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# THE IMPACT OF BANK-SPECIFIC FACTORS ON NON-PERFORMING LOAN IN INDONESIA: EVIDENCE FROM ARDL MODEL APPROACH

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***Abstract.*** *Non-performing Loan (NPL) is an indicator that is generally used to determine the ability of bank management to manage non-performing loans. This study aims to analyze the impact of bank-specific factors on NPL. The bank-specific factors are Capital Adequacy Ratio (CAR), Return on Assets (ROA), Operating Expenses on Operating Income (BOPO), and Loan to Deposit Ratio (LDR). The data used is monthly time series data, a case study on Commercial Banks in Indonesia from January 2015 to August 2020. The model used to analyze these problems is Autoregressive Distributed Lag (ARDL). The results obtained are ARDL(1,6,0,1,1) model is the best model. The model shows that bank-specific factors have a direct impact on NPL. Specifically, the ARDL bounds test offers the analysis results, which show that the ability of bank-specific factors to explain the NPL of commercial banks in Indonesia is 84%. At the same time, 16% are other factors outside the model. The analysis results show a long-run cointegration relationship between NPL and specific characteristics, CAR, ROA, and BOPO. Then, only CAR, BOPO, and LDR impact NPL in the short-run relationship. The equilibrium correction obtained is significant and confirms a long-run relationship. The equilibrium correction indicates a high velocity towards stability after a shock. It means that the performance of Commercial Banks in Indonesia is outstanding during the COVID-19 Pandemic because the ability to recover from shock is relatively faster.*

***Keywords:*** *ARDL, BOPO, CAR, Commercial Bank, NPL, ROA.*

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## 1. INTRODUCTION

According to Law Number 10 of 1998 concerning Banking, a bank is defined as a business entity that collects funds from the public in the form of savings and distributes them to the people in the form of credit and other forms to improve people's living standards. Banks in Indonesia are categorized into commercial banks and Rural Banks (BPR). A commercial bank is a bank that carries out business activities conventionally and/or based on sharia principles, which in its activities provides services in payment traffic [1]. Banks have a function as financial institutions (financial intermediaries), namely connecting parties who have funds (surplus) by collecting these funds and connecting with parties who need funds (deficit) through loans [2].

The provision of credit in banking is the core business and primary source of bank income, so credit quality is the primary indicator of financial performance and the level of banking soundness [3], so credit is one of the crucial factors that influence banking stability [4]. The role of banks as financial intermediaries is inseparable from credit problems. Several previous studies support this. Credit risk plays a crucial role in the banking crisis in developing countries [5]. Credit risk is one of the real risks for banks that cause most banks to fail [6]. Credit risk is also one of the main characteristics of a bank's balance sheet, so it is essential to understand the relationship between credit risk and the business cycle in assessing the banking system's stability [7]. Banks' credit risk can reach 60% to 70% of the total risk exposure [8].

Non-performing Loan (NPL) is an indicator that is generally used to determine the ability of bank management to manage non-performing loans. The credit risk proxy used is the ratio of NPL to total credit [9]. Several recent studies have also shown that NPL is the root of the banking crisis [10] and represent credit risk at the aggregate level as well as a sign of failure in the banking system [11]. This is supported by other studies that conclude that a high NPL ratio impacts company stability and the financial system [12].

The importance of studies encourages various researchers to examine the factors that can influence them. It can be influenced by various variables, both from external and internal banking. Many variables can be affected by external banking, such as the economic condition of a country, both macro and micro. From the inner side of banking, the variables that can affect them are bank-specific factors. Bank-specific factors such as the Capital Adequacy Ratio (CAR) and prudent bank policies on the adequacy of credit loss reserves reduce the amount of [13]. Return on Assets (ROA), Return on equity (ROE), loan to total asset ratio, and total assets are determinants of [14]. Loan to Deposit Ratio (LDR) and Net Interest Margin (NIM) have a positive effect, while Capital Adequacy Ratio (CAR) and ROA have a negative effect [15]. In Indonesia, research on bank-specific factors is not something new. Research that specifically concludes that banking-specific factors also influence it is is still relatively small (see [16], [17], [18], [19], [20]). Some of these studies used multiple linear regression models [16], [17], while several other studies used panel data regression [18], [19], [20]. Both methods do not consider the lag variable as an exogenous variable.

In contrast to previous studies, case studies are similar to previous research on commercial banks in Indonesia. This research has novelty value compared to previous research. The things that make research different and have new value are the range of data used and the method. The data used in this study was time-series data until 2020, when the condition of the Indonesian economy experienced negative growth due to the impact of the COVID-19 Pandemic. The method used is the time series data modeling method, namely Autoregressive Distributed Lag (ARDL) [21]. This method is a regression model that can model the relationship between the dependent and regressor variables, both present and past values. It includes the lag of the dependent variable as one of the exogenous variables. In addition, the method can analyze the short-run and long-run relationships between exogenous variables and the dependent variable [22]. Thus, this study aims to model the relationship between bank-specific factors using the ARDL model and then analyze the variables that impact both the short and long term.

## 2. RESEARCH METHODS

The Autoregressive Distributed Lag (*ARDL*) model was introduced by Pesaran and Shin in 1999 [21]. This model is a linear time series model that simultaneously connects the dependent variable and the regressor by involving the lag of each of these variables. This model is denoted by $\boldsymbol{ARDL(p, q_1, \ldots, q_k)}$, where $\boldsymbol{p}$ is the number of lags of the dependent variable, $\boldsymbol{q_1}$ is the number of lags of the first explanatory variable, and $\boldsymbol{q_k}$ is the number of lags of the *k*th explanatory variable. If $\boldsymbol{y_t}$ is the dependent variable and $\boldsymbol{x_1, \ldots, x_k}$ is the independent variable, then the mathematical equation of the $\boldsymbol{ARDL(p, q_1, \ldots, q_k)}$ model is defined as follows:

$$y_t = \alpha + \sum_{i=1}^{p} \gamma_i y_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{q_j} X_{j,t-i}{}' \beta_{j,i} + \varepsilon_t \quad (1)$$

Using the cointegration regression equation, a methodology for testing the ARDL model that contains a level (or long-run) relationship between the dependent variable and the regressor is obtained, called the *ARDL* bounds test [22]. The results of the transformation of the bounds test procedure are represented as follows:

$$\Delta y_t = -\sum_{i=1}^{p-1} \gamma_i{}^* \Delta y_{t-1} + \sum_{j=1}^{k} \sum_{i=0}^{q_j-1} \Delta X_{j,t-i}{}^* \beta_{j,i}{}^* - \rho y_{t-1} - \alpha - \sum_{j=1}^{k} X_{j,t-1}{}^* \delta_j + \varepsilon_t \quad (2)$$

The tests carried out are $\rho = 0$ and $\delta_1 = \delta_2 = \cdots = \delta_k = 0$. The hypothesis is $H_0$: there is no relationship level (i.e., there is no long-run relationship between the dependent variable and the regressor).

### 2.1 Data

The data used is in the form of monthly time series data for the period January 2015 – August 2020 sourced from Indonesian Banking Statistics published on the official website of the Financial Services Authority (OJK) [23]. The data used is commercial bank data in Indonesia, consisting of several variables as shown in Table 1.

**Table 1. Variable Penelitian**

| Variable | | Notation |
|---|---|---|
| The ratio of Non-performing Loan | Dependent | $NPL$ |
| Capital Adequacy Ratio | Regressor | $CAR$ |
| The ratio of Return on Asset | Regressor | $ROA$ |
| Ratio of Operating Expenses on Operating Income | Regressor | $BOPO$ |
| Loan to Deposit Ratio | Regressor | $LDR$ |

### 2.2 Analysis Procedure

The ARDL modeling procedure is shown as follows:

a. Checking the order of integration of each variable using the Augmented Dickey-Fuller (ADF) test must meet I(d) where d < 2;
b. Determining the optimum number of lags (the ARDL model lag structure) using the smallest Akaike Information Criteria (AIC) value;
c. ARDL model estimation using Ordinary Least Square method;
d. Examination of the goodness of the model, namely testing the model's residual assumptions (normality test, heteroscedasticity test, and autocorrelation test) and CUSUM test for model stability;
e. Perform ARDL Bounds test;
f. Estimated speed of adjustment.

## 3. RESULTS AND DISCUSSION

### 3.1. Variable Description

#### 3.1.1. Non-Performing Loan (NPL)

NPL is the ratio of the number of non-performing loans (substandard, doubtful, and impaired quality) with total loans, one of the indicators to measure banking performance. The plot of NPL data for commercial banks in Indonesia from January 2015 to August 2020 is shown in Figure 1. From 2015 to 2019, the NPL ratio formed a seasonal pattern where the NPL ratio decreased at the end of the year or in the fourth quarter. It shows that the NPL condition of commercial banks in Indonesia is relatively stable. Every year, the upward trend was still relatively small, at around 0.1%-0.2%.

On the other hand, in 2020, the ratio experienced a significant increase of more than 1.5%. The NPL pattern formed in 2020 is different from previous years. It is due to the condition of Indonesia, which is experiencing the COVID-19 Pandemic.

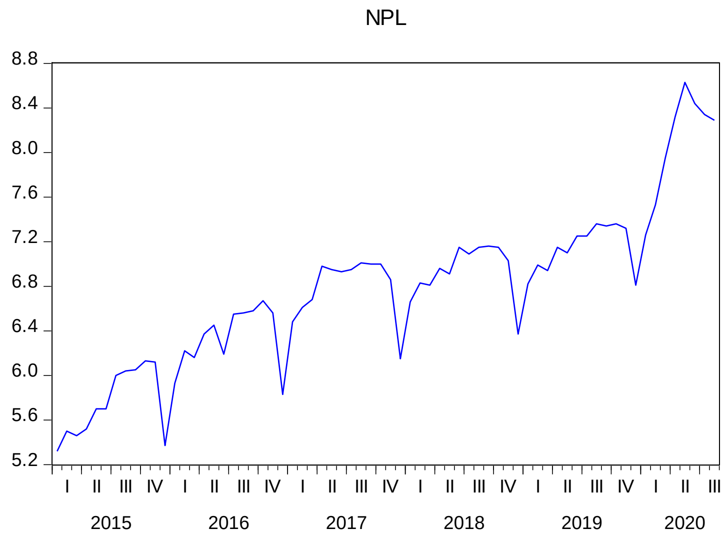


**Figure 1. The ratio of Commercial Banks in Indonesia Period January 2015 – August 2020**

Source: *Processing results using EViews*

The statistical description of the NPL ratio of commercial banks in Indonesia is shown in Table 2. The average ratio is 6.77%, and the highest percentage was in May 2020, when it reached 8.63%. Then it experienced a slow decline until August 2020; the rate went 8.29% (Figure 1 and Table 2). Thus, the COVID-19 pandemic that hit Indonesia also affected credit conditions at commercial banks in Indonesia.

**Table 2. Description of Statistics Banking in Indonesia**

| Variable | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|
| *NPL* | 6.769118 | 0.736240 | 5.32 | 8.63 |

Source: *Processing results using EViews*

### 3.1.2. Bank-Specific Factors

In this study, bank-specific factors are independent variables. The definition of the bank-specific factors is given as follows:

1. CAR is one of the ratios between capital and risk-weighted assets.
2. ROA compares profit before tax for the last 12 months with the average total assets.
3. BOPO compares operating costs (BO) for the previous 12 months with operating income (PO) during the same period.
4. LDR is a comparison of loans disbursed with funds received.

Statistically, the general description of the four variables for the period January 2015 – to August 2020 is shown in Table 3, and the plot of the data is shown in Figure 2.

**Table 3. Description of Statistics Specific Factors for Commercial Banks in Indonesia**

| Variable | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|
| CAR | 22.53 | 0.91 | 20.28 | 23.93 |
| ROA | 2.42 | 0.16 | 1.90 | 2.82 |
| BOPO | 81.37 | 2.33 | 77.86 | 88.84 |
| LDR | 90.97 | 2.37 | 85.38 | 96.19 |

Source: *Processing results using EViews*

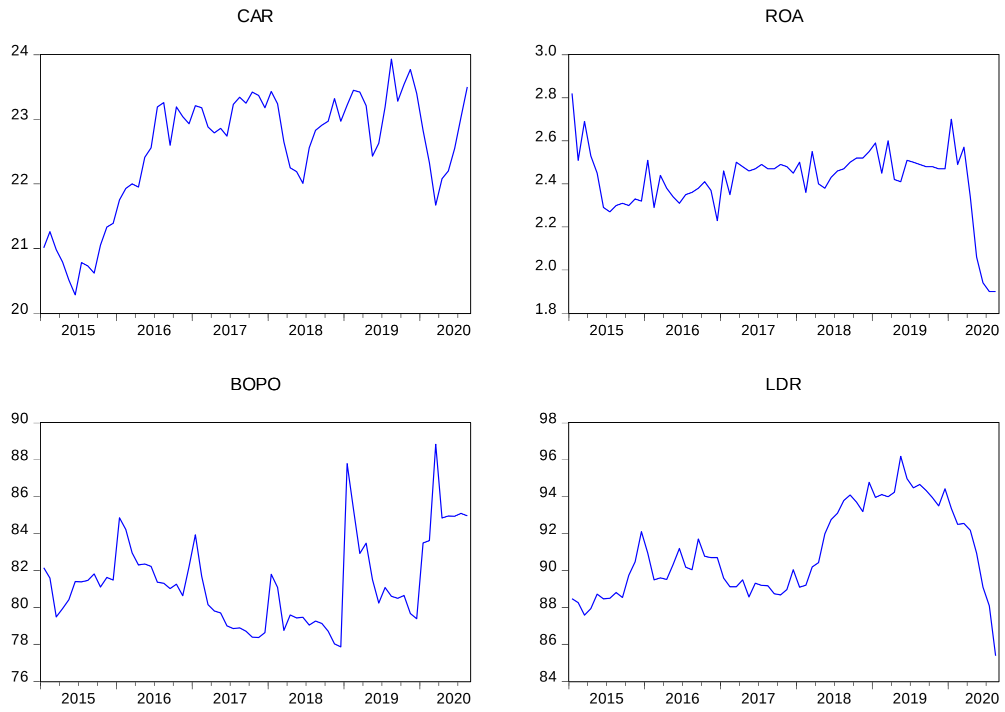


**Figure 2. Specific Factors for Commercial Banks in Indonesia for the period January 2015 – August 2020**
Source: *Processing results using EViews*

Based on Table 3, the average CAR ratio for commercial banks in Indonesia from January 2015 to August 2020 is 22.53%, where the minimum value is 20.28% and the maximum value is 23.93%. In 2020, the Indonesian banking CAR ratio decreased, namely in March, by 21.67%. However, in 2020, the CAR condition showed a positive trend in the following month, namely increasing (Figure 2). Thus, the condition of banking CAR in Indonesia is relatively good because it is above the minimum standard set by Bank Indonesia, namely 8%. It indicates that the COVID-19 Pandemic in Indonesia did not significantly impact the CAR ratio of commercial banks in Indonesia, although initially, it had fallen to 21.67%.

The ROA value is one of the banking profitability ratios expected to increase, not decrease. Based on Figure 2, from March 2020 and April 2020–to August 2020, the value of ROA experienced a significant decrease. In 2020, the value of ROA reached its minimum point for the last six years, namely 1.9%, which occurred in August 2020 (Table 3 and Figure 2). It indicates that the COVID-19 pandemic condition that hit Indonesia impacted the increase in the value of ROA.

The movement of the BOPO ratio from January 2015 to August 2020 fluctuated with an average value of 81.37% (Table 3). The highest BOPO ratio in the last six years occurred in March 2020, at 88.84%. The BOPO ratio is an indicator of the efficiency of Indonesian banking financial management. Based on Table 3, the average value of BOPO does not exceed the maximum limit according to Bank Indonesia regulations, which is 90%. However, the BOPO ratio must be suppressed because an increase in the BOPO ratio will impact banks' profit and financial condition.

Based on Figure 2, the condition of LDR commercial banks in Indonesia experienced a decline during the COVID-19 Pandemic that hit Indonesia (Figure 2). The fall reached a value of 85.38% in August 2020. This value is the lowest in the last six years. The decrease in the LDR ratio indicates that banking liquidity in lending has decreased.

## 3.2. ARDL Modeling: The NPL of Commercial Banks in Indonesia

### 3.2.1. Pre Modeling

Detect $I(0)$ and $I(1)$

The initial assumption that must be met by the model is that each variable must be integrated on order 0, namely $I(0)$, order one, namely $I(1)$, or both, but not on order two $I(2)$. One way to detect the order of integration of each variable is to use the unit root test. The test used is the Augmented Dickey-Fuller (ADF) test. The null hypothesis is rejected if the p-value < 5%, which means the data does not contain unit roots or is stationary. Vice versa, accepts the null hypothesis if the p-value > 5%, which means it has unit-roots or is not stationary.

**Table 4. Augmented Dickey-Fuller Test**

| Variable | Level Condition | | Differentiation I | | Integration Order |
|---|---|---|---|---|---|
| | Statistics Test | $p$ $value$ | Statistics Test | $p$ $value$ | |
| $NPL$ | -1.506136 | 0.5245 | -9.653029 | 0.0000 | I(1) |
| $CAR$ | -1.875939 | 0.3415 | -7.141296 | 0.0000 | I(1) |
| $ROA$ | -2.941545 | 0.0462 | - | - | I(0) |
| $BOPO$ | -3.349762 | 0.0164 | - | - | I(0) |
| $LDR$ | -0.790331 | 0.8152 | -6.754037 | 0.0000 | I(1) |

Source: *Processing results using EViews*

The results of the ADF test summarized in Table 4 are the test results of each variable individually. These results show that each variable has a p-value of less than 5%, so it can be concluded that the variables NPL, CAR, and LDR are integrated on order one or $I(1)$, meaning that the data is stationary in the first differencing. While the variables ROA and BOPO are $I(0)$, it is stationary at the level. These results show the variables are not in $I(2)$. Thus, these variables meet the modeling assumptions of ARDL.

**Multicollinearity**

Multicollinearity is the condition of independent variables that influence each other. In other words, there is a correlation between independent variables. Multicollinearity resulted in the obtained model coefficients being invalid. One way to detect multicollinearity is to use the VIF value. A multicollinearity-free model if the VIF value is 10. Table 5 shows the VIF values of each independent variable (commercial bank-specific factor) less than 10. It means that there is no multicollinearity between the independent variables.

**Table 5. Multicollinearity Test**

| Banking Specific Factors | |
|---|---|
| **Variable** | **VIF** |
| $CAR$ | 1.200499 |
| $ROA$ | 1.292002 |
| $BOPO$ | 1.159015 |
| $LDR$ | 1.345253 |

Source: *Processing results using EViews*

### 3.2.2. Model Estimation

The model notation to be estimated is $ARDL(p_1, q_{11}, q_{12}, q_{13}, q_{14})$ with $p_1$ is order lag of NPL and $q_{11}, q_{12}, q_{13}, q_{14}$ sequentially is the order lag of CAR, ROA, BOPO, and LDR. Determination of the order lag model using the information criteria, namely AIC. The summary of the results of data processing shows 20 models which have the smallest AIC values (Figure 3). Based on Figure 3, $ARDL(1,6,0,1,1)$ is an excellent model because it has the smallest AIC value compared to 19 other models, namely -0.378 (see Table 6). In other words, $ARDL(1,6,0,1,1)$ is the model with the optimum lag compared to 19 different models. These results show no lag of the variable that affects NPL.

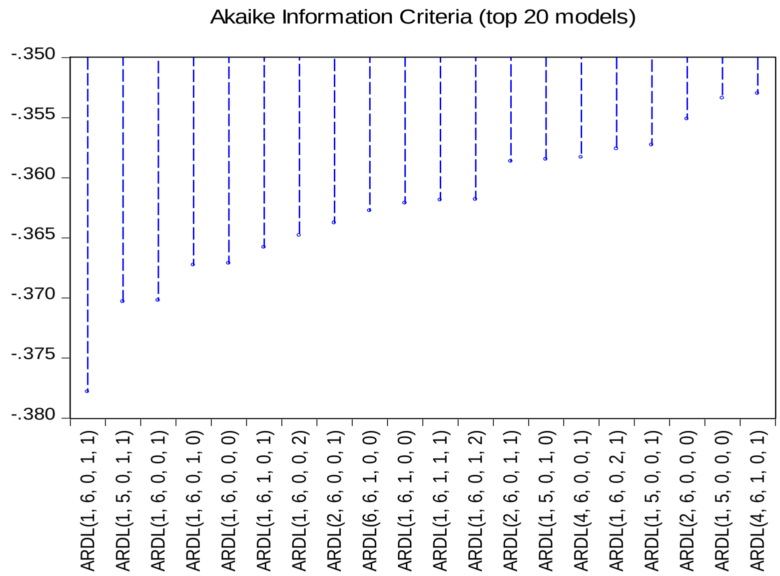


**Figure 3. Lag Model Selection Based on AIC Value**

**Table 6. Model Estimation Result: $ARDL(1,6,0,1,1)$**

| Variable | Coefficient | Standard Error | $t$-Statistics | $p$ value |
|---|---|---|---|---|
| $\Delta NPL_{t-1}$ | -0.108066 | 0.137539 | -0.785713 | 0.4360 |
| $\Delta CAR$ | -0.014574 | 0.078368 | -0.185967 | 0.8533 |
| $\Delta CAR_{t-1}$ | -0.032579 | 0.075124 | -0.433674 | 0.6665 |
| $\Delta CAR_{t-2}$ | -0.192224 | 0.071825 | -2.676290 | 0.0102* |
| $\Delta CAR_{t-3}$ | 0.097424 | 0.072895 | 1.336492 | 0.1878 |
| $\Delta CAR_{t-4}$ | -0.152890 | 0.070512 | -2.168278 | 0.0352* |
| $\Delta CAR_{t-5}$ | -0.261412 | 0.079447 | -3.290393 | 0.0019* |
| $\Delta CAR_{t-6}$ | 0.103622 | 0.074555 | 1.389867 | 0.1711 |
| $ROA$ | 0.874879 | 0.218898 | 3.996742 | 0.0002* |
| $BOPO$ | 0.030753 | 0.016700 | 1.841467 | 0.0719** |
| $BOPO_{t-1}$ | 0.026521 | 0.019055 | 1.391780 | 0.1705 |
| $\Delta LDR$ | -0.088998 | 0.032941 | -2.701748 | 0.0096* |
| $\Delta LDR_{t-1}$ | 0.053042 | 0.036768 | 1.442602 | 0.1558 |
| $C$ | -6.722000 | 1.457902 | -4.610734 | 0.0000* |

Adjusted R-squared = 0.596291; AIC = -0.378;
Wald Test for *short-run relationship*: $F$-statistik = 4.0077, $p$ *value* = 0.0007

*Significant for α = 5%, ** Significant for α = 10%
Source: Processing results using EViews

The results obtained in Table 6 show that lag 2, 4, and 5 of ΔCAR affect ΔNPL significantly at the 5% significance level. The three lag variables affect NPL negatively. An increase in CAR will reduce the NPL ratio in the next 2nd, 4th, and 5th months. ROA affect ΔNPL significantly at the 5% significance level. ROA has a positive impact on increasing NPL, where increasing the value of ROA will increase the NPL ratio. ΔLDR also significantly affects ΔNPL at the 5% significance level. LDR harms NPL, where LDR increases will reduce the NPL ratio. Meanwhile, BOPO has a positive and significant effect on ΔNPL at a significance level of 10%. The results of the Wald test show that all short-run coefficients are significant.

### 3.2.3. Diagnostic Test of *ARDL*(1,6,0,1,1)

The method used to detect residual normality in this study is the Jarque-Bera test. Based on Table 7, the results of the Jarque-Bera test show a p-value of 0.7703 > $\alpha$ = 0.05. Thus, it is concluded that the residual of *ARDL*(1,6,0,1,1) is a normal distribution. To detect the problem of autocorrelation using the Breusch-Godfrey Lagrange-Multiplier test. Based on Table 7, the results of the Breusch-Godfrey test state that the p-value obtained is 0.6733 > $\alpha$ = 0.05. Thus, it can be concluded that there is no autocorrelation or serial correlation in the residual of *ARDL(1,6,0,1,1)*. To detect the problem of heteroscedasticity using the Breusch-

Pagan-Godfrey test. Based on Table 7, the results of the Breusch-Pagan-Godfrey test state that the p-value is 0.1546 > $\alpha$ = 0.05, so it can be concluded that there is no heteroscedasticity in the *ARDL(1,6,0,1,1)*.

**Table 7. Assumption Test: Residual *ARDL* Model$(\mathbf{1,6,0,1,1})$**

| Assumption Test | | Statistics Value | *p value* |
|---|---|---|---|
| Normality | Jarque-Bera (JB) | 0.5221 | 0.7703 |
| Correlation serial | Breusch- Godfrey (BG) | 0.9381 | 0.6256 |
| Heteroscedastic | Breusch-Pagan-Godfrey (BPG) | 18.0773 | 0.1546 |

Source: *Processing results using EViews*

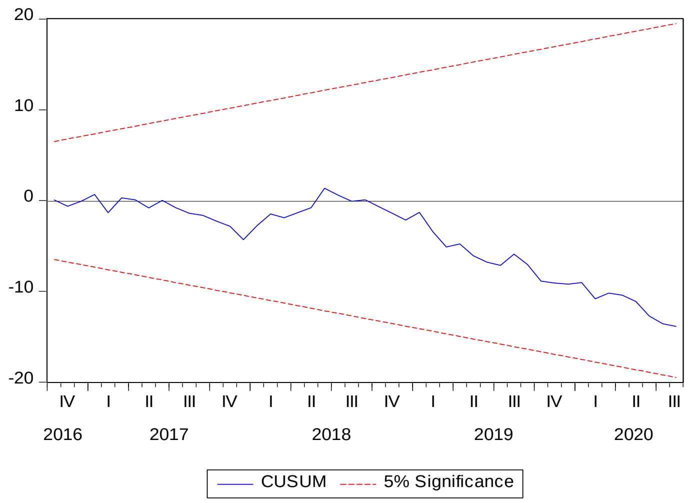


**Figure 4. Stability Test CUSUM Model *ARDL*$(\mathbf{1,6,0,1,1})$**
Source: *Processing results using EViews*

The stability of the *ARDL*(1,6,0,1,1) can be seen in the cumulative sum plot (CUSUM) (Figure 4). The CUSUM value (blue line) is between the 5% significance limit. It means that the *ARDL*(1,6,0,1,1) coefficients are stable. Based on the residual assumption test results and the CUSUM test of the *ARDL*(1,6,0,1,1), it is concluded that the *ARDL*(1,6,0,1,1) is a good model.

### 3.3. *ARDL* Bounds Test

The Bounds test is a series of ARDL model analyses to test the existence of a long-run relationship in the model used. It uses the F test statistic. The hypothesis of this test is $H_0$ a condition where the coefficient of each variable in the regression equation is zero (i.e., there is no long-run relationship between the independent and dependent variables). The results of the Bounds test for the *ARDL* (1,6,0,1,1) model are shown in Table 8.

**Table 8. Bounds Test**

| Statistics Test | Value | *k* |
|---|---|---|
| *F*-statistics | 10.66 | 4 |

The critical value of the bounds test

| Significance (α) | Lower limit: $I(0)$ | Upper limit: $I(1)$ |
|---|---|---|
| 10% | 2.45 | 3.52 |
| 5% | 2.86 | 4.01 |
| 2.5% | 3.25 | 4.49 |
| 1% | 3.74 | 5.06 |

Source: *Processing results using EViews*

Table 8 shows the statistical value of the F test is 10.66., where the value is greater than the upper limit values of *I(1)* at the significance level of 10%, 5%, 2.5%, or 1%. It means that rejecting the $H_0$. It means a long-run cointegration relationship between the variable and the other regressor variables.

**Table 9. Long-run Coefficient Estimation Results**

| Variable | Coefficient | Standard Error | $t$-Statistics | $p$ $value$ |
|---|---|---|---|---|
| $\Delta CAR$ | -0.408490 | 0.176853 | -2.309765 | 0.0253 |
| $ROA$ | 0.789555 | 0.210748 | 3.746446 | 0.0005 |
| $BOPO$ | 0.051688 | 0.012684 | 4.075053 | 0.0002 |
| $\Delta LDR$ | -0.032449 | 0.041343 | -0.784882 | 0.4365 |

Source: *Processing results using EViews*

Based on the results of the Bounds test, the estimation results of the long-run relationship coefficient are shown in Table 9. These results show that the variables CAR, ROA, BOPO have a significant effect on NPL, while the LDR variable does not significantly. Thus, the variable that has a relatively significant impact on NPL in the long term, namely an increase in ROA of 1%, will increase NPL by 79%—then, followed by BOPO, where an increase of 1% will increase the NPL by 5%. The CAR variable has a negative effect, where a rise of 1% will reduce the NPL by 41%.

**Table 10. Error Correction Model**

| Variable | Coefficient | Standard Error | $t$-Statistics | *p-value* |
|---|---|---|---|---|
| C | -6.722 | 0.729901 | -9.20947 | 0.0000* |
| $\Delta_2 CAR$ | -0.01457 | 0.065212 | -0.22349 | 0.8241 |
| $\Delta_2 CAR_{t-1}$ | 0.40548 | 0.089507 | 4.53015 | 0.0000* |
| $\Delta_2 CAR_{t-2}$ | 0.213256 | 0.087608 | 2.434198 | 0.0188* |
| $\Delta_2 CAR_{t-3}$ | 0.31068 | 0.080295 | 3.869219 | 0.0003* |
| $\Delta_2 CAR_{t-4}$ | 0.15779 | 0.08038 | 1.963056 | 0.0556 |
| $\Delta_2 CAR_{t-5}$ | -0.10362 | 0.062005 | -1.67119 | 0.1013 |
| $\Delta BOPO$ | 0.030753 | 0.014174 | 2.169664 | 0.0351* |
| $\Delta_2 LDR$ | -0.089 | 0.024496 | -3.6331 | 0.0007* |
| $ECT_{t-1}$ | -1.10807 | 0.120522 | -9.1939 | 0.0000* |
| **R-squared = 0.87; Adjusted R-squared = 0.84; AIC = -0.51** | | | | |

*Significant for α = 5%
Source: Processing results using EViews

The results shown in Table 10 are the error correction model (ECM) equations with a dynamic relationship between the short-run and long-run coefficients. These results show that the ROA variable does not impact NPL in the short run. The CAR variable has a relatively significant impact on NPL in the short run, although some lag variables do not significantly. On the other hand, BOPO and LDR are significant at 5% but have a relatively more minor impact on NPL in the short term.

In Table 10, there is also a corrected equilibrium coefficient $ECT_{t-1}$. The coefficient is significant with the correct sign (negative value). It implies a high speed of adjustment towards balance after a shock occurs. The rate is around 110.8%, from the imbalance condition after the previous shock to the current long-run equilibrium. It means that recovery speed is breakneck in the event of a shock.

## 4. CONCLUSIONS

This study uses the ARDL model approach to analyze the impact of bank-specific factors on NPL, using commercial banks in Indonesia as a case study. The data period used is until August 2020, when the COVID-19 Pandemic hit Indonesia. The results obtained are ARDL(1,6,0,1,1) as the best model. Based on this model, the NPL ratio of commercial banks in Indonesia is directly influenced by bank-specific factors, CAR, ROA, and LDR at the 5% significance level and BOPO at the 10% significance level. CAR and LDR harm, increasing the NPL ratio. Specifically, the bounds test results show that the ability of bank-specific factors to explain the NPL of commercial banks in Indonesia is 84%, while 16% is explained by other factors outside the model. The analysis results show a long-run cointegration relationship between NPL and specific factors in commercial banks in Indonesia. In the long term, bank-specific variables such as CAR, ROA, and BOPO influence the NPL ratio. CAR has a negative impact, while ROA and BOPO have a positive effect, whereas ROA has a relatively significant effect. Dynamically, only the CAR, BOPO, and LDR variables can explain the NPL in the short term. The CAR variable is somewhat more significant than the BOPO and LDR in the short run. The equilibrium correction obtained is significant and confirms a long-run relationship. The equilibrium correction indicates a high velocity towards stability after a shock. It means that the performance of commercial banks in Indonesia was outstanding during the COVID-19 Pandemic because the ability to recover from the shock that occurred during that period was relatively faster. In other words, the performance of commercial banks in Indonesia is relatively stable.

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