The Impacts of Bank-Specific Factors and Macroeconomics on the Quality of MSME Loans in Indonesia: An Empirical Study of Islamic Banking and Conventional Banking

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Abstract
This study aims to analyze the impacts of bank-specific and macroeconomic factors on the quality of Micro, Small and Medium Enterprises (MSME) credit in Indonesia, both in Islamic and conventional banks by applying Vector Error Correction Model (VECM). The quality of MSME credits is expressed in terms of financial ratios, Non-Performing Financing (NPF) in Islamic Banks and Non-Performing Loan (NPL) in Conventional Banks. This study concludes that NPL and NPF respond differently to macroeconomy and bank-specific factor shocks. The results of the test of Impulse Response Factor (IRF) show that NPL is more stable to the fluctuations in the macroeconomy and bank-specific factors than NPF. In addition, the tests of Variance Decomposition show that NPF is more influenced by macroeconomic factors, while NPL is more affected by bank-specific factors.

Keywords: MSME; Non-Performing Financing; Non-Performing Loan, Credit Risk, Developing Countries

1. Introduction
Micro, Small, and Medium Enterprises (MSMEs) play an essential and strategic role in the economy, especially in developing countries (Gunartin, 2017). MSMEs can contribute up to 40 percent to the Gross Domestic Product (GDP) and more than 60 percent to employment (Permana, 2017).

In Indonesia, MSMEs’ existence supports and complements large-scale businesses and economic stabilizers (Sudati Nur Sarfiah, 2019). Based on data from the Ministry of Cooperatives and Small and Medium Enterprises in 2018, MSMEs in the Indonesian economy absorb around 97 percent of the workforce, contribute 61.07 percent of GDP, contributing 14.37 percent to non-oil and gas exports and 60.42 percent of the total investment.

According to Winarni (2006) and Darwin (2018), there are some challenges faced by Indonesian MSMEs, namely: low capital, tight business competition, shortage of raw materials, lack of adequate information, and technology system, limited managerial capabilities, especially access to finance. In addition, Winarni (2006) states that insufficient capital is an internal problem faced by most MSMEs.

Considering the dual banking system in Indonesia (conventional and Islamic), both conventional and Islamic banks are permitted to provide MSME funding (Huda, 2012). Based on 2016 -2020 statistical data released by Financial Services Authority, the allocation of credit/financing to the MSME sector continues to increase. This was
reinforced by the regulation for the banks to increase MSME loans above 20% from the bank’s total financing portfolio.

On the other hand, OJK’s data from 2015 to 2019 shows that the level of bad debt in the MSME sector is still relatively high, above 3%. This high default probability of MSME loan is one of the primary considerations for banks in financing the sector. Financing quality is an indicator of credit risk and the primary risk banks must manage (Hassan, 2019). Credit risk in conventional banking is measured by the non-performing loans (NPL) ratio, whilst that in Islamic banking is measured by Non-performing financing (NPF) (Rusydiana, 2009). In addition, a deterioration in the level of NPL or NPF can be an indication of an unstable financial system (Ascarya & Yumanita, 2005).

There are various factors that affect the quality of bank credit. Some divide them into categories of specific factors and macro factors (Kuzucu & Kuzucu, 2019; Havidz & Obeng-Amponsah, 2020) and conclude that bank-specific factors have a stronger influence than macro factors. In addition, there are studies that call them macro factors and micro factors (Poetry & Sanrego; 2011; Kartikasari et al, 2020).

However, there are not many studies that specifically discuss the quality of credit in the Micro, Small and Medium Enterprises (MSME) sector, especially those comparing the NPL of MSMEs in Conventional Banks with the NPF of MSMEs in Islamic Banks.

Based on the aforementioned background, this study examines whether bank-specific factors and macroeconomic factors affect the quality of MSME credit in Indonesia, both in Islamic banking and conventional banking.

2. Literature Review

2.1 Banking System in Indonesia

Since 1992, Indonesia has implemented a dual banking system, conventional banks and Islamic banks. In 1998 the government issued Law No.10 of 1998 regarding Islamic Banking which provides a more legal basis for the existence of Islamic Banks. The issue of this law has encouraged many financial institutions to set up Islamic business units which aimed to serve the aspirations of the people who demand Islamic-based financial services (Ascarya & Yumanita, 2005). Moreover, in 2008 the government released Law No.21 / 2008 on Islamic Banking, which contains more detailed regulations on business activities, institutional forms, and codification of Islamic banking products and services.

2.2 Credit Risk

The banking industry is an industry that has strict regulations, whereby one of the regulations is related to the implementation of Risk Management (Pacces & Heremans, 2011). The Financial Services Authority of Indonesia released the financial Service Authority Regulation No.18/2016 concerning commercial banks’ implementation of risk management. According to the regulation, there are eight types of risks that must be considered and managed by the bank’s management: Credit Risk, Operational Risk, Market Risk, Liquidity Risk, Legal Risk, Reputation Risk, Strategic Risk, and Compliance Risk. In addition to these eight risks, there are two additional risks that must be managed by Islamic banks, namely the Risk of Return and Investment Risk. Among these risks, credit risk is a risk that is directly related to the quality of bank credit or financing. In general, the indicator used to assess a credit quality is Non-Performing Loan (NPL). Kjosevski & Petkovski (2017) show that several financial institutions, such as the International Monetary Fund (IMF), use NPL as an indicator to assess credit quality. In Islamic banking, the terminology is known as Non-performing Financing (NPF) (Ascarya & Yumanita, 2007). NPL (NPF) ratio is calculated by dividing the amount of non-performing loans (financing) by the total credit (financing) extended by a bank.

Siamat (2005) sheds light on the importance of monitoring the condition of the borrowers by bank in disbursing financing. Based on regulation 49/POJK.03/2019 from the financial service authority, the credit conditions of these customers are categorized into five groups. Of the five levels of credit quality, what is meant by non-performing loans is the total financing which is categorized as collectability 3 (substandard), collectability 4 (doubtful), and collectability 5 (loss).
2.3 Micro, Small, and Medium Enterprises Loan in Indonesia

According to Law 20/2008, a MSME defines as a productive business owned by an individual or business entity that meets the criteria of MSMEs, as follow:

<table>
<thead>
<tr>
<th>Category</th>
<th>Asset (IDR, million)</th>
<th>Sales (IDR, billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro Enterprises</td>
<td>&lt; 50</td>
<td>&lt; 0.3</td>
</tr>
<tr>
<td>Small Enterprises</td>
<td>50 &lt; 500</td>
<td>0.3 &lt; 2.5</td>
</tr>
<tr>
<td>Medium Enterprises</td>
<td>&gt; 500</td>
<td>&gt; 2.5</td>
</tr>
</tbody>
</table>

To encourage the development of MSMEs in Indonesia, regulators and the government have issued regulations concerning MSME financing. The regulation requires banks to disburse loans or financing to MSMEs at a minimum of 20% of the total bank loans or financing.

Meanwhile, in the Strategic Plan of the Deputy for Financing for 2020-2024, the Ministry of Cooperatives and SMEs of the Republic of Indonesia reported some programs in developing MSMEs such as Guaranteed Credit Program, Government Assistance Program for Beginner Entrepreneurs, Program for Increasing Access to Finance Through Land Rights Certification Assistance and Strengthening Program for Supporting Institutions for Micro, Small and Medium Enterprises Financing.

2.4 Previous Research

Some studies have been conducted to investigate factors that influence NPL/NPF. Kuzucu & Kuzucu (2019) explains that the determinants of credit quality can be categorized into two areas, internal (micro) and external (macro) factors. The results of this study indicate that GDP is the main factor affecting the level of NPL. In addition, the study finds that exchange rate significantly influenced NPLs in developing countries after the global financial crisis in 2008.

Havidz & Obeng-Amponsah (2020) also examine banking industry factors and macroeconomic determinants of credit risk. The study highlights that the impacts of banking industry factors on credit risk are significantly greater than those of macroeconomic determinants. The results of this study are also in line with Kartikasari et al. (2020) where micro factors have larger impact on NPL than those of macro factors. According to Havidz & Obeng-Amponsah, (2020), the significant and higher influences of micro factors as compared to those of macro factors suggest that banks have managed credit risk well and run their business carefully.

In addition, Simon (2010) investigates the effects of macroeconomic variables on NPL. The study reveals short-term relationships between macroeconomics variables (as proxied by interest rate, exchange rate, inflation) and NPL. By using the Granger causality test, the study shows bidirectional and unidirectional causality between variables. Moreover, its IRF tests show that inflation shocks and exchange rate are responded positively by the NPL. Meanwhile, the study finds an inverse relationship between NPL and the benchmark interest rate shock. Likewise, Iriani and Yuliadi (2015) examines the influence of macroeconomic variables on the NPF level of Islamic banks in Indonesia by using the VECM method. The study shows that the macro variables significantly influence non-performing financing in Islamic Rural Banks.

However, another study in Indonesia context, Poetri and Sanrego (2011) find opposite results to abovementioned studies. The study emphasizes that there is no significant short run impact of macro variables on NPL / NPF. Whereas in the long term, NPL is affected by the macro variables, which include Exchange Rate, GDP, Inflation, SBI, LDR, and CAR. From another point of view, Nurlestari and Mahfud (2015) examine the effects of CAR, DPK, NPL, Interest rates, and ROA on MSME lending. The research was conducted by applying multiple linear regression methods and concludes the linear relationships between NPL, NPF, and ROA.

In the meantime, Skarica (2013) have conducted similar research in Central European and Eastern European countries. The study investigates the determinants of NPL in seven countries in those areas from 2007 to 2012. The study indicates some macroeconomics factors that affect NPL are GDP, inflation, and unemployment.
3. Methodology & Data

3.1 Methodology

This study employs the Vector Auto Regression (VAR) / Vector Error Correction Model (VECM) method. VAR is applied to analyze the relationship between variables based on the model built. Meanwhile, VECM is a derivative of VAR, which analyzes the relationship between dependent and independent variables in the short and long term (Basuki & Prawoto, 2019).

3.2 Data

This study uses secondary data obtained from the official website of Bank Indonesia (www.bi.go.id), the Financial Services Authority (www.ojk.go.id), and the Central Bureau of Statistics (www.bps.go.id). The data used in this study were from January 2014 to February 2020.

In order to examine the effects of bank-specific factors on the ratios of NPL and NPF of MSMEs credits, this study uses these variables: Loan to Deposit Ratio (LDR) or Financing to Deposit Ratio (FDR), Non-Performing Loan (NPL) or Non-Performing Financing (NPF), and proportion of MSME financing in both Islamic and Conventional banks. All data is obtained from Indonesian Banking Statistics and Sharia Banking Statistics data that were released by the Indonesian Financial Services Authority or OJK.

Meanwhile, the macroeconomic variables employed in this study are: Industrial Product Index (IPI) as proxy data for economic growth, Bank Indonesia 7 Days Reverse Repo Rate, Rupiah exchange rate against Dollar, and inflation. IPI data were gathered from the website of Central Bureau of Statistics (BPS), while other data were collected from the website of Bank Indonesia (entitled Indonesian Economic and Financial Statistics).

This framework is derived from the previous research about NPL/NPF, theoretical explanation about credit risk, and practical experiences in banking industry.

In estimating the impacts of bank-specific factors and macroeconomy factors on the quality of MSMEs loan in conventional and sharia banks, this study uses these following baseline regressions:

\[
\begin{align*}
NPFMSME_t &= \beta_0 + \beta_1FDR_t + \beta_2MSMES_y + \beta_3Inflation_t + \beta_4IPI_t + \beta_5Exchange_t + \beta_6Riskfreerate_t + \varepsilon \\
NPLMSME_t &= \beta_0 + \beta_1LDR_t + \beta_2MSMEKn + \beta_3Inflation_t + \beta_4IPI_t + \beta_5Exchange_t + \beta_6Riskfreerate_t + \varepsilon
\end{align*}
\]  

Where:
- NPFMSME = Aggregate of MSME non-performing financing to total financing
- NPLMSME = Aggregate of MSME non-performing loan to total loan
- FDR = Financing to deposit ratio
- LDR = Loan to deposit ratio
- MSMESy = Proportion of MSME financing to total financing
- MSMEKn = Proportion of MSME loan to total loan
- Inflation = Monthly inflation rate
- IPI = Monthly Industrial Product Index
- Exchange = Exchange rate of IDR/USD
- Riskfreerate = BI 7 Days Reverse Repo Rate

4. Result and Discussion

4.1 Unit Root Test

This study applies Augmented Dickey Fuller (ADF) at the five percent real level to conduct unit root tests. In this test, the t-ADF value is compared to the McKinnon critical value to check the level of stationarity. If the t-ADF value is smaller than the critical McKinnon value, the data is stationary or does not contain unit roots (Ascarya & Achsani, 2008). This unit root test is carried out at the level up to the second difference. The ADF tests indicate that only the proportion of conventional banks MSME and Industry Production Index (IPI) that are stationary at the level. However, after conducting the second-order difference, all the data are stationary at five percent actual level.
4.2 Optimum Lag Test

Following the data stationarity test, the test of optimal lag length must be conducted to eliminate autocorrelation problems in VAR systems (Rusydiana, 2009). Some of the information criteria required to carry out the test are Likelihood Ration (LR), Final Prediction Error (FPE), Akaike Information Crition (AIC), Schwarz Information Crition (SC), and Hannan-Quin Crition (HQ) (Basuki & Prawoto, 2019).

This study applies the determination of the optimal lag that is based on the shortest lag by using AIC, SC, and HQ. The results show that the NPF equation model for Islamic Banking MSMEs has an optimal lag length at lag 2, whilst the NPL equation model for conventional banks MSME has an optimal lag length at lag 2.

4.3 Model Stability Test

Moreover, the stability of the VAR model must be assessed because an unstable VAR model will result in an invalid IRF and VD analysis. The test is carried out by using a VAR stability condition test in the form of roots of characteristic polynomial (Rusydiana, 2009). A VAR system is stable if its roots have a modulus of less than one (Gujarati, 2003). Based on the stability test of the VAR model, both the Islamic Bank MSME NPF model and the Conventional Bank MSME NPL model that are used for IRF and VD analysis are stable.

4.4 Cointegration Test

The purpose of this test is to determine whether the group of variables that are not stationary at the level meets the requirements of the integration process, that is, where all variables are stationary to a same degree (Basuki & Prawoto, 2019). The concept of integration is basically to see a long-term equilibrium between the investigated variables. Long-term relationship is obtained by defining first the cointegration rank to determine how many equations have cointegration from all existing systems (Rusydiana, 2009).

This study applies Johansen Trace Statistic to test cointegration. If the trace statistic value is greater than the critical value of 5%, the null hypothesis of no cointegration equation is rejected (Basuki & Prawoto, 2019). The cointegration tests of the two VAR models in this study show that both the Islamic Bank MSME NPF model and the Conventional Bank MSME NPL model have at least one cointegration rank at the five percent actual level. Thus, the research can be continued to the next stage to analyze short-term and long-term responses by using the VECM approach.

4.5 Impulse Response Function (IRF)

The IRF analysis explains the impacts of shocks in one variable on other variables, both in the short and long run. This analysis attempts to see how long those influences lasts and at what period the response starts to stabilize (Basuki & Prawoto, 2019).

![Fig.1 Impulse Response Function of MSME’s NPF in Islamic Bank](image)
4.6 Effect of FDR / LDR shocks on the NPF / NPL of MSMEs

Figure 1 shows that the Islamic Bank MSME NPF model responds positively to 10 percent to the FDR variable shock. This indicates that the higher the FDR rate, the greater the NPF level e. This result is in contrast with the NPL model for conventional banks, which respond negatively by 3 percent to the LDR variable shock.

Different responses between MSME NPFs Islamic Banks and MSME NPLs Conventional Banks are may be due to different economies of scale between two bank types. Judging from the market share of Islamic banking, which is less than 10 percent, and the Islamic Bank portfolio, which is more in the MSME segment, makes Islamic Banks more sensitive to credit risk. Thus, the higher the distribution of funds (FDR), the higher the risk of bad credit in the MSME segment. This result is different if we look at the NPF / NPLP as a whole, not only MSMEs. The results of research by Poetry and Sanrego (2011) state that the level of FDR / LDR has a negative effect on NPF / NPL in general.

Regarding the stability period of the two models, the MSME NPF is being stable in the 21st period, whereas the MSME NPL is being stable in the 14th period. The results indicate that MSME NPL recover from bank-specific variable shocks more quickly than that of Islamic banks.

4.7 Effect of MSME Financing/Credit shocks on the NPF / NPL of MSMEs

In regard to the ratio of NPL/NPF to total MSME financing, the result of this study shows that MSME Financing shock was responded negatively by 2 percent. This means that as the proportion of MSME financing in Islamic Banks increases, the MSME NPF ratio decreases. This also applies in MSME NPL of MSME, which respond negatively to 4 percent.

The results of this study imply that the NPF / NPL levels are affected by the bank’s credit or financing policies as well as its risk management, especially in the MSME segment. Because of NPF and NPL have a same response to the fluctuations in the MSME financing/credit, it may indicate that the MSME segment’s financing policies and risk management in Islamic banks are comparable to those in conventional banks. This finding provides evidence to support Aryani (2016), which shows a significant positive relationship between the number of funds distributed and non-performing loans. Furthermore, the results imply that both the MSME NPF and MSME NPL models return to equilibrium after the 20th period.

4.8 Effect of Inflation shocks on the NPF / NPL of MSMEs

Figure 1 shows that the MSME NPF Model responds negatively by 8 percent to inflation shocks. Meanwhile, the NPL model of conventional banks MSME responded positively by 7 percent to the same variable shocks but was temporary as there were periods where inflation was responded negatively. The positive response of the NPL to the inflation shock was caused by a decrease in the actual value of the currency concerned (Simon, 2010). When inflation is high, the interest rate decreases, which in turn causes decline in bank margins. Nevertheless, this makes the price of financing more competitive, hence, increases public access to finance and improves NPF quality (Poetry & Sanrego, 2011).
Meanwhile, in terms of the model stability period, the MSME NPF model returns to stability in the 15th period, faster than the NPL model which is being stable in the 18th period.

4.9 Effect of IPI shocks on the NPF / NPL of MSMEs.

The result of this study also shows that the MSME NPF model responds negatively by 2 percent to the IPI variable shock. This means that as IPI increases, NPF MSMEs decreases. Meanwhile, the response of MSME NPL to the fluctuation in IPI by positive 1 percent.

The response indicates that the economy, which is proxied by IPI, significantly influence the NPF / NPL of MSME. Economic growth indicates that the economic and industrial environment is vibrant, which is indicated by optimal production factors (Marattin & Salotti, 2011). The MSME segment, which is a pillar of economic growth, is also in a productive condition. This will improve the quality of bank credit disbursed to the MSME segment.

Furthermore, the study shows that the MSME NPF model returned to its stability in the 16th period, while MSME NPL model was being stable in the 21st period. NPL needs longer time to achieve stability that may be due to, among other things, the larger proportion of MSME loans in conventional bank’s loan portfolio.

4.10 Effect of Exchange on the NPF / NPL of MSMEs

Figure 1 shows that the exchange rate shock positively influence the NPF model for Islamic MSMEs by 10 percent. This means that if the exchange rate increases (depreciates), the NPF in the MSME segment increases (decreases).

The opposite condition occurs in the MSME NPL, which respond negatively to 3 percent of exchange rate variable shocks of one standard deviation. This indicates that the characteristics of MSME borrowers of Islamic and conventional banks are actively engaged in international trading activities.

In terms of stability, the MSME NPF MSME model returned to stability in the 24th period while the MSME NPL model was being stable in the 7th period.

4.11 Effect of Risk-Free Rate on the NPF / NPL of MSMEs

The last variable tested is the Risk-Free Rate. The Islamic Bank MSME NPF model responds negatively to 7 percent to the Risk-Free Rate variable shock of one standard deviation. This means that if the reference interest rate increases, the NPF level of MSMEs will decrease. An increase in the benchmark interest rate will have a negative effect on the level of distribution of funds to the MSME sector, which means that the NPF rate will also be low (Effendi, 2016).

In the long term, the NPF response of Islamic MSMEs to Rate shocks will stabilize in the 27th period. Likewise, the conventional bank MSME NPL model responds negatively by 2 percent to the Rate variable shock of one standard deviation and will be stable in the 18th period.

4.12 Variance Decomposition

After analyzing the dynamic behavior of the variables through the impulse response function, the study continued by looking at the characteristics of the model through Variance Decomposition (VD). This analysis was conducted to predict the contribution or composition of each independent variable to the dependent variable (Basuki & Prawoto, 2019).
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Figure 3 shows that the NPF of MSME is mainly influenced by exchange rate with a contribution of 3.09 percent, by FDR with a contribution of 2.96 percent, by inflation with a contribution of 2.11 percent, by interest rate with a contribution of 1.30 percent, and by IPI with a contribution of 0.09 percent. In addition, the proportion of MSME financing affect NPF with a contribution of 0.07 percent.

Meanwhile, Figure 4 shows that the NPL is mainly influenced by the proportion of MSME loans with a contribution of 3.04 percent. This result is in accordance with previous study, which was also a hypothesis at the beginning, that the level of MSME credit will increase NPL because there is a credit to the feasible but unbankable category sector in the form of Guaranteed Loan (Lestari, 2017).

The results of the VD analysis as shown in Figure 3 and Figure 4 indicate that the most significant contribution that affects the MSME NPF macroeconomic variables, namely Exchange Rate, IPI, and Inflation. Among these variables, exchange Rate has the largest influences on the quality of MSME financing. Meanwhile, the contribution of bank-specific variables has slight influence on the MSME NPF.

On the other hand, one of bank-specific variables, which is the proportion of MSME credit, is the main contributor in the MSME NPL model. Furthermore, the macroeconomic variables have modest impacts, averaging less than 2 percent in the MSME model. These results are in line with Kuzucu & Kuzucu, (2019) which shows that the level of credit disbursement significantly affects the level of NPLs.

The different responses between MSME NPF and MSME NPL provide evidence to support Poetry and Sanrego (2010) which investigate the effect of macro and micro variable shocks on NPL and NPF.

5. Conclusion & Recommendation

5.1 Conclusion

The overall test results show that Islamic banks and conventional banks have different NPL and NPF responses to shocks to macro and bank-specific factors. This difference in response occurs because the two types of banks have different characteristics, economies of scale, and business focus.

The Impulse Response Function (IRF) and Variance Decomposition (VD) analysis showed the variables that most influence the MSME NPF are macroeconomic variables, namely Exchange Rate, IPI, and Inflation. Meanwhile, the contribution of Islamic bank-specific variables has a very small effect on the MSME NPF model. The Islamic Bank MSME NPF model will return to stability from the shocks of these variables starting from the fifteenth period. In the Conventional Bank MSME NPL model, the variable that most influences MSME NPL is the
Specific variable, with MSME credit as the largest contributor. Meanwhile, macroeconomic variables have a not too big impact with an average contribution of less than 2 percent. The Conventional Bank MSME NPL model will return to stability from the shocks of these variables starting from the seventh period.

5.2 Limitation and Recommendation for future research

The limitation of this research is twofold. First of all, this study does not include bank-specific factors related to risk management and governance policies. Therefore, it is suggested that future research in this field may consider the above-mentioned factors to gain more optimal results. Secondly, this study only employed historical data that were obtained from secondary sources. Hence, future research that can combine the data with primary sources (i.e., interview, etc) would provide more comprehensive results.

The findings of this study send an important message for policy makers. Considering that MSME sector has a crucial role in the national economy, the availability of credit to the sector is important to support their growth. However, to maintain the quality of financing or credit, banks need to formulate comprehensive policies and carry out more intensive supervision because macro and bank-specific factors may affect the NPF and NPL ratios of MSME loans as shown in this study. Moreover, due to the relatively high credit risk in the MSME sector, regulatory support is needed to provide a guarantee mechanism and incentives for the distribution of MSME financing or credit.

References


