPL. This means that the NPL has a tendency for a bank with a high LDR ratio to have a low NPL ratio.

Research on the effect of bank size on non-performing loans (NPL) was conducted by Gustriani et al. (2023) which shows that bank size has a negative effect on NPL. This means that a bank that has large assets can manage its funds better, including in managing its credit risk, so the greater the assets, the smaller the credit risk if followed by good managerial management. However, research conducted by Mahendra & Mahardika (2019) showed different results, in this study bank size had no effect on NPL.

Research on Gross Domestic Product (GDP) conducted by (Isnaini et al., 2019) shows that GDP has a significant effect on NPL. This means that when GDP grows it will have an impact on increasing economic income thereby increasing the debtor's ability to repay credit and reducing NPLs. While different results were shown in the study of Kartikasary et al. (2020) where GDP has no effect on NPL.

Research on the effect of macroeconomic variables on NPL conducted by Prasetyo (2020) shows that macroeconomic variables have a significant positive effect on bank NPL. Inflation occurs due to an increase in the price of goods and is followed by an increase in interest rates. When interest rates increase, the interest expense paid by debtors also increases, thus affecting the bank's NPL. Meanwhile, a different study by Isnaini et al. (2019) which shows that inflation has no effect on bank NPLs.

Research on the BI rate conducted by Setya Wijaya (2019) shows that the BI rate has an effect on bank NPLs. This is because when the BI rate increases, the interest expense received by the debtor also increases, an increase in interest without being matched by an increase in the debtor's income will cause the debtor to have difficulty paying off credit, so that the NPL ratio will increase. Different research results were shown by Isnaini et al. (2019) where the BI rate has no effect on bank NPLs.

## Bank Internal Factors and Macroeconomic Conditions Affecting Non-Performing Loans

In this study there are bank internal factor variables consisting of CAR, LDR, and bank size as well as macroeconomic variables consisting of GDP, inflation, and the BI rate to test their effect on non-performing loans (NPL). According to Bank Indonesia's glossary, non-performing loans / NPLs include substandard loans, doubtful loans, and bad loans. Non-performing loans are an indicator of the health of a bank. The non-performing loan ratio is the ratio of non-performing loans to total loans extended to debtors. According to the Financial Services Authority Regulation (2017) it stipulates that a bank can be said to be healthy if it has an NPL ratio of less than 5% of the total loans provided. Non-performing loans can be caused by a number of things, including unwanted occurrences such as natural disasters, inaccurate bank analysis, debtors having difficulty paying off loans, government policies, etc.

The Capital Adequacy Ratio (CAR) is a ratio between capital and risk-weighted assets (Kasmir, 2016). This ratio is used to see whether the capital adequacy can accommodate the risk of loss that will be faced by the bank. The higher the CAR ratio owned by a bank, the better the bank's ability to bear credit risk. In the Financial Services Authority Regulation (2017) it is explained that the CAR ratio in each bank is a minimum of 8%. The bank intermediary function can be interpreted through the loan to deposit ratio (LDR). According to Kasmir (2016) LDR is a ratio to measure the ratio of the amount of credit given to the amount of funds from third parties and own capital. The LDR ratio is used to see a bank's ability to fulfill its obligations. One of the benchmarks of a bank in assessing its liquidity condition can be seen through the LDR ratio. According to Bank Indonesia Regulations (2013) the maximum LDR ratio is 92% and the minimum is 78%.

According to Kuncoro & Suhardjono (2011) assets or assets show the position of the use of funds in the bank's balance sheet. Bank size is one of the important things in a bank. The size of a bank can be seen from the assets owned by the bank compared to the total assets of other banks (Astrani et al., 2018).

In addition to bank internal factors, NPL is also influenced by macroeconomic conditions such as GDP, inflation, and the BI rate which are used as independent variables in this study. According to Todaro (2009) Gross Domestic Product (GDP) is the total of the final output of all goods and services in a country's economy regardless of both domestic and foreign. According to Mankiw (2003) GDP is the market value of all goods and services in the economy produced within a certain period of time. GDP is used as an indicator in assessing a country's economy.

Besides GDP, inflation is one of the macroeconomic factors that affect NPL performance. According to Sukirno (2015), inflation is a condition where prices increase in a country's economy. Inflation needs to be considered by economic actors, if inflation is unstable it can worsen a country's economy including the banking sector. When inflation is high, it means that people's purchasing power decreases. According to Bank Indonesia, the BI Rate is an interest rate that describes the attitude of monetary policy by Bank Indonesia which is announced to the public. Every month, Bank Indonesia will announce the BI Rate to the public. When interest rates increase, it is also increasingly difficult for debtors to pay off their loans, this can result in an increase in the NPL ratio.

## METHODS

### Research Design
This study uses a quantitative approach. Quantitative data is data whose measurement is on a numerical or numerical scale which is divided into ratio and interval data (Kuncoro, 2018). Quantitative data is used to test the hypothesis that has been determined.

### Data Types and Sources
This study uses secondary data types. Secondary data is data that is not directly obtained from data sources to researchers but through documents or other people (Sugiyono, 2013). Data obtained through the websites of Bank Indonesia, Otoritas Jasa Keuangan, and the Indonesia Stock Exchange in the form of financial reports for commercial banks in Indonesia for 2018-2022.

**Table 1**. List of NPLs for the five largest banks in Indonesia for the 2018-2022 period

| Nama Bank | NPL | | | | |
|---|---|---|---|---|---|
| | 2018 | 2019 | 2020 | 2021 | 2022 |
| PT. Bank Mandiri | 2.79 | 2.35 | 3.12 | 2.74 | 1.88 |
| PT. Bank Rakyat Indonesia (BRI) | 1.22 | 1.37 | 3.41 | 4.38 | 2.67 |
| PT. Bank Central Asia (BCA) | 1.43 | 1.33 | 1.8 | 1.66 | 1.21 |
| PT. Bank Nasional Indonesia (BNI) | 1.96 | 2.33 | 4.2 | 3.7 | 2.8 |
| PT. Bank Tabungan Negara (BTN) | 2.81 | 4.78 | 4.37 | 3.7 | 3.38 |

**Source: Indonesia Stock Exchange (2022)**

### Data analysis method
Five commercial banks that have dominated the banking industry in the last five years, namely PT. Bank Mandiri (Persero) Tbk, PT. Bank Rakyat Indonesia (Persero) Tbk, PT. Bank Central Asia Tbk, PT. Bank Negara Indonesia (Persero) Tbk, and PT. Bank Tabungan Negara (Persero) Tbk with NPL as Table 1. This type of explanatory research is used in this study. Explanational research (eksplanatory research) explain the position and relationship of one variable with other variables by testing the hypothesis (Sugiyono, 2013). This study uses a quantitative approach because the data used is in the form of numbers and is analyzed using statistics. The analytical tool in this study uses Eviews 12 software to perform panel data regression analysis and classical assumption tests.

## Classic assumption test

Before carrying out panel data regression analysis, a classical assumption test was first carried out which aims to determine the coefficient value of the data used is not biased. To see whether data is feasible or not in a study, it is necessary to test the classical assumptions (Sugiyono, 2013). Tests carried out include:

## Normality test

The normality test is a test used to test in the regression model whether the data used is normally distributed or not (Sugiyono, 2013). The regression model can be said to be good if the residual values are normally distributed, so this test is not carried out on each variable. In this study the normality test used the Jarque Bera Statistical Method (J-B) on the basis of decision making, namely:

> If the calculated chi-square value < chi-square table or probability value > significance level then the data is normally distributed
> If the calculated chi-square value > table chi-square or probability value > significance level, then the data is not normally distributed

## Multicollinearity Test

Multicollinearity test is used to test for correlation between independent variables in the regression model (Sugiyono, 2013). The regression model can be said to be good if there is no correlation between the independent variables. To perform a multicollinearity test, you can see the correlation matrix with the following conditions:

> If the value of the correlation matrix is <0.90 for each independent variable, then multicollinearity does not occur.
> If the correlation matrix value is > 0.90 for each independent variable, multicollinearity occurs.

## Heteroscedasticity Test

The heteroscedasticity test is a test used to determine whether or not there is an inequality of the residual variance of one observation to another in the regression model (Sugiyono, 2013). The heteroscedasticity test in this study used the Breusch-Pagan-Godfrey test with the basis for making decisions, namely:

> If the probability value of chi-square <significance level α = 0.05% then there is a symptom of heteroscedasticity
> If the probability value of chi-square > significance level α = 0.05% then there is no symptom of heteroscedasticity

## Panel Data Regression Analysis

Panel data is used in this study so that the regression used is a panel data regression model. Panel data is a combination of cross section data and time series data (Kuncoro, 2018). This study uses panel data regression with the following equation:

$$Y_{it} = α + β_1X_{1it} + β_2X_{2it} + β_3X_{3it} + β_4X_{4it} + β_5X_{5it} + β_6X_{6it} + e$$

Note:
Y = Variabel Non Performing Loan (NPL)
X1 = Variabel Capital Adequacy Ratio (CAR)
X2 = Variabel Loan to deposit ratio (LDR)
X3 = Variabel Bank size
X4 = Variabel Gross Domestic Product (GDP)
X5 = Inflation Variable
X6 = Variable BI rate
a = Constant
$β_1$– $β_6$ = Regression coefficient.
$e$ = error term

## Determination Coefficient Test (R²)

The coefficient of determination test is used to determine the influence of an independent variable on the value of the dependent variable. This test was carried out to measure the ability of a model to show the effect of independent variables simultaneously affecting the dependent variable which is known through the adjusted R-square value (Ghozali, 2016). The smaller the value of the coefficient of determination indicates that the ability of the independent variable to explain the dependent variable is limited, and vice versa. The coefficient of determination has a value of 0 to 1. The closer to number 1, the better the independent variable predicts the dependent variable.

## Hypothesis testing
## Partial Test (t test)

The partial test is used to test the hypothesis of partial influence between the dependent variable and the independent variable based on the t value of the significance level (Sugiyono, 2013). In the partial test, the t-test is used to determine the t-count and t-table values to then test the effect of each independent and dependent variable. The t test is often carried out using a significance level of 5% with the following criteria:

If the value of t test count> 0.05 then $H_a$ rejected and $H_0$ accepted, which means there is no effect of the independent variable on the dependent variable.

If the value of t test count <0.05 then $H_a$ accepted and $H_0$ rejected, which means there is an influence of the independent variable on the dependent variable.

## Simultaneous Test (F Test)

The simultaneous test is used to find out the independent variables simultaneously (together) have an influence on the dependent variable (Ghozali, 2016). The F test was carried out with a significance level of 5% or $\alpha = 0.05$. The provisions of the simultaneous test include:

If the significant value of $F > 0.05$ then $H_a$ rejected and $H_0$ accepted, which means that all independent variables have no effect on the dependent variable.

If the significant value of $F < 0.05$ then $H_a$ accepted and $H_0$ rejected, which means that all independent variables affect the dependent variable.

## RESULTS

### Descriptive Analysis Results

Descriptive analysis is used in research to analyze the data that has been collected by describing and describing the data without making conclusions (Sugiyono, 2013). Observations through calculations and average data can be done more easily using descriptive analysis. The variables used in this study consist of one dependent variable Non Performing Loan (NPL) and six independent variables namely Capital Adequacy Ratio (CAR), Loan-to-deposit ratio (LDR), Bank Size, Gross Domestic Product (GDP), inflation, and BI rate. The data used is annual data for the period 2018-2022. The results of the descriptive analysis can be seen in the following table.

**Table 2**. Descriptive Analysis Results

|  | CAR | LDR | BANK_SIZE | GDP | INFLASI | BI_RATE | NPL |
|---|---|---|---|---|---|---|---|
| Mean | 21.07760 | 85.60400 | 1.09E+09 | 16535981 | 2.982000 | 4.750000 | 2.769200 |
| Median | 20.17000 | 84.20000 | 1.20E+09 | 15832657 | 2.720000 | 5.000000 | 2.800000 |
| Maximum | 25.80000 | 113.5000 | 1.99E+09 | 19588446 | 5.510000 | 6.000000 | 4.780000 |
| Minimum | 16.80000 | 62.00000 | 3.06E+08 | 14838756 | 1.680000 | 3.500000 | 1.300000 |
| Std. Dev. | 2.676382 | 11.47750 | 4.92E+08 | 1712749. | 1.400378 | 0.994778 | 0.917505 |
| Skewness | 0.499484 | 0.020660 | -0.090670 | 0.930431 | 0.972392 | -0.121497 | 0.442382 |
| Kurtosis | 2.179755 | 3.484904 | 2.160051 | 2.441669 | 2.553441 | 1.374654 | 2.572489 |
|  |  |  |  |  |  |  |  |
| Jarque-Bera | 1.740353 | 0.246708 | 0.769165 | 3.931809 | 4.147498 | 2.813330 | 1.005806 |
| Probability | 0.418878 | 0.883951 | 0.680735 | 0.140029 | 0.125714 | 0.244959 | 0.604772 |
|  |  |  |  |  |  |  |  |
| Sum | 526.9400 | 2140.100 | 2.72E+10 | 4.13E+08 | 74.55000 | 118.7500 | 69.23000 |
| Sum Sq. Dev. | 171.9125 | 3161.593 | 5.80E+18 | 7.04E+13 | 47.06540 | 23.75000 | 20.20358 |
|  |  |  |  |  |  |  |  |
| Observations | 25 | 25 | 25 | 25 | 25 | 25 | 25 |

**Source: Data processed by researchers (2023)**

The mean shows the average value of the data, the maximum shows the highest value, and the minimum value shows the lowest data value. Based on table 2, it can be seen that the Non Performing Loan (NPL) variable has a minimum value of 1.30, a maximum value of 4.78, a mean value of 2.7629 and 0.917505 for the standard deviation. The Capital Adequacy Ratio (CAR) variable has a minimum value of 16.80 and a maximum value of 25.80. The mean obtained is 21.0776 and the standard deviation is 2.676382. The Loan-to-deposit ratio (LDR) variable has a minimum value of 62.00 and a maximum value of 113.5, an average value of 85.604 and a standard deviation of 11.4775. The next variable is bank size which has a minimum value of IDR 306,436,194 and a maximum value of IDR 1,992,544,687. The average value is IDR 27,246,012,777. The Gross Domestic Product (GDP) variable has a minimum value of 14,838,756 and a maximum value of 19,588,445.6, an average value of 16,535,981 and a standard deviation value of 1,712,749.0. The inflation variable has a minimum value of 1.68 and a maximum value of 5.51, an average value of 2.982 and a standard deviation of 1.40. The last variable is the BI Rate with a minimum value of 3.50 and a maximum value of 6.00 and an average value of 4.75 and a standard deviation of 0.994778.

**Classical Assumption Test Results**
**Normality test**
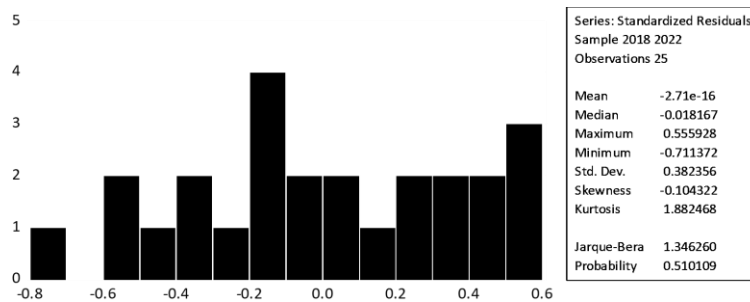In this study the normality test used the Jarque Bera Statistical Method (J-B).



**Figure 3.** Normality Test Results
**Source: Data processed by researchers (2023)**

Based on the graph above, it can be seen that the probability value is 0.510 > a significance value of 0.05, so it can be concluded that the data used is normally distributed.

**Multicollinearity Test**
The regression model can be said to be good if there is no correlation between the independent variables. To perform a multicollinearity test, you can see the correlation matrix.

**Table 3**. Multicollinearity Test Results

|          | CAR       | LDR       | BANK_SIZE | GDP       | INFLASI   | BI_RATE   |
|----------|-----------|-----------|-----------|-----------|-----------|-----------|
| CAR      | 1.000000  | -0.698805 | 0.433360  | 0.170598  | 0.063648  | -0.065143 |
| LDR      | -0.698805 | 1.000000  | -0.554091 | -0.358541 | -0.071249 | 0.293772  |
| BANK_... | 0.433360  | -0.554091 | 1.000000  | 0.294450  | 0.145080  | -0.100358 |
| GDP      | 0.170598  | -0.358541 | 0.294450  | 1.000000  | 0.745454  | 0.065262  |
| INFLASI  | 0.063648  | -0.071249 | 0.145080  | 0.745454  | 1.000000  | 0.704008  |
| BI_RATE  | -0.065143 | 0.293772  | -0.100358 | 0.065262  | 0.704008  | 1.000000  |

**Source: Data processed by researchers (2023)**

If the value of the correlation matrix is <0.90 for each independent variable, then multicollinearity does not occur. The test results show that if the highest value of the correlation matrix is 0.745454 <0.90, then the data used does not have multicollinearity.

**Heteroscedasticity Test**
The heteroscedasticity test is used to determine whether or not there is an inequality of residual variance from one observation to another in the regression model (Sugiyono,

2013). The heteroscedasticity test in this study used the Breusch-Pagan-Godfrey test to determine the obs*R-squared probability value which would be compared with the significance value α = 5%.

**Table 4.** Heteroscedasticity Test Results

| | | | |
|---|---|---|---|
| F-statistic | 0.158690 | Prob. F(6,18) | 0.9846 |
| Obs*R-squared | 1.255977 | Prob. Chi-Square(6) | 0.9740 |
| Scaled explained SS | 0.287287 | Prob. Chi-Square(6) | 0.9996 |

**Source: Data processed by researchers (2023)**

If the obs*R-squared probability value > significance level α = 0.05% then there are no symptoms of heteroscedasticity. In this study the probability of obs*R-squared 0.9740 > 0.05 means that there is no heteroscedasticity in the data used.

## Panel Data Regression Analysis

**Table 5**. Regression Analysis Results

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| CAR | -0.039691 | 0.051293 | -0.773819 | 0.4491 |
| LDR | 0.059297 | 0.014047 | 4.221183 | 0.0005 |
| BANK_SIZE | -2.10E-10 | 2.23E-10 | -0.941389 | 0.3590 |
| GDP | -4.58E-07 | 3.42E-07 | -1.338744 | 0.1973 |
| INFLASI | 1.106467 | 0.597448 | 1.851990 | 0.0805 |
| BI_RATE | -1.661033 | 0.573964 | -2.893967 | 0.0097 |
| C | 10.92328 | 6.257602 | 1.745601 | 0.0979 |

**Source: Data processed by researchers (2023)**

Based on the table above, the regression equation is:

$$NPL_{it} = 10{,}923 - 0{,}039(CAR_{it}) + 0{,}059(LDR_{it}) - 2{,}10(BANK\_SIZE_{it}) - 4{,}58(GDP_{it}) + 1{,}106(INFLASI_{it)} - 1{,}661(BI\_RATE_{it}) + \varepsilon$$

The panel data regression equation explains that:
A constant value of 10,923 indicates that the NPL level of commercial banks in Indonesia is 10,923% if the CAR, LDR, Bank Size, GDP, inflation, and BI Rate variables are constant.
The CAR variable has a negative effect on the NPL of commercial banks with a regression coefficient of -0.039 meaning that if the CAR variable increases by 1%, it will reduce the NPL level of commercial banks in Indonesia by 0.039%.
The LDR variable has a positive effect on the NPL of commercial banks with a regression coefficient of 0.059 meaning that if the LDR variable increases by 1%, it will increase the NPL level of commercial banks in Indonesia by 0.059%.
The Bank Size variable has a negative effect on the NPL of commercial banks with a regression coefficient of -2.10 meaning that if the Bank Size variable increases by 1%, it will reduce the NPL level of commercial banks in Indonesia by 2.10%.
The GDP variable has a negative effect on the NPL of commercial banks with a regression coefficient of -4.58 meaning that if the GDP variable increases by 1%, it will reduce the NPL level of commercial banks in Indonesia by 4.58%.
The inflation variable has a positive effect on the NPL of commercial banks with a regression coefficient of 1,106 meaning that if the inflation variable increases by 1%, it will increase the NPL level of commercial banks in Indonesia by 1,106%.
The BI rate variable has a negative effect on the NPL of commercial banks with a regression coefficient of -1,661 meaning that if the BI rate variable increases by 1%, it will reduce the NPL level of commercial banks in Indonesia by 1,661%.

## Coefficient of Determination

The percentage of influence of the independent variable on the dependent variable can be known through the coefficient of determination R2.

**Table 6**. Coefficient of Determination

| | | | |
|---|---|---|---|
| R-squared | 0.826333 | Mean dependent var | 2.769200 |
| Adjusted R-squared | 0.768443 | S.D. dependent var | 0.917505 |
| S.E. of regression | 0.441507 | Akaike info criterion | 1.434248 |
| Sum squared resid | 3.508706 | Schwarz criterion | 1.775534 |
| Log likelihood | -10.92811 | Hannan-Quinn criter. | 1.528906 |
| F-statistic | 14.27439 | Durbin-Watson stat | 2.070518 |
| Prob(F-statistic) | 0.000006 | | |

**Source: Data processed by researchers (2023)**

Based on the table above the value of R2 of 0.826333, which means that the total variation in NPLs of commercial banks in Indonesia can be explained by the independent variables CAR, LDR, Bank Size, GDP, inflation and the BI rate of 82.63% while the remaining 17.37% is explained by other variables outside the model.

### Hypothesis testing
### Partial t test

In the partial test, the t-test is used to determine the t-count and t-table values to then test the effect of each independent and dependent variable. The partial test in this study was carried out using a significance level of 5%

Partial t test results as follows.

**Table 7.** Test Results t

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| CAR | -0.039691 | 0.051293 | -0.773819 | 0.4491 |
| LDR | 0.059297 | 0.014047 | 4.221183 | 0.0005 |
| BANK_SIZE | -2.10E-10 | 2.23E-10 | -0.941389 | 0.3590 |
| GDP | -4.58E-07 | 3.42E-07 | -1.338744 | 0.1973 |
| INFLASI | 1.106467 | 0.597448 | 1.851990 | 0.0805 |
| BI_RATE | -1.661033 | 0.573964 | -2.893967 | 0.0097 |
| C | 10.92328 | 6.257602 | 1.745601 | 0.0979 |

**Source: Data processed by researchers (2023)**

Based on the table above, it can be seen that the influence of each independent variable is as follows:

The CAR variable obtained a t-value of -0.773819 < t-table, namely 2.10092 and a sig. 0.4491 > 0.05, then Ha rejected and H0 accepted, meaning that the CAR variable has no effect on the NPL of commercial banks in Indonesia.

In the LDR variable, the t count value is 4.221183 > t table, namely 2.10092 and the sig. 0.0005 < 0.05, then Ha accepted and H0 rejected, meaning that the LDR variable affects the NPL of commercial banks in Indonesia.

For the Bank Size variable, the t value is -0.941389 <t table, namely 2.10092 and the sig. 0.3590 > 0.05, then Ha rejected and H0 accepted, meaning that the variable bank size has no effect on the NPL of commercial banks in Indonesia.

In the GDP variable, the value of t count is obtained -1.338744 <t table, namely 2.10092 and sig. 0.1973 > 0.05, then Ha rejected and H0 accepted, meaning that the GDP variable has no effect on the NPL of commercial banks in Indonesia.

In the inflation variable, the t-count value is 1.851990 <t-table, namely 2.10092 and the sig. 0.0805 > 0.05, then Ha rejected and H0 accepted, meaning that the inflation variable has no effect on the NPL of commercial banks in Indonesia.

In the BI rate variable, the t value is -2.893967 <t table, namely 2.10092 and the sig. 0.0097 < 0.05, then Ha accepted and H0 rejected, meaning that the BI rate variable affects the NPL of commercial banks in Indonesia.

## Simultaneous F Test

The simultaneous test is used to find out the independent variables simultaneously (together) have an influence on the dependent variable (Ghozali, 2016). The F test was carried out with a significance level of 5% or α = 0.05.

**Table 8.** F test results

| | |
|---|---|
| F-statistic | 14.27439 |
| Prob(F-statistic) | 0.000006 |

**Source: Data processed by researchers (2023)**

Based on the table above, the probability value of the F-statistic is 0.000006 < the significance level (α = 5%), so that H0 rejected and Ha accepted. Acceptance of the alternative hypothesis indicates that the CAR, LDR, Bank Size, GDP, inflation, and BI rate variables together have a significant effect on the NPL variable of commercial banks in Indonesia.

## DISCUSSION

### CAR against NPL

Based on the results of the analysis shows the variables Capital Adequacy Ratio has a coefficient value of -0.773819 and a probability of 0.4491 is greater than α = 0.05, so the CAR variable has no significant effect on NPL. The negative coefficient value indicates that CAR has the opposite effect, meaning that if the CAR value is smaller, the NPL level will be greater. The CAR has no effect on NPL because the decrease and increase in non-performing loan risk is not affected by the CAR ratio, but on the contrary CAR is formed by the bank's NPL level. Problem loans occur because debtors are unable to pay off their credit obligations, and CAR does not cause the NPL ratio to decrease. The level of the Capital Adequacy Ratio at large banks in Indonesia has a stable value and is above the minimum limit set by Bank Indonesia. This shows that commercial banks in Indonesia are able to bear the credit risk provided.

### LDR to NPL

Based on the results of the partial analysis of the effect of LDR on NPL, it can be seen that the coefficient value is 4.221183 and the probability value is 0.0005 <of significance α = 0.05. So it can be concluded that LDR has a significant effect on the NPL performance of commercial banks in Indonesia. This positive coefficient value indicates that if the LDR value increases, it will also cause an increase in the NPL ratio, and vice versa. The results of this study are in accordance with research conducted by Astrini et al. (2018) which states that LDR has a significant positive effect on NPL performance. The higher the credit liquidity of a bank, the risk of non-performing loans will also increase. Broadly speaking, commercial banks in Indonesia have a stable LDR ratio because banks are able to manage credit well.

### Bank Size against NPL

Based on the results of the analysis of the effect of bank size on NPL partially, it can be seen that the coefficient value is -0.941389 and the probability value is 0.3590 > from the significance of α = 0.05. So it can be concluded that bank size has no significant effect on the NPL performance of commercial banks in Indonesia. Banks that have large assets will be better at managing their assets and lending. So that the high assets of a bank have no effect on the bank's NPL ratio. In minimizing credit risk, banks need to use the 5C principles

(Character, Capacity, Capital, Collateral, Condition) and 7P (Personality, Party, Purpose, Prospect, Payment, Profitability, Protection).

### GDP to NPL

Based on the results of analysis of the effect of GDP on NPL partially, it can be seen that the coefficient value is -1.338744 and the probability value is 0.1973 > from the significance of α = 0.05. So it can be concluded that GDP has no significant effect on the NPL performance of commercial banks in Indonesia. This is of course not in accordance with the existing theory. No effect on GDP is caused by several things. The pattern of public consumption is one of the causes, when public consumption increases, there will be an increase in income. However, the increase in income is allocated more for consumption activities, not used to pay off credit payments. Based on data obtained from the Central Statistics Agency (BPS), Indonesia's GDP in 2021 is IDR 16.97 quadrillion and household consumption contributes IDR 9.24 quadrillion or 54.42% of total national GDP. The high contribution of household consumption to GDP illustrates that Indonesian society is consumptive. The increase in income has no effect on the ability of debtors to fulfill their credit obligations.

### Inflation to NPL

Based on the results of the partial analysis of the effect of inflation on NPL, it can be seen that the coefficient value is 1.851990 and the probability value is 0.0805 > from the significance of α = 0.05. So it can be concluded that inflation has no significant effect on the NPL performance of commercial banks in Indonesia. This is of course not in accordance with the existing theory. Inflation has no effect on NPLs due to several reasons, the inflation rate during the year of study was relatively stable between 1% -5%. In addition, when there is inflation, the public will reduce their level of spending and will not reduce their obligations to fulfill their credit payments. To be able to affect NPLs, inflation requires a long grace period. So that the five-year research time has not been able to determine the effect of inflation on NPLs. This is in accordance with research conducted by Isnaini et al. (2019) which shows that inflation has no effect on bank NPLs.

### BI Rate to NPL

Based on the results of the partial analysis of the influence of the BI rate on NPL, it can be seen that the coefficient value is -2.893967 and the probability value is 0.0097 < of significance α = 0.05. So it can be concluded that the BI rate has a significant effect on the NPL performance of commercial banks in Indonesia. The negative coefficient value indicates that the higher the interest rate, the smaller the NPL ratio. As is well known, the biggest profit for banks is obtained from credit interest. Low interest rates will attract customers to borrow funds so that the bank's credit risk will also increase. To minimize non-performing loans, banks can adjust the risk profile of debtors who apply for loans to these banks.

### CONCLUSION

The research results show that non performing loans major banks in Indonesia are influenced by loan to deposit ratio and BI rate. While the factors that do not affect non-performing loans are CAR, bank size, GDP and inflation. The banks with the largest assets in Indonesia have good managerial skills, which can be seen from their high capital adequacy ratio. However, this does not affect non-performing loans, because non-performing loans are caused by the debtor's inability to fulfill their obligations and CAR will only overcome the potential losses that will be faced by the bank. Broadly speaking, commercial banks in Indonesia have an LDR ratio below the safe limit, this indicates that the bank is able to manage the loans it disburses well. LDR has an effect on NPL, if it is not paid close attention it will affect the bank's NPL ratio. The size of the bank can be seen from the total assets owned, the increase in the assets of these large banks shows that the bank has a high industry market share and is able to maintain the stability of the bank's NPL.

## LIMITATION

This study has several drawbacks, including in analyzing the factors that influence the ratio of non-performing loans not only to banks with the largest assets in Indonesia but more broadly in the banking sector in Indonesia. In addition, the macroeconomic variables (GDP, inflation and the BI rate) used in this study are time series, this of course can affect their level of significance. So that for further research can use data that is cross section.

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