Bank Capital Buffer Model and Monetary Policy Approach to Non-performing Loans in Indonesia

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Abstract. The economic and monetary crisis will greatly affect the economic growth of a country. In practice, there are many conditions and factors that can make the provision of credit detrimental to the banking sector. Therefore, the monetary and banking authorities has made various efforts to avoid systemic risks from lending. This study aims to examine the important role of bank capital buffers, RR-LDR policies, Gross Domestic Product, credit interest rates and credit growth in Indonesia on Non Performing Loan from 2012 to 2020. The model used<!-- Query ID="Q1" Text="<!-- Query ID="Q2" Text="Please check and confirm if the authors given and family names have been correctly identified." --> is panel data analysis with cross section data of conventional banks listed in book four according to Bank Indonesia's classification. The results of this study indicate that the bank's capital buffer, GDP and credit interest rates have a significant positive effect on bank credit in Indonesia. On the other hand, RRLDR and credit growth have a negative effect on credit growth.

Keywords: RR-LDR · bank capital buffer · credit interest rates · gross domestic product · credit growth

1 Introduction

The economic growth of a country will be affected by monetary and financial crisis. According to the theory explained by [1], there are several factors that can cause a financial crisis including uncertainty, rising interest rates, problems in the banking sector, and imbalances in fiscal regulations by the government. Banking as a financial intermediary from two parties, those who have excess and those who lack of funds have an important role and position as a supporter and driving force for the economy. Although in the current economic system, banking is not the only main source of capital available for national and public investment, but the role of banking capital is still relatively large and needed when compared to the capital market and other sources of capital [2]. The financial system has a tendency to create procyclicality. Procyclicality is a situation where the economy grows faster during the expansion phase and the economy worsens during the contraction phase [3]. Procyclicality rising and tend to ignore risk when its in expansion phase. Against this procyclicality behavior, policies that are countercyclical
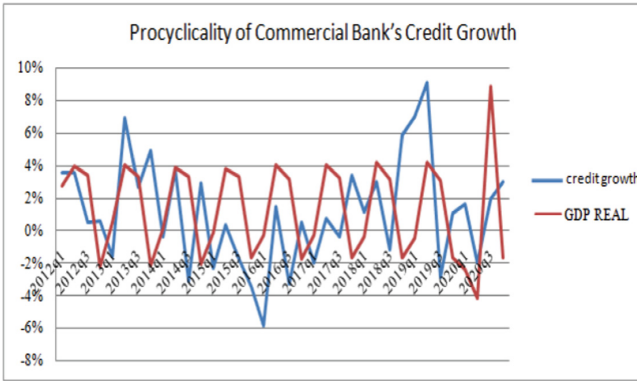
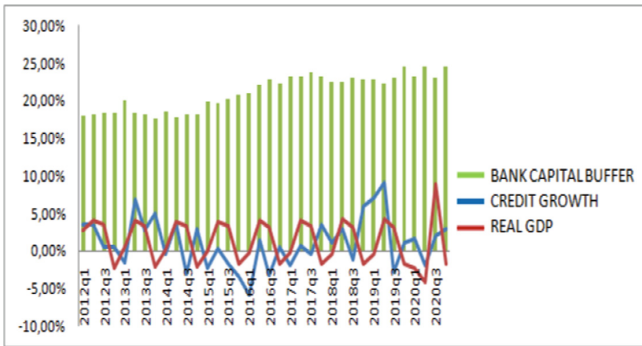**Fig. 1.** Procyclicality of Commercial Bank's Credit Growth

Fig. 2. Bank Capital Buffer, Credit Growth and Real GDP in Indonesia

in nature are needed that can inhibit the rate of economic growth that is too high during the expansion phase and accelerate low or even negative economic growth during the contraction phase. The following Fig. 1 is a graph of the procyclicality of commercial bank's credit growth.

Procyclicality occurs from the relationship between the business cycle and the bank's risk behavior cycle. When the economy experiences an expansion phase, which is marked by economic growth that increases in the business cycle and causes optimistic investor behavior and tends to ignore risk, it causes an increase in credit demand.

Another instrument that can affect Non-Performing Loans is the Bank's capital buffer. The bank's capital buffer is the difference in excess of the Capital Adequacy Ratio (CAR) or the capital adequacy ratio with the minimum CAR set at (8%). The function of the bank's capital buffer in the banking industry is to anticipate an increase in future losses [4]. The following is a graph of the Capital Formation of Commercial Banks in Indonesia.

The picture above shows the condition of the development of credit growth and the formation of banking capital which is influenced by the level of the bank's capital buffer.

It can be seen in the Fig. 2 that the buffer growth rate was quite volatile from 2012 to 2020. The highest buffer level was recorded at 15% in line with the increase in credit growth and GDP growth.

The existence of this bank capital buffer can be a protection that can absorb various risks of losses that may arise from excessive credit growth or during the crisis period. Banks can hold and make bank capital buffers as insurance to avoid market discipline costs and supervisory intervention costs if they decide to lower their capital below the capital adequacy ratio (CAR) requirements. The existence of a bank capital buffer policy can show and suppress the rate of credit growth in the period of economic expansion through transmission if an increase in the cost of credit (loanable funds) creates a need for banks to increase their capital reserves as well as in anticipation of the risk of losses that will arise during a crisis period. Will have a direct impact on the banking intermediation function [5].

2 Empirical Studies

Research conducted by [6] concluded that the Bank's capital buffer has a significant negative effect on Non-Performing Loans in Spain. Then the results of the same study were carried out by [2] who concluded that bank capital buffers have a positive and significant effect on Non-Performing Loans in Indonesia. Different results were carried out by [7] concluding that bank capital buffers have a positive effect on Non-Performing Loan Banks in France.

In relation to Non Performing Loans, there are several studies that discuss Non Performing Loans. Research [8] shows that banks with large total assets tend to affect the level of Non Performing Loans (NPL), he variable size of the bank is not widely studied for Non Performing Loans (NPL) in Indonesia [9]. Then according to [10] evaluated the effectiveness of the use of instruments in reducing systemic risk in 49 countries and some instruments (LTV and GWM) were effective in reducing procyclicality but their effectiveness was highly dependent on shocks in the financial sector. Thus, these shocks will affect the non-performing loans of banks.

Hypothesis:

- Reserve Requirement Loan to Deposit Ratio (RR-LDR) has a negative effect on Non-Performing Loans (NPL) of conventional commercial banks in Indonesia.
- Bank capital buffer has a positive effect on Non Performing Loans (NPL) of conventional commercial banks in Indonesia.
- Gross Domestic Product (GDP) has a positive and significant impact on the Non-Performing Loans (NPL) of conventional commercial banks in Indonesia.
- Credit Interest Rates have a negative and significant effect on Non Performing Loans (NPL) of conventional commercial banks in Indonesia.
- It is suspected that the credit growth variable has a positive and significant effect on the Non Performing Loan (NPL) of conventional commercial banks in Indonesia.

3   Research Methodology

This research consists of dependent variable and independent variable. The dependent variable in this study is Non Performing Loans (NPL) which is described by the percentage of Non Performing Loans (NPL) of selected Commercial Banks in Indonesia. While the independent variables consist of RRLDR, Bank Capital Buffer, Gross Domestic Product (GDP), Credit Growth and Interest Rates. Credit Interest. The scope of this research is selected commercial banks in Indonesia.

The definition of each variable used in this study is as follows:

- Non-Performing Loans (NPL)

  Definition of Non-Performing Loan (NPL) is credit in which there are obstacles caused by 2 elements, namely from the banking side in analyzing and from the customer who intentionally or unintentionally in his obligations does not make payments. NPL data in the form of percentages obtained from reports and book publications in digital form through the official website of the Financial Services Authority.

- Reserve Requirement (RR-LDR)

  RR-LDR is a policy implemented by Bank Indonesia in which the minimum deposit that must be maintained by commercial banks is in the form of a checking account balance with bank Indonesia in the amount of a percentage of third party funds calculated based on the difference between the LDR owned by commercial banks and the target LDR. Obtained from reports and book publications in digital form through the official website of the Financial Services Authority

- Bank capital buffer

  Bank capital buffer is the difference between the capital adequacy ratio (CAR) owned by the banking sector and the minimum banking capital requirements imposed by the regulator. Bank capital buffer data in the form of percentages obtained from reports and book publications in digital form through the official website of the Financial Services Authority.

- Growth in Gross Domestic Product

  The GDP growth rate or what can be interpreted as the rate of economic growth calculated through the addition of real GDP in effect from period to period. The calculation of real GDP growth is the result of reducing real GDP for a certain period with real GDP in the previous period which is then divided by real GDP for the previous period. GDP data in the form of Percentages obtained from reports and book publications in digital form through the official website of Bank Indonesia.

- Credit Interest Rate

  Credit Interest Rate is the interest expense charged by the bank to the debtor on the loan provided by the bank. Data on loan interest rates in the form of Percentages obtained from reports and book publications in digital form through the official website of Bank Indonesia.

- Credit Growth

  The data used in this study are credit growth data for seven conventional commercial banks in Indonesia. Data on credit growth for conventional commercial banks in Indonesia is in the form of a percentage. The data is obtained from reports and book publications in digital form through the official website of the Financial Services Authority. The calculation of credit growth is by subtracting the total credit in a certain period with the total credit in the previous period, then divided by the total credit of the previous period.

3.1 Research Model to Test the Effect of RRLDR and Bank Capital Buffer on Non Performing Loans (NPL)

The specifications of the model used in this study are as follows:

$$npl_{it} = \beta_1 + \beta_2 rrldr_{it} + \beta_3 cb_{it} + \beta_4 gdp_{it} + \beta_5 cg_{it} + \beta_6 ir_{it} + \varepsilon_{it}$$

Description:
npl_{it} = Non performing loan.
cg_{it} = credit growth.
gdp_{it} = Gross Domestic Product.
ir_{it} = credit interest rate.
$rrldr_{it}$ = Reserve Requirement Loan Deposit Ratio.
cb_{it} = bank capital buffer.
    Observation of economic unit actors such as households, companies or the state, will not only observe these units but at the same time also the behavior of these units at various time periods. This combination of cross section and time series data is called panel data (paneled data). This study used the General Least Square (GLS) method.

4 Regression and Estimation Results

After the regression equation model has been determined using the Fixed Effect Model, the estimation results are obtained as follows in Table 1:
    Based on the estimation results in table 5, the regression equation can be written as follows:

$$npl_{it} = -0.287074 - 0.035326 gwmldr_{it} + 0.131928 cb_{it} + 4.819550 gdp_{it} - 0.012074 cg_{it} + 0.118587 ir_{it} + \varepsilon_{it}$$

    The estimation results in this study indicate that the coefficients for each independent variable and their effect on the dependent variable. The following is the interpretation of the regression results in this study:

Table 1. Panel Data Estimation Results With Fixed Effect Model Approach

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RR-LDR	-0.035326	0.008701	-4.059884	0.0001
CB	0.131928	0.024514	5.381764	0.0000
GDP	4.819550	1.310289	3.678235	0.0003
CG	-0.012074	0.004981	-2.423824	0.0162
IR	0.118587	0.054636	2.170486	0.0311
C	-0.287074	0.083041	-3.457015	0.0007
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.546421	Mean dependent var		0.027215
Adjusted R-squared	0.523106	S.D. dependent var		0.007468
S.E. of regression	0.005157	Akaike info criterion		-7.645315
Sum squared resid	0.005691	Schwarz criterion		-7.463693
Log likelihood	875.9206	Hannan-Quinn criter.		-7.572020
F-statistic	23.43667	Durbin-Watson stat		0.640123
Prob(F-statistic)	0.000000			

- The RR-LDR regression coefficient is negative and significant, so it can be interpreted that RR-LDR has a negative effect on Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia. This means that if there is an increase in RR-LDR by 1%, it will cause a decrease in the value of Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia by 0.035326% with the assumption of ceteris paribus.
- The regression coefficient of the Bank's capital buffer is positive and significant, so it can be interpreted that the Bank's capital buffer has a positive and significant effect on Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia. This means that if there is an increase in the Bank's capital buffer by 1%, it will cause an increase in the value of Non-Performing Loans (NPL) of Commercial Banks in Indonesia by 0.131928% with the assumption of ceteris paribus.
- Gross Domestic Product (GDP) regression coefficient is positive and significant, so it can be interpreted that Gross Domestic Product (GDP) has a positive influence on Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia. This means that if there is an increase in Gross Domestic Product (GDP) of 1%, it will cause an increase in the value of Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia by 4.819550% with the assumption of ceteris paribus.
- Credit Growth regression coefficient is negative and significant, so it can be interpreted that credit growth has a significant influence on Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia. This means that if there is an increase in credit growth of 1%, it will cause a decrease in the value of Non-Performing

Loans (NPL) of Conventional Commercial Banks in Indonesia by 0.012074% with the assumption of ceteris paribus.

- Loan Interest Rate regression coefficient is positive and significant, so it can be interpreted that Credit Interest Rates have a positive influence on Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia. This means that if there is an increase in Loan Interest Rates by 1%, it will cause an increase in the value of Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia by 0.118587% with the assumption of ceteris paribus.

5 Conclusion

Based on the results of the analysis on the research and discussion that has been described, the following conclusions can be drawn:

- RRLDR has a negative and significant impact on Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia. This means that if there is an increase in GWMLDR, it will reduce the value of Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia.
- Bank capital buffer has a positive and significant impact on Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia. This means that if there is an increase in the Bank's capital buffer, it will increase the value of Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia.
- Gross Domestic Product (GDP) has a positive and significant impact on Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia. This means that if there is an increase in Gross Domestic Product (GDP), it will be accompanied by an increase in the value of Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia.
- Credit growth has a negative and significant impact on Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia. This means that, if there is an increase in credit growth, it will reduce the value of Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia.
- Credit Interest Rates have a positive and significant impact on Non-Performing Loans (NPLs) of Conventional Commercial Banks in Indonesia. This means that if there is an increase in the Credit Interest Rate, it will increase the value of Non-Performing Loans (NPL) of Conventional Commercial Banks in Indonesia.

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