Procyclicality Credit in Indonesian Banking Sector

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Abstract. This study aims to analyze procyclicality in credit for the banking sector and how the credit growth and GDP growth respond to banking performance shocks and interest rates. This study used the VAR/VECM method and used time series data with quantitative and descriptive approaches. The results of this show that the long-term relationship for credit growth is significant with BI rate and BOPO and the long-term relationship for GDP growth is significant with BOPO, CAR, LDR, and BI rate. Meanwhile, for the short-term relationship, real credit growth is significant to, LDR, CAR, BI rate and BOPO and for the short-term relationship, GDP growth is significant both to CAR and BOPO.

Keywords: Real Credit Growth · Banking Performance · BI Rate · Procyclicality · Real GDP Growth

1 Introduction

The phenomenon in 2008 which caused global financial crisis is one of the evidence from the existence of procyclical behavior between the business cycle and the financial cycle in the economy. This procyclical behavior works through a credit mechanism which is then known as the concept of financial acceleration. The concept states that small changes that occur in the financial system lead to significant changes in economic conditions. In a stable condition, the financial system can absorb changes in the financial system through a self-corrective mechanism and prevent the effects of these changes on the real economy and other financial systems. Problems that occur in the financial sector are often triggered by information asymmetry and interconnections in a financial system [1].

The problem of information asymmetry that often occurs in the financial sector occurs between creditors and debtors which causes credit rationing, which is a condition when creditors set interest rate risk premiums as collateral (collateral) to overcome the existence of information asymmetry on credit or investment capital provided to customers. Debtor, the guarantee is usually in the form of a business project or a guarantee for fixed assets, such as land and property. As a result, project guarantees and fixed assets fluctuate with the economic cycle which will then result in fluctuations in credit and investment capital, this condition is referred to as procyclicality in finance [2].

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Berger and Udell [3] state that there are two views that explain procyclicality observed by bankers, regulators, practitioners, and researchers. The first view holds that borrowing increases significantly in expansion period and then falls significantly in contraction period. The second view states that banks take much greater risk in lending during periods of expansion, but this risk only materializes during periods of contraction. The global financial crisis of 2008 caused the instability in the financial system through the credit boom. According to Landau [4], it is necessary to pay special attention to intrinsic procyclicality behavior. Intrinsic procyclicality is understood that the accumulated economic impetus from the financial sector does not occur only because the financial sector (banking) is the cause of the instability that occurs in the financial sector itself.

In general, procyclicality shows a phenomenon where the financial cycle tends to be faster than the economic cycle (financial stability board, 2009). Excessive expansion of bank credit in lending causes lending to exceed what is actually needed in accordance with economic fundamental conditions, and therefore creates a higher accumulation of risk and vulnerability in financial system. Conversely, during a period of economic downturn, the credit cycle worsens the economic cycle downturn, because banks are pessimistic about lending to customers.

Bank Indonesia (2014) explains that banking procyclicality is the behavior of excessive banking credit distribution so as to encourage faster economic growth when in an expansionary condition and accelerate the decline in economic activity when in a contraction condition.

Procyclicality known as a consequence that normally happened in the financial system financing economic growth (Craig et al. 2006). Excessive procyclicality can affect the cycle of business, credit growth as well as financial system stability so that the economy will grow faster during the expansion period and will find it difficult to recover during the contraction period. Procyclicality is a mutually reinforcing interaction over the real economy and the financial sector (Athanasoglou et al. 2014).

Procyclicality has several problems that can occur in banks in terms of efficiency, performance, demand and supply of credit [5]. Procyclicality can interfere with the allocation of bank resources, especially during periods of expansion. This is due to the behavior of banks that tend to underestimate risk by lowering their lending standards. This condition also causes bank procyclicality to generally increase during the expansion period. However, lower lending standards will cause non-performing loans to increase and the ability of banks to disburse loans (offering loans) to decline, so that the economy moves into a period of recession. To avoid the problem of bad credit from happening again, banks increase their lending standards which causes loan demand to decline.

Research on procyclicality is still needed, especially for developing countries like Indonesia. Craig et al. [6] show that sharp declines in credit, output and assets are often associated with financial system instability in developing countries such as Indonesia, Korea, Malaysia and Thailand. The financial system features in question include the excessive dependence of credit ratings on collateral as indicated by property prices and weak supervision that allows banks to accumulate bad loans. This can make the financial system more vulnerable when excessive procyclicality occurs.

Analysis of factors that have the potential to increase the procyclicality according to Craig et al. [6] can be carried out using 3 approaches, namely: 1) credit growth and economic growth, 2) bank loan interest rate margins on money market interest rates, 3) provision level. In this study, the approach used is only focused on credit growth and economic growth.

One of the things that influenced the trend of slowing down in bank credit was the quality of bank lending, which was triggered by the process of adjusting the banking balance through standard lending, in which banks were more careful in extending credit to curb the rate of deterioration in credit quality. The description of the two cycles indicates the existence of credit procyclicality.

Concerning to support financial system stability by reducing procyclicality, which will cause systemic risk, a macroprudential policy approach is needed. According to the G-20 working group (2010), macroprudential policies are the policies that focused on increasing the resilience of financial system and can reduce the systemic risks from the inter-institutional linkages (interconnectedness) and the movement of financial institutions to follow economic cycles which can increase systemic risk.. Macroprudential policy is designed as a countercyclical for procyclical issues.

Another factor that also determines the effect of procyclicality on the level of lending is the BI rate, the BI rate is a certain amount that must be paid by the borrower to the lender for a certain amount of money to finance consumption and investment. According to research conducted by masithah akbar (2014) showed the BI rate has a significant influence on lending.

Bank credit and the BI rate has a significant effect on Indonesia's economic growth simultaneously. The level of bank credit is also strongly influenced by the high and low interest rates of banks. If interest rates fall, the demand for credit increases, ceteris paribus, and vice versa. Low interest rates can increase procyclicality by encouraging the financial sector to be more risk-taking (excessive risk taking). The negative relationship between asset value and interest rates, assuming other factors remain significant when interest rates are low, asset value will increase, and vice versa. Furthermore, low interest rates will be followed by high risk appetite. Therefore, Explicitly, this study aimed to examine the effects of credit procyclicality in the banking sector in Indonesia. This is shown to see how much credit procyclicality affects the effectiveness of financial system stability, especially in banking in Indonesia.

2 Study of Literature

There are two main sources that trigger procyclical behavior is come from information asymmetry between lender and borrower. The first source is the limitation in risk measurement. The risk measures and assumptions used by the banking sector generally have a short-term time dimension regardless of the business cycle as a whole. The level of perceived risk changes in line with economic conditions so that ittends to be very procyclical [7]. This is also exacerbated by herding behavior. Another source is the distortion of incentives. For example, collateral-based loans can protect providers from the impact of declining loan claims.

Advances in communication technology such as the ease of obtaining reliable information about debtors play a role in increasing procyclicality [8, 9]. On the one hand,

technological advances increase efficiency in the process of monitoring and assessing debtors. But on the other hand, this condition also has an impact on the lack of interaction with customers which can lead to underpricing risk.

The role of banking in Indonesia does not only involve domestic banking. Foreign banks also play a role in the Indonesian banking industry. However, domestic banks and foreign banks have different focuses in banking operations. Domestic banks (government-owned banks) which generally have a function as agents for economic growth will always try to channel credit in a declining economic condition so as to reduce the effect of procyclicality. If the government prioritizes lending to companies or government projects in a declining economic condition, the allocation of credit to the private sector will decrease so that the procyclicality effect will worsen [1]. Some foreign banks are known to extend credit more at a time of economic downturn. Meanwhile, some other foreign banks are not affected by the macro conditions that occur in the country concerned. This happened because foreign banks have more liquid assets than domestic banks. That implies that foreign banks are not too influential with changes in macroeconomic conditions.

According to Dell Aricia, et al. [10], excessive procyclicality behavior, especially in booming economic conditions can trigger excessive credit growth.

3 Research Methods

The analytical model used in this study is a quantitative descriptive method. The test is to find out how the response to real credit growth and real GDP growth is if there are shocks from the BOPO, CAR, LDR, and BI interest rate variables.

Testing for the presence response to real credit growth and real GDP growth if there are shocks from the BOPO, CAR, LDR, and BI interest rate variablescarried out using a non-structural model of Vector Autoregression (VAR) analysis. Data analysis was carried out using a descriptive quantitative approach. Quantitative is a research method based on positivism, used to look at certain samples.

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To answer all the questions in this study using the VAR analysis method if not cointegrated, if cointegrated then VECM analysis will be used.

$$Log\text{GKREDITriil} = \alpha_0 + \beta_1 \text{BOPO}_{t-j} + \beta_2 \text{CAR}_{t-j} + \beta_3 \text{LDR}_{t-j} + \beta_4 \text{BIrate}_{t-j} + \varepsilon_t$$

where

GKREDITriil = Real credit growth
BOPO = Operating Expenses
CAR = *Capital Adequacy Ratio*
LDR = Loan to depositratio
BIrate = B Irate Interest Rate
ECT = Error Term

4 Results and Discussion

The stationarity test used in this study is to use the unit root test using the Augmented Dickey Fuller Test (ADF test) method.

Figure 1 shows the unit root test using ADF at the level level. By comparing the value of t-count with the critical value for each variable. The results of the unit root test by comparing the value of t-count with the critical value for each α namely 1 percent, 5 percent, and 10 percent, it can be concluded that the stationary variables are the real GKredit variables, real GDP and BOPO. So that the unit root test will be carried out again on the first difference in each variable and the results can be seen in Fig. 2.

To test the stability of the VAR estimation that has been formed, a stability condition check is carried out using the roots of characteristic polynomial and inverse roots of AR characteristic polynomial.

Variable	ADF T-Statistic	Critical Value 1%	5%	10%	Results	Conclusion
Real GCredit	-11.38266	-3.486	-2.885	-2.579	AcceptH_0	Stationary
real GDP	-3.265	-3.491	-2.888	-2.581	RejectH_0	Stationary
BOPO	-3.667	-3.486	-2.885	-2.579	RejectH_0	Stationary
CAR	-0.973	-3.486	-2.885	-2.579	AcceptH_0	Not Stationary
LDR	-2.553	-3.486	-2.885	-2.579	AcceptH_0	Not Stationary
BI rate	-1.417	-3.486	-2.886	-2.579	AcceptH_0	Not Stationary

Fig. 1. Unit Root Test Results at level

Variable	ADF T-Statistic	Critical Value 1%	5%	10%	Results	Conclusion
Real GCredit	-7.931	-3.491	-2.888	-2.581	RejectH_0	Stationary
real GDP	-3.305	-3.491	-2.888	-2.581	RejectH_0	Stationary
BOPO	-10-144	-3.487	-2.886	-2.580	RejectH_0	Stationary
CAR	-12.504	-3.486	-2.886	-2.579	RejectH_0	Stationary
LDR	-11.481	-3.486	-2.886	-2.579	RejectH_0	Stationary
BI rate	-6.962	-3.486	-2.886	-2.579	RejectH_0	Stationary

Fig. 2. Unit Root Test Results on the first difference

Variable	ADF T-Statistic	Critical Value 1%	5%	10%	Results	Conclusion
Real GCredit	-7.931	-3.491	-2.888	-2.581	RejectH_0	Stationary
real GDP	-3.305	-3.491	-2.888	-2.581	RejectH_0	Stationary
BOPO	-10-144	-3.487	-2.886	-2.580	RejectH_0	Stationary
CAR	-12.504	-3.486	-2.886	-2.579	RejectH_0	Stationary
LDR	-11.481	-3.486	-2.886	-2.579	RejectH_0	Stationary
BI rate	-6.962	-3.486	-2.886	-2.579	RejectH_0	Stationary

Fig. 3. VAR stabilitas stability test

Table 1. stability test results

Equation Model	Modulus Range
Equation Model 1	0.296425 - 0.638842
Equation 2. Model	0.352388 - 0.627919

From the Table 1 showed that modulus value of all equation models is less than 1 so it can be concluded that the VAR model is valid.

Based on Fig. 3, the the inverse roots used in VAR stability test of AR characteristic polynomial for all equation models shows that the points on the circle or the distribution of the data was in the circle, this means that the data is valid for further analysis using VAR (Fig. 4).

Based on the Table 1 shows that the value of the trace statistic r = 0 is greater than the critical value with a significance level of 5 percent, namely 350.2784 g reater than 60,06141 for the model of Eq. 1, the relationship between real credit growth and BOPO, CAR, LDR, and BI rate. 175.2674 is greater than 76.97277 for the Eq. 2 model of the relationship between real GDP growth and BOPO, CAR, LDR, and BI rate. The results of the co-integration test indicate that between real GKredit movements, real GDP, BOPO, CAR, LDR, and BI interest rates have a relationship of stability/balance and similarity of movements in the long term. Therefore, in any short-run period, all variables tend to adjust to each other to reach their long-run equilibrium.

So we can conclude, the appropriate model to be used in this study is the Vector Error Correction Model (VECM) because the variables used are cointegrated and stationary at the second difference level. This is a requirement that must be met in testing the VECM model according to Mujica and Saens [11].

The estimation results on the obtained research variables have a significant effect if the t-count value is greater than t-table value with a level significance of 1% (2.629) 5% (1.98099) and 10% (1.661) . (rate) the BOPO coefficient 0.007955 and the coefficient is significant at the 90% confidence level or (α = 10%) and the BI rate coefficient0 .014380 significant at the 95% confidence level or (=5%). This showss that when there is an increase of 1 unit of BOPO, it will cause an increase in real credit in Indonesia

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistics	Critical Value	Prob.**
None *	0.650136	350.2784	60.06141	0.0001
At most 1 *	0.530776	227.4037	40.17493	0.0001
At most 2 *	0.444558	138.8729	24.27596	0.0001
At most 3 *	0.340233	70.07793	12.32090	0.0000
At most 4 *	0.167306	21.42139	4.129906	0.0000
Trace test indicates 5 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Fig. 4. Cointegration Test Results

Table 2. Long-Term VECM Estimation Results

Variable	Coefficient	t-statistics	Information
real credit (-1)	1000000		
BOPO (-1)	0.007955	[1.68862]	Significant
CAR (-1)	-0.001126	[-0.20501]	Not significant
LDR (-1)	0.002305	[-1.4960]	Not significant
BI rate (-1)	0.014380	[2.26840]	Significant

by 0.007955 billion rupiah. And if there is an increase of 1% in the BI rate, then it will cause an increase in real credit in Indonesia by 0.014380 billion rupiah.

The estimation results in the long term obtained real GK redit variables with independent variables (BOPO, CAR, LDR, and BI credit in banks so that it does not have a significant relationship to the increase in the BI rate (Table 2).

5 Conclusion

Based on the results, the conclusions of this study are:

The long-term relationship in real credit growth is significant with BI rate and BOPO, and for short-term real credit growth is significant to CAR, LDR, BI rate BOPO variables. And the long-term relationship for real GDP growth is significant with BOPO, CAR, and BI rate. And a significant short-term relationship with BOPO and CAR variables. The real credit response to the shock of the BOPO variable was from the first period, and the second experienced a positive trend. The response of real credit to the shock of the CAR variable is from the first period, and secondly, the response of real credit to the shock of the CAR has decreased by showing a negative trend.

6 Discussion

The following is a discussion of the estimation results above the long-term relationship between real credit and BOPO. In the long term, the BOPO variable has a significant and positive relationship with real credit. BOPO as a ratio between operational costs and operational income. This ratio is used to measure the management's ability to manage their wealth to gain profits.

Many banks' BOPO values in this study ranged between 80% and some exceeded 92%. So that the BOPO which is a benchmark for the profitability ratio has an influence in measuring credit distribution. The results of this study indicate that there is a tendency for BOPO to have a positive and significant effect on lending. This condition reflects that banks are efficient in maximizing income from funds lent to the public.

LDR has a positive and insignificant relationship with real credit which shows that the LDR value is high. LDR shows the bank's ability to meet credit demand by using the total assets owned by the bank, in other words, this ratio is a comparison of how much credit the bank provides compared to the total assets owned by the bank.

CAR has a negative and insignificant relationship to real credit, which indicates that a high CAR value indicates a stable capital condition so that it will increase the bank's ability to anticipate losses arising from lending activities. The amount of CAR also reflects the amount of capital owned by the bank, with a fairly high capital, push the ability of the bank to disburse credit, but in this study the CAR value is low and unstable so that it has not been able to anticipate losses from lending.

The BI rate has a positive and significant relationship in the long term. When BI rate policy raised, banking interest rates also increase, where people prefer to save their funds in banking (saving) so that the profitability ratio increases due to an increase in saving patterns. Society, and lowering the level of.

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