



Default Risk on Islamic Banking in Indonesia

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Abstract: Stability of financial institutions is a crucial issue amid the economic crisis that hit the US and Europe. Islamic banking in Indonesia as financial institutions are also required to have good stability in order to maintain the stability of the national economy. The aim of this research is to determine the stability of Islamic banking in Indonesia, and understand the factors that affect the stability. Stability of Islamic banking will be measured using Merton model to estimate the Probability Default (PD). Panel data regression was used to estimate the factors that affect the stability of Islamic Banking. The object of this research is 10 Islamic banking in Indonesia that meet the specified criteria. From the analysis of the Merton model, the research found that the stability of Islamic banking in Indonesia is not good enough. This can be seen from the value of the probability default on Islamic banking which still above 0.5. However, based on the trend, the probability default of Islamic banking has decreased from year to year. Some of the variables that influence the stability of Islamic banking is asset and BI rate (SBI).

Keywords: Stability, Islamic Banking, Probability Default, Merton, Market Share.

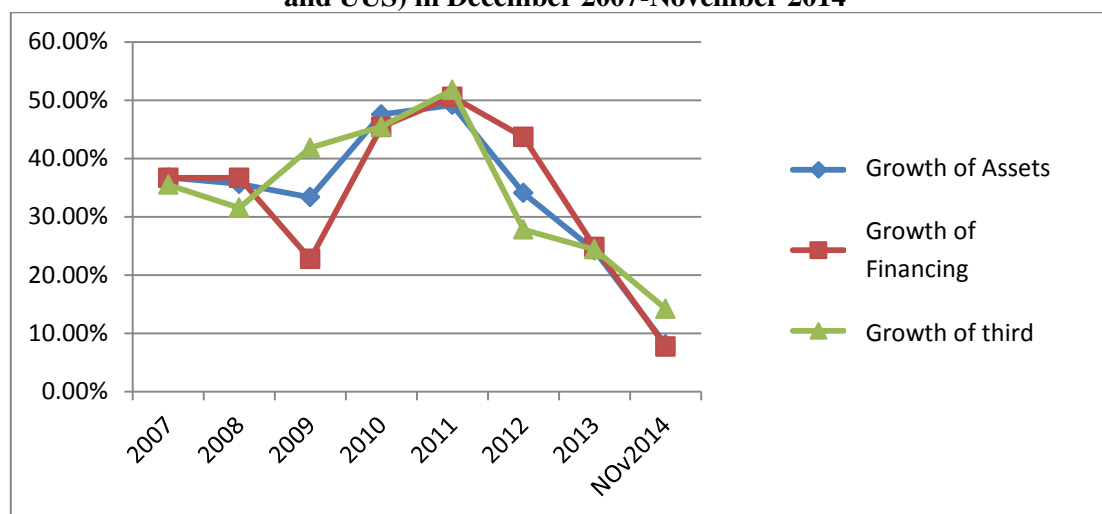
Introduction

Islamic banks at the beginning of its appearance is a response to the reality of the conventional banking system that dominated by interest. Interest in fiqh is categorized into usury that are prohibited in Islam. Therefore, the appearance of Islamic banks is the answer to the needs of people who want banking services that are free from usury.

Islamic banking in Indonesia begins with the presence of Bank Muamalat Indonesia (BMI) which was established in 1992. Until 1998, BMI is still the only Islamic bank in Indonesia. In 2005, the number of Islamic banks has reached 20 units with 3 Bank Umum Syariah (BUS) and 17 Unit Usaha Syariah (UUS) (Karim, 2013: 25). As for today, in Indonesia there are 12 Bank Umum Syariah (BUS) dan 22 Unit Usaha Syariah (UUS) (Otoritas Jasa Keuangan, 2015).

Although the growth of Islamic banking industry is very rapid, the market share of Islamic banking is still stagnant at around 5%. In addition, when viewed from the growth of assets, the amount of financing, and the amount of third party fund (DPK) BUS and UUS during the last three years (in figure 1), the trend is decline significantly.

Figure 1. Growth of Asset, Financing, and Third Party Fund (DPK) Islamic Banking (BUS and UUS) in December 2007-November 2014



Source: Otoritas Jasa Keuangan, 2014

In theory, Islamic banking has a higher resistance when compared to conventional banks. It is based on the characteristics of Islamic banking that use profit sharing system. Profit sharing gives a fair portion for both parties (debtor and creditor) because the distribution of profit and risk sharing will take place with fair (Faiz, 2010).

This study aims to determine the level of stability or resilience of Islamic banking in Indonesia as well as understand the factors that influence the stability of Islamic banking, whether it be the external variables (macroeconomic) or internal variables. Results from this study are expected to be sources of information that related with Islamic banking stability in Indonesia so as to provide a sense of security to all stakeholders.

Theoretical and Literature Review

The Stability of the Financial System

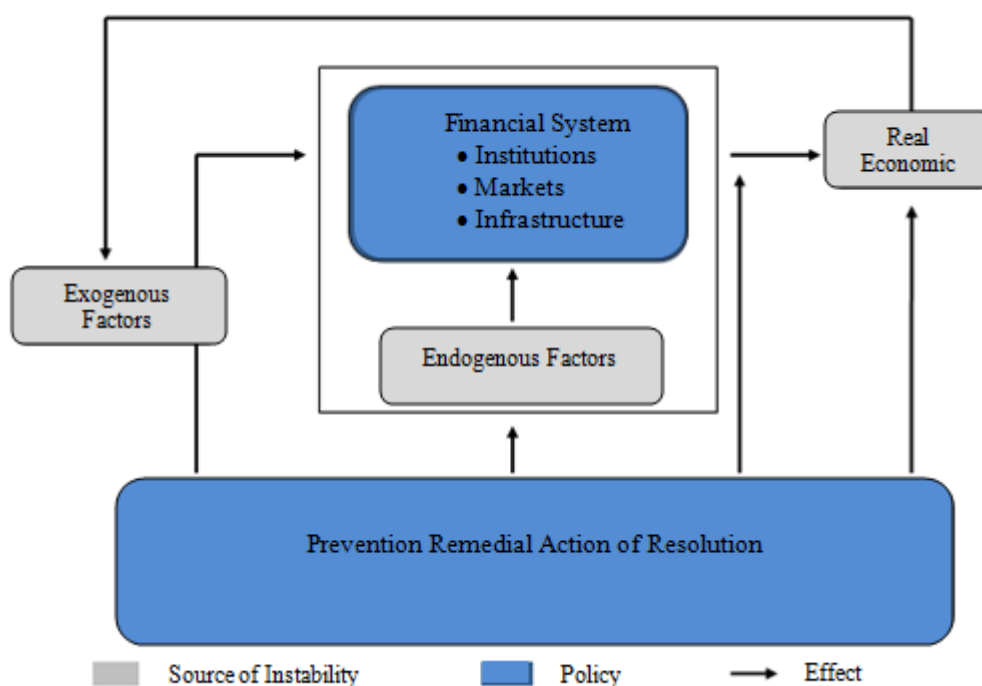
According to the Reserve Bank of Australia (2012), a stable financial system is defined as a system in which each fund transfer from the lender to the borrower accommodated well by financial intermediaries, markets and market structure. Therefore, financial instability is a condition in which the collapse of the financial system by interrupting these activities and triggered the financial crisis. Indeed systemic risk is always inherent in the financial system, which according to Davis (2001) is closely related to wealth and health of financial institutions. In other cases, the failure of market liquidity and market infrastructure damage also can initiate this risk.

Davis (2001) states that there are several theories that explain financial instability, namely: 1) the theory of debt and financial fragility, 2) the theory of disaster myopia, and 3) the theory of bank runs. Debt and financial fragility theory states that the economy follows a cycle which consists of periods of positive and negative growth (Fisher, 1933). With the advancement of economic, debt and risk-taking activities are increased. This creates an asset bubble that will lead to negative growth. Meanwhile, disaster myopia theory shows that financial instability can be caused by the competitive behavior of financial institutions which lead to a condition where the credibility of the borrower ignored and reduced risk (Herring, 1999). On the other hand, bank runs a theory explains the conditions in which investors panic and sell their assets or withdraw their funds for fear that the economy will come worsen (Diamond and Dybvig, 1983,

Davis, 1994). As a consequence, this will lead to a sudden slump in asset prices and liquidity crisis.

Many factors affect the stability of the financial system. In general, these factors are categorized into two, namely the endogenous factors and exogenous factors. Endogenous factor itself is divided into several parts, among which are institutions, markets and infrastructures. While the exogenous factors could come from domestic macro economic disruption and inevitable risks. Both these factors will affect the performance of the financial system through institutions, markets, or financial infrastructure. Furthermore, the performance of the financial system will affect the performance of the real economy which is the feedback from exogenous factors that becomes a cycle. Abnormal fluctuation of one of the elements will affect the course of the cycle (Simorangkir, 2014). For more details can be seen in the in figure 2.

Figure 2. Factors Affecting Financial System Performance



Source: Iskandar Simorangkir, 2014.

In institutions, there are some things that can affect the stability of the financial system, including financial risks (credit, liquidity, interest rate, exchange rate), operational risks, weakness/failure of technology, legal risk, reputation risk, strategic risk, concentration risk, and risks capital. As for the market, some of the things that affect the stability of the financial system namely counterparty risk, asset prices that are not appropriate, a massive withdrawal of funds from the financial system, and contagion effects. And the last, some things in the infrastructure that could affect the stability of the financial system namely payment system risk, legal shortcomings, weaknesses of the accounting system, the weakness of supervision, a collapse of confidence, and the domino effect (Simorangkir, 2014). In addition to the above factors, there are four contributing factors related to the stability of the financial system, namely a stable macroeconomic environment, financial institutions are well-managed, effective supervision of financial institutions, and payment system safe and reliable (Bank Indonesia, 2007).

While in practice, Islamic financial system is driven by commerce and production, not by the level of interest. The rate of return from financial assets is determined by the rate of return in the real sector. Therefore, in a growing economy, Islamic banks will accept net positive returns.

The basic principles of Islamic finance that provide Islamic financial system stability (Simorangkir, 2014: 499) are as follows:

1. The prohibition of interest (riba). Riba means "excess" and is defined as "any increase in capital either in the loan or sale of which is not justified."
2. Money as a "potential" capital. That is money is not a commodity, but a medium of exchange, store of value and unit of measurement. Money is power and cannot be used to increase purchasing power without productive activities.
3. *Risk sharing. With the banning of the interest, then the position of suppliers of funds are as investors, not creditors.* Dilarangnya perilaku spekulatif. Dalam keuangan syariah, dilarang melakukan penimbunan dan transaksi yang mengandung ketidakpastian berlebihan (*gharar*), dan perjudian (*maysir*).
4. The glory of the contract. Islamic financial system upholding contractual obligations and disclosure of information as a noble task. This feature is designed to reduce the risk of asymmetric information and moral hazard.
5. The operations are allowed only those businesses that do not contain elements which are prohibited in Islam, such as gambling and alcohol.
6. Social justice. All transactions that cause injustice and exploitation are not allowed.

Previous Study

Previous research related to the stability and resilience of the Islamic banking ever undertaken by Boumediene and Caby (2009), which examines the financial stability of Islamic banks during the subprime mortgage crisis. This study uses the conditional variance (volatility) return to measure the stability of banks with the sample of 14 Islamic banks and 14 conventional banks. Results of the research are Islamic banks more resilient from the shocks of the subprime mortgage crisis compared to conventional banks. But because of the crisis could lead to sluggishness in the real sector, Islamic banks also gradually affected. It is given that Islamic banking is highly dependent on the performance of the real sector.

Research that conducted by Faiz (2010) reinforce research Boumediene and Caby (2009). He investigate the resilience of credit (financing) syariah during the 2008 global financial crisis. The method used is using Vector Auto Regression (VAR) and multiple regression or Ordinary Least Square (OLS) to observe the Non Performing Loan (NPL). The results showed that Islamic banks tend to be resistant to the crisis than conventional banks (seen from NPL).

While the research conducted Said (2012) showed that a large Islamic banks (with assets of more than \$ 600 million) showed an increase in efficiency during 2006 to 2008, and then declined in 2009. However, small and medium-sized Islamic banks (with assets of less than \$ 600 million) showed a low level of efficiency. In addition, the efficiency of Islamic banks operating in the Middle East and non-Middle East increased during the economic crisis. He investigate the efficiency of Islamic banking during the financial crisis seen from the difference of size and location (regions). The method used is on-parametric technique namely DEA (Data Envelopment Analysis) and T-test.

The Cihak and Hese (2010) examined the stability of Islamic banking Islamic banks to determine whether more or less stable compared with conventional banking. The samples are Islamic banking and conventional banking in 20 countries. The result shows that small Islamic banks (with assets of less than \$ 1 billion) tend to be more stable than small conventional banks, large conventional banks (with assets of more than \$ 1 billion) tend to be more stable than large Islamic banks and small Islamic banks tend to be more stable than large Islamic banks.

Research Methodology

This research uses descriptive quantitative approach. This study aims to determine the stability of Islamic banking is proxied on *Default Probability* (PD). The study also aimed to determine the effect of internal and external variables on the stability of Islamic banking itself. The value of probability default generated from Merton model (1974), whereas to determine the factors that affect the stability (probability default) Islamic banking, panel pregresi method is used.

The object in this research is the Islamic Banks in Indonesia. Method of determination of the sample in this research is using purposive sampling method. From the results of the sample selection, there are ten Islamic Banks that meet the criteria are: (1) PT Bank BNI Syariah; (2) PT Bank Mega Syariah; (3) PT Bank Muamalat Indonesia; (4) PT Bank Syariah Mandiri; (5) PT Bank BCA Syariah; (6) PT Bank BRI Syariah; (7) PT Bank Jabar Banten Syariah; (8) PT Bank Panin Syariah; (9) PT Bank Syariah Bukopin; dan (10) PT Bank Victoria Syariah.

Data

The data used in this research is secondary data in the form of a quarterly financial report published by Bank Indonesia (BI) and the Financial Services Authority (FSA) through its website on the observation period beginning from the second quarter of 2010 until the third quarter of 2014. Meanwhile, macroeconomic data which obtained from publications conducted by Bank Indonesia (BI), Statististik Central Agency (BPS) and other relevant agencies.

Dependent Variable

The dependent variable in this study is the stability of Islamic banking which proxied by value of probability default which is the result of estimation of the Merton model (1974).

Independent Variable

Independent variables used in this study consisted of internal variables Islamic banks and external variables. Internal variable which used are total assets (LNASSET), NPF, ROE (Return on Equity) and ROA or Operational Efficiency Ratio. While external variables used are interest rate of Bank Indonesia (SBI), growth of GDP (Gross Domestic Product), inflation and exchange rate.

Tabel 1. Variabel-Variabel Penelitian

Variabel	Detail	Source
Variabel Dependen		
Probability Default	The value that generated from Merton models.	Data compiled from the Quarterly Financial Statements of islamic bank that taken from the website of Bank Indonesia and the Financial Services Authority (OJK).
Variabel Independen		
Total Aset	Total assets of the Islamic banking	Quarterly Financial Statements of islamic bank that taken from the website of Bank Indonesia and the Financial Services Authority
NPF (Non Performing Financing)	Non Performing Financing	
ROE (Return on Equity)	Ratios that measure	

	profitability or profitability. ROE resulted from the ratio of profit after tax (annualized) of the total capital or equity on average.	(OJK).
BOPO atau Operational Efficiency Ratio	Comparison between the total cost of operation with total operating revenues.	
Suku Bunga Bank Indonesia (SBI)	Interest rates on three-month deposits published by Bank Indonesia	Bank Indonesia Monetary Policy Report
Pertumbuhan PDB	Percentage change in Gross Domestic Product (GDP) at constant prices of 2000	Socio-Economic Data Reports Central Statistics Agency (BPS)
Inflasi	The percentage change in CPI (Consumer Price Index)	Socio-Economic Data Reports Central Statistics Agency (BPS)
Kurs	Value of rupiah to the US dollar (Exchange Buy)	Bank Indonesia

Merton Models

The analysis method used in this research is the Merton model (1974). Merton models is developed from Black Scholes. Based on this model, the failure of the company can be estimated using the company's balance sheet indicators, including total assets, equity and corporate debt. Merton models can be used to look at the probability of default on Islamic banking, so in this study, Merton models used are as follows:

$$E_0 = V_0 N(d_1) - D e^{-r*T} N(d_2) \quad (1)$$

Dimana,

- E = Islamic banks equity,
- V = the value of assets of Islamic banks,
- D = the value of the debt obligation of Islamic banks,
- T = maturities which assumed 1 year,
- R = interest rate Bank Indonesia (BI rate),
- σ_a = the percentage standard deviation (volatility) of the value of assets,
- N = the cumulative normal distribution function whose value is calculated by d_1 and d_2 .

Then to seek value d_1 and d_2 use the following formula:

$$d_1 = \frac{\ln\left(\frac{V}{D}\right) + \left(r + \frac{1}{2}\sigma_a^2\right)T}{\sigma_a \sqrt{T}} \quad (2)$$

$$d_2 = d_1 - \sigma_a \sqrt{T} \quad (3)$$

Probability Default calculated as follows:

$$PD = -\frac{1}{T} \log \left[N(d_2) + \frac{V_0}{D} \exp(r * T) * N(-d_1) \right] \quad (4)$$

Default Distance (DD) estimation to initial default probability calculation as follows:

$$DD_T = \frac{\log\left(\frac{V_0}{D}\right) + \left(r - \frac{1}{2}\sigma_a^2\right) * T}{\sigma_a \sqrt{T}} \quad (5)$$

So that the probability default can also be calculated by N (-DD). The smaller value indicates lower PD risk of default.

Model Specification

Random Effects Model (REM)

Methods to determine the factors that affect Islamic banking Probabililty Default is use panel data regression method. Data panel chosen here because it can enrich the empirical analysis when compared to the time series data (Gujarati, 2009). The specifications of the panel regression model in this study generally are as follows:

$$PD_{it} = \beta_0 + \beta_1 LNASSET + \beta_2 NPF + \beta_3 ROE + \beta_4 BOPO + \beta_5 SBI + \beta_6 GPDB + \beta_7 INFLASI + \beta_8 LNKURS + e_{it} \quad (6)$$

dimana,

PD_{it}	= probability default bank during the second quarter 2010 to third quarter 2014,
LNASSET	= log natural of the total assets of Islamic banking,
NPF	= Non Performing Financing,
ROE	= Return on Equity,
BOPO	= the ratio of operating expenses to operational income,
SBI	= interest rate of Bank Indonesia or BI rate,
GPDB	= growth of Gross Domestic Product (GDP),
INFLASI	= the percentage increase in the CPI (Consumer Price Index),
LNKURS	= log natural of the rupiah to the US Dollar (exchange rate).

There are 4 types of panel regression approach that can be done (Gujarati, 2009: 593), namely: (1) Pooled OLS Model; (2) The Fixed Effects Least Squares Dummy Variable (LSDV) Model; (3) The Fixed Effects Within-Group Model; and (4) The Random Effects Model (REM).

Finding and Discussion

Stability of Islamic Banking in Indonesia

Based on the test results Probability Default (PD) using the Merton models that have been carried out on ten Islamic banking in Indonesia, PD values obtained results which vary in the range of 0.4 to 0.9. Here are the test results using the model of Merton of ten Islamic banking in Indonesia:

Figure 3. Movement of Probability Default Value of Islamic Banking in Indonesia

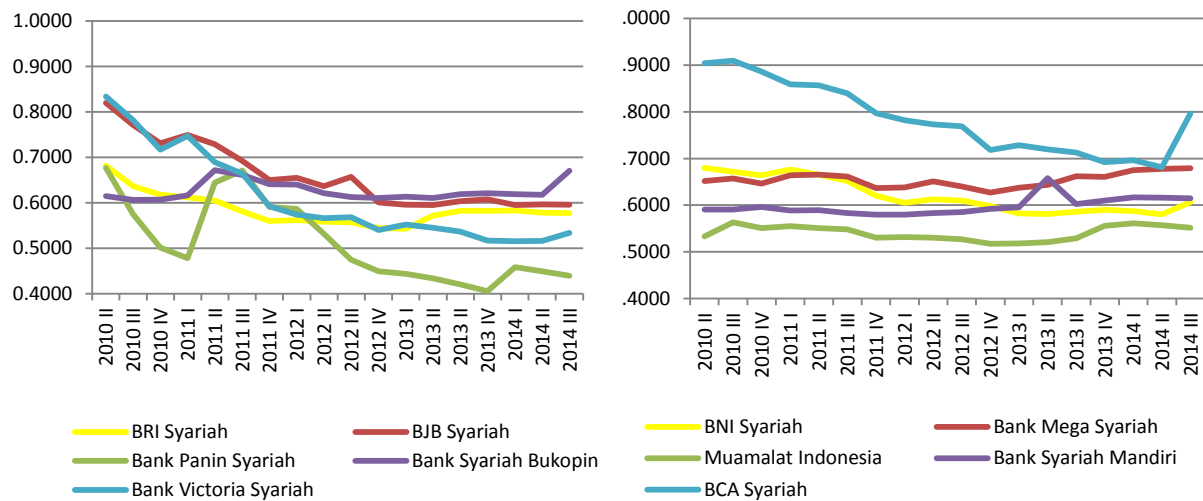


Figure 3 shows the value of movement *Probability Default* (PD). In general, Bank Panin Syariah has an lowest average rate of PD when compared with other Islamic banking in the amount of 0.5130. Even in the last period of the study (September 2014), Bank Panin Syariah has the lowest PD at 0.4397. Low levels of PD Bank Panin Syariah is reasonable because of the fact that the Bank Panin Syariah has the highest rate of current ratio when compared with other Islamic banks in Indonesia that is equal to 1.25. It means the ability of Bank Panin Syariah in paying short-term liabilities using current assets amounted to 1.25, or in other words every Rp1 current debts guaranteed by Rp1.25 Current assets. In 2014, Bank Panin Syariah is also get top growth financing category for equity BOOK I Rp100 billion to Rp1 trillion in the Islamic Finance Award 2014 (lppi.or.id, Maret 2014). The next Islamic banking that has lowest average PD among others in sequence is Bank Muamalat, BRI Syariah and Bank Syariah Mandiri, with each having an average PD value of 0.5407, 0.582 and 0.5985.

While Islamic banking with the highest PD value is BCA Syariah with the average value of PD in the period March 2010 to September 2014 is 0.785. Despite the decrease in the value of PD Bank BCA Syariah from the original 0.904 in the period March 2010 to 0.7963 in the period September 2014, Bank BCA Syariah remain an Islamic banking with the highest default risk, it is also offset by the value of the current ratio is low when compared with other Islamic banks in the amount of 1.12.

Furthermore, Bank Muamalat is the Islamic bank with the most stable PD value during the study period. This is because the Bank Muamalat has a very consistent PD value at about 0.5. The highest PD value ever achieved by Bank Muamalat is at 0.5635 which occurred in the third quarter of 2010, whereas for the lowest PD value of Bank Muamalat amounted to 0.5173 which occurred in the fourth quarter of 2012.

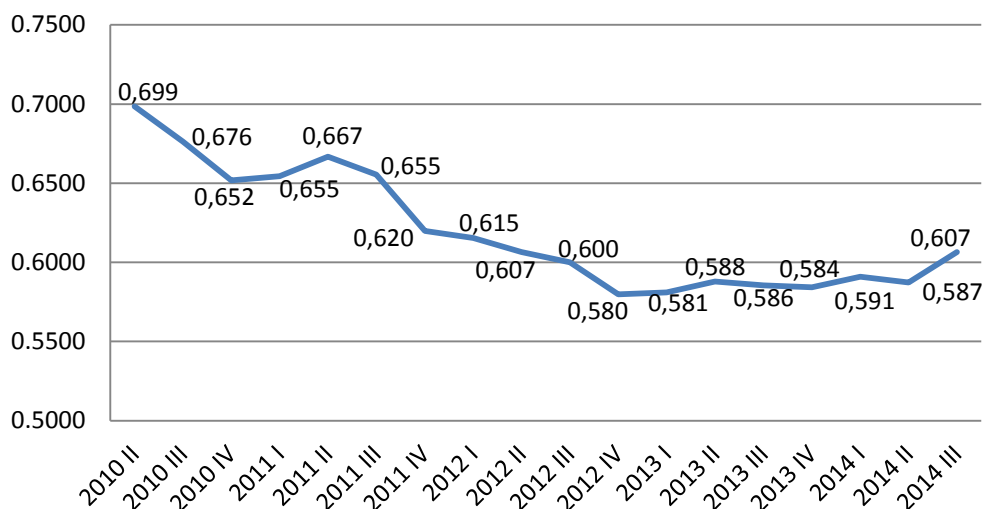
Figure 4. Movement Average Value of Probability Default of Islamic Banking in Indonesia

Figure 4 illustrates the movement of the Islamic banking PD average value. Moving average of PD value of Islamic banking showed a downward trend. It can be seen from the value of PD that at the beginning of the study period from 0.699 which is the average value of the highest PD, and then drop to 0.607 at the end of the study period. As for the lowest PD value during the observation period is 0.580 which occurred in December 2012. Although the general trend of its decline, but the average PD value Islamic banking is still relatively high because the value is greater than 0.5 ($PD > 0.5$).

Factors Affecting Stability of Islamic Banking in Indonesia

Panel regression Random Effects Model (REM) been selected after testing by Hausman Test, the result that the model is the most good. In this model, each variable is assumed have different intercepts, but the intercept are random (Yamin, Rachmach, dan Kurniawan, 2011:201).

Table 2. The Result of Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	8	1.0000

*Significant at 5% Level

Table 2 shows the results of Hausman test which used for model selection. It can be seen that the value of *Prob. Cross Section Random* amounted to 1.0000 or greater than Alpha 0.05. It can be concluded that the best model that can be used to estimate the PD (Probability Default) is Random Effect Models.

Table 3. The Result of Random Effect Model (REM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.756050	0.383892	4.574336	0.0000
LNASSET	-0.082446	0.010987	-7.503935	*0.0000
NPF	-0.471575	0.251715	-1.873451	0.0627
ROE	-0.060399	0.036949	-1.634666	0.1040
BOPO	-0.030384	0.016983	-1.789082	0.0754
SBI	2.389049	0.742726	3.216598	*0.0016
GPDB	0.316792	0.162680	1.947324	0.0531
INFLASI	-0.467133	0.280111	-1.667668	0.0972
LNKURS	0.005357	0.057840	0.092623	0.9263
Weighted Statistics				
R-squared	0.543619	Mean dependent var	0.059588	
Adjusted R-squared	0.522268	S.D. dependent var	0.056411	
S.E. of regression	0.038990	Sum squared resid	0.259961	
F-statistic	25.46089	Durbin-Watson stat	0.532252	
Prob(F-statistic)	0.000000			

*Significant at 5% Level

Table 3 shows the results of the panel regression using Random Effects Model (REM). At the 5% significance level, there are two variables that significantly affect the PD variable amount of assets (LNASSET) and the interest rate Bank Indonesia (SBI). This can be seen from the value prob (t-statistic) of each variable are 0.0000 and 0.0016 which is smaller than the value of Alpha 0.005.

In Table 3, it can be seen that the value prob (F-statistic) is 0,000 or less than 0.05 Alpha. This shows that the independent variables LNASSET, NPF, ROE, ROA, SBI, GPDB, INFLATION and LNKURS simultaneously significantly influence the dependent variable PD (Probability Default). The coefficient of determination (R^2) is 0.544. It shows that 54.4 percent of the variation dependent variable (PD) can be explained by the independent variables (LNASSET, NPF, ROE, ROA, SBI, GPDB, INFLATION and LNKURS). The value that approaching one means independent variables provide almost all the information needed to predict the dependent variable (Kuncoro,2011).

Variable Total Assets (LNASSET) a significant negative effect on PD. It is quite groundless because when there is an increase in total assets, increased size of Islamic banking, it is quite reasonable if the default risk of Islamic banking will be lower. Due to the large size would make Islamic banking more resistant to financial shocks happens.

Variable SBI (Bank Indonesia's interest rate) positive significant effect on PD. This shows that when there is an increase in SBI, default risk of Islamic banking will increase. The underlying reasons are related to the cost of funds, although Islamic banking does not use the usury, but in order to compete with conventional banking, Islamic banking use SBI as a benchmark above the cost of funds. So, when the SBI rises, the cost of funds will rise, therefore causing the default risk of its becoming ride anyway.

From the explanation above, it can be concluded that the factors that affect the stability (probability default) of Islamic banking is the amount of assets and the interest rate Bank Indonesia (SBI).

Conclusion

Based on the results value of Probability Default (PD) using the Merton models, at the beginning of the study (March 2010) PD value of Islamic banking as a whole is equal to 0.6986, while at the end of the study period (September 2014) PD value dropped to 0.6066. It shows that the Islamic banking default risk tends to decline. But overall, the PD value of Islamic banking is still relatively high ($PD > 0.5$). This makes Islamic banking tends to be unstable. It is underlying Islamic banking difficult to expand the market share of Islamic banking and make market share stagnate

Results of the panel regression using Random Effects Model (REM) shows that the amount of assets a significant negative effects on the probability of default of Islamic banking, while the variable interest rate of Bank Indonesia significant positive impact on the probability default of Islamic banking. SBI variables that significantly be an indication that although the Islamic banking does not use interest, but it still can not avoid the influence of these systemic variables. Bank Indonesia as macroprudential policy makers expected to consider the establishment of policies SBI to support the stability of Islamic banking.

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Laporan Keuangan Perbankan Indonesia, Bank Indonesia (BI) dan Otoritas Jasa Keuangan (OJK).

Laporan Kebijakan Moneter, Bank Indonesia (BI).

Laporan Data Sosial Ekonomi, Badan Pusat Statistik (BPS).

Appendix

A. Probability Default (PD) Value Merton Model Estimation Results

Tahun	Periode	BNI Syariah	Bank Mega Syariah	Bank Muamalat	Bank Syariah Mandiri	BCA Syariah	BRI Syariah	BJB Syariah	Bank Panin Syariah	Bank Syariah Bukopin	Bank Victoria Syariah
2010	Triwulan II	0.6800	0.6516	0.5333	0.5904	0.9042	0.6814	0.8198	0.6765	0.6151	0.8339
	Triwulan III	0.6718	0.6573	0.5635	0.5908	0.9096	0.6364	0.7716	0.5746	0.6061	0.7817
	Triwulan IV	0.6643	0.6465	0.5510	0.5959	0.8860	0.6175	0.7309	0.5012	0.6072	0.7171
2011	Triwulan I	0.6763	0.6643	0.5550	0.5887	0.8584	0.6122	0.7493	0.4782	0.6160	0.7470
	Triwulan II	0.6652	0.6657	0.5508	0.5896	0.8567	0.6047	0.7289	0.6447	0.6721	0.6896
	Triwulan III	0.6517	0.6610	0.5482	0.5833	0.8396	0.5811	0.6925	0.6711	0.6612	0.6639
2012	Triwulan IV	0.6201	0.6370	0.5305	0.5797	0.7971	0.5597	0.6497	0.5905	0.6410	0.5923
	Triwulan I	0.6052	0.6381	0.5318	0.5795	0.7818	0.5621	0.6550	0.5867	0.6399	0.5739
	Triwulan II	0.6127	0.6508	0.5301	0.5834	0.7732	0.5586	0.6369	0.5318	0.6211	0.5664
2013	Triwulan III	0.6097	0.6404	0.5273	0.5855	0.7687	0.5571	0.6569	0.4745	0.6129	0.5682
	Triwulan IV	0.5979	0.6272	0.5173	0.5923	0.7184	0.5443	0.6005	0.4494	0.6107	0.5400
	Triwulan I	0.5825	0.6371	0.5184	0.5958	0.7287	0.5432	0.5955	0.4435	0.6131	0.5522
2014	Triwulan II	0.5813	0.6432	0.5206	0.6580	0.7194	0.5720	0.5948	0.4340	0.6107	0.5452
	Triwulan III	0.5859	0.6618	0.5293	0.6026	0.7130	0.5823	0.6039	0.4205	0.6190	0.5363
	Triwulan IV	0.5897	0.6609	0.5559	0.6102	0.6921	0.5824	0.6075	0.4053	0.6208	0.5169
2014	Triwulan I	0.5875	0.6750	0.5615	0.6167	0.6965	0.5834	0.5951	0.4583	0.6191	0.5154
	Triwulan II	0.5802	0.6780	0.5574	0.6161	0.6811	0.5784	0.5968	0.4495	0.6180	0.5164
	Triwulan III	0.6065	0.6793	0.5514	0.6145	0.7963	0.5774	0.5960	0.4397	0.6706	0.5340
Rata-rata PD		0.6205	0.6542	0.5407	0.5985	0.7845	0.5852	0.6601	0.5128	0.6264	0.6106

B. Estimation Result of Random Effect Model (REM)

Dependent Variable: PD

Method: Panel EGLS (Cross-section random effects)

Date: 06/17/15 Time: 07:37

Sample: 2010Q2 2014Q3

Periods included: 18

Cross-sections included: 10

Total panel (balanced) observations: 180

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.756050	0.383892	4.574336	0.0000
LNASSET	-0.082446	0.010987	-7.503935	0.0000
NPF	-0.471575	0.251715	-1.873451	0.0627
ROE	-0.060399	0.036949	-1.634666	0.1040
BOPO	-0.030384	0.016983	-1.789082	0.0754
SBI	2.389049	0.742726	3.216598	0.0016
GPDB	0.316792	0.162680	1.947324	0.0531
INFLASI	-0.467133	0.280111	-1.667668	0.0972
LNKURS	0.005357	0.057840	0.092623	0.9263
Effects Specification				
			S.D.	Rho

Cross-section random		0.092437	0.8560
Idiosyncratic random		0.037908	0.1440
Weighted Statistics			
R-squared	0.543619	Mean dependent var	0.059588
Adjusted R-squared	0.522268	S.D. dependent var	0.056411
S.E. of regression	0.038990	Sum squared resid	0.259961
F-statistic	25.46089	Durbin-Watson stat	0.532252
Prob(F-statistic)	0.000000		
Unweighted Statistics			
R-squared	-0.823864	Mean dependent var	0.619341
Sum squared resid	2.645744	Durbin-Watson stat	0.065564

C. Test Result *Hausman Test*

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	8	1.0000

* Cross-section test variance is invalid. Hausman statistic set to zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LNASSET	-0.104362	-0.082446	0.000035	0.0002
NPF	-0.434446	-0.471575	0.000366	0.0522
ROE	-0.079023	-0.060399	0.000046	0.0060
BOPO	-0.046980	-0.030384	0.000020	0.0002
SBI	1.757997	2.389049	0.028792	0.0002
GPDB	0.319433	0.316792	0.000002	0.0710
INFLASI	-0.478637	-0.467133	0.000085	0.2127
LNKURS	0.097783	0.005357	0.000629	0.0002

Cross-section random effects test equation:

Dependent Variable: PD

Method: Panel Least Squares

Date: 06/17/15 Time: 07:41

Sample: 2010Q2 2014Q3

Periods included: 18

Cross-sections included: 10

Total panel (balanced) observations: 180

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.304885	0.402070	3.245414	0.0014
LNASSET	-0.104362	0.012494	-8.352695	0.0000
NPF	-0.434446	0.252440	-1.720989	0.0872
ROE	-0.079023	0.037566	-2.103571	0.0370
BOPO	-0.046980	0.017567	-2.674366	0.0083
SBI	1.757997	0.761862	2.307501	0.0223
GPDB	0.319433	0.162687	1.963481	0.0513
INFLASI	-0.478637	0.280263	-1.707810	0.0896
LNKURS	0.097783	0.063046	1.550988	0.1229

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.839520	Mean dependent var	0.619341
Adjusted R-squared	0.822679	S.D. dependent var	0.090023
S.E. of regression	0.037908	Akaike info criterion	-3.612670
Sum squared resid	0.232797	Schwarz criterion	-3.293374
Log likelihood	343.1403	Hannan-Quinn criter.	-3.483209
F-statistic	49.85123	Durbin-Watson stat	0.654296
Prob(F-statistic)	0.000000		

Cross-section random effects test equation:

Dependent Variable: PD

Method: Panel Least Squares

Date: 06/17/15 Time: 07:41

Sample: 2010Q2 2014Q3

Periods included: 18

Cross-sections included: 10

Total panel (balanced) observations: 180

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.304885	0.402070	3.245414	0.0014
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NPF	-0.434446	0.252440	-1.720989	0.0872
ROE	-0.079023	0.037566	-2.103571	0.0370
BOPO	-0.046980	0.017567	-2.674366	0.0083
SBI	1.757997	0.761862	2.307501	0.0223
GPDB	0.319433	0.162687	1.963481	0.0513
INFLASI	-0.478637	0.280263	-1.707810	0.0896
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Cross-section fixed (dummy variables)

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Sum squared resid	0.232797	Schwarz criterion	-3.293374
Log likelihood	343.1403	Hannan-Quinn criter.	-3.483209
F-statistic	49.85123	Durbin-Watson stat	0.654296
Prob(F-statistic)	0.000000		
