

Prediction of Credit Risk; a Macroeconomic Perspective (Case in Indonesian Banking)

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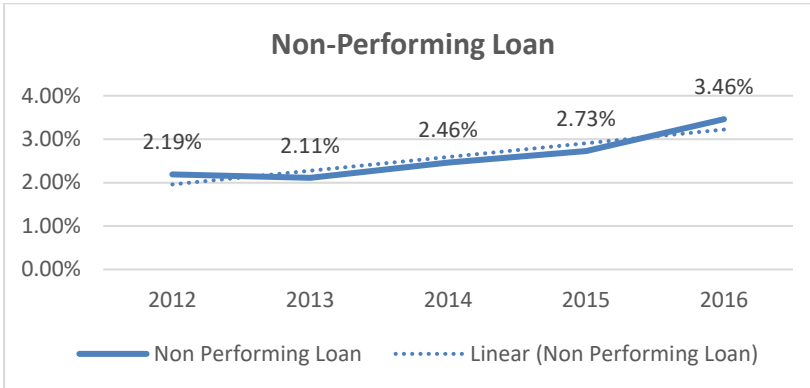
This research aims to predict credit risk using the macroeconomic variable approach. Macroeconomic variables used to predict credit risk consist of real interest rates and inflation rates, while risk of credit is measured through the level of Non Performing Loans. The research method uses descriptive and verification methods. The study was conducted on Commercial Banks that were listed on the IDX during the period of 2012-2016. Observations were made on 37 Public Commercial Banks through sampling using the purposive sampling method. Data analysis uses panel data regression models by testing as required. The F test and t test are used as statistical tests at the significance level of 5%. The research results indicate that macroeconomic variables consisting of real interest rates and inflation rates can significantly predict the occurrence of credit risk as measured by non-performing loans.

Key words: *Real interest rate, Inflation, Non-performing loans, Commercial banks.*

Introduction

Credit risk is the risk of a loan not returning in accordance with an agreed contract. These risks can be categorized as late payments; reducing interest payments or principal loans, or not paying loans at all. Credit risk can be used as a bank indicator of performance. The risk of credit in banks in Indonesia increased during the period of 2012-2016. Figure 1 below shows an increase in credit risk in commercial banks during the period of 2012-2016.

Figure 1. Average of Non-Performing Loans for Commercial Banks Period 2012-2016

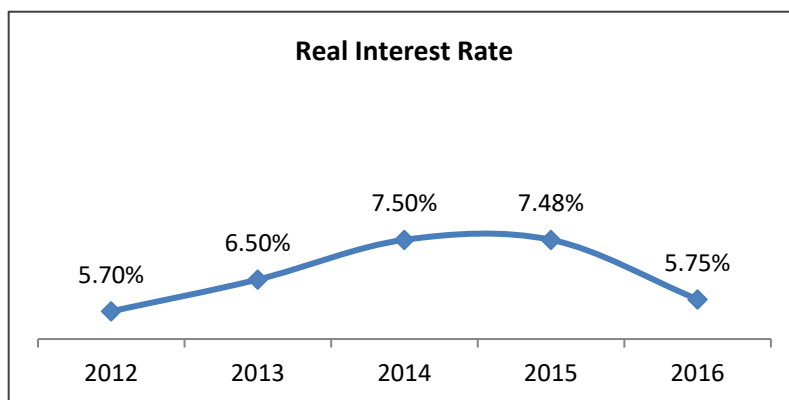


(Source: OJK, 2017)

There are many causes of increased credit risk. The focus in this research is the movement of macroeconomic variables consisting of real interest rates and inflation rates (Ginting, 2016; Abid et al., 2014; Beck et al., 2013). The rate of real interest in this research is the credit interest rate which is actually a cost for banking customers. Determination of bank loan interest rates follows the movement of Bank Indonesia interest rates.

The increase in real interest rates can reduce the ability of customers to repay loans. This condition will have an impact on increasing credit risk. On the contrary, if the level of real interest rates drops, credit risk will also decline (Kumala and Suryantini, 2015). The phenomenon that occurred during the research period (2012-2016) is not in line with the theory. During this period, the level of real interest rates declined, but credit risk measured through non-performing loans increased (figure 2). This phenomenon illustrates the gap between the levels of real interest rates with credit risk.

Figure 2. Average of Real Interest Rate for Commercial Banks Period 2012-2016



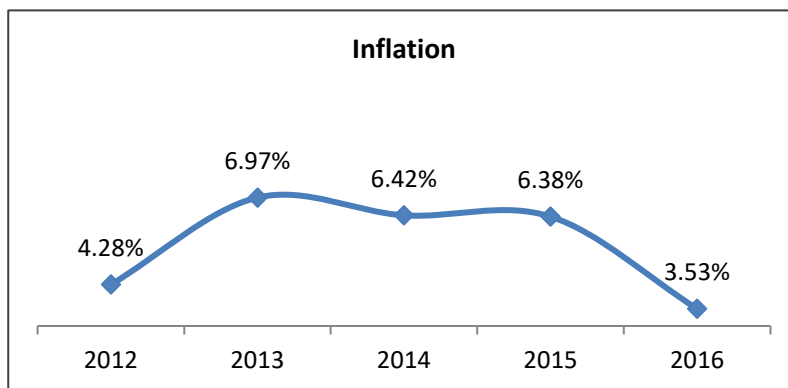
(Source: OJK, 2017)

The next macroeconomic variable identified as influencing credit risk is the inflation rate. Inflation is the process of increasing prices continuously which results in a decrease in purchasing power. High inflation causes an increase in living expenses so that banking customers will find it more difficult to repay loans. Difficulties in returning the loan will have an impact on increasing credit risk. If the inflation rate decreases, credit risk will also decrease. The inflation rate increase will reduce the community real income and will have an impact on the increasing credit risk level. However, the phenomenon experienced is the opposite. During the research period (2012-2016), the inflation rate declined, but the level of credit risk measured through non-performing loans increased (figure 3). This phenomenon illustrates the gap between the inflation rate and credit risk.

Based on the explanation above, the problem formulation is:

1. Can macroeconomic variables, measured by real interest rates, predict credit risk level using Non Performing Loans (NPL) measurements of 2012-2016 period on the commercial banks.
2. Can macroeconomic variables, measured by the inflation rate, predict the level of credit risk as measured by the Non-Performing Loans (NPL) of 2012-2016 period on the commercial banks.

Figure 3. Average of Inflation Rates during the Period 2012-2016



(Source: BI, 2017)

Literature Review

The movement of macroeconomic variables consisting of the real interest rate and inflation rate can impact on the high and low risk of banking. The increase in interest rates by Bank Indonesia will encourage an increase in real banking interest rates. The increase in real interest rates will result in an increase in credit expenses, so customers will have more difficulty in covering their loans. This condition will eventually lead to non-performing loans

and have an impact on increasing bank credit risk. In this research, credit risk is measured through Non-Performing Loans (NPL) (Kamarudin et al., 2019).

According to the research results of Messai and Jouini (2013), Krisna and Suryanawa (2015), Kumala and Suryantini (2015), Barus and Erick (2016), Diansyah (2016), Yusuf and Fakhruddin (2016), Ginting (2016), Muthy et al (2017), there is a significant positive effect of real interest rates on the level of non-performing loans (NPL). Increasing real interest rates will have the impact of increasing credit risk, and a decrease in real interest rates will reduce credit risk. Thus the hypothesis can be formulated as follows (Fatula, 2018):

H1: Real Interest Rate (RIR) can be used to predict credit risk measured through Non-Performing Loans (NPL).

In general, inflation is defined as the increase in the price of goods and services as a result of the money supply being more than the amount of goods or services available (Olkiewicz, 2018). An increase in the inflation rate can have an impact on the decline in people's purchasing power. The reduced purchasing power of the people will affect the ability to repay loans. This condition can lead to increased bank credit risk (Sanchez, 2018).

Research conducted by Diyanti and Widyarti (2012), Barus and Erick (2016), Ginting (2016), Diansyah (2016), states that the inflation rate has a positive and significant effect on bank credit risk (NPL). Increased inflation will have the impact of increasing credit risk, and a decrease in inflation will reduce credit risk. Thus the second hypothesis can be formulated as follows:

H2: Inflation (INF) can be used to predict credit risk measured through Non-Performing Loans (NPL).

Research Methodology

This research used descriptive and verificative methods. The data that investigated in this research is Commercial Banks listed on the IDX during the period of 2012-2016. Samples were taken using the purposive sampling method and there were 37 commercial banks sampled. The analysis method used panel data regression model with F test and t test statistic to the test of hypothesis; at the 5% significance level.

Empirical Finding and Discussion

The results of testing the research model can be seen in the following table.

Table 1: The Results of Estimates Panel Data Regression Model

Variable	Coeff	Std. Error	t-Statistic	p-value	
(Constant)	0.015920	0.022511	0.707230	0.4806	
RIR	0.624304	0.248565	2.511626	0,0131	Sign
INF	-0.424209	0.132970	-3.190264	0.0017	Sign
<i>R-Squared</i>	0.581594				
<i>Adj.R-Squared</i>	0.465370				
F-Statistic	5.004084				
Prob. F	0.000000				
α	0.05				

a Predictors: (Constant): Real Interest Rate, Inflation Rate

b Dependent Variable: Non Performing Loan

The results of model testing show that predictors of macroeconomic variables are significant for credit risk (p-value 0.0000). This result shows that macroeconomic variables measured through real interest rates and inflation rates can be used to predict credit risk measured through non-performing loans. The results of the study also show that 46% of the variation in the level of credit risk can be predicted by the variables of real interest rate and inflation rate.

The results of hypothesis testing indicate that the predictor of the level of the real interest rate is positive and significant for the occurrence of non-performing loans (p-value 0.0131). This result shows that an increase in the level of real interest rates can be used to predict an increase in credit risk, and a decrease in real interest rates can be used to predict a decrease in credit risk.

This research result is in line with Poetry and Sanrego (2011), Messai and Jouini (2013), Tanaskovic and Jandric (2014), Krisna and Suryanawa (2015), Rizvi & Sheheryar Khan (2015), Barus and Erick (2016), Diansyah (2016), Yusuf and Fakhruddin (2016), Ginting (2016), Indra (2018), Muthy et al (2017), and contrary to the research results of Bucur (2014), Nurismalatri (2017) which shows of negative relations between interest rates with NPL. The results of the study also contradicted with Tasman (2015), Aishwarya Rai and Purnawati (2017), Naiboho and Rahayu (2018), whose studies showed that real interest rates did not significantly affect credit risk.

The predictor of the inflation rate is significant to the non-performing loan (p-value 0.0017) with a negative relationship. The findings of this study indicate that the inflation rate can be used to predict credit risk for commercial banks during the period of 2012-2016. A negative relationship indicates that an increase in the inflation rate, which will be followed by a decline in people's purchasing power, does not result in a decrease in the ability of the community to fulfil their credit to banks, so that it does not have an impact on increasing banking credit risk. The increase in the inflation rate during the research period can still be controlled because the average is below 10%. This negative relationship can also occur because, when inflation rises, people will experience financial difficulties, which will reduce interest in borrowing from banks. This reduced level of loans will reduce the level of bank credit risk.

The result is in line with research by Bucur (2014), Tasman (2015), Nurismalatri (2017), Indra (2018), Naiboho and Rahayu (2018), Barus and Erick (2016), Ginting (2016), Ghyasi (2016), and contrary to the results of Poetry and Sanrego (2011), Chowdhury (2012), Tanaskovic & Jandric (2015), Diyanti and Widyarti (2012), Diansyah (2016), which shows the positive relationship between inflation and NPL.

Conclusion

Based on the research results it can be concluded that the level of banking credit risk can be predicted by measuring the conditions of macroeconomic variables. Real interest rates can predict the level of credit risk with a positive correlation. The increase in real interest rates will increase credit risk as measured by non-performing loans. The inflation rate can predict the level of credit risk with a negative correlation. Increased inflation reduces the level of credit risk as measured by non-performing loans. The inflation rate during the investigation period averages below 10%, and is within the control limits that can be accepted by the market. The increase in inflation does not reduce the ability of customers to fulfil their loans to banks, so the credit risk decreases.

REFERENCES

- Abid, L., Quertani, M.N., & Zouari Ghorbel, S. 2014. Macroeconomic and Bank-Specific Determinants of Household's Non Performing Loans in Tunisia: A Dynamic Panel Data. *Procedia Economics and Finance*, 13 (1), 58-68.
- Aishwarya Rai, I., Ayu, Ni Ketut Purnawati. 2017. Faktor-Faktor yang Mempengaruhi Kredit pada Bank Umum Swasta Nasional (BUSN) Devisa. *E-Jurnal Manajemen Unud*, Vol.6, No. 11. Hal: 5942:5969.
- Barus, A., Caroline. 2016. Analisis Faktor-Faktor yang Mempengaruhi Non Performing Loan pada Bank Umum di Indonesia. *Jurnal Wira Ekonomi Mikroskil Volume 6, Nomor 02*, pp.113-122.
- Beck, R., Jakubik, P., & Piloui, A. 2013. Non-Performing Loan: What Matters in Addition to Economic Cycle?. *European Central Bank Working Paper Series No. 1555*, 1-34
- Bucur, I., Andreea, Vaseli Alecsandri. 2014. The Influence of Macroeconomic Conditions on Credit Risk: Case of Rumanian Banking System. *Studies and Specifics Researches. Economics Edition*, No. 19. Pp. 84-95.
- Chowdhury, E., Kalyan. 2012. Impact of Inflation on Bank Lending Rates in Bangladesh. *Journal of Politics & Governance*, Vol. 1, No. 1, pp. 5-13.
- Dewi, Made Diah Krisna. I Ketut Suryanawa. 2015. Pengaruh Tingkat Suku Bunga, Profesi Nasabah Kredit, Efektifitas Badan Pengawas pada Non Performing Loan. *E-Jurnal Akuntansi Universitas Udayana Vol 13.3 Hal.779-795*.
- Diyanti, Anin. Endang Tri Widyarti. 2012. Analisis Pengaruh Faktor Internal dan Eksternal terhadap Terjadinya Non-Performing Loan. *Diponegoro Journal of Management (Studi kasus pada bank Umum Komersial yang Menyediakan Layanan Kredit Pemilikan Rumah Periode 2008- 2011)*. Volume 1, Nomor 2, Halaman 290-299.
- Dyansyah. 2016. Pengaruh Faktor Internal dan Eksternal terhadap Non Performing Loan (Studi pada Bank yang Terdaftar di Bursa Efek Indonesia Periode 2010-2014). *Journal of Business Studies Volume 2 No. 1 pp 1-13*.
- Fatula, D. (2018). Selected micro-and macroeconomic conditions of wages, income and labor productivity in Poland and other European Union countries. *Contemporary Economics*, 12(1), 17-32

- Ghyasi, Azar. 2016. Effect of Macroeconomic Factors on Credit Risk of Banks in Developed and Developing Countries: Dynamic Panel Method. *International Journal of Economics and Financial Issues*, 2016, Vol. 6(\$). 1937-1944.
- Ginting, S. Mulianta. 2016. Pengaruh Makroekonomi terhadap Non Performing Loan (NPL) Perbankan (The Influence of Macroeconomic Factor to Non Performing Loan (NPL) Banks). *Jurnal Ekonomi dan Kebijakan Publik*, Vol.7, No. 2. Hal. 159-170.
- Indra. 2018. Macro Street Test Model Risiko Kredit: Studi Empiris Perbankan Konvensional dan Syariah di Indonesia (A Macro Stress Test Model of Credit Risk: An Empirical Studies of Conventional and Islamic Banking in Indonesia) *Jurnal Ekonomi & Kebijakan Publik*. Vol.9. No.2. Hal. 113-129.
- Kamarudin, F., Sufian, F., Nassir, A.M., Anwar N.A.M., Hussain, H.I., (2019) Bank Efficiency in Malaysia a DEA Approach, *Journal of Central Banking Theory and Practice*, 8 (1), 133–162.
- Kumala, Putu A Sintya, Ni Putu Santi Suryantini. 2015. Pengaruh Capital Adequacy Ratio, Bank Size, dan BI Rate terhadap Risiko Kredit (NPL) pada Perusahaan Perbankan. *E-Jurnal Manajemen Unud*, Vol.4, No. 8, Hal: 2228-2242.
- Messai, A., Selma, Fathi Jouini. 2013. Micro and Macro Determinants of Non-Performing Loans. *International Journal of Economics and Financial Issues*. Vol.3, No. 4, pp.852-860.
- Murthy, Uma. Nassel Muhammed Kamil. Paul Anthony Mariadas & Dilashenyi Devi Factors. 2017. Influencing Non-Performing Loans in Commercial Banks: The Case of Banks in Selangor. *International Journal of Business and Management* Vol.12 No.2, pp.246-255.
- Naibaho, Kristiani. Sri Mangesti Rahayu. 2018. Pengaruh GDP, Inflasi, BI Rate, Nilai Tukar terhadap Non Performing Loan Bank Umum Konvensional di Indonesia. (Studi pada Bank Umum Konvensional yang terdaftar di Bursa Efek Indonesia Periode 2012-2016). *Jurnal Administrasi Bisnis (JAB)*. Vol. 62 No. 2, pp. 87-96.
- Nurismalatri. 2017. Analisis Pengaruh Makro Ekonomi terhadap Kredit Bermasalah Perbankan Indonesia. *Jurnal Sekuritas*. Vol.1. No. 2. Hal: 103-116.
- Olkiewicz, M. (2018). Quality improvement through foresight methodology as a direction to increase the effectiveness of an organization. *Contemporary Economics*, 12(1), 69-80.



- Poetry, Z., Dwi. Yulizar D Sanrego. 2011. Pengaruh Variabel Makro dan Mikro terhadap NPL Perbankan Konvensional dan Perbankan Syariah. *TAZKIA Islamic Finance & Business Review* Vol. 6. No.2. pp. 79-104.
- Rizvi, Wafa., Iqra, Malik M. Sheheryar Khan. 2015. The Impact of Inflation on Loan Default: A Study on Pakistan. *Volume 1 No.1.* pp. 87-94.
- Sánchez, V. M. G. (2018). Self-employment, Knowledge and Economic Growth: An empirical study for Latin American countries. *Contemporary Economics*, 12(4), 473-483.
- Tanaskovic, Svetoz. Maja Jandric. 2015. Macroeconomic and Institutional Determinants of Non-Performing Loans. *Journal of Central Banking Theory and Practice*, 1, pp.47-62.
- Tasman, Abel. 2015. Analisis Risiko Kredit Perbankan Go Public di Indonesia: Suatu Perspektif Makro Ekonomi. *Jurnal Kajian Manajemen Bisnis* Volume 4, Nomor 1, p.73-91.
- Yusuf, M., Rahmadi. Fakhruddin. 2016. Analisis Variabel Makro dan Rasio Keuangan terhadap Kredit Bermasalah. *Jurnal Ekonomi dan Kebijakan Publik*. Vol.3. No.2. Hal: 93-108.