

The Macroeconomic Effects on Non-Performing Loan and its Implication on Allowance for Impairment Losses

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ARTICLE INFORMATION

Received: June 21, 2021

Accepted: July 02, 2021

Volume: 3

Issue: 2

DOI: 10.32996/jefas.2021.3.2.2

KEYWORDS

NPL, Allowance for Impairment Losses, Macroeconomics, FASS 55, FASS 71

ABSTRACT

The change in the Allowance for Impairment Losses calculation method from FASS 55 to FASS 71 in Indonesia requires banks to consider macroeconomic variables as variables in calculating Allowance for Impairment Losses. This research has an objective to study and analyze the effect of macroeconomic proxied by GDP, inflation, exchange rate, unemployment rate, BI rate, and loan growth on NPL and its implications for Allowance for Impairment Losses. The population of this research was issuers of foreign exchange banks in 2011-2019, with a total sample of 26 issuers of foreign exchange banks. This research uses the panel data regression method to analyze the data. The research results found that macroeconomic variables proxied by GDP, inflation, exchange rates, unemployment rate, BI rate, and loan growth did not significantly affect NPL. In contrast, NPL had a significant effect on Allowance for Impairment Losses. This research implies that banks are expected to improve credit quality management against the effects of macroeconomic fluctuations. As a result, the NPL ratio remains under control and does not increase the burden of Allowance for Impairment Losses.

1. Introduction

The fund's distribution in the form of credit or loans which a bank acts as a creditor has the risk of payment failure for the loans or credit given to the debtor. As the anticipation for the loss of the debtor payment failure, the bank must establish an allowance of loss back up for credit or loans are given to the debtor. The allowance that is stated in Allowance for Impairment Losses of credit is regulated in Financial Accounting Standard Statement (Ikatan Akuntan Indonesia (IAI), 2011) PSAK 55. One of the important variables for counting Allowance for Impairment Losses based on FASS 55 is Non-Performing Loan (NPL). Non-Performing Loan (NPL) is a ratio related to the quality of bank assets that reflected cashflow risk in the distribution of credit or loan and marketable securities owned by the financial institution, which cannot be paid fully by the debtor (Saunders et al., 2021).

In 2016, Financial Accounting Standards Board, Institute of Indonesia chartered accountant ratified an Exposure Draft (ED) about the new Financial Accounting Standard Statement (FASS) 71 which will replace FASS 55 (Ikatan Akuntan Indonesia (IAI), 2020). The allowance basis in FASS 71 is Expected Credit Loss (ECL) which included relevant credit risk information and looking forward to macroeconomy information. The reason for macroeconomy variable inclusion in Allowance for Impairment Losses FASS 71 calculation is the probability of credit loss risk which can happen related to macroeconomy fluctuation in the future.

There is a lot of macroeconomy data source, but in the conclusion of the FASS 71 implementation issue discussion result released by the Financial Services Authority (FSA) in 2018, declared there are some macroeconomy factors that can be

considered, such as Gross Domestic Product (GDP), unemployment rate, inflation, BI rate, exchange rate, and loan growth. There is a reason why this macroeconomy is recommended. It is because the macroeconomy fluctuation and NPL movement in Bank's product in Indonesia have a strong connection. The calculation method has changed from FASS 55 to FASS 71, in which FASS 71 calculation considers macroeconomy variable as one of the variables for calculating Allowance for Impairment Losses. Therefore, this research wants to investigate macroeconomy variable effects which proxied by Gross Domestic Product (GDP), unemployment rate, inflation, BI rate, exchange rate, and loan growth to Non-Performing Loan (NPL), and its implication to Allowance for Impairment Losses in the issuer of foreign exchange bank in 2011 – 2019 period.

2. Literature Review

Determinants of macroeconomy relationship towards NPL have been researched since the 1980's, in this case, Bernanke and Gertler (1998), Gertler and Gilchrist (1989) presented their research result proves that there is a negative relation of macroeconomy condition and NPL. It shows, when economic growth is getting better, the income of banking customers also increases, so customers will have the ability to pay off their loans. On the other side, when the economic growth is slowing down, then NPL will increase because the increasing unemployment rate and available income decreased, and it will give some difficulties to the banking customer to pay their loans (Jimnez et al., 2004; Klein, 2013; Quagliarello, 2007; Salas & Saurina, 2002). However, researchers got a different result in the next research development, which created the distance between research results of macroeconomy effects on NPL.

2.1 Gross Domestic Product (GDP)

Gross Domestic Product (GDP) is the market value of the whole final goods and services produced in a country during a certain period (Mankiw, 2006). Ginting (2017), Naibaho and Rahayu (2018), and Szarowska (Szarowská, 2018) declared GDP has negative and significant relation towards NPL. When the GDP increased, NPL will decrease. In the correlation with NPL, the recession is when the society income decreases; it will affect society's ability (banking customer) in paying their loan, which directly affects the increasing NPL ratio.

2.2 Inflation

Inflation and NPL have a tight connection. Inflation is a condition of continuously increasing product price, which triggers the decreased purchasing power of a society, in the social income is also decreasing with an assumption of fixed society income (Mankiw, 2006). Inflation happens when there is a continuous rise in goods or services price, and society's purchasing power will decrease; in this condition, the banking customer will find it difficult to pay their loan to the bank. Damanhur et al. (2018), Naibaho and Rahayu (2018), and Leka et al. (2019) stated that inflation has a positive and significant relation towards NPL, the rise of Inflation will trigger the rise of NPL credit ratio from the various economic sector.

2.3 Exchange Rate

The Exchange rate used between two countries is a currency price used by the citizens of those countries to do international trading (Mankiw, 2006). Relation between Exchange rate and NPL happens when the local currency rate is getting higher to spend for getting 1 USD, it will increase the probability of high NPL ratio. Syahid (2016), Rahman and Hamid (2019), and Sinaga et al. (2020) stated exchange rate has a positive influence on NPL. The big bank debtors whose business activities need a USD exchange rate will get pressured from the exchange rate, increasing the default or NPL.

2.4 Unemployment Rate

The Unemployment rate is the percentage of people's total amount in the labor force that is unemployed (Krugman & Wells, 2021). Mileris (2014), Szarowska (2018), Mazreku et al (2018), and Agić and Jeremić (2018) claimed that the unemployment rate has a significant affects the NPL. When the unemployment rate increased, it will affect the rise of the NPL ratio. In relation to NPL, the rise of the unemployment rate will trigger the decline of society ability to provide the cash flow and reduce society ability (in this case, banking customer) in paying the debt to the bank.

2.5 BI Rate

BI Rate is a policy of interest rate that reflected an attitude or position of monetary policy established by Indonesia Bank and declared to the public (Bank Indonesia, 2016). Nurismalatri (2014), Rizal and Zulham (2019) declared BI interest rate has a positive and significant influence on NPL. BI interest rate will be increasing, and at the same time, society's willingness to save their money in the bank will also increase. It is because they have an excess allowance which will increase credit or financing. If the credit or financing increased, it would trigger increasing in NPL cases or financing risks. In the NPL case, the interest rate change will affect money demand change (credit), which the increasing interest rate triggers investment/ demand total decrease.

2.6 Loan Growth

Loan Growth is a credit growth measured by comparing changes of credit distribution in the current year and credit distribution amount in the previous year (Ali, 2004). Related to NPL, significant credit growth increment will enhance financial system vulnerability through standard loan reduction, excessive leverage, and asset price inflation, encouraging increment of non-performing loans (Reinhart & Rogoff, 2009). Anjom et al. (2016), Peric and Konjusak (2018), and Saputro et al. (2019) said that loan growth has a positive and significant influence on NPL. It happens when banks perform a high credit growth in a short time, bank tends to lower its standard in selecting its customer.

2.7 Non-Performing Loan (NPL)

Non-Performing Loan (NPL) is the total ratio of credit with issues, doubtful credit, and a total of credit with issues towards the credit total (Bank Indonesia, 2017). In the Allowance for Impairment Losses point of view, NPL reflected the number of non-performing loan credit, how big it is. To handle the increases of NPL, the bank needs to increase the allowance amount in predicting the default debtor loss. Syahid (2016), Ozili (2018), and Bhattarai (2018) showed that NPL has a positive and significant effect on Allowance for Impairment Losses. When NPL is getting higher or bigger in amount, at the same time, allowance for impairment losses will be getting higher.

2.8 Allowance for Impairment Losses

Allowance for Impairment Losses which refers to FASS 55 (2014), is the amount of loan value degradation loss measured in amortized acquisition cost. The difference between the book value loan and the recent value of the main payment and future interest is discounted in an original actual interest rate and separately calculated. On July 26th, Finance Accounting Standard Board decided FASS 71 as the new allowance for impairment losses calculation guidance, which will be used effectively in Indonesia started from January 1st, 2020.

3. Methodology

3.1 Research Model and Hypothesis

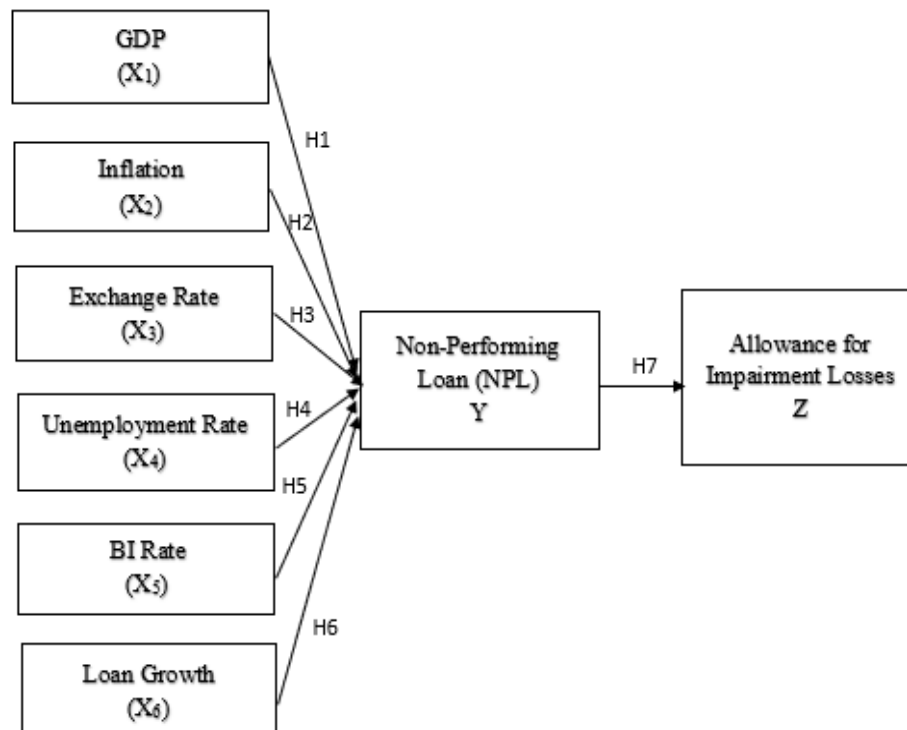


Figure 1.1 Research Model

Hypothesis:

- H1: GDP has a negative impact on NPL
- H2: Inflation has a positive impact on NPL
- H3: Exchange Rate has a positive impact on NPL
- H4: Unemployment Rate has a positive impact on NPL
- H5: BI Rate has a positive impact on NPL

- H6: Loan Growth has a positive impact on NPL
- H7: NPL has a positive impact on Allowance for Impairment Losses

3.2. Research Data and Sample

Data used in this research is taken from secondary data sources. The data was obtained from Bank Indonesia, the Central Statistics Agency of Indonesia, the Indonesia Stock Exchange, and Trading Economics. The data collection in this research is used with documentation technique. The population in this research were issuers of foreign exchange banks in 2011-2019. Sampling was done using purposive sampling so that 26 samples of issuers of foreign exchange banks were obtained.

3.3 Data Analysis Method

The data was analyzed using the panel data regression analysis method with the help of the Eviews software program. Panel data is time series and cross-section data combination so that the panel data regression equation in this research can be formulated as showed below (Gujarati, 2002) :

Regression Equation Model 1

$$Y_{it} = \alpha + \beta X_{1it} + \beta X_{2it} + \beta X_{3it} + \beta X_{4it} + \beta X_{5it} + \beta X_{6it} \dots \dots \dots (1.1)$$

Where:

- | | | | |
|----------|--|------------|----------------------|
| Y_{it} | = Non-Performing Loan (NPL) | X_5 | = Unemployment Rate |
| α | = Constant | X_6 | = BI Rate |
| β | = Regression coefficient of Variable X | X_7 | = Loan Growth |
| X_1 | = GDP | ϵ | = Error term |
| X_2 | = Inflation | i | = Cross-section data |
| X_3 | = Exchange Rate | t | = Time series data |

Regression Equation Model 2

$$Y_{it} = \alpha + \beta X_{1it} \dots \dots \dots (1.2)$$

Where:

- Y_{it} = Allowance for Impairment Losses
- ϵ = Error term
- α = Constant
- i = Cross-section data
- β = Regression coefficient of Variable X
- t = Time series data
- X_1 = Non-Performing Loan (NPL)

Determining the suitable panel data model, the regression model estimation method was carried out using three approaches. They are the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). Chow, Hausman, and Lagrange tests were used to determine the most suitable model from the three approaches mentioned above. The process of determining the panel data estimation model can be shown in Figure 1.2 (Gujarati, 2012) below:

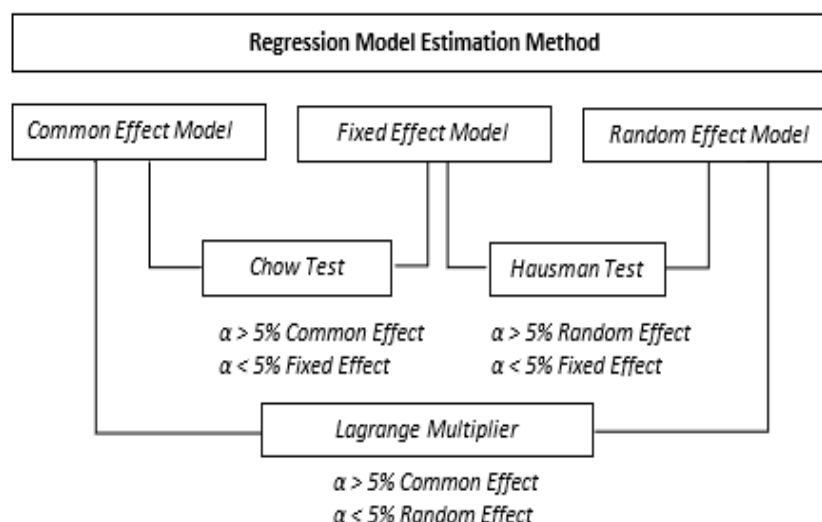


Figure 1.2 The Determination of Panel Data Regression Estimation Model

Hypothesis testing was conducted using the Coefficient of Determination test, t-test, and F-test. Coefficient of Determination (R^2) test used to measure the model's ability to explain the variation of the independent variable. It was also used to explain the ability of the regression model to predict the dependent variable. The t-test was used to examine the significance level of the influence of each independent variable towards the dependent variable in parallel. The F-test was used to verify whether all of the independent variables included in the model affect the dependent variables.

4. Results

4.1 Descriptive Statistic

Table 1. Descriptive Statistic

	Log AIL*	NPL	GDP	Inflation	Log ER*	Unemp. Rate	BI Rate	Loan Growth
Mean	5.71	1.57	5.33	4.77	4.08	5.74	6.13	14.78
Median	5.77	1.32	5.10	4.30	4.12	5.60	6.00	11.00
Maximum	7.39	6.37	6.20	6.90	4.15	6.70	7.50	24.00
Minimum	3.56	0.00	4.90	3.00	3.94	5.20	4.60	8.00
Std. Dev	0.89	1.18	0.46	1.44	0.08	0.46	0.94	6.49
Skewness	-0.23	1.33	0.89	0.23	-0.67	0.79	0.05	0.42
Kurtosis	2.18	4.72	2.19	1.41	1.87	2.65	1.98	1.45
Jarque-Bera	8.52	98.24	37.77	26.75	29.69	25.33	10.22	30.33
Sum Sg.Dev	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Observation	234	234	234	234	234	234	234	234

*Log AIL: Logarithm Allowance for Impairment Losses

*Log ER: Logarithm Exchange Rate

4.2 Panel Data Regression Result

By using E-Views 9 program, the research data was processed. Panel data regression model 1 and 2 was transformed into three models of panel data regression estimation; those are Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). Chow, Hausman, and Lagrange tests were done to determine the most suitable regression model for panel data regression models 1 and 2. The result of panel data regression model testing can be seen in Table 2 below:

Table 2. Regression Model Testing

Chow Test		Hausman Test		Lagrange Test	
Model 1					
Prob. Chi Square	0.0000	Cross-section Random	1.0000	Breusch-Pagan	0.0000
Sig α	0.05	Sig α	0.05	Sig α	0.05
Hypothesis	Sig > α: CEM Sig < α: FEM	Hypothesis	Sig > α: REM Sig < α: FEM	Hypothesis	Sig > α: CEM Sig < α: REM
Result	FEM	Result	REM	Result	REM
Model 2					
Prob. Chi Square	0.0000	Cross-section Random	0.0009	Not required	
Sig α	0.05	Sig α	0.05		
Hypothesis	Sig > α: CEM Sig < α: FEM	Hypothesis	Sig > α: REM Sig < α: FEM		
Result	FEM	Result	FEM		

Based on the Chow test, Hausman test, and Lagrange test results on panel data regression model 1, the most suitable model is the Random Effect Model (REM). This result indicates that REM provides significant additional value compared to CEM and FEM. For panel data regression model 2, the most suitable model is Fixed Effect Model (FEM) based on the Chow test and Hausman test result, so there was no need for the Lagrange test. This result indicates that FEM provides significant additional value compared to CEM and REM. Therefore, the regression equations for model 1 and model 2 are obtained as follows:

Regression Equation Model 1

$$\text{NPL} = 1.41 + 0.44 (\text{GDP}) - 0.058 (\text{Inflation}) + 0.038 \text{Log} (\text{Exchange Rate}) - 0.29 (\text{Unemployment Rate}) + 0.07 (\text{BI Rate}) - 0.056 (\text{Loan Growth})$$

Table 3. Regression Result and t-Test of Model 1

Variable	Coefficient	t-Statistic	Probability	Sig α = 5%
C	1.4108	0.082336	0.9345	Not Significant
GDP	0.438715	0.308899	0.7577	Not Significant
Inflation	-0.057927	-0.516755	0.6058	Not Significant
Log Exchange Rate	0.037965	0.010381	0.9917	Not Significant
Unemployment Rate	-0.292776	-0.404358	0.6863	Not Significant
BI Rate	0.072936	0.321193	0.7484	Not Significant
Loan Growth	-0.055612	-0.710249	0.4783	Not Significant
R-Squared			0.135925	
Adjusted R-Squared			0.113086	
F-Statistic			5.951463	
Prob. F-Statistic			0.000009	

Regression Equation Model 2

$$\text{Log (Allowance for Impairment Losses)} = 5.38 + 0.22 (\text{NPL})$$

Table 4. Regression Result and t-Test of Model 2

Variable	Coefficient	t-Statistic	Probability	Sig α = 5%
C	5.375988	123.2513	0.0000	Significant
NPL	0.217833	8.992143	0.0000	Significant
R-Squared			0.887478	

Adjusted R-Squared	0.873206
F-Statistic	62.186840
Prob. F-Statistic	0.000000

4.3 Regression Result Interpretation

Interpretation of Model 1

Based on the estimation results of the regression equation and t-test in table 3 and table 4, the effect of GDP, inflation, exchange rate, unemployment rate, BI rate, and loan growth on NPL can be explained as follows:

1) GDP (X_1)

The GDP has a positive and insignificant impact on NPL with a coefficient of 0.438715. This result indicates that if GDP increases by 1%, it will increase the NPL by 0.438715% but in an insignificant amount.

2) Inflation (X_2)

Inflation has a negative and insignificant impact on NPL with a coefficient of minus (-) 0.057927. This result points out that if there is an increase in inflation by 1% it will reduce the NPL by 0.057927% but in an insignificant amount.

3) Exchange Rate (X_3)

The exchange rate has a positive and insignificant impact on NPL with a coefficient of 0.037965. This result shows that if the exchange rate increases by 1% it will increase the NPL by 0.037965% but in an insignificant amount.

4) Unemployment Rate (X_4)

The impact of an unemployment rate is negative and insignificant on NPL with the coefficient of minus (-) 0.292776. This result indicates that if there is an increase in the unemployment rate by 1%, it will reduce the NPL by 0.292776% but in an insignificant amount.

5) BI Rate (X_5)

The impact of BI rate is positive and insignificant on NPL with a coefficient of 0.072936. This result shows that if there is an increase in the BI rate by 1% it will increase the NPL by 0.072936% but in an insignificant amount.

6) Loan growth (X_6)

The loan growth has a negative and insignificant impact on NPL with the coefficient of minus (-) 0.055612. This result points out that if there is an increase in loan growth of 1% it will reduce the NPL by 0.055612% but in an insignificant amount.

Interpretation of Model 2

The estimation results of the regression equation and t-test above explain that the effect of NPL on Allowance for Impairment Losses is positive and significant with the coefficient of 0.217833. This result indicates that every 1% increase in NPL will increase Allowance for Impairment Losses by 0.217833% with a significant amount.

4.4 F-Test and Coefficient of Determination

Table 5. F Test and Coefficient of Determination

F Test			Coefficient of Determination	
Model 1				
F Statistic	F Table	Result	Coef. R ²	Interpretation
5.951463	2.63	Significant	0.1359 (13.59%)	The independent variable explains 13.59% of the dependent variable and is quite weak in predicting the dependent variable
Model 2				
F Statistic	F Table	Result	Coef. R ²	Interpretation

62.18684	4.26	Significant	0.8875 (88.75%)	The independent variable explains 88.75% of the dependent variable and is quite strong in predicting the dependent variable.
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Based on Table 5, regression model 1 has an F-value of 5.95, which is greater than F-Table 2.63. Therefore, macroeconomics variable simultaneously has a significant impact on NPL, and the model considered proper to use. The result of regression model 2 presents an F-value of 62.19, which is much greater than F-Table 4.26. That means NPL significantly affects the allowance for impairment losses based on F-test results; also, the model considered feasible to use. The coefficient of determination (R^2) of model 1 indicates that the macroeconomic variable can only explain 13.59% of the variation in the dependent variable. In comparison, the rest are explained by other variables that were not included in this research. On the other hand, the coefficient of determination (R^2) of model 2 shows that the NPL variable can explain 88.75% of the variation in the dependent variable. In comparison, the rest are explained by other variables that have not been included in this research.

5. Discussion

5.1 The Impact of GDP on NPL

Table 3 shows that GDP has a positive and insignificant impact on NPL. This research shows that there is a prosperity improvement in society. It indicates that people choose to postpone the payment of bank loans to banks and prioritize saving, buying assets, investing, or consumption. From the banking side, it indicates that there is a possibility of mismanagement of credit distribution by the bank. The results of this research are in a row with the results of the previous studies conducted by Ouhibi and Hammami (2015) and Agić and Jeremić (2018), which stated that GDP growth has a positive relationship and insignificant effect on NPL.

5.2 The Impact of Inflation on NPL

Table 3 shows that the effect of inflation on NPL is insignificant. This research has results that indicate that an increase in bank interest rates will accompany an increase in inflation. Consequently, when the bank interest rates are high, the public will suppress their urge to apply for new loans from the banks. It will have a high impact on the risk reduction potential and will reduce the customer credit levels. The previous studies conducted by Rahman and Hamid (2019) and Wijaya (2019) stated the same thing as this research: inflation and NPL have a negative and insignificant correlation.

5.3 The Impact of Exchange Rate on NPL

Table 3 shows that the exchange rate has a positive and insignificant towards NPL. The previous research conducted by Wijaya (2019) also stated that the exchange rate has a negative and insignificant relation with NPL. This research shows that changes (increases/decreases) in the rupiah exchange rate against foreign currencies relatively occur in the short term so that the situation is not so disruptive towards the businesses run by the customers. Besides, in the medium and large-scale business sector, hedging is used in loan transactions or purchases of raw materials in the form of debt so that changes in exchange rates during the transaction period will not affect the business transactions.

5.4 The Impact of Unemployment Rate on NPL

The impact of unemployment rate is negative and insignificant on NPL. People with employee status have other sources of income besides salary income, such as micro-enterprises or investments, so that they can help maintain family cash flow and debt repayment obligations to banks. The results of this research are in a row with the results of the previous studies conducted by Marouf & Guellil (2017) and Leka et al. (2019). Those studies stated that the unemployment rate insignificantly affects NPL.

5.5 The Impact of BI Rate on NPL

BI rate has a positive and insignificant impact on NPL, just like what is shown in Table 3. Bank Indonesia’s interest rate is no longer be one of the main considerations for customers to apply for bank credit. When the BI rate rises, customers will still apply for credit from the bank to meet their daily needs. They also will continue to pay credit debt obligations to the bank, to maintain the credit quality properly to prevent any withdrawal of collateral by the bank. The results of this research are in a row with the previous studies conducted by Syahid (2016) and Naibaho and Rahayu (2018) which stated that BI rate has an insignificant correlation with NPL.

5.6 The Impact of Loan Growth on NPL

Table 3 shows that loan growth has a negative and insignificant impact on NPL. This research indicates that if the disbursement of new credit increases does not directly become a non-performing loan. But instead, existing loans have the potential for bad

credit. In other words, the escalation of loan growth does not directly affect the NPL, but it can be observed in the next year. The result of this research is in a row with previous research conducted by Rosita and Musdholifah (2018) also stated that loan growth has negative and insignificant relation with NPL.

5.7 The Impact of NPL on Allowance for Impairment Losses

As shown in Table 3, NPL has a positive and significant impact on the Allowance for Impairment Losses. The results show that a high level of non-performing loans will increase the allowance demands for impairment losses that the banks must form. The banks need to form an allowance for impairment losses to predict possible losses. The inadequacy of bank credit management and recovery has led to an increase in non-performing loans, and non-performing loans that are not managed properly will increase the risk of loss. The results of this research are in a row with the results of the previous studies conducted by Fitriana & Arfianto (2015), Abdullah et al. (2015), Ekanayake (2015), Syahid (2016), Ozili (2018), and Bhattarai (2018). Those previous studies stated that there is a positive and significant correlation between NPL and Allowance for Impairment Losses, and an increase in NPL will increase the Allowance for Impairment Losses.

6. Conclusion

Based on the results of the regression equation and the significance test along with the discussion analysis of this research, it can be concluded:

1. GDP, exchange rate, and BI rate have a positive and insignificant impact on the NPL of foreign exchange bank issuer during the observations in 2011-2019.
2. Inflation, unemployment rate, and loan growth have a negative and insignificant impact on the NPL of foreign exchange bank issuer during the observations in 2011-2019.
3. Non-Performing Loan (NPL) has a positive and significant impact on the Allowance for Impairment Losses of foreign exchange banks issuer during the observations in 2011-2019.

Based on the results of this research, foreign exchange banks are expected to be able to improve the quality of credit disbursement management. Considering that macroeconomic variables have an insignificant impact on NPL, issuers of foreign exchange banks are expected to be able to improve the quality of credit disbursement management against macroeconomic fluctuations so that the ratio of NPL and Allowance for Impairment Losses expenses can be controlled properly.

7. Limitations

The limitation in this research is that the sample population is only for issuers of foreign exchange banks while each bank has different products, which have different effects on the macroeconomy. For further research, it is expected that it will increase the scope of the banking industry, not only for issuers of foreign exchange banks.

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