Islamic Bank Credit Risk: Macroeconomic and Bank Specific Factors

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Abstract:

The purpose of this research is to investigate the influence of macroeconomic and banking factors on credit risk in Islamic banking.

The methodology used is panel data regression analysis. The data set is consisting of secondary data from banking financial statements contained in the respective websites, as well as macroeconomic variables obtained from the Central Bureau of Statistics and Central Bank Indonesia for the period 2010 to 2016.

The results support the hypothesis that the SIZE of the bank is influencing positively and significantly the credit risk. Other variables tested were financing expansion, financing quality, GDP and inflation which have been proven to influence negatively and significantly the credit risk.

These results support the results of another study by Effendi and Yuniarti (2018) regarding the influence of macroeconomic variables on credit risk. The contribution of this article is that similar conclusions have been made regarding the influence of banking factors on credit risk. Both results lead to the conclusion that Islamic banking could be affected negatively if it does not regulate the quality and the expansion of its financing properly.

Keywords: Islamic bank credit risk, bank factors.

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1. Introduction

According to the literature Islamic banking first appeared in the 1960s. Its emergence was characterized by the establishment of interest-free cooperation founded by Ahmed El Najjar 1963 in the city of Mit Ghamr, which is a small city in Egypt (Ahangar *et al.,* 2013). Then began to develop in Islamic countries and other non-Islamic in 1975 (Misman *et al.,* 2015), namely the UK, Australia, Singapore, Hong Kong and some countries in Europe. Islamic banking in Indonesia has emerged in 1992, which coincided with the establishment of the Bank Muamalat by MUI. The emergence of Islamic banking provides alternative funding in addition to conventional banking. In addition, Islamic banking is increasingly showing its existence as a stable financial institution with a proof that it is the only bank that did not has liquidity of capital problems when a financial crisis is striking.

A financial crisis is not a new phenomenon in the world of banking. The Asian financial crisis in 1997 was caused by the depression of Thai currency (bath), which affected the banking system in Southeast Asia, including Indonesia. Then an economic crisis in 2007 caused by the failure of mortgage financing in the United States affected the global economic system. The Asian economic crisis in 1997 which led to a jump in the inflation rate in Indonesia was another experience which pushed the Central Bank in Indonesia to raise interest rates to suppress a surge on inflation. As a result, lending rates increased, and the failure of credit payments also increased. This gives an early assumption that macroeconomic may affect credit risk.

Because of the economic crisis in 2007 the global economy has been affected seriously, a fact that provides an initial overview that a banking factor may affect credit risk. Even though Islamic banking is stable amid the shocks of crises, Islamic banking is not immune from the economic risks as well as the risk experienced by conventional banking. Islamic banking is highly affected by credit risk.

There are two types of credit risk, namely the systematic and unsystematic risk (Haryono *et al.,* 2016). According to Aver (2008) and Castro (2012), a systematic risk is related to macroeconomic variables and unsystematic risk is related to several banking factors. The research regarding the influence of credit risk by macroeconomic variables was first claimed in the work of Modligiani and Brumberg in the early 1950s (Deaton, 2005). According to this research, macroeconomic variables such as GDP, unemployment rate, and inflation rate may play a crucial role in credit risk evaluation.

According to Louzis *et al.* (2011) and Thalassinos *et al.* (2015) credit risk is influenced by macroeconomic variables. Empirical studies by Salas and Saurina (2002), Jimenez and Saurina (2006), Das and Ghosh (2007), Boudriga *et al.* (2009), Thiagarajan *et al.* (2011) and Castro (2012) had confirmed the negative correlation between the level of GDP and problematic credit (credit risk). Moreover, empirical studies by Rinaldi and Sanchis-Arellano (2006) and Castro (2012) had revealed that the unemployment rate and the inflation rate have a negative correlation with the problematic credit.

Literature supports the hypothesis that credit risk is affected by banking factors (Berger and DeYoung, 1997; Fischer *et al.,* 2000; Jimenez and Saurina, 2004; Ahmad and Arif, 2007; Thalassinos *et al.,* 2012; 2013; Setyawati *et al.,* 2017). Meanwhile, the efficiency hypothesis is risky in formulating mechanisms that may be related to efficiency and problematic credit (credit risk). According to the agency theory, banks with relatively low capital respond to moral hazard incentively by increasing the riskiness of their loan portfolio, which resulted in higher financing problems (NPF) on average in the future. In other words, banks will increase lending without considering the credit quality.

To compensate the low capital, bank managers can boost credit growth with sacrificing future credit quality (Berger and DeYoung, 1997). According to Misman *et al.* (2015) factors included into banking specifics are financing expansion, financing quality, capital buffer, capital ratio, net interest margin, management efficiency and the log of total assets (SIZE). Other researches on systematic and unsystematic factors affecting the credit risk are the works of Das and Ghosh (2007), Bonfim (2007), Louzis *et al.* (2011), Thiagarajan *et al.* (2011), Zribi and Boujelbene (2011), Suhartono (2012), Mahboud (2017) and Haryono *et al.* (2015). According to Haryono *et al.* (2015) GDP and the unemployment rate have a significant effect on credit risk, while banking factors have no significant effect.

The aim of this research is to examine the correlation of macroeconomic variables and banking factors against credit risk in the Indonesian Islamic banking in a more extensive way compared to a previous study by Effendi and Yuniarti (2018).

2. Data and Methodology

We have used several macroeconomic variables and several banking factors such as: Financing Expansion (X_1), Financing Quality (X_2), Gross Domestic Product (X_3), inflation (X_4), total assets (SIZE) (X_5) and Credit Risk (Y). The method used is panel data regression analysis. The data set is secondary data which is banking financial statements contained in the respective website, as well as macroeconomic data obtained from the Central Statistical Bureau and Central Bank Indonesia as written in the abstract. The research period is from 2010 to 2016. Banking data have been collected from Islamic banks in Indonesia, namely, Bank BCA Syariah, Bank BNI Syariah, Bank BRI Syariah, Bank Bukopin Syariah, Bank Mandiri Syariah, Bank Muamalat and Bank Panin Shariah. The methodology used is the panel data regression model using the software program E-Views 9. The analytical method in this research is illustrated in Figure 1. The linear panel data model with five independent variables can be represented as follows:

$$y_{it} = \alpha_0 + \sum_{j=1}^{k} \alpha_j X_{j,it} + u_{it}$$

This model is implemented into the estimation equation as follows:

CR = C(1) + C(2)*FEXP + C(3)*FLP + C(4)*GDP + C(5)*INF + C(6)*SIZE + [CX=F]

Figure 1. *Research Framewor*k
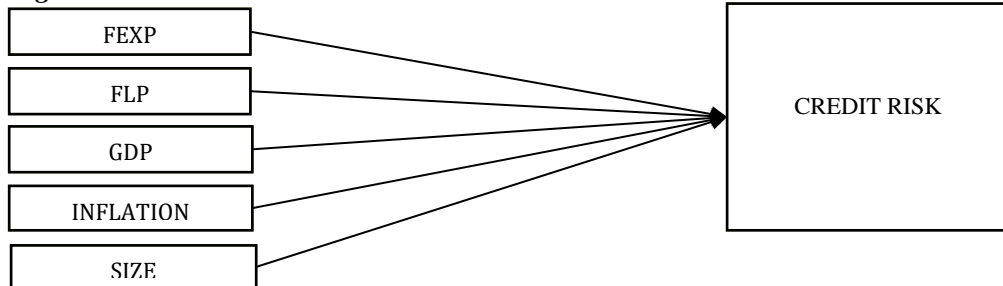
The forming of a panel data regression model requires 3 steps, namely: Correlation test, model test and regression analysis. In the correlation test, the value between the variables should be <0.8 to verify absence of multicollinearity. The model test is done to determine the best regression analysis. There are four regression models of panel data namely: Common Effect Model (CEM), Fixed Effect Model (FEM), Fixed Effect with Cross Section Weights Model (FECSM) and Random Effect Model (REM). There are three tests before the correct model selected namely the Chow test, the Hausman test and the Lagrange multiplier test. Chow test is used to choose either the Common Effect or the Fixed Effect Model, Hausman test to choose Random Effect or Fixed Effect Model and the Lagrange multiplier test to choose Common Effect or Random Effect Model. The last test is used when the result of Chow test and Hausman test is not aligned. Below are the research hypotheses for the model selection:

- *The first model from Chow test: Ho: Common Effect and Ha: Fixed Effect Model.*
- *The second model from Hausman test : Ho: Random Effect and Ha: Fixed Effect Model.*
- *The third model from Lagrange multiplier test: Ho: Common Effect and Ha: Random Effect Model.*
- *If p-value> 0,05 then accept Ho and if p-value <0,05 then reject Ho.*

The next step is to evaluate the results of the panel data regression analysis, which is the best model, whether it is Common Effect, Fixed Effect, Fixed Effect with Cross Section Weights and Random Effect Model.

3. Result and Discussions

3.1 Correlation Analysis

Table 1 summarizes the correlation values for all the variables used. This test is performed to identify some variables that have high correlation, correlation value

above 0.8. If there is a correlation value above 0.8, then inter-variable creates multicollinearity.

Table 1: *Multicollinearity Test*

	CR	FEXP	FLP	GDP	INFL	SIZE
CR	1.0000					
FEXP	0.3982	1.0000				
FLP	0.1998	-0.1596	1.0000			
GDP	-0.2602	-0.1901	-0.0854	1.0000		
INFL	0.1743	0.1708	0.1423	-0.6681	1.0000	
SIZE	0.5948	0.3331	0.2366	-0.2329	0.1753	1.0000

Table 1 shows that all variables have a correlation value below 0.8. This means that all variables are independent of multicollinearity. If all variables are free from multicollinearity, then the research can be proceeded further.

3.2 Model Testing

3.2.1 Chow Test
Testing the first model by using Chow test the results are presented in Table 2.

Table 2: *Chow Test*

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	20.724169	-6.29	0.0000

Table 2 shows that the probability result is 0.0000. This concludes that Ho is rejected so that the Fixed Effect model is better than the Common Effect. Therefore, according to Chow test, the model used is a Fixed Effect model.

3.2.2   Hausman Test
In the second stage the Hausman test is used to determine which model is better among Fixed and Random Effect models. Table 3 presents the results of this test.

Table 3: *Hausman Test*

Correlated Random Effects - Hausman Test

Test   cross-section
random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	16.47221	7.00	0.0000

Table 3 indicates conformity with the previous test, i.e., Ho is rejected then the result obtained is that the Fixed Effect model is better than the Random Effect. Therefore, Fixed Effect model is the most appropriate model for the regression analysis in this study.

3.2.3 Regression Analysis
The estimation results in Table 4 present the effect of selected macroeconomic variables and selected bank factors on credit risk using a Fixed Effect model with cross section weights.

Table 4. *Estimation Results of Credit Risk with Fixed Effect Model*

	Dependent Variable: CREDIT RISK ISLAMIC BANKING	
	FIXED EFFECT MODEL	
Independent Variable	Coeff	Prob
FEXP	-0.019418	0.0000
FLP	-0.297353	0.0002
GDP	-0.257008	0.0000
Inflation	-0.034367	0.0071
Size	5.72E-07	0.0010
C	0.0684	0.0000
R-squared	0.938608	
Durbin-Watson stat	2.222837	
Dummy Variables	Yes	
GLS-Weights	Cross section weights	

From the estimation results of credit risk using a Fixed Effect model we claimed that all variables have a significant effect. However, the results of the estimation model above support the hypothesis that financing expansion and financing quality variables

from the bank factors and GDP and inflation from the macroeconomic variables that have a negative significant effect on credit risk. On the other hand, the size of the company has a small positive significant effect on credit risk.

The goodness of fit in this model is 0.9386, meaning that the variations of the overall variables can explain 93,86% of the total variation in credit risk.

This result is consistent with previous studies by Al-Smadi (2010), Al-Wesabi and Ahmad (2013), Kabir *et al.* (2015) Haryono *et al.* (2016) and Effendi and Yuniarti (2018) which have confirmed the negative correlation between GDP and credit risk in Islamic banking. GDP growth can negatively affect credit risk or financing risk due to higher payment capacity of banks' clients. This GDP growth provides information about the country's economic development. If a country's GDP growth increases, then the community's payment capacity for the credit taken will increase, so that a bank's credit risk will decrease. Thus, the results of this study have supported the hypotheses and are in line with the theory and empirical studies originating from previous studies.

Al-Wesabi and Ahmad (2013), Nursechafi and Abdul (2014), Kabir *et al.* (2015) and Haryono (2016) have revealed that the inflation rate has a negative correlation with credit risk. Inflationary pressure from the cost side is a significant source of inflation in price formation. The company utilizes this condition by increasing the prices of goods and services. This may increase the company's revenue, which can result in the company's ability to repay bank loans or financing, which results in a decrease in credit risk in Islamic banking.

The results are also in line with the research of Rahman and Shahimi (2010) and Misman *et al.* (2015) revealing that financing expansion has a negative impact on credit risk. A possible explanation is that financing on Islamic banking has a good and diverse portfolio so that with many financing expansions carried out, it can reduce credit risk because Islamic finance is not only in the manufacturing and construction sectors, but in agriculture, plantations, property and other partnership businesses. In addition, the PLS system can reduce Islamic banking from credit risk. In line with previous researches, Ahmad and Ahmad (2003), Ahmad and Arif (2007) and Misman (2015) obtained results that the quality of financing negatively affected credit risk in Islamic banking. A possible explanation for the results is that a decrease in the quality of financing forces banks to allocate higher provision losses, and consequently increases the level of credit risk in Islamic banking.

The results are in line with previous researches which revealed that the size of the company have a positive effect. According to Dash and Gosh (2007), Khemraj and Pasha's (2010), Zribi and Boujelbene (2011) and Thehulu and Olana (2014) the greater the size of the bank the greater the assets owned. The greater the amount of assets, the higher the financing to be issued, therefore it can trigger an increase in credit risk.

4. Conclusion

From the results of the testing and the discussion above it can be concluded that the selection of the most appropriate model in the data panel regression analysis is the Fixed Effect Model (FEM). After going through the classic assumption tests, the data in this study proved to have no indication of multicollinearity. The regression results obtained are that the total asset (SIZE) variable has a positive and significant effect on credit risk. This means, if the SIZE variable rises, credit risk will rise and vice versa. Other variables are the financing expansion, the financing quality, GDP and inflation which have a significant negative effect on credit risk. This means that, if the FEXP, FLP, GDP and inflation variables rise, the credit risk will decrease, and vice versa. This could have an impact on Islamic banking if it does not regulate the quality and the expansion of its financing properly, then the credit risk will increase. Therefore, before issuing financing, a more thorough analysis of the borrower is needed.

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