

Determinants of Bank Loans in Indonesia

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ABSTRACT

This study intends to analyze the effect of the level of nonperforming loans (NPL) on the lending behavior of banks in Indonesia. This study also seeks to understand whether other variables, such as bank capitalization and bank market power, influence the relationship between NPLs and lending behavior at banks in Indonesia. The macroeconomic factors that is accommodated is the Indonesian economic cycle. This study uses data from commercial banks that run conventional bank businesses in Indonesia and operated from 2007 to 2017. The factors that determine the level of credit growth in Indonesia are deposit growth, the ratio of nonperforming loans in the previous year, the bank capital adequacy ratio, Gross Domestic Product (GDP), real growth, and the Indonesian benchmark interest rate. The effect of credit risk, which can be represented by the ratio of bank's nonperforming loans to the credit that it provides is smaller if the bank has high market power. The credit growth provided by banks in the BUKU IV category was more unaffected by the previous year's bad credit ratio compared with other bank categories. Banks owned by the government and banks owned by non-government exhibited no differences in lending behavior. Big banks' lending behavior is also not different from that of other banks.

Keywords: *Loan, Market Power, Nonperforming Loan, Bank*

1. INTRODUCTION

Bank lending behavior in a country can affect that country's economic growth and the effectiveness of the monetary policy that is implemented. Significant changes in banks' lending behavior can lead to a condition called the credit crunch (Sarath & Pham; 2014).

Several previous studies related to lending behavior focused on the determinants of banks' lending behavior (Sarath & Pham; 2014; Cucinelli; 2015). Novelllyni and Ulpha (2017), carried out research on the lending behavior of banks in Indonesia. This research employed the threshold regression method attempt to identify the existence of moral hazard in banks' lending behavior in Indonesia. Subsequent research that sought to explain other dimensions of the lending behavior of banks in Indonesia was carried out by Zulkhibri and Sakti (2018) which attempted to analyze banks' lending behavior and the Indonesian economic cycle. The study intended to determine whether the lending behavior of banks in Indonesia is procyclical and whether this procyclical nature exists in the lending behavior of conventional and Islamic banks in Indonesia. However, these two previous studies did not attempt to explain the factors

that are determinants of the lending behavior of banks in Indonesia.

This study intends to analyze the effect of the level of nonperforming loans (NPL) on lending behavior of banks in Indonesia. Research that seeks to explain the effect of (NPLs) on lending behavior is still very limited. This study also seeks to understand whether other variables, such as bank capitalization and bank market power, can influence the relationship between NPL and the lending behavior of banks in Indonesia. This study offers several contributions. First, this study seeks to analyze the factors that determine the lending behavior of banks and how the transmission of the influence of these factors on banks' lending behavior is represented by the growth of bank credit in Indonesia. Second, this study seeks to explain how market forces possessed by banks can moderate the effect of credit risk on the growth rate of bank credit. Third, this study analyzes the differences in the effect of credit risk on credit growth in banks with different core capital sizes.

2. LITERATURE REVIEW

Until now, a significant number of studies sought to explain the influence of banks' NPL ratio on bank lending behavior. Research by Tracey and Leon (2011) evaluated the relationship between lending behavior variables and the level of NPLs in several Caribbean countries. The study found that when the NPL ratio increases, banks in Jamaica, Trinidad, and Tobago tend to reduce the credit they provide; in other words, the growth of the credit provided by banks in these countries is negative. In addition, this study found a fairly unique behavior of banks in countries in the research: when the ratio of NPLs is less than 5.6%, banks still increase their credit even though this ratio also increases. When the ratio of NPLs is already higher than 15.6%, banks reduce the loans they make as the NPL ratio increases in value (Tracey & Leon, 2011).

Bouvatier and Lepetit (2012) attempted to conduct research that aimed to determine whether an increase in credit risk causes banks to reduce the level of loans given. This research takes a larger sample of countries than prior studies and not only from one specific geographic area. The countries sampled in this study were drawn from five different geographical regions: Europe, Japan, the United States, Central and South America, and East and South Asia. In contrast to similar studies that mostly used the NPL ratio to measure credit risk, this study measures credit risk using loan loss provision (LLP) because the author wants to determine whether using a backward-provisioning system makes credit growth in a country more procyclical. The results of the study are consistent with those of previous studies in which credit risk significantly negatively affected the growth rate of loans provided by banks. Cucinelli (2015) used data from 488 banks in Italy to determine the effect of the degree of NPLs and other factors (macroeconomic and bank specific) on banks' lending behavior. This research showed that the degree of NPLs has a negative effect on the growth rate of bank credit in Italy. Sarath and Pham (2014) conducted research aimed at analyzing how the degree of NPLs affect banks' lending behavior. In contrast to other studies previously described, this study found the peculiar result that a bank's NPLs positively influence credit growth in Vietnam.

The degree of NPLs affects banks' lending behavior. However, this influence can be moderated by various factors from both the bank and outside the bank, such as macroeconomic factors. Banks with higher capital tend to have higher credit rates and deposit growth (Karim, Hassan, and Mohammad 2014). In addition, adequate capital also makes a bank more resistant to shocks that can be caused by monetary policy (Leroy; 2014 ; Khan, Ahmad, & Gee 2016). In addition to the amount of capital, lending behavior may also be influenced by

banks' market power. Banks with higher market power have more funding options and are better able to diversify their sources of income. In addition, banks with higher market power are proven to have stronger resistance to monetary policy shocks. Leroy (2014) and Khan, Ahmad, and Gee (2016) found that when the government implements a contractionary monetary policy by increasing the benchmark interest rate, banks with large market power will experience a weaker impact than banks with smaller market power. In other words, the growth of bank credit through large market forces is less vulnerable to the rate of change in bank interest costs. The implication is that banks with large market forces have a more stable credit growth rate, which in turn helps banks with large market forces achieve higher credit growth than banks with smaller market forces.

Research that seeks to explain the effect of NPLs on lending behavior at banks in Indonesia is still very limited. Novellyni and Ulpha (2017) attempted to identify the existence of moral hazard behavior of banks in Indonesia by determining the NPL threshold value that causes the moral hazard to arise. The study found that when the degree of NPLs of a bank is higher than 5.29%, banks actually increase the loans provided, increasing the degree of NPLs.

3. RESEARCH METHOD

This study aims to explain the factors that determine the lending behavior in Indonesia. Bank lending behavior is proxied with bank credit growth. We use a sample of 47 banks in Indonesia, consisting of 14 government-owned banks and 33 non-government banks. Each bank's financial report was obtained from the Indonesian Banking Directory (DPI), which can be accessed through the Bank Indonesia website and each bank's official website. Each bank's annual report was obtained from each bank's official website. Other financial data were obtained from various sources, such as Thompson Reuters, Datastream, and others.

This study uses data from commercial banks that operate conventional bank businesses in Indonesia from 2007 to 2017. The 47 banks with complete data resulted in 517 total observations.

The estimation models used in this study are as follows:

$$\begin{aligned}
 LG = & \alpha + \beta_1 DG + \beta_2 NPL_{t-1} + \beta_3 CAR + \beta_4 LI + \beta_5 NPL_{t-1} \times LI \\
 & + \beta_6 \Delta GDP + \beta_7 BI \text{ Rate} + \beta_8 \text{Dummy Pemerintah} \\
 & + \beta_9 NPL_{t-1} \times \text{Dummy BUKU4} + \beta_{10} \text{Dummy BUKU4}
 \end{aligned}
 \tag{1}$$

Table 1. List of variables

Variable	Indicator	Source(s) of Data
Lending Growth (LG)	$\frac{Loan_t - Loan_{t-1}}{Loan_{t-1}}$	Bankscope, Financial Reports, Euromonitor
Lending Growth (DG)	$\frac{Deposit_t - Deposit_{t-1}}{Deposit_{t-1}}$	Bankscope, Financial Reports, Euromonitor
NPL _{t-1}	Bank's last year nonperforming loan ratio	Bankscope, Financial Reports, Euromonitor
CAR	$\frac{Total\ Capital}{Risk\ Weighted\ Asset\ (RWA)}$	Bankscope, Financial Reports, Euromonitor
Market Power (LI)	$Lerner_{it} = \frac{(P_{it} - MC_{it})}{P_{it}}$	Anginer, Kunt, & Zhu (2013)
NPL _{t-1} x LI	Interaction variable of NPL _{t-1} and LI	NA
NPL _{t-1} x Dummy BUKU4	Interaction variable of NPL _{t-1} and BUKU4 Dummy	NA
ΔGDP	Growth of Indonesia Real GDP	Indonesian Central Bureau of Statistics
BI Rate	Indonesian benchmark interest rate	Central Bank of Indonesia
Dummy Government	Variable value is 1 (one) for state-owned bank and 0 (zero) for others	NA
Dummy BUKU4	Variable value is 1 (one) for bank in category BUKU4 and 0 (zero) for others	NA

Equation (1) is used to analyze the factors that influence the lending behavior of banks in Indonesia. The model that most resembles the one used in this study is from Sarath and Pham (2014). Researchers used the credit growth (LG) variable to measure the lending behavior of banks in Indonesia. The use of credit growth variables to describe bank lending behavior is also used by Tracey and Leon (2011), Bouvatier and Lepetit (2012), Sarath and Pham (2014), and Cucinelli (2015) in their research that aimed to identify the determinants of a bank's lending behavior. The Lerner Index (LI) variable is used as a proxy to measure the market power owned by a bank.

Commercial banks in Indonesia are regulated by their business activities and office networks based on commercial bank's core capital (Tier 1 capital). Regulations for business activities and office networks based on core capital (Tier 1 capital) have been formalized in Bank Indonesia Regulation No. 14/26 / PBI / 2012. This regulation further classifies commercial banks into four groups called BUKU (Commercial Banks based on Business Activities). A BUKU I bank is

a commercial bank with core capital of less than IDR 1,000,000,000,000 (one trillion). A BUKU II bank is a commercial bank with a minimum core capital of IDR 1,000,000,000,000 (one trillion) and up to less than IDR 5,000,000,000,000 (five trillion). A BUKU III bank is a commercial bank with a minimum core capital of IDR 5,000,000,000,000 (five trillion) and up to less than IDR 30,000,000,000,000 (thirty trillion). A BUKU IV bank is a commercial bank with a minimum core capital of 30,000,000,000,000 (thirty trillion).

4. RESULTS AND DISCUSSION

In this research, to eliminate outliers in the study sample, the authors used the winsorizing method at the 1% level from the research sample data. The method for overcoming winsorizing outliers produces a better estimate than the trimming method, especially when the distribution of the research data is not precisely known (Bieniek; 2016). Table II shows the differences in the descriptive statistics of all of the variables used in this study regarding the conditions after the winsorizing process.

Table 2. Descriptive Statistics

Variable	Obs.	Mean	SD	Max.	Min.
LG	517	0.2209	0.2949	1.7865	-0.3041
DG	517	0.1912	0.3133	2.2322	-0.3263
NPL_{t-1}	517	0.0287	0.0264	0.1582	0
CAR	517	0.1977	0.0827	0.6044	0.0957
LI	517	0.2570	0.1649	0.6306	-0.3143
$NPL_{t-1} \times LI$	517	0.0060	0.0079	0.0306	-0.0330
ΔGDP	517	0.0564	0.0066	0.065	0.046
BI Rate	517	0.0677	0.0139	0.093	0.043
Dummy Government	517	0.3191	0.4666	1	0
$NPL_{t-1} \times$ Dummy BUKU4	517	0.0010	0.0047	0.0292	0
Dummy BUKU4	517	0.0561	0.2303	1	0

To determine the panel model that is most suitable for use, we exercise two tests: the LM Test and the Chow Test. Based on these tests, the pooled least square model is most suitable for use as the estimation model in this study than the random effects and fixed effects model. The calculation of the partial correlation coefficient using Stata 14 shows that almost all partial correlation coefficient values between independent variables are less than 0.8, except for the correlation between the interaction variables $NPL_{t-1} \times$ Dummy BUKU4.

After the multicollinearity test, we conduct a further test to check for heteroskedasticity and autocorrelation. Problems which we found to exist in our model. Thus, to these problems, we convert the chosen pooled ordinary least square model into a generalized least square (GLS) model. Table IV provides the regression results of the GLS model for the first, second, and third models. The regression results of the three models are then used to test the research hypotheses that are explained in greater detail during the analysis and discussion of each hypothesis.

Deposit growth (DG) has a positive and significant influence on LG. The growth of bank deposits will cause growth rate of loans provided by banks to increase. This finding is consistent with those of Gunji, Miura, and Yuan (2007), Sarath and Pham (2014), and Khan, Ahmed, and Gee (2016). DG is a driving factor on the supply side, which can increase credit growth because bank deposits are the main funding source for bank assets.

The ratio of the previous (NPL_{t-1}), has a negative and significant influence LG. This finding is significantly consistent with the findings of Tomak (2013) for Turkey and Cucinelli (2015) for Italy. The increase in the ratio of NPLs is often associated with the deteriorating internal and external conditions of banks, which in turn can be a stimulus from both the supply and demand sides of credit, leading to a decline in credit growth (Kaminsky & Reinhart; 1999) Acconero et. al. (2017) stated that an increase in the ratio of NPLs could indicate worsening balance sheet conditions and an increase in credit risk faced by banks, which could eventually cause banks to be more vulnerable to monetary policy shocks and increased funding costs. These factors make banks more reluctant to provide credit. Bank's reluctance can be a stimulus from the supply side - the decline in credit given by banks.

A bank's capital adequacy ratio (CAR), has a positive and significant effect on LG. This finding indicates that banks with greater capital adequacy are better able to channel more loans. This finding is consistent with those of Karim, Hassan, and Mohammad (2014). Banks with a higher CAR tend to have a greater ability to capture more business opportunities (Athanasoglou et al.; 2008). Leroy (2014) also found that a bank's capital level can reduce the impact of increasing credit risk on bank credit growth. In addition, banks that struggle to meet the CAR determined by regulators also face lending constraints (Peek & Rosengren; 1995; Adrian & Shin; 2008).

Table 3. Correlation Matrix

	LG	DG	NPL _{t-1}	CAR	LI	NPL _{t-1} ×LI	ΔGDP	BI Rate	Dummy Government	NPL _{t-1} × Dummy	Dummy BUKU4
LG	1.0000										
DG	0.7399	1.0000									
NPL _{t-1}	-0.1208	-0.0447	1.0000								
CAR	0.1687	0.1376	-0.0970	1.0000							
LI	0.0297	-0.0339	-0.2927	0.1368	1.0000						
NPL _{t-1} ×LI	-0.0851	-0.0957	0.1396	0.0412	0.6111	1.0000					
ΔGDP	0.2878	0.1471	0.0028	-0.0679	-0.0421	-0.0226	1.0000				
BI Rate	0.2042	0.1043	-0.0298	-0.0579	-0.0899	-0.0631	0.2670	1.0000			
Dummy Government	-0.0373	-0.0804	0.1431	-0.1147	0.1481	0.1612	0.0000	0.0000	1.0000		
NPL _{t-1} × Dummy BUKU4	-0.0708	-0.0506	-0.0289	-0.0444	0.3210	0.1751	-0.0591	-0.1338	0.2342	1.0000	
Dummy BUKU4	-0.0736	-0.0548	-0.0752	-0.0530	0.3601	0.1260	-0.0597	-0.1030	0.1938	0.9103	1.0000

Table 4. Results

	Model 1	Model 2	Model 3
Dependent Var.	LG	LG	LG
DG	0.652*** (0.0268)	0.651*** (0.0271)	0.650*** (0.0268)
NPL _{t-1}	-0.770** (0.326)		-0.611* (0.363)
CAR	0.279*** (0.101)	0.322*** (0.102)	0.273*** (0.102)
LI	0.0675 (0.0525)		0.167** (0.0782)
NPL _{t-1} x LI		-0.440 (1.070)	-2.391 (1.485)
ΔGDP	7.555*** (1.307)	7.511*** (1.319)	7.503*** (1.300)
BI Rate	1.973*** (0.616)	1.930*** (0.624)	1.930*** (0.617)
Dummy Gov			0.0248 (0.0185)
NPL _{t-1} x Dummy BUKU4		-0.477 (1.791)	1.917 (4.304)
Dummy BUKU4			-0.0992 (0.0897)
Constant	-0.514*** (0.0818)	-0.518*** (0.0805)	-0.526*** (0.0820)
Observations	517	517	517
Num. of bank	47	47	47

*10% significance level, ** 5% significance level, and *** 1% significance level

In the first model, LI, has a positive but not significant effect on the LG provided by the bank. This finding is different from those of Leroy (2014) and Khan, Ahmad, and Gee (2016), who found a positive and significant relationship between market power variables and bank credit growth. Growth in gross domestic product (ΔGDP) has a positive and significant effect on LG. This result indicates that the credit growth of banks in Indonesia is procyclical consistent with the findings of Kurniawan (2017) and Zulkhibri and Sakti (2018).

The Indonesian benchmark interest rate (BI Rate) has a positive and significant effect on LG. This consistency of significance was found in the first, the second, and the third. Kisman (2017) indicated that an increase in the BI Rate can reduce LG in Indonesia only if this increase causes an increase in bank deposit interest rates in Indonesia, and the increase ultimately causes banks to increase lending rates. However, this hypothesis does not always happen in reality. Blanchard (2017) explained that the corporate investment level is not affected by

policy interest rates but is negatively affected by loan interest rates, where the loan interest rates are not only influenced by policy interest rates (BI Rate) but also by inflation expectations and the risk premium imposed by banks.

The coefficient for the Dummy Government variable is positive but not significant. This finding is inconsistent with research conducted by Bertay, Kunt, and Huizinga (2015). The results of the research by Bertay, Kunt, and Huizinga (2015) showed that credit growth in government-owned banks is less sensitive to the economic cycle than for private sector banks. Moreover, the BUKU4 dummy variable does not significantly affect LG, indicating that there is no difference in lending behavior, which is proxied by LG in the BUKU 4 and other BUKU category banks. This finding is consistent with the conclusions in Berrospide and Edge (2010), which stated that a bank's capital has a weak influence on the credit that it provides.

Interesting results are found if we have the NPL variable interact with other variables that address the market power of the bank. The effect of $NPL_{t-1} \times LI$ on LG is negative but not significant, indicating that bank's market strength can moderate the effect of the variable ratio of NPLs in the previous year (NPL_{t-1}) on bank's LG. Similarly, the influence of the variable NPL ratio in the previous year (NPL_{t-1}), which interacts with the BUKU4 dummy variable ($NPL_{t-1} \times \text{Dummy BUKU4}$), also shows that the effect of the variable ratio of the previous year's NPL (NPL_{t-1}) on LG becomes insignificant. These results suggest that banks with high market power and significant core capital do not have to lower their credit growth when their NPL increases because those factors can moderate the negative impact of a bank's rising credit risk on its ability to channel loans.

5. CONCLUSION

This study seeks to explain the determinants of the lending behavior of commercial banks in Indonesia. In this study, banks' lending behavior is proxied by the growth of loans provided by commercial banks in Indonesia. The factors that were analyzed for their influence on the lending behavior of commercial banks in Indonesia were the growth of third party funds, the previous year's credit risk, capital, and market forces possessed by banks. The macroeconomic factors accommodated are the Indonesian economic cycle, which is represented by the variable growth of Indonesia's real GDP. Variable GDP is used because this study aimed to determine whether or not the growth of bank credit in Indonesia is procyclical.

The factors that determine the LG in Indonesia are DG, the ratio of NPLs in the previous year (NPL_{t-1}), bank CAR, Δ GDP, and the BI Rate. The effect

of a bank's credit risk, which is proxied NPLs, on the credit growth of banks is smaller if a bank has greater market power. The credit growth provided by banks in the BUKU IV category was more unaffected by the previous year's bad credit ratio (NPL_{t-1}) than other bank categories. No differences existed in the lending behavior of government-owned bank relative to other banks. BUKU IV category banks exhibited no different lending behavior from that of other banks in the BOOK category.

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