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The Influence of Loan to Deposit Ratio, Non-Performing Loan, Capital Adequacy Ratio and Return on Assets of Credit Distribution at Commercial Banks in Indonesia 2017-2020

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ABSTRACT

The purpose of this study is to partially determine the effects of Loan to Deposit Ratio (LDR), Non-Performing Loan (NPL), Capital Adequacy Ratio (CAR) dan Return on Assets (ROA) Against The Distribution of Credit in Commercial Banks in Indonesia for the Period 2017-2020. This research was conducted on Conventional Commercial Banks registered in the IDX during the period of 2017-2020, i.e., 41 conventional banks. The independent variables in the study are LDR, NPL, CAR and ROA, while the dependent variable is Credit Distribution. The data analysis technique used in this study is pooled data linear regression to get a comprehensive picture of the relationship between one variable and another using Microsoft Excel dan Eviews version 9 to process the research data. From the results of the study it is known that LDR has a significant positive effect on the distribution of credit to commercial banks in Indonesia which means the hypothesis is accepted. NPL has a significant positive effect on lending to commercial banks in Indonesia which means the hypothesis is accepted. CAR is positive value but does not have a significant influence on credit distribution to commercial banks in Indonesia which means the hypothesis is rejected. ROA is negative but does not have a significant influence on credit distribution in commercial banks in Indonesia which means the hypothesis is rejected.

Keywords: Capital Adequacy Ratio (CAR), Credit Distribution, Loan to Deposit Ratio (LDR), Non-Performing Loan (NPL), Return on Assets (ROA)

INTRODUCTION

In the last quarter of 2016, Indonesia's quarterly gross domestic product (GDP) growth was 4.9 percent, then increased to 5.0 percent in the first quarter of 2017, driven by recovering government consumption levels and rising export values (World Bank, 2021). This growth was also supported by improved fiscal management and credibility, as evidenced by a credit rating upgrade from Standard & Poor's (S&P) (World Bank, 2021).

However, this trend changed when the COVID-19 virus was first identified in December 2019 in Wuhan, China. The virus quickly spread worldwide, developing into a pandemic. Besides its impact on public health, the COVID-19 pandemic indirectly caused economic distress and a global downturn. According to The Economic Times, banks and non-bank financial institutions faced the risk of lower asset quality and higher lending terms due to mobility restrictions imposed in several countries, affecting business transactions and slowing economic output (Shukla, 2022). In some countries, such as India, banks were forced to reduce credit loans to businesses due to government-imposed lockdowns during the pandemic (Singh & Bodla, 2020).

In Indonesia, the pandemic also affected the financial sector and banking performance, particularly in credit and financing. Disruptions in economic performance and debtor repayment abilities led to a decline in credit distribution by banks (Supeno & Hendarsih, 2020). Although the Financial Services Authority (OJK) reported that Indonesia's banking sector remained resilient until 2020, sustained economic challenges during the pandemic prevented a positive performance (OJK, 2021).

According to the Business report, the intermediation function remained in a contraction trend until early 2021, with a minus 2.1 percent year-on-year (yoy) growth rate. In January 2021, when the coronavirus was first announced, credit growth in March 2020 was still at 7.95 percent yoy, higher than February 2020's 5.93 percent. However, from April 2020 onward, credit growth slowed to 5.73 percent and continued to decline, reaching negative growth in October 2020 with a contraction of -0.47 percent yoy. This downward trend persisted, with bank lending contracting to -1.39 percent yoy in November 2020 and further deepening to -2.41 percent yoy by the end of the year.

As a response, regulators revised the 2021 credit growth target from 7–9 percent to 5–7 percent. Amid weakening demand, bank credit restructuring reached IDR 987.48 trillion from 7.94 million debtors as of February 8, 2021. This figure remained close to the end of 2020, which was also in the range of IDR 900 trillion (Richard, 2021).

In addition to the findings above, the following data presents the development of credit distribution from 2017 to 2020:

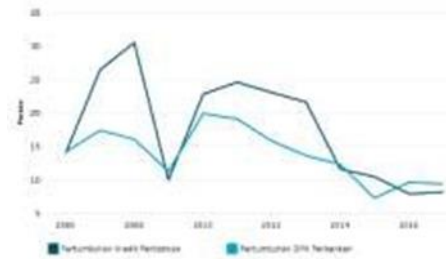


Figure 1. The Development of Credit Distributions in 2017

Source: Databoks (2018)

The figure above shows that, based on Indonesian Banking Statistics Data, OJK recorded an 8.24% growth in banking credit last year, reaching IDR 4,737.97 trillion from the previous year. This growth was higher than the previous year and marked the first increase since 2012 (Databoks, 2018). Furthermore, the development of credit distribution in 2018 is illustrated in the following figure:

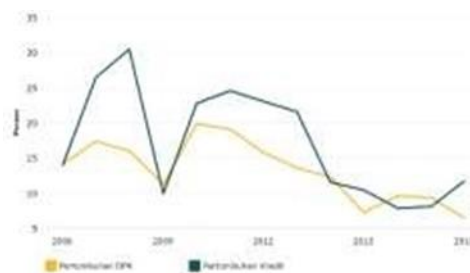


Figure 2. The Development of Credit Distributions in 2018

Source: Databoks (2019)

The figure above shows that growth in 2018 was the lowest compared to previous years. The growth of Third Party Funds (DPK) slowed, while bank credit continued to expand. According to Indonesian Banking Statistics Data, banking deposits at the end of 2018 grew by only 6.45% to IDR 5,630.45 trillion compared to the previous year's position (Databoks, 2019). Furthermore, credit distribution in 2019 is illustrated in the following figure.

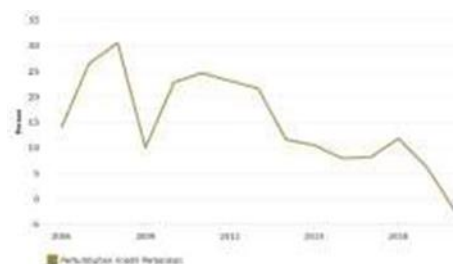


Figure 3. The Development of Credit Distributions in 2019

Source: Jayani (2021)

The figure above shows that the COVID-19 pandemic and the implementation of social restrictions have led to a slowdown in real sector activity, putting pressure on banking performance. Bank credit experienced negative growth of 2.41% year-on-year (yoy). The main causes include large companies that have not yet resumed operations at pre-pandemic levels and policies aimed at reducing loan debit balances to minimize interest expenses (Jayani, 2021). Furthermore, credit distribution in 2020 is illustrated in the figure below.

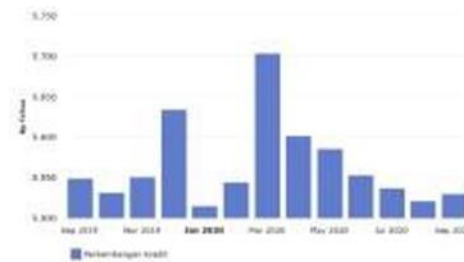


Figure 4. The Development of Credit Distributions in 2020

Source: Jayani (2020)

The image above explains that Bank Indonesia noted a 0.4% year-on-year (yoy) contraction in loans extended by banks, amounting to IDR 5,529.4 trillion in September 2020. The decline was primarily driven by a -0.7% (yoy) decrease in loans to non-financial corporate debtors, which fell to IDR 2,764.2 trillion. Meanwhile, loans to individual debtors grew by 0.7% (yoy) to IDR 2,573 trillion.

Furthermore, the credit slowdown was influenced by a decline in loan distribution across all types of use. Working Capital Loans (KMK) showed a negative 3.1% (yoy) growth in September 2020, particularly in the manufacturing, trade, hotel, and restaurant sectors.

These conditions indicate that the financial crisis disrupted the loan disbursement process, leading to limited credit distribution and higher borrowing costs. Companies without an adequate credit history and those with high default rates are more likely to face credit rejections. From the banks' perspective, managing credit risk involves maintaining asset quality and continuously calculating the allowance for asset losses. Given changes in global financial conditions and several related regulations, there is a need to harmonize provisions regarding asset quality assessment.

This aligns with Article 1/2 of the Republic of Indonesia's Constitution Number 10/1998, which amends Constitution Number 7/1992 on Banking. The article states that a bank is a business entity that functions to collect public funds and redistribute them in the form of credit or other financial instruments to improve the standard of living in society. Thus, banks serve as key intermediaries in the payment system, facilitating the exchange of goods and services for money

or other financial assets. Beyond making transactions safer and easier, banks also play a crucial role in credit distribution.

During the credit process, banks prioritize distributing financial capital to healthy businesses with strong repayment prospects rather than to companies that have suffered losses and may struggle to repay their loans (OpenStax, 2021). The following scheme illustrates credit distribution by banks.

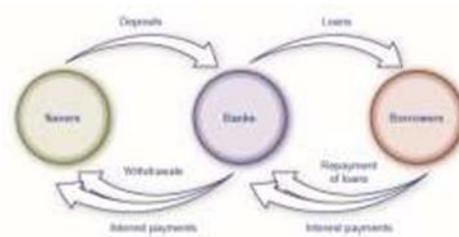


Figure 5. Credit Distribution Scheme

Source: OpenStax (2021)

The figure above explains that banks act as financial intermediaries, positioning themselves between debtors and creditors. The debtor places deposits in the bank, receives interest payments, and can withdraw money. The creditor, in turn, obtains a loan from the bank and repays it with interest. According to the Banking Law No. 10/1998, credit refers to the provision of cash or other assets based on an agreement between a bank and another party, requiring the creditor to repay the debt within a specified period with interest.

Several factors influence bank credit, such as the Loan to Deposit Ratio (LDR), which indicates bank liquidity. This ratio reflects the extent to which a bank can repay fund owners by relying on loans extended to the public. A higher LDR ratio results in lower liquidity for the bank, while a lower LDR ratio leads to higher liquidity (Agatha & Priana, 2020). A larger amount of credit increases the risk borne by the bank (Praja & Hartono, 2019). However, the LDR ratio can also serve as an indicator of how efficiently a bank manages its available funds. Additionally, a high volume of distributed credit impacts a bank's profitability. If a bank holds substantial funds but disburses fewer loans, it may face losses due to a reduced spread between deposit and loan interest rates.

Another factor is Non-Performing Loans (NPLs). The NPL ratio significantly affects banks' financial conditions and plays a crucial role in bank management decisions regarding credit expansion (Hermuningsih et al., 2020). Research by Hermuningsih et al. (2020) indicates that NPLs have a negative and significant effect on credit. A lower NPL ratio enables banks to function effectively as financial intermediaries, whereas a high NPL ratio can reduce available credit funds. A rising number of NPLs can influence bank policies regarding credit extension.

The next factor is the Capital Adequacy Ratio (CAR), which aims to enhance the professionalism and discipline of banks in managing assets to generate profits (Langodai & Lutfillah, 2019). A strong CAR encourages public confidence in saving funds in banks, which are then redistributed as credit. Bank capital originates from core and additional capital.

Another key factor is financial ratios, which assess banking performance. This study uses Return on Assets (ROA) as a measure of banking efficiency. ROA evaluates how effectively banks generate profits from their assets. A higher ROA signifies better financial performance, leading to increased returns. If ROA rises, the profitability of the banking sector improves, benefiting shareholders. Research by Riadi (2018) demonstrates that ROA has a positive and significant effect on credit. A high ROA allows banks to extend more credit to generate income.

This study aims to analyze the effects of the Loan to Deposit Ratio (LDR), Non-Performing Loans (NPL), Capital Adequacy Ratio (CAR), and Return on Assets (ROA) on credit distribution in commercial banks in Indonesia from 2017 to 2020.

LITERATURE REVIEW

Loan to Deposit Ratio (LDR)

LDR is a ratio related to loans or distributions from third parties in the form of Rupiah or foreign currencies. These loans do not include those originating from other banks or interbank fund flows but come from third-party funds, which include savings, time deposits (in Rupiah or foreign currency), and checking accounts (giro) (Sari & Murni, 2016).

In short, LDR indicates a bank's ability to lend funds to debtors using funds collected from the public, also known as third-party funds. LDR can serve as an indicator of a bank's liquidity, reflecting its ability to fulfill short-term obligations and provide funds to debtors. A healthy bank is characterized by an ideal LDR ratio, ensuring both liquidity stability and optimal profitability (Hakim, 2017).

LDR also supports sustainable economic growth while maintaining the minimum liquidity required by the central bank, such as the 3% Reserve Requirement under Bank Indonesia Regulation Number 22/10/PBI/2020 concerning Statutory Reserves (GWM) in Rupiah or Foreign Exchange for Conventional Commercial Banks, Sharia Commercial Banks, and Sharia Business Units.

If a bank increases its LDR, liquidity risk rises; conversely, if it decreases its LDR, credit distribution becomes less optimal. Any deviation from the optimal LDR should be subject to additional reserve requirements. However, in practice, achieving this optimal point may not always be feasible. Therefore, the optimal LDR is defined as a range between the lower and upper limits (Satria et al., 2016).

Non-Performing Loan (NPL)

NPL is a condition where a customer cannot pay half or all of their obligations to the bank as agreed at the beginning of the agreement. This risk significantly impacts bank operations. Non-performing loans refer to loans that face repayment difficulties due to internal or external factors beyond the debtor's control, such as poor economic conditions (Hermuningsih et al., 2020).

Bad credit arises when borrowers, who are expected to make payments, are either unable or unwilling to do so. It occurs due to a failure to fulfill the agreed repayment terms, leading to potential losses from delayed payments. Every bank is likely to experience bad credit, meaning some customers cannot repay their loans. Two main factors contribute to bad credit: (1) credit analysts being insufficiently thorough in verifying documents and (2) a lack of precision in calculating banking ratios.

Credit quality is classified into five categories: Current, Special Mention, Substandard, Non-Current, Doubtful, and Loss. According to Bank Indonesia Circular Letter Number 7/3/DPNP, issued on January 31, 2005, credit quality is assessed based on three criteria: business prospects, performance, and the ability to repay debt.

Capital Adequacy Ratio (CAR)

To maintain business continuity, banks need to measure the Capital Adequacy Ratio (CAR). This allows banks to determine the amount of capital obtained and how it is used for operational activities, assessing whether the capital is sufficient to cover potential losses. The higher the CAR, the better a bank's ability to bear the risk of any risky credit or productive asset. Credit is considered risky if it has the potential to become bad credit, which affects CAR (Syukriyah et al., 2020).

The CAR ratio aims to enhance the professionalism and discipline of each bank in managing assets to generate profits (Langodai & Lutfillah, 2019). It is based on the principle that every investment carries risk; therefore, a certain percentage of total capital should be allocated relative to the total investment (Riadi, 2018). According to Bank Indonesia Regulation No. 15/12/PBI/2013 on Minimum Capital Adequacy Requirements for Commercial Banks, each bank is required to maintain a minimum capital of 8% of Risk-Weighted Assets (RWA) to cover the risks stated in capital adequacy regulations.

A company's assets consist of core capital and supplementary capital. Core capital is divided into two: paid-in capital and additional capital reserves, which include other factors (e.g., retained earnings from previous years after tax) and deduction factors (e.g., losses from previous years). Bank capital refers to the total capital originating from the bank, comprising both core and supplementary capital. Meanwhile, risk-weighted assets (RWA) include assets reported in the financial position statement and administrative assets reflected in the bank's

contingent liabilities to third parties. To determine the amount of RWA, a simple multiplication is applied based on the asset's level of risk or its characteristics (Ismaulandy, 2014).

Return on Assets (ROA)

Profitability reflects a company's ability to generate profit within a certain period. The profitability ratio aims to assess a bank's performance in earning profits over a specific timeframe. The higher the profitability ratio, the more successful the bank is in increasing revenue and minimizing operating costs. Profitability analysis can be used to evaluate the performance of profit-oriented companies (Dewi & Sudiartha, 2017).

In this study, profitability is measured using the ROA ratio. ROA represents the ratio between net income and average assets, measuring a company's ability to utilize its assets to generate after-tax profits. Profit is the primary goal of both companies and banks. Achieving bank profits ensures the ability to fulfill obligations to shareholders, evaluate leadership performance, and attract investors to purchase shares. Bank profits also enhance public trust. When a bank can raise significant funds or capital, it gains greater opportunities to provide loans (Hermuningsih et al., 2020). The level of profitability in banks can be measured using ROA.

Profitability serves as a record of financial transactions, assessed by investors and creditors (banks) as an indicator of total investment returns and the company's ability to meet its debt obligations. It reflects asset utilization and resource efficiency, demonstrating the company's overall performance. The effectiveness and efficiency of management can be observed through the profit generated from sales and investments, as shown in financial statements. A higher profitability ratio indicates a better financial condition, symbolizing strong profit levels and operational efficiency, which can be seen through income and cash flow.

Profitability is more significant when compared to previous performance periods and competitors' ratios. Thus, analyzing industry trends is essential for drawing useful conclusions about a company's profitability. Profitability ratios reveal the outcomes of financial policies and operational decisions made by management, which are also influenced by the petty cash recording system.

Credit Distribution

In Latin, credit is called "credere," which means "to believe." A creditor believes that the debtor will return the loan according to the agreement. Meanwhile, the debtor receives this trust and, therefore, has an obligation to repay the loan within the agreed time period (Giri et al., 2019). According to Fahmi (2014), credit is a form of trust, where credit and trust are like two sides of the same coin that cannot be separated. A loan requires trust because trust is valuable.

Based on Constitution Number 10/1998, as an amendment to Constitution Number 7/1992 concerning Banking, the definition of credit is "the provision of cash or its equivalent, based on an agreement between a bank and another party, which requires the debtor to repay the loan within a certain period, including interest." According to Yulianto (2016), credit is the ability to make payments according to a promised agreement, allowing for a delay in payment over a specified period for purchases or loans.

Therefore, credit can be defined as the transfer of money or goods based on an agreement between a debtor and a creditor, where the borrower is obligated to repay the debt within a specified time frame.

The provision of credit is one of the key activities of commercial banks, utilizing funds collected from the public to fulfill their role as financial intermediaries. Before disbursing credit, banks must assess the debtor's feasibility to prevent risks such as non-performing loans, which could threaten the bank's financial stability.

Framework of Thinking

Based on the conceptual explanation above, the following framework can be outlined as follows:

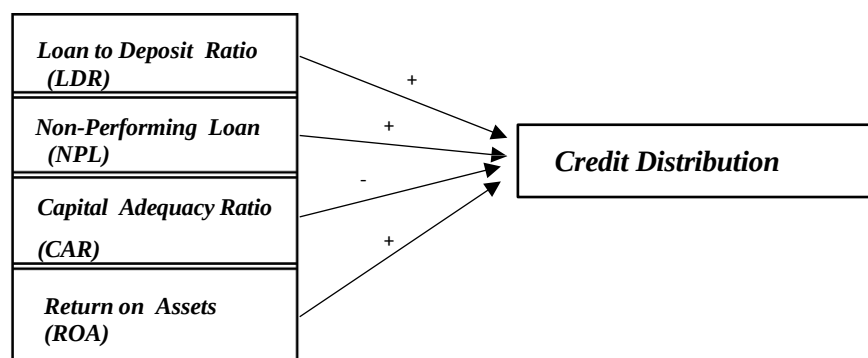


Figure 6. Theoretical Framework

Source: Processed Data by Researchers

Research Hypotheses

LDR is a ratio related to loans or credit distribution derived from third-party funds (savings, deposits, and current accounts). According to the theory of money supply and demand, banks collect money from the public in the form of savings and redistribute it as alternative working capital, investment, and consumptive loans. Individuals with excess funds can deposit them in savings, demand deposits, time deposits, or other forms based on their needs and agreements with the bank (Dini & Widyawati, 2019). In relation to risk management theory, this ratio measures liquidity and bank efficiency in generating profits. It should be maintained in a balanced condition. Banks must balance liquidity risk while maximizing profits through interest spreads on loans and savings.

Previous research by Nasedum, Murni, and Untu (2020) found that LDR positively affects lending, meaning that a higher LDR indicates increased credit distribution by commercial banks to boost income. However, banks must also monitor credit quality to avoid bad loans and maximize benefits.

Further research by Suryawati, Cipta, and Susila (2018) also confirmed that LDR has a significant positive effect on credit distribution, implying that banks can meet short-term obligations, such as disbursing deposit withdrawals and fulfilling credit requests from debtors.

Based on the above explanations and previous research findings, the hypothesis is formulated as follows:

H₁: LDR has a significant positive effect on Credit Distribution.

NPL represents loans that have not been repaid by creditors for more than ninety days. High NPL levels can lead to inefficient management, reduced bank profitability, and decreased depositor confidence (Mondal, 2016). Since NPL is closely related to credit risk, a high NPL value indicates poor asset quality. The NPL ratio reflects how well a bank manages credit risk, as it represents the proportion of total loan losses relative to total loan disbursement. When the NPL ratio is high, banks must allocate more funds to cover losses, leading to decreased capital availability and reduced credit disbursement capability.

Research conducted by Christiamanah, Agatha & Priana (2020); Pamungkas (2020); Pinto, Bagiada & Parameswara (2020); Haryanto & Dewi (2019); Ramandhana et al. (2018); and Kustina et al. (2018) all indicate that NPL has a significant effect on lending.

Based on the above explanations and previous research findings, the hypothesis is formulated as follows:

H₂: NPL has a significant positive effect on Credit Distribution.

CAR represents the capital held by banks as a buffer for operational activities and potential losses. While a higher CAR indicates a stronger financial position, it does not necessarily mean that the available capital can be redistributed for credit. A high CAR may increase the bank's credit risk, as it raises the RWA (Risk-Weighted Assets) value. When RWA increases, the denominator of the CAR ratio also rises, suggesting that the bank is less likely to extend credit.

Research by Masdjojo & Devi (2013), Darmawan (2017), Arullia (2017), and Ibrahim et al. (2020) supports the finding that CAR negatively affects lending.

Based on the above explanations and previous research findings, the hypothesis is formulated as follows:

H₃: CAR has a significant negative effect on Credit Distribution.

ROA is an indicator that measures how effectively a bank's assets generate income. An increase in ROA suggests that the bank's assets are being utilized optimally, leading to improved financial performance. Previous studies by Novianti & Indraswarawati (2020), Haryanto & Dewi (2019), and Dini & Widyawati (2019) indicate that ROA has a significant effect on credit distribution. Based on the above explanations and previous research findings, the hypothesis is formulated as follows:

H₄: Return on Assets (ROA) has a significant positive effect on Credit Distribution.

RESEARCH METHODOLOGY

Research Types

This research aims to test the hypothesis by analyzing the relationship between the independent variables—LDR, NPL, CAR, and ROA—and the dependent variable, Credit Distribution, in Conventional Banks registered on the IDX from 2017 to 2020. This study employs a causal quantitative approach, which involves collecting, processing, analyzing, and presenting data objectively from a set of studied objects to solve a problem and develop general principles (Duli, 2019).

Population and Sample

In this research, the population consists of Conventional Commercial Banks listed on the Indonesia Stock Exchange (IDX) from 2017 to 2020. The sample is a subset of the population, selected based on specific criteria set by the researcher to ensure representativeness. This study employs a non-probability sampling method, specifically purposive sampling, where the sample is chosen based on predetermined criteria (Sugiyono, 2017). The criteria for this research are as follows:

1. Conventional Commercial Banks that have gone public and were listed on the Indonesia Stock Exchange from 2010 to 2020;
2. Availability of complete and publicly accessible annual financial reports, with sufficient data to analyze the projected variables for 2017–2020; and
3. Availability of annual financial reports in Rupiah currency for the years 2017–2020.

Variable Operations

Research variables refer to all forms that are investigated to obtain information and draw conclusions to solve the research problems determined beforehand (Sugiyono, 2017). The variables in this study are as follows:

1. LDR

Loan to Deposit Ratio (LDR) is a ratio related to loan or credit distribution (in Rupiah or foreign currency) sourced from third-party funds. These third-party funds consist of savings, time deposits, and current accounts. The LDR value in a bank can be calculated using the following formula (Nasedum, Murni, & Untu, 2020):

$$LDR = \frac{\text{Credit Given}}{(\text{Savings} + \text{Deposits} + \text{Current Accounts})} \times 100\%$$

2. NPL

Non-Performing Loan (NPL) is a ratio that indicates the amount of loans from banks or other financial institutions that have not been repaid for more than 90 days relative to the total credit extended to creditors. The NPL ratio can be calculated using the following formula (Nasedum, Murni, & Untu, 2020):

$$NPL = \frac{\text{Bad Credit (Substandard + Doubtful + Bad Loans)}}{\text{Credit Given}} \times 100\%$$

3. CAR

Capital Adequacy Ratio (CAR) is a bank performance ratio that measures the adequacy of capital owned by a bank to support assets containing risk. CAR can be calculated using the following formula (Nurhayati et al., 2020):

$$CAR = \frac{\text{Total Bank's Capital}}{\text{Risk - Weighted Assets}}$$

4. ROA

Return on Assets (ROA) is a ratio that measures how efficiently a bank utilizes its assets to generate profits. Bank Indonesia sets a minimum ROA value of at least 2%. A high ROA enables banks to fulfill obligations to shareholders, assess management performance, and attract investors. Therefore, banks strive to generate profits. A high ROA allows banks to provide more credit, thereby increasing income. The ROA formula is as follows (Riadi, 2018):

$$ROA = \frac{\text{Earnings Before Tax (EBT)}}{\text{Total Assets}} \times 100\%$$

5. Credit Distribution

Credit distribution refers to the provision of money or claims based on a loan agreement between a bank and another party, requiring the borrower to repay the debt within a specified period with a predetermined interest rate. The loan disbursement rate is measured using the natural logarithm of the total credit amount (Panuntun & Sutrisno, 2018).

Data Collection Technique

The required data will be obtained using the documentation method, where data collection is conducted by tracing historical records such as autobiographies, government and private documents, notebooks, letters, clippings, and photographs. In this study, data will be collected from financial reports published on www.idx.co.id.

Data Analysis Technique

The data analysis used in this study is panel data regression analysis (pooled data), which combines time series and cross-section data. Time series data refers to data recorded at different points in time but sharing the same characteristics, while cross-section data consists of observations with different characteristics at the same point in time.

The data processing tools used in this study are Microsoft Excel and EViews version 9.

The regression equation in this study is formulated as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

or

$$\text{CREDIT} = C + b_1 \text{LDR}_{ij} + b_2 \text{NPL}_{ij} - b_3 \text{CAR}_{ij} + b_4 \text{ROA}_{ij} + \epsilon$$

Description:

Y or CREDIT = Credit Distribution

α or C = Constant

$\beta_1 - \beta_4$ or $b_1 - b_4$ = Regression coefficients

X_1 or LDR = Loan to Deposit Ratio

X_2 or NPL = Non-Performing Loan

X_3 or CAR = Capital Adequacy Ratio

X_4 or ROA = Return on Assets

ϵ = Error term

ij = Company and Year

To perform panel data regression, three models can be used: Pooled Least Square (Common Effect Model), Fixed Effect Model, and Random Effect Model (Basuki & Prawoto, 2017).

Common Effect Model (Pooled Least Square)

This model is a simple technique for estimating regression models with panel data. It does not account for differences between data and time. In this model, data across individuals remains the same over various time periods studied. The Common Effect Model can be estimated using the Ordinary Least Squares (OLS) method.

Fixed Effect Model

This model considers heterogeneity among individuals, which is reflected in different intercept values for each individual while maintaining a constant slope. The approach used in this model is the Fixed Effect/Least Square Dummy Variable (LSDV) model.

Random Effect Model

This model allows for different intercepts among individuals and estimates panel data by considering the errors of each individual with distinct characteristics over different time periods. The Random Effect Model can be estimated using the Generalized Least Squares (GLS) method.

Before determining the appropriate model, the data is first selected using the following tests:

Chow Test

The Chow test determines the appropriate model between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). The hypotheses in the Chow test are:

1. H_0 : Common Effect Model (CEM)
2. H_a : Fixed Effect Model (FEM)

If Prob. Cross-section Chi-square > 0.05 , H_0 is accepted, indicating that the appropriate model is CEM. Conversely, if Prob. Cross-section Chi-square < 0.05 , H_0 is rejected, and FEM is the appropriate model. If CEM is selected, the Lagrange Multiplier (LM) test is conducted. If FEM is selected, the Hausman Test follows.

Hausman Test

The Hausman Test determines the appropriate model between the Random Effect Model (REM) and the Fixed Effect Model (FEM). The hypotheses are:

1. H_0 : Random Effect Model (REM)

2. H_a : Fixed Effect Model (FEM)

If Prob. Cross-section Random > 0.05 , H_0 is accepted, meaning REM is the appropriate model. If Prob. Cross-section Random < 0.05 , H_0 is rejected, and FEM is the appropriate model. If REM is selected, the Lagrange Multiplier (LM) test follows. If FEM is selected, the panel data regression can proceed.

Lagrange Multiplier (LM) Test

The Lagrange Multiplier Test determines the appropriate model between the Common Effect Model (CEM) and the Random Effect Model (REM). The hypotheses are:

1. H_0 : Common Effect Model (CEM)
2. H_a : Random Effect Model (REM)

If Prob. Test Hypothesis Cross-section from Breusch-Pagan > 0.05 , H_0 is accepted, and CEM is the appropriate model. If Prob. Test Hypothesis Cross-section from Breusch-Pagan < 0.05 , H_0 is rejected, and REM is the appropriate model. Once the model is determined, panel data regression can proceed.

Hypothesis Testing

Similarity Test

The similarity test evaluates the extent to which variations in the independent variable explain variations in the dependent variable, while other variations are attributed to external factors. The Adjusted R-Squared value ranges from 0 to 1. A value close to 0 indicates that the independent variable poorly explains the dependent variable's variation, whereas a value close to 1 suggests a stronger explanatory power (Ghozali & Ratmono, 2017). The Adjusted R-Squared is preferred over R-Squared to eliminate bias that may arise when additional independent variables increase R-Squared without genuine correlation with the dependent variable.

Partial Significance Test (t-Test)

The t-test evaluates the individual effect of each independent variable on the dependent variable (Ghozali & Ratmono, 2017). The hypotheses are:

1. H_0 : The independent variable has no effect on the dependent variable.
2. H_a : The independent variable has a positive/negative effect on the dependent variable.

If Prob. t-statistic > 0.05 , H_0 is accepted, indicating no significant effect of the independent variable. If Prob. t-statistic < 0.05 , H_0 is rejected, indicating a significant positive or negative effect of the independent variable on the dependent variable.

RESULT AND DISCUSSION

Research Result

Panel Data Regression Test

Model Selection

Model selection in panel data regression is conducted using the Chow Test and Hausman Test to determine the most appropriate method for this research model among the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM).

Chow Test

The Chow test is conducted to determine the appropriate model between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). The hypotheses for the Chow test are as follows:

1. H_0 : Use the Common Effect estimation model.
2. H_1 : Use the Fixed Effect estimation model.

The appropriate model is determined based on the probability value. If the probability value is less than 5% (significant), the Fixed Effect Model is used. However, if the probability value is greater than 5% (not significant), the Common Effect Model is used. Below are the test results:

Table 1. Chow Test Result

Effects Test	Statistic	d.f.	Prob.
Cross-section Chi-square	541,0474	40	0,0000

Source: The Result of Eviews 9

Based on the test results between the common and fixed effects, the chi-square cross-section probability value is 0.0000. Since this value is less than 5% ($0.0000 < 0.05$), H_0 is statistically rejected, indicating that the fixed effect model is the correct one.

Hausman Test

The Hausman test is used to determine the appropriate model between the Random Effect Model (REM) and the Fixed Effect Model (FEM). The hypotheses for the Hausman test are as follows:

1. H_0 : Use the Random Effect estimation model.
2. H_1 : Use the Fixed Effect estimation model.

If the probability value is less than 5% (significant), the Fixed Effect Model should be used. However, if the probability value is greater than 5% (not significant), the Random Effect Model is preferred.

Table 2. Hausman Test Result

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	35,14156	4	0,0000

Source: The Result of Eviews 9

Based on the Hausman test table, the probability value of a random cross-section is 1.0000. Since this probability value is less than 5% ($0.0000 < 0.05$), the appropriate model to use is the fixed effect estimation model.

Panel Data Regression Model Test

After selecting the regression model, this research adopts the Fixed Effect Model (FEM) as the most appropriate approach. The FEM accounts for heterogeneity among individuals by allowing different intercept values while maintaining a constant slope. This test aims to examine the functional relationship between the independent and dependent variables.

Table 3. Fixed Effect Model Regression Results

Variable	Coefficient	t-Statistic	Prob.
C	15,75478	202,6061	0,000
LDR	1,008699	14,09049	0,000
NPL	0,052284	5,808084	0,000
CAR	0,001956	1,343076	0,1819
ROA	-0,00173	-0,306351	0,7599
R-squared	0,997752		
Adjusted R-squared	0,996884		
F-statistic	1149,889		
Prob(F-statistic)	0		

Source: The Result of Eviews 9

Regression Evaluation

Similiarity Test

The fit test uses Adjusted R-Squared to measure the influence of independent variables in explaining variations in the dependent variable by estimating the standard error.

Based on the estimation results of the fixed effect model, the Adjusted R-Squared is 0.996884 or 99.7%. This indicates that the independent variables, including LDR, NPL, CAR, and ROA, explain 99.7% of the variation in the dependent variable (credit distribution), while the remaining 0.3% is influenced by other variables outside the model.

Independent Variable Significance Test (t-Test)

Table 4. t-Test Result

Variabel	t	Sig.	Hypothesis
(Constant)	202,6061	0,000	
LDR	14,09049	0,000	Accepted
NPL	5,808084	0,000	Accepted
CAR	1,343076	0,1819	Rejected
ROA	-0,306351	0,7599	Rejected

Source: Processed Data by Researcher (2021)

After determining the regression equation, the next step is to examine whether each independent variable—LDR, NPL, CAR, and ROA—individually affects the dependent variable, namely credit distribution. When the significance level is <0.05 , it indicates that the independent variables have a positive and significant individual effect on the dependent variable.

Research Discussion

The Influence of LDR toward Credit Distribution

The test results between the LDR variable and the Loan Distribution variable indicate that the accepted hypothesis is that LDR has a significant and positive effect on Credit Distribution at commercial banks in Indonesia.

Generally, the LDR ratio falls within an ideal range that enables banks to generate efficient profits while ensuring the availability of third-party funds (savings, current accounts, and time deposits). According to the theory of money supply and demand, banks fulfill their role in the economic sector as collectors of public funds and distribute them in the form of alternative working capital loans, investment, and consumption (Fildzah & Adnan, 2018).

The LDR ratio should be balanced, with a minimum range of 80% and a maximum tolerance limit of 92% (Peraturan BI No. 18/14/PBI/2016). A balanced LDR position allows banks to remain liquid in meeting their short-term

obligations while maximizing returns from the spread between deposit and loan interest rates.

In this research, based on Table 4.2, the average LDR value during the 2017–2020 period is 95.22%, slightly exceeding the maximum tolerance limit set by Bank Indonesia regulations. Therefore, it can be concluded that, according to the initial hypothesis, an increased LDR ratio leads to an increase in lending.

This finding supports previous research conducted by Masdjojo & Devi (2013), Nasedum et al. (2020), Dini & Widyawati (2019), Suryawati et al. (2018), Riadi (2018), and Khotimah & Atiningsih (2018), which found that LDR has a positive and partially significant effect on lending.

The Influence of NPL toward credit Distribution

The results of the partial t-test between the NPL variable and the Loan Distribution variable indicate that the hypothesis is accepted—NPL has a significant positive effect on credit distribution at commercial banks in Indonesia.

The higher the NPL, the greater the credit distributed; conversely, the lower the NPL, the smaller the credit distributed. Based on the study results, it is possible that banks have issued large loans without applying the principle of prudence. Non-Performing Loans (NPL) reflect credit risk. A smaller NPL indicates lower credit risk for the bank.

In line with existing theory, NPL tends to reduce the amount of credit disbursed and vice versa. A higher NPL level decreases the amount of credit disbursed and increases the level of risk borne by the bank.

This finding is supported by previous research conducted by Arullia (2017), Agatha & Priana (2020), Pamungkas (2020), Pinto, Bagiada, and Parameswara (2020), and Ramandhana et al. (2018), who found that NPL has a positive and partially significant effect on credit. Therefore, the research findings align with prior studies.

The Influence of CAR toward Credit Distribution

The results of the t-test (partial test) between the CAR variable and the Loan Distribution variable indicate that the hypothesis is rejected. CAR is positive but does not have a significant effect on Credit Distribution at commercial banks in Indonesia. Therefore, the hypothesis is rejected.

The CAR ratio aims to improve the professionalism and discipline of each bank in managing its assets to obtain profits. (Langodai & Lutfillah, 2019). This supports previous research conducted by Agatha & Priana (2020), which explains that CAR has no effect on credit because banks aim to maintain their capital. The percentage level of CAR is related to Bank Indonesia regulations, which require a minimum of 8%. Thus, banks have sufficient capital to support their needs and bear risks, including credit risk. With large capital, banks can distribute more

credit, increasing credit distribution. Therefore, CAR is no longer a determining factor in credit distribution.

Moreover, research conducted by Pujiati et al. (2013) found that CAR had no partial significant effect on credit. This was due to the movement of CAR from March 2005, which was 26.64%, gradually decreasing to 14.24% in December 2012. Another factor in extending credit is maintaining the ratio of non-performing loans at a low level, which can be managed by issuing bonds and retaining profits.

Additionally, research by Pratiwi & Hindasah (2014) also found that CAR does not have a significant effect on credit. CAR is a capital ratio that indicates a bank's ability to provide funds for business development and accommodate the risk of loss from operational activities. Moreover, credit has been widely funded by other sources, such as third-party funds.

An insignificant result can also be seen in this study. CAR is used to maintain the minimum capital adequacy requirement and anticipate potential losses. The determination of this minimum standard makes banks aim for a minimum CAR of 8%, regardless of changes in credit. Although the results are not significant, banks cannot ignore CAR in credit, as capital adequacy is often disrupted by excessive lending. Therefore, these research findings align with previous studies.

The Influence of ROA toward Credit Distribution

The results of the partial test between the ROA variable and the Loan Distribution variable indicate that the hypothesis is rejected. ROA is negative but not significant for Credit Distribution in commercial banks in Indonesia.

The purpose of achieving bank profits is to ensure the adequacy of fulfilling obligations to shareholders, evaluate leadership performance, and increase investor attractiveness in purchasing shares. High bank profits can strengthen public trust. When a bank can raise significant funds or capital, it gains broader opportunities to provide loans (Hermuningsih et al., 2020). According to Simorangkir (2004), high profits allow banks to gain public trust, enabling them to raise more funds and, in turn, provide more loans.

This research is supported by previous studies conducted by Pratiwi & Hindasah (2014), Mamahit & Sumiyarsih (2018), and Wiyasa et al. (2021), who found that ROA had no partial effect on credit. This is because banks prioritize other funding sources besides credit. ROA is not the primary source of bank loan funding; therefore, fluctuations in the ROA ratio do not impact the amount of credit disbursed.

Additionally, this research confirms that ROA does not partially affect credit distribution. This is because credit allocation is not determined based on ROA. Instead, banks consider other factors, such as credit growth trends—whether there is a deceleration or an increase. A continuous decline in credit

growth reflects Indonesia's economic condition, indicating an unfavorable economic climate. As a result, banks prioritize economic conditions over ROA when determining the amount of credit to be disbursed. These findings align with previous research.

CONCLUSION AND SUGGESTION

Conclusion

Based on the results of data analysis and discussions conducted on the effect of Loan to Deposit Ratio (LDR), Non-Performing Loan (NPL), Capital Adequacy Ratio (CAR), and Return on Assets (ROA) on Commercial Bank Credit Distribution in Indonesia for the 2017–2020 period, the following conclusions can be drawn. The first hypothesis is accepted, indicating that the Loan to Deposit Ratio (LDR) has a positive and significant effect on credit distribution to Commercial Banks in Indonesia during this period. The second hypothesis is also accepted, showing that the Non-Performing Loan (NPL) has a positive and significant effect on credit distribution. However, the third hypothesis is rejected, as the Capital Adequacy Ratio (CAR) is positive but has no significant effect on credit distribution. Similarly, the fourth hypothesis is rejected, as the Return on Assets (ROA) is negative but has no significant effect on credit distribution to Commercial Banks in Indonesia during the 2017–2020 period.

Suggestion

Several suggestions can be considered for further research. Banks should expand their credit reach by simplifying requirements for communities and MSMEs. At certain stages of life, most people tend to borrow money, and with various types of credit and loans available, the findings of this study can serve as a reference for the public in choosing the most suitable loan for their needs. Additionally, banks should optimize transaction structures, collateral, and guarantees to mitigate both identified and inherent risks in individual credit. However, transactions should primarily be based on the creditor's repayment capacity.

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