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Journal of Asian Finance, Economics and Business

Letter of Acceptance

AUTHORS AND TITLE:

Author(s): Sebastiana VIPHINDRARTIN, Margaretha ARDHANARI, Regina Niken WILANTARI, Rafael Purtomo SOMAJI, Selvi ARIANTI
Article Title: "Effects of Bank Macroeconomic Indicators on the Stability of the Financial System in Indonesia"
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Corresponding Email: sebastianaviphindrartin@gmail.com
Date of Issue: December 07, 2020, Seoul, South Korea

Dear Author(s),

Thank you for submitting a signed **Journal Publishing Agreement Form** and having completed proofreading of the copy edited proof meeting an acceptable standard for publication in the ***Journal of Asian Finance, Economics and Business*** (JAFEB). We have now received the votes and recommendations on the final version of corrected manuscript from the Journal's Editorial Executive Board.

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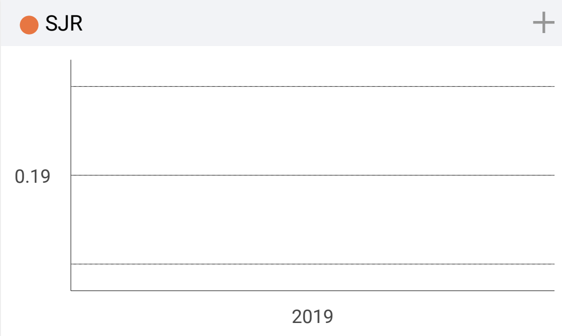

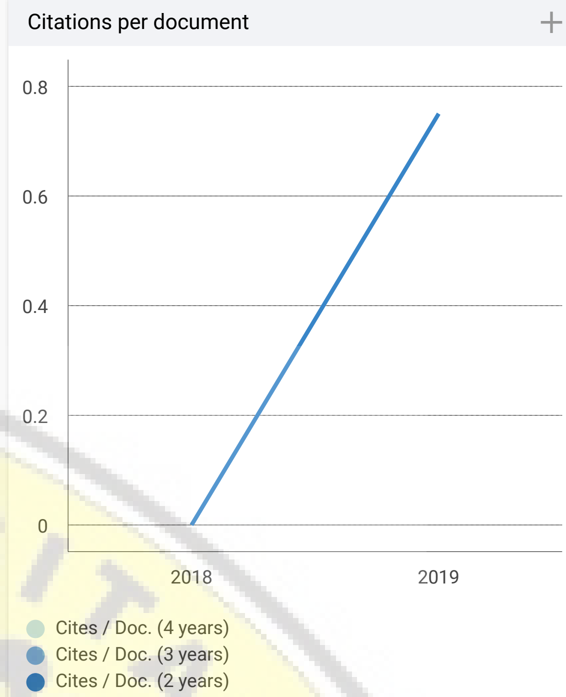

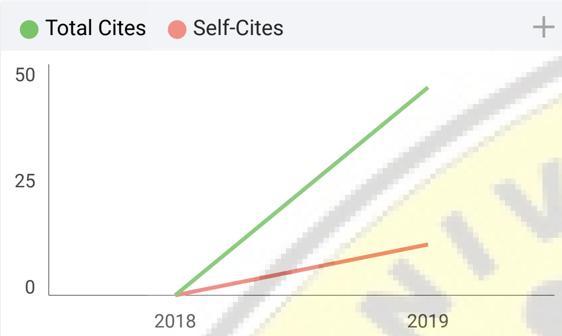

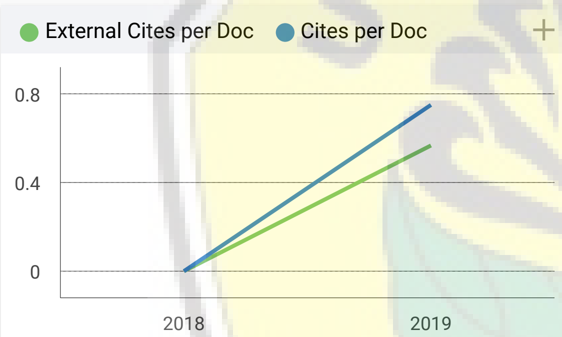

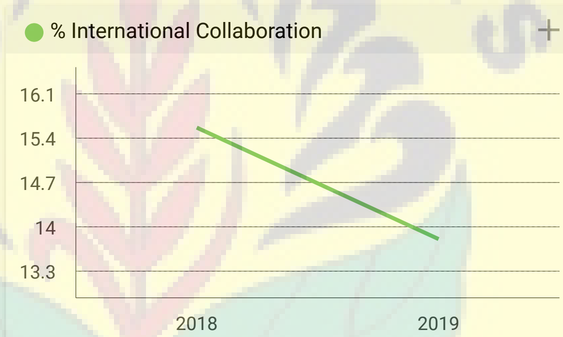

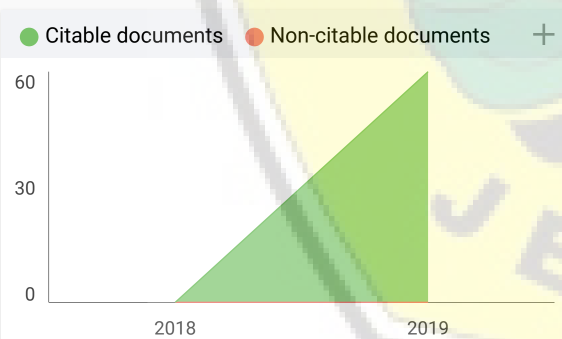

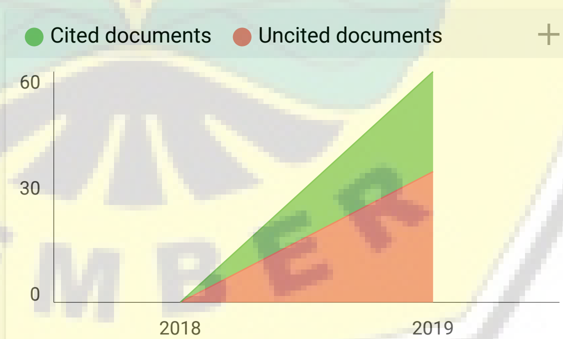

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Effects of Bank Macroeconomic Indicators on the Stability of the Financial System in Indonesia

VIPHINDRARTIN, Sebastiana;ARDHANARI, Margaretha;WILANTARI, Regina Niken;SOMAJI, Rafael Purtomo;ARIANTI, Selvi

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Abstract

This study examines the non-performing loans of rural banks and macroeconomic factors in Indonesia, including inflation, exchange rates, and interest rates. Theoretically, the existence of erratic macroeconomic conditions can affect the level of non-performing credit risk in rural credit banks in Indonesia. The effect of macroeconomic conditions on non-performing loans has a different response for each economic sector. The main objective of this study is to determine the effect of macroeconomic factors (inflation, exchange rates, and interest rates) and bank-specific factors (credit) on the Non-Performing Loans (NPL) of Rural Banks in Indonesia for the period from January 2015 to December 2018. This study uses a Vector Error Correction Model (VECM) estimation to determine the effect of independent variables consisting of macroeconomic factors and bank-specific factors. Based on the estimation results of the Vector Error Correction Model, three variables that have a positive and significant effect on long-term non-performing loans are credit, inflation, and interest rates. Meanwhile, in the short term, there are only two variables that have a positive and significant effect on non-performing loans, namely, credit and interest rates. Inflation and exchange rate variables have a negative and insignificant effect on bad credit in the short term.

Keywords

Financial Economics; Rural Bank; Non Performing Loans; Vector Error Correction Model; Indonesia

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Effects of Bank Macroeconomic Indicators on the Stability of the Financial System in Indonesia

Sebastiana VIPHINDRARTIN[1], Margaretha ARDHANARI[2], Regina Niken WILANTARI[3], Rafael Purtomo SOMAJI[4], Selvi ARIANTI[5]

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Abstract

This study examines the non-performing loans of rural banks and macroeconomic factors in Indonesia, including inflation, exchange rates, and interest rates. Theoretically, the existence of erratic macroeconomic conditions can affect the level of non-performing credit risk in rural credit banks in Indonesia. The effect of macroeconomic conditions on non-performing loans has a different response for each economic sector. The main objective of this study is to determine the effect of macroeconomic factors (inflation, exchange rates, and interest rates) and bank-specific factors (credit) on the Non-Performing Loans (NPL) of Rural Banks in Indonesia for the period from January 2015 to December 2018. This study uses a Vector Error Correction Model (VECM) estimation to determine the effect of independent variables consisting of macroeconomic factors and bank-specific factors. Based on the estimation results of the Vector Error Correction Model, three variables that have a positive and significant effect on long-term non-performing loans are credit, inflation, and interest rates. Meanwhile, in the short term, there are only two variables that have a positive and significant effect on non-performing loans, namely, credit and interest rates. Inflation and exchange rate variables have a negative and insignificant effect on bad credit in the short term.

Keywords: Financial Economics, Rural Bank, Non Performing Loans, Vector Error Correction Model, Indonesia

JEL Classification Code: C01, E44, E51

1. Introduction

Financial system Stability plays a vital role in a country's economy because it is a condition in which the economic mechanism in determining prices, allocating funds and managing risk functions well, and supports economic growth. If the financial system is unstable and does not function efficiently, the allocation of funds will not work well, which can hamper economic growth in the country (ADB Institute, 2015).

Financial system stability can be understood by researching the factors that cause instability. Financial system instability can be triggered by a variety of causes and fluctuations, which are generally a combination of market failures, either due to structural or behavioral factors. Market failure itself can come from external (international) and internal (domestic) pressures.

Based on the above conditions, efforts to avoid or reduce the risk of possible instability of the financial system are

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necessary, especially to avoid another huge loss. Several factors that influence the stability of the financial system, in theory, are capital flows, exchange rates, interest rates, inflation, the ratio of bad loans (non-performing loans) and others. The ratio of non-performing loans (NPL) to total loans, which is commonly known as the NPL ratio for total loans, is the ratio between total loans classified as substandard, doubtful, and non-performing, to total loans. The increase in NPL shows a sign of a decline in the performance of the banking sector and a decrease in the quality of the loan portfolio (Lehner, 2016).

In line with the increase in the amount of credit in microfinance institutions (Bank Pengkreditan Rakyat), it means that there is an indication that it will also increase financial risk. Thus, it turns out that this increase is still not effective in resolving economic problems, especially its effect on financial system stability, so this study was conducted to determine the level of financial risk in Indonesia and the influence of credit from microfinance institutions, as well as the influence of several macroeconomic variables, namely, inflation, interest rates, and exchange rates on credit risk (NPL). Macroeconomic variables are taken because macroeconomic indicators can affect bank liquidity so that they become a factor in the level of bad credit (Cornock, 2018).

Judging from previous studies, there is a research gap. This research gap can be caused by differences in the object of research, the year of research, and the sample used. From the description above, there are also inconsistencies with the theories put forward by economists. Macroprudential can act as indicators of financial system stability (Dombret & Lucius, 2013). Macroprudential indicators include capital flows, exchange rates, interest rates, and the ratio of bad loans. Meanwhile, according to Akerlof's research in 1970 in Ramlall (2018), financial system stability rests on three pillars, namely, information asymmetry, adverse selection, and moral hazard. The three pillars are traditional factors that cause bad credit. The existing theoretical gap is caused by differences in the assumptions used in the study.

2. Literature Review and Hypotheses

2.1. Literature Review

Development of financial institutions as intermediary institutions, both banks and institutions, non-bank finance can experiences ups and downs following developments in financial and monetary conditions experienced by a country. Financial institutions consist of various forms of institutions operating in the financial sector. Microfinance is a financial service for low-income groups of people that include credit, savings, instalments, payment, and money transfer services. In general, microfinance services are aimed at low-income groups of people who do not have access to banking or other public financial services (Schmidt et al., 2016).

Microfinance improves poverty reduction (Mago, 2014). Microfinance institutions help low-income people to get financial services, where low-income people generally cannot access banking services. Microfinance institutions generally operate on easier and simpler terms than services provided by banks because they are intended for people who have not been able to access banking services. Small companies or micro-companies that do not have access to banking or cannot access banking services are also included in the target of microfinance services, which aims to help micro-companies develop and succeed in managing and developing their business through microfinance services. Micro-companies, of course, need capital services. However, because banks cannot yet serve micro-businesses, microfinance services are an alternative financial service that can help micro-businesses to obtain capital services and other financial services.

According to Keynes in Cammarosano (2016), he explains that money is a form of wealth that a person has. The decision of a person/society in turning wealth into cash, savings or securities will determine level of interest rate. The Keynesian model states that there are three public motives for holding money, namely, transaction motives, vigilance, and speculation. In the research, the writer emphasizes speculation motive as a derivative of Keynes' grand theory of money demand. Keynes differs from the classics in his emphasis on the speculative motive and the role of the interest rate in determining the demand for money for speculative purposes. Keynes also realized that people want the amount of cash to exceed for transaction purposes because of the desire of people to keep their wealth in the most current form (cash). This saved cash fulfils the function of money as a means of hoarding wealth (store of value). In more modern terms, it is often called the demand for money to hoard wealth (asset demand for money). According to Keynes, the demand for money for speculative purposes is determined by the interest rate. The higher the interest rate, the lower the public's desire for speculative motives.

The theory of bank behavior is a derivative of Keynes' money demand theory. The theory of bank behavior states that interactions between people determine the interest rate in banking. Public behavior in using banking products can cause banks to become more or less liquid so that each of the banking products offered has risks. This risk will hurt all aspects involved. Especially, it will disrupt financial system stability. The theory of bank behavior is a derivative of Keynes' money demand theory with speculative motives. The speculation motive in liquidity preference theory involves information about the need to take anticipatory steps against factors that are uncertain (uncertainty) and expectations for the future (Fontana & Setterfield, 2016).

The interest rate is one of the economic variables that is often monitored by economic actors. Interest rates are seen as having a direct impact on economic conditions. Decisions regarding consumption, saving, and investment are closely linked to conditions of the rate of interest. Interest is the dependence on borrowed money, which is usually expressed as a percentage of the money loaned. The interest rate is the interest rate expressed in per cent, for a certain period (monthly or annually). An increase in the interest rate will worsen the quality of the loan, the higher the cost of debt will make it more difficult for the debtor to repay the loan. Also, high-interest rates are a potentially detrimental alternative for debtors (Bofondi et al., 2011).

Inflation is a macroeconomic factor that affects the efficiency of banking activities. Inflation decreases the value of money, which reduces the general rate of return. A reduction in capital investment negatively affects economic performance. The inflation rate is an indicator that is often used to measure the stability of prices for goods and services. Inflation is defined as a continuous increase in the general price level over a certain period.

According to Mankiw (2013), the currency exchange rate between two countries is the price of the currency used by residents of these countries to trade with each other. Real currency exchange rates depend on the price level of goods in domestic currency as well as the exchange rate of the domestic currency against foreign currencies. If the real exchange rate of the domestic currency is high, then the prices of goods abroad are relatively lower, and the prices of domestic goods are relatively higher. Conversely, if the real exchange rate of the domestic currency is low, then the prices of goods abroad are relatively higher, and the prices of domestic goods are relatively lower.

Non-Performing Loans (NPL) can be defined as loans that experience repayment difficulties due to deliberate factors and/or external factors beyond the control of the debtor. NPL theory relating to bank stability rests on three pillars: (i) information asymmetry, (ii) adverse selection, and (iii) moral hazard theory. The theory mentions the traditional causes of bad credit loans, which translate to banking system instability. Relationships that have a positive or negative influence. A country's NPL ratio can affect the state of the financial system in a country. A low NPL ratio indicates a stable financial system of a country, and conversely, a high NPL ratio in a country indicates financial instability of a country due to inefficiency in management in the banking sector to overcome bad credit risk. Bank macroeconomic risk factors are a source of systemic risk that can affect the performance of the banking sector (which is then expressed as the ratio of non-performing loans to total credit) (Scardovi, 2015).

The definition of credit is the provision of money or an equivalent bill, based on a loan agreement or agreement between a lender and a borrower, which requires the borrower to pay off his debt after a certain period of time with interest (Green, 2016). According to some literature, excessive credit growth is often associated as a key factor causing crises in the financial sector, particularly in developing countries. Financial crises in various countries often begin with an increase in non-performing loans (Rachman et al., 2018). The major banking crisis in the last 30 years that occurred in Chile in 1982 (Oberfield, 2013), Denmark, Finland, Norway and Sweden was called the Nordic Banking Crisis that occurred in the early 1990s (Schweiger, 2014), the Mexican crisis in 1994 (Sosa & Ortiz, 2015), the Asian financial crisis in 1997 (Joe & Oh, 2018) and the subprime mortgage credit crisis in the United States that occurred in 2008 (Flavin & Sheenan, 2015), and the European debt crisis that occurred in 2010–2013 (Keddad & Schalck, 2020) also began with a boom period for non-performing loans.

2.2. Hypotheses

There is a relationship between macroeconomic changes and bad credit, where economic factors affect bad credit because they affect the ability to pay people for borrowed debt (Betz et al., 2020). Credit growth is one of the macroeconomic factors that have an impact on non-performing loans (Vithessonthi, 2016). Inflation affects people's income (Zheng et al., 2020), with income affected by inflation, the next impact is the ability to pay people for their debts. The exchange rate has an impact on economic growth, which describes the overall income of the community (Jovica et al., 2019). And, in the end, it has an impact on the ability to pay public debt. Interest rate risk affects bank performance (Margono et al., 2020). Interest rates and debt repayments have a relationship where the higher the interest, the more difficult it is for debt recipients to pay their debts so that it has an impact on bad credit (Bellotti et al., 2020).

Hence, this study examined every domain of the entrepreneurial competencies to investigate whether each of the competencies would be directly affecting the women micro-entrepreneurs' business success. The investigation is based on the following hypotheses:

H1: *Credit growth of microfinance institutions has an impact on the level of Non-Performing Loan in Indonesia*

H2: *The inflation rate has an impact on the level of Non-Performing Loan in Indonesia.*

H3: *The exchange rate has an impact on the level of Non-Performing Loan in Indonesia.*

H4: *The interest rate has an impact on the level of Non-Performing Loan in Indonesia.*

3. Research Methods and Materials

Based on the research objectives, namely, to determine the effect of bank-specific factors (credit) for the People's Credit Bank and macroeconomic variables (inflation, interest rates, exchange rates) on non-performing loans without ensuring the existence of cause and effect in Indonesia, the type of data used in this study is secondary data in the form of time-series data in the period from January 2015 to December 2018 with the objects of all People's Credit Banks in Indonesia.

The focus of the object of this research is the state of Indonesia. Determination of the vulnerable time used in this study is based on the availability of data and economic phenomena that occur at that time. Therefore it is vulnerable that the data used can show the form of economic problems by the research context. Data sources come from Bank Indonesia, Financial Services Authority, Central Bureau of Statistics.

Then, the data is analyzed to determine the effect between variables using the Vector Error Correction Model (VECM). This type of research is a quantitative research type because the research aims to find results in the form of data turned into numbers, which are used as an analysis tool for information about what is investigated.

The model specification used is the VAR method adopted from the research by Sigh and Sudana (2017). Sigh and Sudana (2017) included the variable non-performing loans (NPL), credit, bank size, ROA, IRL and CAR as proxies of bank-specific factors. And using the variables GDP, exchange rates, inflation and interest rates as proxies of macroeconomic variables. Sigh and Sudana (2017) considers that the model can explore the relationship between direct aspects and relevant models for the analysis of the effects of macroeconomic variables and bank-specific factors on non-performing loans (NPL). The model used in Sigh and Sudana (2017) is as follows:

$$NPL = \beta 0 + \beta_1 GDP_1 + \beta_2 INF_2 + \beta_3 EX_3 + \beta_4 Bank\ Size_4 + \beta_5 ROA_5 + \beta_6 CAR_6 + \beta_7 IRL_7 + \mu i$$

Specifically, the above equation is formed in the econometric model as follows:

Where :
NPL = Non-Performing Loan Level
CDR1 = Credit growth of microfinance institutions
INF2 = Inflation rate
NTR3 = Exchange rate
SBA4 = Interest rate
ui = Error term
β0 = Constant parameter / Intercept
β1, β2, β3, = The coefficients of the independent variables are x1, x2, x3

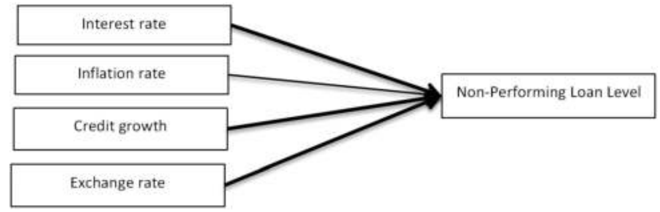

Figure 1 : Research Model

4. Results and Discussion

The unit root test results in Table 1 show that all the variables to be estimated at the level: NPL, credit, inflation, exchange rates and interest rates are not stationary. Some variables are declared not stationary at the level because they have Augmented Dicky-Fuller statistical values that are greater than the critical value of McKinnon, i.e., has a probability of more than 0.05. While the unit root test in the first different level, all the variables to be estimated does not contain a unit root so that it is stationary. All variables in this study were declared stationary because the Augmented Dicky-Fuller statistical value was smaller than the critical value of McKinnon, i.e., has a probability of less than 0.05.

The selection of lag four as the optimum lag in this study is based on the use of the minimum Akaike Information Criteria (AIC) value of the variables estimated in the equation, namely, non-performing loans (NPL), credit, inflation, exchange rates and interest rates. Lag four was chosen because it produced the minimum Akaike Information Criteria (AIC) values, meaning that the model was able to explain the relationship between variables in this study.

VAR modelling is declared stable if in determining the optimum lag, all variables have a Modulus Roots of Characteristic Polynomial value that is smaller than one (Levendis, 2019). If the VAR system is unstable, the results obtained, such as IRF and VD, will be invalid. After testing the stability of the VAR, an estimate can be made of the VECM. In this study, the VAR model is stable; namely, the average modulus value of the variable is 0.896584, which is less than 1.

The results of the Johansen Cointegration Test show that the Trace Statistic value has a value greater than the Critical Value, which means that the system has a cointegration equation. According to the estimation results in the table below, four equations have cointegration equations, so that means there are three equations in the system that have long-term relationships. Based on these four equations, the Vector Error Correction Model (VECM) model will be used in this study.

Table 1: Stationarity Test Result

	Level		First Different	
	Probability	**Caption**	**Probability**	**Caption**
NPL	0.2548	not stationary	0.0000	stationary
CDR	0.8247	not stationary	0.0000	stationary
INF	0.0000	stationary	0.0000	stationary
NTR	0.2548	not stationary	0.0000	stationary
SBA	0.0010	stationary	0.0000	stationary

Information: 5% probability

Table 2: Optimum Lag Test Result

Lag	LR	FRE	AIC
0	NA	1.99E+10	37.90345
1	324.5806	12205249	30.4982
2	28.75294	16651642	30.7633
3	41.7045	13192312	30.4102
4	43.06198	8094131	29.6743*

Note: The asterisk and bold type indicate the smallest AIC value.

Table 3: Cointegration Test Result

	Eigenvalue	Trace Statistic	0,05 Critical Value	Probability
None*	0.759435	149.5263	69.81899	0.0000
At most 1*	0.580723	88.26137	47.8561	0.0000
At most 2*	0.529874	50.8847	29.7971	0.0001
At most 3*	0.347615	18.43027	15.4947	0.0175

Information: 5% probability

Table 4: Granger Causality Test result

NPL	Credit	Inflation	Exchange rate	Interest Rates
-	0.0321*	0.0517**	0.1597**	0.7711**
0.3324**	-	0.6226**	0.5870**	0.0010*
0.0215*	0.6018**	-	0.8444**	0.3304**
0.9287**	0.6841**	0.6247**	-	0.0885**
0.2772**	0.0341*	0.7206**	0.5135**	-

Information: 5% probability
Note: * (has a causality relationship), ** (does not have a causality relationship).

Table 5: VECM Result

Variable	Coefficient	T-statistics
	Long-term	
D(CDR(-1))	0,00011	-4,70396
D(INF(-1))	0,39959	-5,93812
D(NTR(-1))	0,00026	-0,05960
D(SBA(-1))	0,16596	-0,240687
C	-0,048474	
	Short-term	
CointEq1	0,20325	-4,36820
D(NPL(-1),2))	0,19307	-2,05044
D(NPL(-2),2))	0,24322	-3,22031
D(CDR(-1),2))	0,00017	0,99419
D(CDR(-2),2))	8,2E-05	1,21928
D(INF(-1),2))	0,32772	-4,99535
D(INF(-2),2))	0,38153	-5,57208
D(NTR(-1),2))	0,00013	-0,76731
D(NTR(-2),2))	0,00019	-0,47660
D(SBA(-1),2))	0,07707	-4,31502
D(SBA(-2),2))	0,09106	-1,15329
C	0,03106	-1,38357

In the test results, there are three two-way causality relationships between variables in the system, namely, credit causes NPL and vice versa NPL causes credit. Followed by interest rates cause inflation and vice versa inflation causes interest rates. Then, interest rates cause credit and credit also cause interest rates because these variables have a probability value that is smaller than the 5% Critical Value so that it is stated to have a causal relationship.

In the short term, the credit variable affects NPL significantly. There is a positive relationship between the variable credit and NPL in the short term. This can be seen from the credit coefficient of 0.00017 per cent. This means that, if there is an increase in credit by one per cent, it will cause an increase in NPLs of 0.00017 per cent. This result causes the credit growth of Bank Pengkreditan Rakyat to increase in the short term, which will increase the NPL, which is an indicator of financial system stability. Then, this means that, when the NPL is high, it will cause financial system instability or in other words, the stability of the financial system will be disrupted. The inflation variable in the short term does not have a significant effect on the NPL level. This is known by looking at the T-statistic value of the inflation variable under the T-table value. It means that, if there is an increase in the inflation rate in the short term, it will not affect the NPL level. Another macroeconomic variable that does not affect the NPL level is the exchange rate. In this study, the interest rate variable influences the NPL rate. This happens because if the interest rate is increased, the debtors will not be able to pay the instalments they borrow, which will cause the NPL rate to increase

In this study, the results of the regression test stated that there was a relationship between the credit variable and the NPL variable. In the long run, there is a relationship between inflation and NPL. Inflation and NPLs have a significant positive relationship in the long run. Inflation and NPLs have a significant positive relationship in the long term of 0.39959. This means that when there is an increase in the exchange rate of one per cent, it will increase the NPL by 0.39959 per cent in the long term.

Meanwhile, the interest rate variable significantly influences NPL in the long term. There is a positive relationship between interest rates and NPLs. This can be seen from the estimated coefficient of 0.16596, which means that every one per cent increase in interest rates will respond to an increase in NPL of 0.16596 per cent in the long run.

Then, in the long run, the increase in the exchange rate does not significantly affect the NPL. This is evidenced by the coefficient value of 0.00026. And the size of the T-statistic is in the range of 0.05960, which is smaller than the size of the t-table, so it means that in the long term this variable does not significantly affect the NPL.

In this study, it can be seen that exchange rate fluctuations are inversely related to the NPL rate in the period from January 2015 to December 2018. This is because other NPL variables such as credit, inflation and interest rates in Indonesia have increased.

In this study, over this 4-year period, various kinds of economic turmoil occurred, which caused credit figures, inflation, exchange rates and interest rates on non-performing loans (NPLs) to fluctuate. During this time, there were at least several macroeconomic symptoms that were quite influencing the Indonesian economy, which could directly affect the banking sector, especially the People's Credit Bank. Several monetary events that occurred in this timeframe were financial pressures and global political uncertainty related to the global economy. Based on this study, where macroeconomic indicators are measured using inflation, exchange rates and interest rates, the specific factors for the People's Credit Bank are measured using credit growth, and NPL shows that there is a good long-term and short-term relationship.

The credit variable as an indicator in bank-specific factors, which in this study is more specific to microcredit, namely, People's Credit Banks throughout Indonesia, has a significant positive effect on the NPL of Bank Pengkreditan Rakyat. The increase in credit caused by public consumption, increase in public income or for the productive sector in micro-business development creates the risk of an increase in the level of NPL (bad credit), which will disrupt the stability of the financial system in the banking sector itself. The high credit growth of Bank Pengkreditan Rakyat was also accompanied by qualified quality where the NPL ratio was able to be maintained up to 0.3%. According to the OJK, this crisis did not really disrupt credit growth; however, credit for the People's Credit Bank, People's Credit Bank and conventional banks experienced a slowdown.

Furthermore, the inflation variable as a macroeconomic indicator has a significant effect on the NPL level. Because the increase in inflation means that the increase and decrease in the price of goods are unstable during the study period 2015 to 2018. The results of the author's research are in line with the research of Linda, Defianawati, and Megawati (2015), which shows that inflation has a significant effect on NPL in Indonesia. Inflation that occurs continuously has an impact on decreasing people's purchasing power because in real terms the level of income also decreases with the assumption that the level of people's income is constant (Mankiw, 2013). The financial risk then also arises due to inflation. If there is an unexpected increase in inflation, it will risk people's purchasing power. It is in line with the theory and research of the author that when there is an increase in inflation, it will affect the NPL level. Even though it was affected by the trade war, the current inflation rate affected the NPL level, it was still manageable and was in the range of 0.3%.

Other macroeconomic variable indicators used in this study are the exchange rate and interest rate variables. In this study, the exchange rate harms NPL, which means that it does not have a significant effect on the NPL level. In the span to 2018, when facing economic turmoil such as the US and China trade wars, the fall in world oil prices and disputes between the United States and Russia, causing the rupiah exchange rate to depreciate against the US dollar. This resulted in companies engaged in exporting abroad unable to handle the pressure generated if this crisis continued into the fourth quarter of 2018. Because the impact of this crisis caused a soft market so that demand decreased, then decreased demand would result in the value of the rupiah exchange rate weakens and will put pressure on the economy.

Then, the next variable is the interest rate. The results of the author's research indicate that interest rates have a positive and significant effect on the NPL level. This is consistent with Bekhet and Mahtar's (2012) research results from the ARDL approach, which shows that there is a long-term relationship between the stock price index and macroeconomic variables.

Theoretically, every country that is facing the impact of shocks to handle the financial system should implement a policy of lowering interest rates. However, in reality, advanced industrial countries have actually increased their interest rates in their monetary policy. The same thing happened in Indonesia in responding to the financial crisis that occurred. Starting from the provision of a large-scale economic stimulus by the US from 2009 to 2013. Then, proceed with the withdrawal of stimulus and monetary tightening plans through the increase in the US central bank's interest rate. Global economic uncertainty in 2015, which ultimately resulted in a slowdown in some economies and made financial markets more volatile than before. Also, the issue of Brexit, which shocked the economy in the European Union, caused market risks in early 2016. The Tax Amnesty Law also enacted at the end of June 2016 is expected to reduce financial risk and become a source of economic financing.

Indonesia has also provided a similar policy in response to the economic turmoil. Through Bank Indonesia as the Central Bank of the Republic of Indonesia issued a mix of monetary and macroprudential policies as well as financial market deepening as an effort to mitigate these various risks. The monetary authority of the Republic of Indonesia has also increased domestic interest rates. Mankiw (2013) states that if a shock occurs in the economy that causes a decline, it must be overcome with a fiscal and monetary policy that re-stabilizes the economy so that it returns to a full-employment position

5. Conclusions

The results of examining macroeconomic variables and bank-specific factors for non-performing loans (NPLs) in Indonesia use VECM. Provides results that the NPL variable provides a positive and significant response to credit increases in the short and long term. This means that high and low credit levels lead to high and low NPL levels.

The inflation variable used as a macroeconomic indicator has a different effect on the level of NPL in the short term and the long term. In the short term, the inflation variable hurts the NPL level. This means that the increase in the inflation rate does not affect the NPL level. Meanwhile, in the long term, inflation has a positive and significant impact on the NPL level. This means an increase in the inflation rate increases the NPL level. Inflation that increases is caused by government policies to increase the price of goods, which causes prices also to increase. Then, this can affect the purchasing power of the people so that the business world weakens, resulting in hampered credit.

The next macroeconomic variable is the exchange rate variable. Exchange rates have a negative and insignificant impact on NPL in the long term and the short term. This means that the depreciation or appreciation of the exchange rate does not affect credit payments extended by the People's Credit Bank/non-performing credit rate (NPL) in the long term or the short term.

The interest rate variable has a positive and significant impact on the NPL level. This means that an increase in interest rates will also increase the rate of non-performing loans (NPL) in the long term and the short term in Indonesia.

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EFFECTS OF BANK MACROECONOMIC INDICATORS AND SPECIFIC FACTORS ON THE STABILITY OF THE FINANCIAL SYSTEM IN INDONESIA

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The presence of uncertain macroeconomic conditions may affect the level of non-performing credit risk in banks. The effect of macroeconomic conditions on NPLs has a different response for each economic sector. The main objective of this study is to determine the effect of macroeconomic factors (inflation, exchange rates and interest rates) and bank-specific factors (credit) on the Non-Performing Loans (NPL) of rural banks in Indonesia in the period 2015-1 to 2018. -12. This study uses a Vector Error Correction Model (VECM) estimation to determine the effect of independent variables consisting of macroeconomic factors and bank-specific factors. Based on the results of the VECM estimation, three variables have a positive and significant effect on long-term NPL, namely credit, inflation and interest rates. Meanwhile, in the short term, there are only two variables that have a positive and significant effect on NPL, namely credit and interest rates. Inflation and exchange rate variables have a negative and insignificant effect on NPL in the short term.

Keywords: People's Credit Bank, Macroeconomic Indicators, NPL, Financial System Stability, VECM

Introduction

Financial System Stability plays a vital role in a country's economy because it is a condition in which the economic mechanism in determining prices, allocating funds and managing risk functions well and supports economic growth. If the financial system is unstable and does not function efficiently, the allocation of funds will not work well, which can hamper economic growth in the country (ADB Institute, 2015).

Financial system stability can be understood by researching the factors that can cause instability in the financial sector. Financial system instability can be triggered by a variety of causes and fluctuations which are generally a combination of market failures, either due to structural or behavioural factors. Market failure itself can come from external (international) and internal (domestic).

Based on the above conditions, efforts to avoid or reduce the risk of possible instability of the financial system are necessary, especially to avoid it
another huge loss. Several factors that influence the stability of the financial system, in theory, are capital flows, exchange rates, interest rates, inflation, the ratio of bad loans (Non-Performing

Loans) and others. The ratio of non-performing loans (NPL) to total loans, which is commonly known as the NPL ratio for total loans, is the ratio between total loans classified as substandard, doubtful, and non-performing, to total loans. The increase in NPL shows a sign of a decline in the performance of the banking sector and a decrease in the quality of the loan portfolio (Lehner, 2016).

In line with the increase in the amount of credit in microfinance institutions (Bank Pengkreditan Rakyat), it means that there is an indication that it will also increase financial risk. Thus it turns out that this increase is still not effective in resolving economic problems, especially its effect on financial system stability, so this study was conducted to determine the level of financial risk in Indonesia and the influence of credit from microfinance institutions, as well as the influence of several macroeconomic variables, namely inflation, interest rates and exchange rates on credit risk (NPL). Macroeconomic variables are taken because macroeconomic indicators can affect bank liquidity so that they become a factor in the level of bad credit (Cornock, 2018).

Judging from previous studies, there is a research gap. The occurrence of a research gap can be caused by differences in the object of research, the year of research and the sample used. From the description above, there are also inconsistencies with the theories put forward by economists. Macroprudential and macroprudential can act as indicators of financial system stability (Dombret & Lucius, 2013). Macroprudential indicators include capital flows, exchange rates, interest rates and the ratio of bad loans. Meanwhile, according to Akerlof's research in 1970 in Ramlall (2018), financial system stability rests on three pillars, namely information asymmetry, adverse selection and moral hazard. The three pillars are traditional factors that cause bad credit. The existing theoretical gap is caused by differences in the assumptions used in the study.

Literature review

Microfinance Institution

Development of financial institutions as intermediary institutions, both banks and institutions non-bank finance which experiences ups and downs following developments in financial and monetary conditions experienced by a country. Financial institutions consist of various forms of institutions operating in the financial sector. Microfinance is a financial service for low-income groups of people that include credit, savings, instalments, payment and money transfer services. In general, microfinance services are aimed at low-income groups of people who do not have access to banking or other public financial services (Schmidt, et al., 2016).

Keynes' Money Demand Theory

According to Keynes in Cammarosano (2016), he explains that money is a form of wealth that a person has. The decision of a person/society in turning wealth into cash, savings or securities will determine the high-interest rate. In the Keynesian model states that there are three public motives for holding money, namely transaction motives, vigilance and speculation. In the research, the writer emphasizes on speculation motive as a derivative of Keynes' grand theory of money demand. Keynes differs from the classics in his emphasis on the speculative motive and the role of the interest rate in determining the demand for money for speculative purposes. Keynes also realized that people want the amount of cash to exceed for transaction purposes because of the desire of people to keep their wealth in the most current form (cash). This saved cash fulfils the function of money as a means of hoarding wealth (store of value). In more modern terms, it is often called the demand for money to hoard wealth (asset demand for money). According to Keynes, the demand for money for speculative purposes is determined by the interest rate. The higher the interest rate, the lower the public's desire for speculative motives.

Bank Behavior Theory

The theory of bank behaviour is a derivative of Keynes' money demand theory. The theory of bank behaviour states that interactions between people determine the interest rate in banking. Public behaviour in using banking products can cause banks to become more or less liquid so that each of the banking products offered has risks. This risk will hurt all aspects involved. Especially it will disrupt financial system stability. The theory of bank behaviour is a derivative of Keynes' money demand theory with speculative motives. The speculation motive in Liquidity preference theory involves information about the need to take anticipatory steps against factors that are uncertain (uncertainty) and expectations for the future (Fontana & Setterfield, 2016).

Macroeconomic Indicators (Inflation, Exchange Rates and Interest Rates)

The interest rate is one of the economic variables that is often monitored by economic actors. Interest rates are seen as having a direct impact on economic conditions. Decisions regarding consumption, saving and investment are closely linked to conditions at the rate of interest. Interest is the dependence on borrowed money,
which is usually expressed as a percentage of the money loaned. The interest rate is the interest rate expressed in per cent, for a certain period (monthly or annually). An increase in the interest rate will worsen the quality of the loan, the higher the cost of debt will make it more difficult for the debtor to repay the loan. Also, high-interest rates are a potentially detrimental alternative for debtors (Bofondi, et al., 2011).

Inflation is a macroeconomic factor that affects the efficiency of banking activities. Inflation decreases the value of money, which reduces the general rate of return. A reduction in capital investment negatively affects economic performance. The inflation rate is an indicator that is often used to measure the stability of prices for goods and services. Inflation is defined as a continuous increase in the general price level over a certain period.

According to Mankiw (2013), the currency exchange rate between two countries is the price of the currency used by residents of these countries to trade with each other. Real currency exchange rates depend on the price level of goods in domestic currency as well as the exchange rate of the domestic currency against foreign currencies. If the real exchange rate of the domestic currency is high, then the prices of goods abroad are relatively lower, and the prices of domestic goods are relatively higher. Conversely, if the real exchange rate of the domestic currency is low, then the prices of goods abroad are relatively higher, and the prices of domestic goods are relatively lower.

Non-Performing Loan

Non-Performing Loans (NPL) or often called non-performing loans can be defined as loans that experience repayment difficulties due to deliberate factors and/or external factors beyond the control of the debtor. NPL theory relating to bank stability rests on three pillars: (i) information asymmetry, (ii) adverse selection and (iii) moral hazard theory. The theory mentions the traditional causes of bad credit loans which translate to banking system instability. Relationships that have a positive or negative influence. A country's NPL ratio can affect the state of the financial system in a country. A low NPL ratio indicates a stable financial system of a country, and conversely, a high NPL ratio in a country indicates financial instability of a country due to inefficiency in management in the banking sector to overcome bad credit risk. Bank macroeconomic risk factors are a source of systemic risk that can affect the performance of the banking sector (which is then expressed as the ratio of non-performing loans to total credit) (Scardovi, 2015).

Bank Specific Factors: Credit

The definition of credit is the provision of money or an equivalent bill, based on a loan agreement or agreement between the credit provider and the borrower, which requires the borrower to pay off the debt after a certain period of time with interest (Green, 2016). According to several kinds of literature, excessive credit growth is often associated as a key factor contributing to the crisis in the financial sector, particularly in emerging countries. The major banking crisis in the last 30 years that occurred in Chile in 1982 (Oberfield, 2013), Denmark, Finland, Norway and Sweden called The Nordic Banking Crisis occurred in the early 1990s (Schweiger, 2014), the Mexican crisis in 1994 (Sosa & Ortiz, 2015), the Asian financial crisis in 1997 (Joe & Oh, 2018) and the Rakyatime mortgage credit crisis in the United States that occurred in 2008 (Flavin & Sheenan, 2015) and the European debt crisis that occurred in 2010 - 2013 (Keddad & Schalck, 2020) was also preceded by a credit boom period.

Research methods

Based on the research objectives, namely to determine the effect of bank-specific factors (credit) for the People's Credit Bank and macroeconomic variables (inflation, interest rates, exchange rates) on Non-Performing Loans without ensuring the existence of cause and effect in Indonesia, the type of data used in this study is secondary data in the form of time series data with the period 2015 from January to 2018 in December with the objects of all People's Credit Banks in Indonesia.

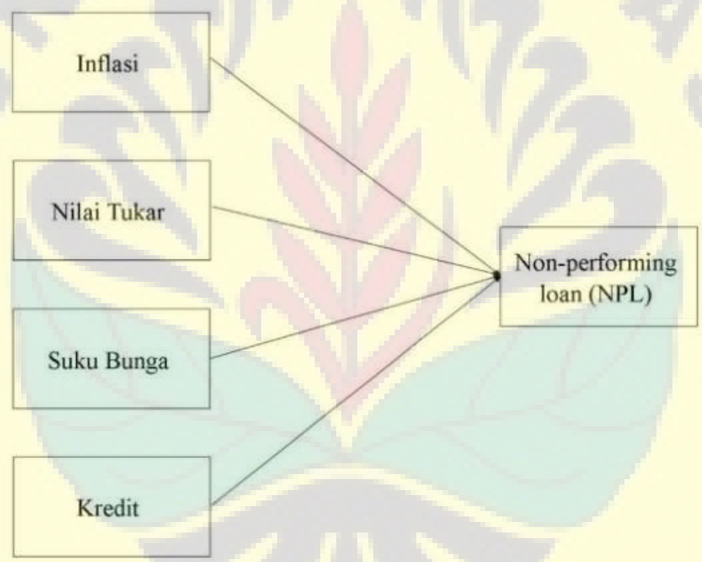
The focus of the object of this research is on the state of Indonesia. Determination of the vulnerable time used in this study is based on the availability of data and economic phenomena that occur at that time. Therefore it is vulnerable that the data used can show the form of economic problems by the research context. Data sources come from Bank Indonesia, Financial Services Authority, Central Bureau of Statistics.

Then the data is analyzed to determine the effect between variables using the Vector Error Correction Model (VECM). This type of research is a quantitative research type because the research aims to find results in the form of data in the form of numbers which are used as an analysis tool for information about what you want to know.

The model specification used is the VAR method adopted from the research of S.K Sigh and I.M Sudana (2017). S.K Sigh and I.M Sudana (2017) in their research included the variable Non-Performing Loan (NPL), credit, bank size, ROA, IRL and CAR as proxies of bank-specific factors. And using the variables GDP, exchange rates, inflation and interest rates as proxies of macroeconomic variables. S.K Sigh considers that the model can explore the relationship between direct aspects and relevant models for the analysis of the effects of macroeconomic variables and bank-specific factors on Non-Performing Loans (NPL).

The model used in S.K Sigh and I.M Sudana's research (2017) is as follows:

$$NPL = \beta_0 + \beta_1 GDP_1 + \beta_2 INF_2 + \beta_3 EX_3 + \beta_4 Bank\ Size_4 + \beta_5 ROA_5 + \beta_6 CAR_6 + \beta_7 IRL_7 + \mu i$$



Specifically, the above equation is formed in the econometric model as follows:

$$NPL = \beta_0 + \beta_1 CDR_1 + \beta_2 INF_2 + \beta_3 NTR_3 + \beta_3 SBA_4 + \mu i$$

Where :

NPL = Non-Performing Loan Level

CDR_1 = Credit growth of microfinance institutions

INF_2 = Inflation rate

NTR_3 = Exchange rate

SBA_4 = Interest rate

ui = Error term

β_0 = Constant parameter / Intercept

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β_1 , β_2 , β_3, = The coefficients of the independent variables are x1, x2, x3

Research Results and Discussion of Stationarity Test

The unit root test results, as shown in the table below show that all the variables to be estimated at the level are: NPL, credit, inflation, exchange rates and interest rates are not stationary. Some variables are declared not stationary at the level because they have Augmented Dicky-Fuller statistical values that are greater than the critical value of Mc. Kinnon, i.e. has a probability of more than 0.05. While the unit root test in the first different level, all the variables to be estimated does not contain a unit root so that it is stationary. All variables in this study were declared stationary because the Augmented Dicky-Fuller statistical value was smaller than the critical value of Mc. Kinnon, i.e. has a probability of less than 0.05.

Variabel	Level		First Different	
	Probability	Caption	Probability	Caption
NPL	0.2548	not stationary	0.0000	stationary
CDR	0.8247	not stationary	0.0000	stationary
INF	0.0000	stationary	0.0000	stationary
NTR	0.2548	not stationary	0.0000	stationary
SBA	0.0010	stationary	0.0000	stationary

Information: 5% probability

Optimum Lag Test

The selection of lag four as the optimum lag in this study is based on the use of the minimum Akaike Information Criteria (AIC) value of the variables estimated in the equation, namely Non-Performing Loan (NPL), credit, inflation, exchange rates and interest rates. Lag four was chosen because it produced the minimum Akaike Information Criteria (AIC) values, meaning that the model was able to explain the relationship between variables in this study..

Lag	LR	FRE	AIC
0	NA	1.99E+10	37.90345
1	324.5806	12205249	30.4982
2	28.75294	16651642	30.7633
3	41.7045	13192312	30.4102
4	43.06198	8094131	**29.6743***

Note: The asterisk and bold type indicate the smallest AIC value

VAR Stability Test

VAR modelling is declared stable if in determining the optimum lag, all variables have a Modulus Roots of Characteristic Polynomial value that is smaller than one (Arsana, 2005). If the VAR system is unstable, the results obtained, such as IRF and VD, will be invalid. After testing the stability of the VAR, an estimate can be made of the VECM. In this study, the VAR model is stable; namely, the average modulus value of the variable is 0.896584, which is less than 1.

Cointegration Test

The results of the Johansen Cointegration Test show that the Trace Statistic value has a value greater than the Critical Value, which means that the system has a cointegration equation. According to the estimation results in the table below, four equations have cointegration equations, so that means there are three equations in the system that have long-term relationships. So based on these four equations, the Vector Error Correction Model (VECM) model will be used in this study.

Hypothesized No of Ce (s)	Eigenvalue	Trace Statistic	0,05 Critical Value	Probability
None*	0.759435	149.5263	69.81899	0.0000
At most 1*	0.580723	88.26137	47.8561	0.0000
At most 2*	0.529874	50.8847	29.7971	0.0001
At most 3*	0.347615	18.43027	15.4947	0.0175

Information: 5% probability

Granger Causality Test

In the test results, there are 3 two-way causality relationships between variables in the system; namely, credit causes NPL and vice versa NPL causes credit. Followed by interest rates cause inflation and vice versa, inflation causes interest rates. Then interest rates cause credit and credit also cause interest rates because these variables have a probability value that is smaller than the 5% Critical Value so that it is stated to have a causal relationship.

NPL	Credit	Inflation	Exchange rate	Interest Rates
-	0.0321*	0.0517**	0.1597**	0.7711**
0.3324**	-	0.6226**	0.5870**	0.0010*
0.0215*	0.6018**	-	0.8444**	0.3304**
0.9287**	0.6841**	0.6247**	-	0.0885**
0.2772**	0.0341*	0.7206**	0.5135**	-

Information: 5% probability

Note: * (has a causality relationship), ** (does not have a causality relationship)

Variabel	Koefisien	T-statistik
	Long-term	
D(CDR(-1))	0,00011	-4,70396
D(INF(-1))	0,39959	-5,93812
D(NTR(-1))	0,00026	-0,05960
D(SBA(-1))	0,16596	-0,240687

C	-0,048474	
	Short-term	
CointEq1	0,20325	-4,36820
D(NPL(-1),2))	0,19307	-2,05044
D(NPL(-2),2))	0,24322	-3,22031
D(CDR(-1),2))	0,00017	0,99419
D(CDR(-2),2))	8,2E-05	1,21928
D(INF(-1),2))	0,32772	-4,99535
D(INF(-2),2))	0,38153	-5,57208
D(NTR(-1),2))	0,00013	-0,76731
D(NTR(-2),2))	0,00019	-0,47660
D(SBA(-1),2))	0,07707	-4,31502
D(SBA(-2),2))	0,09106	-1,15329
C	0,03106	-1,38357

Short-Run VECM Estimation Results

In the short term, the credit variable affects NPL significantly. There is a positive relationship between the variable credit and NPL in the short term. This can be seen from the credit coefficient of 0.00017 per cent. This means that if there is an increase in credit by one per cent, it will cause an increase in NPLs of 0.00017 per cent. This result causes the credit growth of Bank Pengkreditan Rakyat to increase in the short term, which will increase the NPL, which is an indicator of financial system stability. Then this means that when the NPL is high, it will cause financial system instability or in other words, the stability of the financial system will be disrupted. The inflation variable in the short term does not have a significant effect on the NPL level. This is known by looking at the T-statistic value of the inflation variable under the T-table value. Which means that if there is an increase in the inflation rate in the short term, it will not affect the NPL level. Another macroeconomic variable that does not affect the NPL level is the exchange rate. In this study, the interest rate variable influences the NPL rate. This happens because if the interest rate is increased, the debtors will not be able to pay the instalments they borrow, which will cause the NPL rate to increase.

Long Term Estimates

In this study, the results of the regression test stated that there was a relationship between the credit variable and the NPL variable. In the long run, there is a relationship between inflation and NPL. Inflation and NPLs have a significant positive relationship in the long run. Inflation and NPLs have a significant positive relationship in the long term of 0.39959. This means that when there is an increase in the exchange rate of one per cent, it will increase the NPL by 0.39959 per cent in the long term.

Meanwhile, the interest rate variable significantly influences NPL in the long term. There is a positive relationship between interest rates and NPLs. This can be seen from the estimated coefficient of 0.16596, which means that every one per cent increase in interest rates will respond to an increase in NPL of 0.16596 per cent in the long run.

Then, in the long run, the increase in the exchange rate does not significantly affect the NPL. This is evidenced by the coefficient value of 0.00026. And the size of the T-statistic is in the range of 0.05960, which is smaller than the size of the t-table, so it means that in the long term this variable does not significantly affect the NPL.

In this study, it can be seen that exchange rate fluctuations are inversely related to the NPL rate in 2015-1 to 2018-12. This is because other NPL variables such as credit, inflation and interest rates in Indonesia have increased.

Discussion of Data Estimation Results

In this study, in the period 2015-1 to 2018-12, various kinds of economic turmoil occurred which caused credit figures, inflation, exchange rates and interest rates on Non-Performing Loans (NPLs) to fluctuate. During this time, there were at least several macroeconomic symptoms that were quite influencing the Indonesian economy, which could directly affect the banking sector, especially the People's Credit Bank. Several monetary events that occurred in the 2015-1 to 2018-12 timeframe were financial pressures and global political uncertainty related to the global economy. Based on this study, where macroeconomic indicators are measured using inflation, exchange rates and interest rates, the specific factors for the People's Credit Bank are measured using credit growth, and NPL shows that there is a good long-term and short-term relationship.

The credit variable as an indicator in bank-specific factors, which in this study is more specific to microcredit, namely People's Credit Banks throughout Indonesia, has a significant positive effect on the NPL of Bank Pengkreditan Rakyat. The increase in credit caused by public consumption, increase in public income or for the productive sector in micro-business development creates the risk of an increase in the level of NPL (bad credit), which will disrupt the stability of the financial system in the banking sector itself. The high credit growth of Bank Pengkreditan Rakyat was also accompanied by qualified quality where the NPL ratio was able to be maintained up to 0.3%. According to the OJK, this crisis did not really disrupt credit growth; however, credit for the People's Credit Bank, People's Credit Bank and conventional banks experienced a slowdown.

Furthermore, the inflation variable as a macroeconomic indicator has a significant effect on the NPL level. Because the increase in inflation means that the increase and decrease in the price of goods are unstable during the study period 2015 to 2018. The results of the author's research are in line with the research of Linda, Defianawati and Megawati (2015) which show that inflation has a significant effect on NPL in Indonesia. Inflation that occurs continuously has an impact on decreasing people's purchasing power because in real terms the level of income also decreases with the assumption that the level of people's income is constant (Mankiw, 2013). The financial risk then also arises due to inflation. If there is an unexpected increase in inflation, it will risk people's purchasing power. It is in line with the theory and research of the author that when there is an increase in inflation, it will affect the NPL level. Even though it was affected by the trade war, the current inflation rate affected the NPL level, it was still manageable and was in the range of 0.3%.

Other macroeconomic variable indicators used in this study are the exchange rate and interest rate variables. In this study, the exchange rate harms NPL, which means that it does not have a significant effect on the NPL level. In the span of 2018 when facing economic turmoil such as the US and China trade wars, the fall in world oil prices and disputes between the United States and Russia, causing the rupiah exchange rate to depreciate against the US dollar. This resulted in companies engaged in exporting abroad unable to handle the pressure generated if this crisis continued into the fourth quarter of 2018. Because the impact of this crisis caused a soft market so that demand decreased, then decreased demand would result in the value of the rupiah exchange rate weakens and will put pressure on the economy.

Then the next variable is the interest rate. The results of the author's research indicate that interest rates have a positive and significant effect on the NPL level. This is consistent with Bekhet and Mahtar's (2012) research results from the ARDL approach, which shows that there is a long-term relationship between the stock price index and macroeconomic variables.

Policy Implications

Theoretically, every country that is facing the impact of shocks to handle the financial system should implement a policy of lowering interest rates. However, in reality, advanced industrial countries have actually increased their interest rates in their monetary policy. The same thing happened in Indonesia in responding to the financial crisis that occurred. Starting from the provision of a large-scale economic stimulus by the US from 2009 to 2013. Then proceed with the withdrawal of stimulus and monetary tightening plans through the increase in the US central bank's interest rate. Global economic uncertainty in 2015, which ultimately resulted in a slowdown in some economies and made financial markets more volatile than before. Also, the issue of Brexit, which shocked the economy in the European Union, caused market risks in early 2016. The Tax Amnesty Law also enacted at the end of June 2016 is expected to reduce financial risk and become a source of economic financing.

Indonesia has also provided a similar policy in response to the economic turmoil. Through Bank Indonesia as the Central Bank of the Republic of Indonesia issued a mix of monetary and macroprudential policies as well as financial market deepening as an effort to mitigate these various risks. The monetary authority of the Republic of Indonesia has also increased domestic interest rates. Mankiw (2007) states that if a shock occurs in the economy that causes a decline, it must be overcome with a fiscal and monetary policy that re-stabilizes the economy so that it returns to a full-employment position.

Conclusion

The results of examining macroeconomic variables and bank-specific factors for Non-Performing

Loans (NPLs) in Indonesia use VECM. Provides results that the NPL variable provides a positive and significant response to credit increases in the short and long term. This means that high and low credit levels lead to high and low NPL levels.

The inflation variable used as a macroeconomic indicator has a different effect on the level of NPL in the short term and the long term. In the short term, the inflation variable hurts the NPL level. This means that the increase in the inflation rate does not affect the NPL level. Meanwhile, in the long term, inflation has a positive and significant impact on the NPL level. This means an increase in the inflation rate increases the NPL level. Inflation that increases the increase is caused by government policies to increase the price of goods which causes prices also to increase. Then this can affect the purchasing power of the people so that the business world weakens. Resulting in hampered credit.

The next macroeconomic variable is the exchange rate variable. Exchange rates have a negative and insignificant impact on NPL in the long term and the short term. This means that the depreciation or appreciation of the exchange rate does not affect credit payments extended by the People's Credit Bank / non-performing credit rate (NPL) in the long term or the short term.

The interest rate variable has a positive and significant impact on the NPL level. This means that an increase in interest rates will also increase the rate of non-performing loans (NPL) in the long term and the short term in Indonesia.

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