

Non-Performing Financing and Bank Efficiency of Islamic Banks in Indonesia

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This paper investigates the inter-temporal relationships between bank efficiency and non-performing financing (NPF) and the determinants of non-performing financing (NPF) of Islamic banks in Indonesia in the period of January 2007 – September 2012. This research uses time series and monthly-published report data of BPS-Statistics Indonesia. The Data Envelopment Analysis (DEA) approach is used to measure efficiency of Islamic banks. The inter-temporal relationships between bank efficiency and NPF is run using VAR model for time series to test the two hypotheses of four hypotheses that are introduced by Berger and deYoung (1997): 'Bad Debt' and 'Bad Management'. The study examines the determinant variables: return on assets (ROA); financing debt ratio (FDR), inflation, interest rate and GDP of NPF. The finding shows that Islamic banks in Indonesia in the period of January 2007 – September 2012 tends to support the 'bad management' hypothesis. The finding implies that the increase of non-performing financing of the Islamic banks in Indonesia is mainly caused by poor management rather than external factors. This result is also indirectly supported by the determinant variables of non-performing financing (NPF), especially the bank-specific variables. ROA is the highest coefficient among the determinant variables used in this research that affect NPF and external variable: Inflation is the weakest coefficient that affect NPF. The bank-specific variables/internal variables that have more effect to NPF of Islamic banks in Indonesia compared to external variables may also be explained due to the small market share of Islamic banks' assets in Indonesia, just around 3% compared to conventional banks' total assets.

1. Introduction

The banking sector is still the primary form of financial intermediation in Indonesia. Since Act number 21 of 2008 concerning Islamic banking is issued, the existence of Islamic banks in Indonesia is increasing. Moreover, until September 2012 the total of Syariah Commercial Banks in Indonesia is 11, total of Syariah Business Unit is 24 and total of Syariah Rural Banks is 155. Improving the existence of Islamic banks in Indonesia is also driven by the high interest of the community to put their money in Islamic banks and has grown to be a trend. Islamic banking in the Progress Report by Bank Indonesia (2009) as cited by Pratiwi (2012) noted the growing trend of Islamic banking funds due to product appeal to depositors given the profit sharing ratio and product margins that are still competitive compared to commercial bank interest. Several characteristics that distinguish Islamic banking system with commercial banks are profit sharing (profit and loss sharing / PLS) and a unique contract scheme.

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The combination between PLS and *akad* in Islamic banks will give a fair portion for both parties in terms of profit and risk sharing (Mudharabah contract primarily).

The main purpose of bank credit management is in order to improve health and performance by increasing the quantity and quality of credit. Quantity credit is assessed from the number and rate of growth of loans. Credit quality can be measured from the number and share of non-performing financing. Non Performing Financing (NPF) is one of the interesting topics in developing bank's issue. From bank managing aspect, NPF is one of the indicators that show the bank's health and describe how well the manager runs the financing system. Indonesia has the world's largest Muslim population and Southeast Asia's biggest economy¹. Therefore, Indonesia offers bright prospects for the development of the Islamic financial industry. Islamic bank is one of new expectations for banking system that is claimed as anti-crisis business. Based on Outlook Islamic Bank of Bank Indonesia (2011), crisis happened in the beginning of the second quarter of 2010 in Greece, it does not significantly affect Islamic bank in Indonesia. Islamic bank condition is still in the early development and has no integration rate yet to global finance system, so Islamic bank is out of that direct crisis.

Based on the information already mentioned above, it shows those Islamic banks in Indonesia probably are more affected by the internal banking variables. In the previous studies, internal banking variables that used to be observed the NPF were financial ratios, such as Return on Assets (ROA) and Financing Debt Ratio (FDR). However, to obtain the empirical results, the researchers are interested to know the effect of several external variables such as inflation, interest rate and gross domestic products. Since most of previous studies did not employ these external variables to determine the NPF, so the research attempts to give different finding and provide new result. In this study, a variety of internal and external factors will be accommodated to see significant variables that affect the NPFs of banks.

Besides NPF, one important aspect in the measurement of bank performance is efficiency. One method to calculate efficiency is Data Envelopment Analysis (DEA). Data Envelopment Analysis can calculate the efficiency of the entire Islamic banking unit by using a lot of inputs and multiple outputs. Based on previous research, the researcher found that Islamic bank in Indonesia could not maintain the efficiency persistently. According to Suswandi (2007), he found that during his research January 2003-December 2006, only in December 2006 Islamic bank in Indonesia could raise the efficiency, and the rest was inefficient.

As explained above, NPF and efficiency are the important aspects in measuring banking performance. The question here is how Non Performing Financing affects the bank efficiency. In several previous studies, Berger and De Young (1997); stated that an increase in non-performing loans is caused by an unexpected exogenous event (bad luck), such as economic slowdowns or firms' breakdown. Banks will, consequently incur higher costs in order to monitor these problem loans, decreasing efficiency. Karim *et al.* (2010) stated that NPL have a negative effect on cost efficiency. Increase in bank efficiency, decrease in NPL. This research is focusing on Indonesian Islamic bank (BUS and UUS) condition. By estimating the temporal-relationship between NPF and bank efficiency, the researchers can determine whether an increase in problem financing have a negative impact on banking efficiency, vice versa, the decrease of efficiency has a negative impact on the increase of NPF.

Hence, the objective of this research is to determine the significant variables that affects the non

performing financing of Islamic Bank in Indonesia and to examine the efficiency of Islamic Bank in Indonesia by using Islamic Bank's input-output. This research also aimed to determine the relationship between non-performing financing and efficiency of Islamic Bank in Indonesia.

Based on these objectives, the following research questions are developed:

1. What factors that give significant effect and how those factors affect the Non Performing Financing (NPF) of Islamic Banking in Indonesia?
2. What is the efficiency of Islamic Bank in Indonesia during January 2007 until August 2012?
3. What is the relationship between NPF and Islamic bank efficiency?

To the best of our knowledge, this is the first empirical study in Indonesia that determining the significant variables that affects the non performing financing of islamic bank by using variety internal and external factors, measuring the efficiency and then regressed against non-performing financing to determine the temporal-relationship between non-performing financing and banks efficiency. The findings of this study will bring some implications for banking companies as inputs in define business strategy in the future and for the government, in this case Bank of Indonesia, the assessment of the efficiency of the banking can be use to determine and implement appropriate control strategies on the islamic bank.

The remainder of this paper is structured as follows. Section 2 reviews the literature. Section 3 describes the data, sources and methodology, which is employed in the study. The empirical results are available in section 4. Finally, we conclude in section 5

2. Literature Review

Research on the NPL/NPF and efficiency of the banking system has been done in economic research. Related to this research, the researcher found some previous study of each research objective as basis concept.

In recent years, the variables used to observe the NPF were financial ratios, such as Return on Asset, Financing Deposit Ratio and macroeconomic such as Gross Domestic Product. In this study, the researchers also used the same variables, but in different period. According to Pratiwi (2012), the object of research is The affect of CAR, BOPO, NPF and FDR to ROA during 2005-2010. The result showed that NPF have a negative and significant affect on ROA. Padmantyo (2011), the object of research is Analyzing the variable that affected the non performing loan of Indonesian bank, and the result showed that The number of Islamic bank financing (FDR) and the GDP level affects the level of funding problem (NPF) significantly. Besides that, there is something attractive for the researchers, which is macroeconomic variables inflation and interest rate. The researchers have not found the previous researches that use inflation and interest rate for Islamic bank case. Islamic bank does not use interest system. In basic theory, NPL of commercial banks would increase if inflation happened and interest rate raised the value. Actually, the essence of NPL and NPF is similar, because it reflects the channelization of loans/financing. In this research, the researchers would like to know how interest rate and inflation could affect NPF of Islamic bank in Indonesia. ROA is the indicator to measure the effectiveness of the company to get profit and utilize their assets. If NPF is getting lower, the possibility of ROA is getting higher, so the effectiveness of the bank is good. Based on previous study of Mawardi (2005), NPF

gave negative affect to ROA. This happened because if NPF were getting higher, cost of reserve asset productive would get higher. FDR measures the bank's liquidity that shows the ability of the bank to fulfill credit demand by using bank's assets. If NPF is getting higher, the possibility is that FDR is getting higher too. Based on previous study of Ding Lu *et al.* (2001) as cited by Padmanty (2011), if a bank gives "over" credit demand to company, it would run the chance of increasing NPL ratio. The level of income of the people also affects financing repayment. If income level is getting higher (as reflected by GDP), so the possibility of non-performing financing is getting lower, and vice versa (Padmanty, 2011). Faiz (2010) finds that GDP had a negative and significant affect on NPF. Study conducted in UK by Hoggarth, Sorensen and Zicchino (2005) considering time period between 1988-2004 according to the authors inflation and interest rates have positive relationship with the non-performing loans.

In recent years, studies on bank efficiency have taken into account asset quality, specifically non-performing loans. Data Envelopment Analysis (DEA) introduced by Charnes, Cooper and Rhodes (1978) has been proven to be an effective tool in identifying such empirical frontiers and in evaluating relative efficiency (Zhu, 2010:4). To examine the bank efficiency, this study uses input and output variables based on intermediation approach. The intermediation approach assumes that financial firms act as an intermediary between savers and borrowers and posits total loans and securities as outputs, whereas deposits along with physical capital are defined as inputs. Previous banking efficiency studies that adopted this approach are Suswandi (2007), Karim *et al.* (2010), Omar *et al.* (2006), Setiawan (2012) and Sufian (2007). According to Suswandi (2007), he found that during his research January 2003-December 2006, only in December 2006 Islamic bank in Indonesia could raise the efficiency, and the rest was inefficient.

Fiordelisi, *et al.* (2010) stated that increase in bank risk might temporally precede a decline in cost efficiency related to lower credit screening. Controlling for the exogenous impact of problem loans is important in Japanese banking, especially for the smaller regional banks (Drake and Hall, 2003). Podpiera and Weill (2007), by utilizing Granger causality model developed by Berger and De Young (1997) and applying GMM dynamic panel estimators on panel of Czech bank from 1994 to 2005, the findings support the "bad management" hypothesis, according to which deteriorations in cost efficiency precede increases in non-performing loans, and reject the "bad luck" hypothesis. Yosra and Anis (2009) analyzed Tunisia's Professional Association of Banks and Financial Institutions APTBEF annual covering the period of 1999-2009. They found that the high volume of NPL generate low profitability of Tunisian banks compared to International standards. Large volumes of nonperforming loans (NPL) constitute the main source of their inefficiency and their vulnerability. Viverita and Ariff (2011) analyzed efficiency measurement and determinants of Indonesian bank efficiency. They found that bank credit risk (non-performing loans) negatively affect cost and profit efficiencies.

3. Data and Methodology

This study investigates the inter-temporal relationships between bank efficiency and non-performing financing (NPF) and the determinants of non-performing financing (NPF) of Islamic banks in Indonesia in the period of January 2007 – September 2012. This study used secondary aggregated data consist of monthly financial ratios of Syariah commercial banks (BUS) and Syariah Business unit (UUS) of conventional banks during January 2007 – September 2012. Data collected through literature by reviewing literature books, journals,

papers, several websites that contain necessary information and other references related to the research to gain a comprehensive theoretical foundation linked Islamic Banks.

Table 1 The Number of BUS and UUS during the year 2007 – 2012 in Indonesia

Bank's category	Year					
	2007	2008	2009	2010	2011	2012
BUS	3	5	6	11	11	11
UUS	26	27	25	23	23	24

Source: Islamic banks statistics, Bank Indonesia (2012)

The list of Syariah Commercial Banks (BUS) and Syariah Business Unit (UUS) can be found in the appendix

To examine the determinants of non-performing financing (NPF) of Islamic banks in Indonesia, the coefficient score is calculated by estimating linear regression least squares method. To measure efficiency of Islamic banks in Indonesia, the efficiency score is calculated by estimating an envelopment model function. These scores were then regressed against non-performing financing to determine the temporal-relationship between non-performing financing and banks efficiency by using VAR model for time series.

3.1 Estimation of Determinants of non-performing financing

In analyzing the data, the application software used was Eviews7 coefficient result and summary statistics. The coefficient measures the marginal contribution of the independent variable to the dependent variable, holding all other variables fixed. The standard errors measure the statistical reliability of the coefficient estimates—the larger the standard errors, the more statistical noise in the estimates. Probability column is known as the p-value or the marginal significance level. The researchers performed the test at the 10% significance level, (Schwert, User's Guide II. 2010:12). t- Test is used to see the effect of each independent variable in multiple regression model toward the dependent variable by comparing the value of significant t of each independent variable with significant standard $\alpha = 0.10$. The null hypotheses to be tested were:

- H₀₁: Return on Assets (ROA) has negative affect to Non-Performing Financing (NPF)
- H₀₂: Financing to Deposit Ratio (FDR) has positive affect to Non-Performing Financing (NPF)
- H₀₃: Interest Rate has positive affect to Non-Performing Financing (NPF)
- H₀₄: Inflation has positive affect to Non-Performing Financing (NPF)
- H₀₅: Gross Domestic Product (GDP) has negative affect to Non-Performing Financing (NPF)

Multiple Regression uses type of regression for predicting the value of one dependent variable from the value of one independent variable. It is also widely used to predict the value of one dependent variable from the values of two or more independent variables.

In this research, the researchers put a variety of internal and external factors will be accommodated to see significant variables that affect the NPFs of banks. For external factor,

the researchers added interest rate and inflation which are previously only used for commercial bank case. The variable that used consists of two kinds of variables, namely:

- a. Dependent Variable (Variable Y) is the value of this variable affected by Independent variables. Dependent variable of this study is NPF
- b. Independent Variable (Variable X) is the variable that affects dependent variable. Independent variables of this study are ROA, FDR, GDP, Inflation and Interest Rate Spread.

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + \varepsilon$$

Where:

Y = Non Performing Loan (NPF)

a = Constanta

x_1 = Return on Asset (ROA)

x_2 = Financing to Deposit Ratio (FDR)

x_3 = Gross Domestic Product (GDP)

x_4 = Inflation (INF)

x_5 = Interest rate spread (INT)

b_1, \dots, b_5 = regression coefficient

ε = error term

3.2 Estimation of Efficiency

In analyzing the data, researchers uses an application that is DEA – CRS (Data Envelopment Analysis – Constant Return to Scale) input oriented to know the efficiency score. Data Envelopment Analysis (DEA) is a relatively new “data oriented” approach for evaluating the performance of a set of peer entities called Decision Making Units (DMUs) which convert multiple inputs into multiple outputs. This study uses inputs variable consist of total deposit, fixed asset and paid-in capital; outputs variable consist of total financing and income. The definition of a DMU is generic and flexible. Recent years have seen a great variety of applications of DEA being used in evaluating the performances of many different kinds of entities engaged in many different activities in many different contexts in many different countries (Zhu, 2010:3). DEA uses mathematical programming to implicitly estimate the tradeoffs inherent in the empirical efficient frontier (Zhu, 2010:4). According to Sherman and Zhu (2006) as cited by Zhu (2010:4), such previous DEA studies provide useful managerial information on improving the performance. In particular, DEA is an excellent tool in improving the productivity of service businesses.

Table 2 Envelopment Model

Input – Oriented	
$\min \theta - \varepsilon \left(\sum_{i=1}^m s_i^- + \sum_{r=1}^s s_r^+ \right)$	
subject to	
$\sum_{j=1}^n \gamma_j x_{ij} + s_i^- = \theta x_{i0} \quad i = 1, 2, \dots, m;$	
$\sum_{j=1}^n \gamma_j y_{rj} - s_r^+ = y_{r0} \quad r = 1, 2, \dots, s;$	
$\gamma_j \geq 0$	$j = 1, 2, \dots, n.$

Each DMU has a set of inputs and outputs, representing multiple performance measures. Consider a set of n observations on the DMUs. Each observation, DMU j ($j = 1, 2, \dots, n$), uses m inputs x_{ij} ($i = 1, 2, \dots, m$) to produce s outputs y_{rj} ($r = 1, 2, \dots, s$).

Where

DMU_0 = one of the n DMUs under evaluation

x_{i0} and y_{r0} = the i th input and r th output for DMU_0 , respectively.

θ = input-oriented efficiency score of DMU_0

= output-oriented efficiency score of DMU_0

s_i^- and s_r^+ = input and output slacks

γ_j = benchmark for a specific DMU under evaluation

3.3 Determination of inter-temporal relationship between NPF and bank efficiency

To determine the temporal-relationship between non-performing financing (NPF) and bank efficiency of Islamic banks in Indonesia, the researchers use Vector Auto regressions (VARs) model for time series.

According to Schwert User's Guide II (2010), the Vector Auto Regression (VAR) is commonly used for forecasting systems of interrelated time series and for analyzing the dynamic impact of random disturbance on the system of variables. The VAR approach sidesteps the need for structural modeling by treating every endogenous variable in the system as a function of the lagged values of all of the endogenous variables in the system.

The general mathematical representation of a VAR is:

$$NPF_{i,t} = f_1(NPF_{i,t-1} \dots NPF_{i,t-n}; eff_{i,t-1} \dots eff_{i,t-n}) + e_{it} \dots \dots \dots (1)$$

$$eff_{i,t} = f_2(eff_{i,t-1} \dots eff_{i,t-n}; NPF_{i,t-1} \dots NPF_{i,t-n}) + e_{it} \dots \dots \dots (2)$$

Where:

e_{it} = a vector of innovations that may be contemporaneously correlated but are uncorrelated with their own lagged values and uncorrelated with all of the right-hand side variables.

Equation number 1: NPF as dependent variable, EFF as independent variable (Bad Management Hypothesis)

Equation number 2: EFF as dependent variable, NPF as independent variable (Bad Luck Hypothesis).

According to Schwert User's Guide II (2010), estimating VAR in EViews, the researchers must set the estimation sample; enter the lag specification in the appropriate edit box. This information is entered in pairs; each pair of numbers defines a range of lags and enters the names of endogenous and exogenous series in the appropriate edit boxes. In VAR estimation Output, Each column in the table corresponds to an equation in the VAR. For each right-hand side variable, EViews reports the estimated coefficient, its standard error, and the *t*-statistic.

4. Results and Discussion

This table below shows all of the regression result by using Ordinary Least Square (OLS) method in Eviews7 software. The researchers use NPF as dependent variable and ROA (Return on Asset), FDR (Financing Deposit ratio), IRT (Interest Rate), INF (Inflation) and GDP (Gross Domestic Product) as independent variables.

Table 3 Regression Model Result

Dependent Variable: NPF
 Method: Least Squares
 Date: 12/04/12 Time: 07:11
 Sample: 1 69
 Included observations: 69

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.475128	3.062683	-2.767223	0.0074
ROA	-1.713993	0.604373	-2.835985	0.0061
FDR	0.168221	0.029607	5.681832	0.0000
IRT	0.402902	0.216672	1.859507	0.0676
INF	-0.085908	0.047665	-1.802353	0.0763
GDP	-0.409287	0.173660	-2.356835	0.0216
R-squared	0.425177	Mean dependent var		4.322899
Adjusted R-squared	0.379556	S.D. dependent var		1.082717
S.E. of regression	0.852838	Akaike info criterion		2.602446
Sum squared resid	45.82193	Schwarz criterion		2.796717
Log likelihood	-83.78440	Hannan-Quinn criter.		2.679520
F-statistic	9.319782	Durbin-Watson stat		0.401116

Prob(F-statistic)

0.000001

Estimation Command:

=====
LS NPF C ROA FDR IRT INF GDP

Estimation Equation:

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NPF = C(1) + C(2)*ROA + C(3)*FDR + C(4)*IRT + C(5)*INF + C(6)*GDP

Substituted Coefficients:

=====
NPF = -8.47512778982 - 1.71399328172*ROA + 0.168221365059*FDR + 0.40290244905*IRT - 0.085908350376*INF -
0.409287295187*GDP

The result of Eviews7 shows the t-statistic of ROA is -2.835 with significance level of 0.006. It indicated that ROA has a negative and significant effect on NPF. This result also answers and has the same result as Pratiwi (2012) finding that ROA had a negative and significant affect on NPF. The result of Eviews7 shows the t-statistic of FDR is 5.681 with significance of 0.000. It indicates that FDR has a positive and significant effect on NPF. This result agrees with theory formulation as explained previously. Faiz (2010) also found that the stability of Islamic bank in Indonesia is affected by financing deposit ratio. The result of Eviews7 shows the t-statistic of IRT is 1.859 with significance of 0.067. It indicates that IRT has a positive and significant effect on NPF. This result agrees with theory formulation as explained previously. According to Wijaya, A. (2009); Head of Research and Project Management Karim Business Consulting (KBC), Islamic bank would be more competitive with decreasing BI rate, because assets and performing financing side showed that Islamic bank had better performance from year to year. Alfi added that decreasing BI rate made Islamic banks more competitive from the interest rate side and could upgrade profit-lose sharing ratio. The result of Eviews7 shows the t-statistic of INF is -1.802 with significance of 0.076. It indicates that INF has a negative and significant effect on NPF. This negative result is contrary to the hypothesis and theory formulation, where if inflation rate rise, it should raise the ratio of non-performing financing. However, in this research, when inflation rate rise, the ratio of non-performing financing reduce. This condition can explain by the relationship between inflation and interest rate. Based on *Transmisi Kebijakan Moneter* : Bank Indonesia (2008), if inflation increased central bank of Indonesia would decrease the BI rate to break untimely economic activities thus reducing inflationary pressure. As the result of analysis of hypothesis 3, it shows the positive result between interest rate and NPF ratio. If interest rate decreases, the ratio of NPF will decrease. It also proves that Islamic bank is one of new expectations for banking system that is claimed as anti-crisis business, because when inflation increased, the NPF of Islamic banks could still be in a safe condition, in other word, NPF decreased when inflation increased. The result of Eviews7 shows the t-statistic of GDP is -2.356 with significance of 0.021. It indicates that GDP has a negative and significant effect on NPF. This result agrees with theory formulation as explained previously. The result is consistent with the study by Faiz (2010)

From five independent variables, the strongest variable that affects NPF is ROA. This result agrees with theory formulation as explained previously. When NPF is getting lower, the possibility of ROA is getting higher, so the effectiveness of bank to get profit is good. Meanwhile, the weakest variable that affects NPF is INF. This result is in line with the current condition of Islamic bank in Indonesia, the market share of Islamic bank in the total banking

industry is still very small, which is less than 3% compare to the market share of total assets of commercial banks. Therefore, it indicates that the performance of Islamic bank in Indonesia is more affected by internal-banks variables.

4.1 Efficiency Result

Based on DEA, Islamic banks is efficient if the outputs to inputs ratio equals to one. It means economic activities of those banks already used their inputs well and optimize the outputs. According to Amirillah (2010), Islamic banks are efficient if they raised their efficiency score to one. On the other hand, Islamic bank is inefficient if their efficiency scores between zero and one.

Data processing result of Islamic bank during January 2007 until September 2012 and the explanation are as follow:

Table 4 Efficiency Result

EFFICIENCY							
Month	2007	2008	2009	2010	2011	2012	Mean
JAN	0.99886*	0.88171*	0.99480*	0.99382*	0.90275*	0.92085*	0.94880
FEB	0.99102*	0.89818*	1.00000	0.96938*	0.90682*	0.93334*	0.94979
MAR	0.97017*	0.91317*	1.00000	1.00000	0.91527*	0.98276*	0.96356
APR	0.96960*	0.92896*	0.97039*	1.00000	0.90107*	0.97610*	0.95769
MAY	0.96108*	0.94905*	0.93674*	0.99588*	0.90479*	0.98967*	0.95620
JUN	0.97766*	0.97351*	0.96639*	0.97944*	0.94356*	1.00000	0.97343
JUL	0.98976*	0.97155*	0.98315*	0.99102*	0.95789*	1.00000	0.98223
AUG	0.99333*	0.97021*	1.00000	1.00000	0.98634*	1.00000	0.99165
SEP	1.00000	1.00000	1.00000	0.99148*	0.98961*	1.00000	0.99685
OCT	1.00000	1.00000	0.99187*	0.98107*	1.00000		0.99459
NOV	1.00000	0.98415*	1.00000	1.00000	1.00000		0.99683
DEC	1.00000	0.98453*	1.00000	1.00000	1.00000		0.99691
Mean	0.98762	0.95458	0.98695	0.99184	0.95068	0.97808	0.97571

The * mark shows the month that the position in which Islamic bank is not fully efficient in Indonesia. Inefficiency happens because of some factors that affect the economic activity of those Islamic banks. Generally, lack of human resources, lack of education about Islamic banking and high ratio of non-performing financing are the main factors of inefficiency on Islamic banks in Indonesia during 2007 – 2012. The result shows that Islamic banking efficiency in Indonesia during the period of 2007-2012 experience means efficiency of 97.57%.

4.2 Vector Auto Regression Model Result

To study the effect of non-performing loans on the Islamic banks' efficiency and *vice-versa*, the researchers use two, three and four *lags* to prove and estimate whether "bad luck" hypothesis or "bad management" hypothesis of Berger and De Young (1997) can be implemented in Islamic banking in Indonesia. The result was obtained from Vector Auto Regression equation model in Eviews7 software. The estimation results are presented in Table 5 and Table 6.

The result obtained from the VAR Model for time series (*lag two, lag three and lag four*) shows that the sum of the non-performing financing coefficient is negatively associated with efficiency estimate of Islamic bank. This indicated that non-performing financing has a negative effect on bank efficiency. This result is consistent with study by Karim *et al.* (2010).

Table 5 Bad Management Hypothesis

Dependent : NPF					
	Sum of Coefficient	Sum of Standard Error	Sum of t-ratio	R-Squared of NPF	F-statistic of NPF
EFF Lag 2	-1.979	-4.532	-0.875	0.846	84.849
EFF Lag 3	-3.109	-7.887	-1.290	0.847	54.275
EFF Lag 4	-1.860	-11.044	-0.288	0.850	39.778

Table 6 Bad Luck Hypothesis

Dependent : EFF					
	Sum of Coefficient	Sum of Standard Error	Sum of t-ratio	R-Squared of EFF	F-statistic of EFF
NPF Lag 2	0.001	-0.013	0.343	0.542	18.360
NPF Lag 3	0.001	-0.023	0.805	0.557	12.367
NPF Lag 4	0.002	-0.034	0.964	0.570	9.263

As pointed out by Berger and De Young (1997), the negative relationship indicated increases in non-performing financing tend to be followed by decreases in measured banks efficiency, high levels of problem loans cause banks to increase spending on monitoring, working out, and/or selling off these loans. This result rejects "bad luck" hypothesis proposed by Berger and De Young (1997), because the result shows that the estimated sum of the coefficient of NPF of Islamic bank is associated positively with efficiency.

Likewise, the result shows that the estimated sum of the coefficient of efficiency of Islamic bank is associated negatively with non-performing financing. The result indicated that a decrease in banks efficiency increase non-performing financing. This supports the "bad management" hypothesis proposed by Berger and De Young (1997), which suggested that decrease in measured banks efficiency is generally followed by increases in non-performing financing. The bad management hypothesis implies that the major risks facing financial

institutions are caused internally. This suggests that banks supervision and research should consider banks efficiency along with other traditional predictors of troubled banks such as financing losses and credit risk.

5. Conclusion

The study examines the determinant variables: return on assets (ROA); financing debt ratio (FDR), inflation, interest rate and GDP of NPF. The result shows that ROA, FDR, inflation, interest rate and GDP affect NPF significantly. The bank-specific variable, ROA is the highest coefficient among the determinant variables used in this research that affects NPF, and external variable: Inflation is the weakest coefficient that affects NPF. This result appropriate with current condition of Islamic bank in Indonesia, the market share of Islamic bank in the total banking industry is still very small, which is less than 3% compare to the market share of conventional bank. This result implies that better profitability of the banks reduce the problem financing. Therefore, to reduce credit risk exposure the effective way is by having prudent and professional personnel in managing financing and by pay attention to the internal as well as the external factors that significantly have either positive or negative impact that tend to increase the problem financing. The finding also shows that Islamic banks in Indonesia in the period of January 2007 – September 2012 indirectly support the ‘bad management’ hypothesis. This result supports the finding of the determinants of NPF, more affected by internal variables compared to external variables. ‘Bad Management’ occurs when low efficiency is a signal of poor senior management practices, financing problem are generally caused by controllable factors by management which applies to the day-to-day operations and the management of the portfolio. There are possibilities managers in these banks do not practice adequate financing underwriting, monitoring, and control. As ‘bad’ managers, they may a) have poor skills in credit scoring and therefore choose a relatively high proportion of financing with low or negative net present values, b) be less than fully competent in appraising the value of collateral pledged against the financing, and c) have difficulty monitoring and controlling the borrowers after financing is used to assure that covenants are obeyed. Therefore, low efficiency, or simply inefficiency, occurs before high NPF.

Moreover, The restrictiveness of this research is limited data availability. Bank of Indonesia only provides financial data of Islamic bank per period (aggregate data from all Islamic banking in Indonesia), not per-bank. The researchers try to contact each bank of Islamic bank, but the bank only provides quarter data; monthly data cannot be share because of confidential reason. Those banks suggest using monthly data that Bank Indonesia published only. Therefore, the researchers decided to use aggregate data of Islamic bank (*Syariah* commercial bank (BUS) and *Syariah* units bank (UUS); exclude BPRS) for monthly basis.

Endnotes

- ¹ BBC News Asia - Pacific, “Indonesia Profile June 2013”, <http://www.bbc.co.uk/news/world-asia-pacific-14921238> (accessed August 2013)

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Appendix:

List of Syariah Commercial Banks (BUS) and Syariah Business Unit (UUS) operation in Indonesia

Islamic (syariah) Commercial Bank (BUS)

1. PT Bank Syariah Muamalat Indonesia
2. PT Bank Syariah Mandiri
3. PT Bank Syariah Mega Indonesia
4. PT Bank Syariah Bukopin
5. PT Bank Syariah BRI
6. PT Bank Panin Syariah
7. PT Bank Victoria Syariah
8. PT BCA Syariah
9. PT Bank Jabar dan Banten
10. PT Bank Syariah BNI
11. PT Maybank Indonesia Syariah

Islamic (syariah) Business Unit (UUS) in Conventional Banks

1. PT Bank Danamon
2. PT Bank Permata
3. PT Bank International Indonesia
4. PT CIMB Niaga
5. HSBC, Ltd.
6. PT Bank DKI
7. BPD DIY
8. BPD Jawa Tengah (Jateng)
9. BPD Jawa Timur (Jatim)
10. BPD Banda Aceh
11. BPD Sumatera Utara (Sumut)
12. BPD Sumatera Barat (Sumbar)
13. BPD Riau
14. BPD Sumatera Selatan (Sumsel)
15. BPD Kalimantan Selatan (Kalsel)

16. BPD Kalimantan Barat (Kalbar)
17. BPD Kalimantan Timur (Kaltim)
18. BPD Sulawesi Selatan (Sulsel)
19. BPD Nusa Tenggara Barat (NTB)
20. PT BTN
21. PT Bank Tabungan Pensiunan Nasional (BTPN)
22. PT OCBC NISP
23. PT Bank Sinarmas
24. BPD Jambi

Vector Autoregression Estimates

Date: 03/05/13 Time: 06:31

Sample (adjusted): 3 69

Included observations: 67 after adjustments

Standard errors in () & t-statistics in []

	EFF	NPF
EFF(-1)	0.838	-0.855
	-0.119	-2.288
	[7.01938]	[-0.37377]
EFF(-2)	-0.184	-1.124
	-0.117	-2.244
	[-1.56972]	[-0.50098]
NPF(-1)	0.019	0.889
	-0.007	-0.126
	[2.95690]	[7.04876]
NPF(-2)	-0.018	0.049
	-0.007	-0.130
	[-2.61404]	[0.37891]
C	0.330	2.150
	-0.094	-1.795
	[3.52093]	[1.19811]
R-squared	0.542	0.846
Adj. R-squared	0.513	0.836
Sum sq. resids	0.033	11.963
S.E. equation	0.023	0.439
F-statistic	18.360	84.849
Log likelihood	160.457	-37.354
Akaike AIC	-4.641	1.264

Schwarz SC	-4.476	1.429
Mean dependent	0.974	4.292
S.D. dependent	0.033	1.083
Determinant resid covariance (dof adj.)		0.000
Determinant resid covariance		0.000
Log likelihood		123.596
Akaike information criterion		-3.391
Schwarz criterion		-3.062

Vector Autoregression Estimates

Date: 03/05/13 Time: 06:34

Sample (adjusted): 4 69

Included observations: 66 after adjustments

Standard errors in () & t-statistics in []

	EFF	NPF
EFF(-1)	0.808	-0.773
	-0.129	-2.476
	[6.24952]	[-0.31201]
EFF(-2)	-0.152	-0.268
	-0.162	-3.091
	[-0.94306]	[-0.08660]
EFF(-3)	0.028	-2.069
	-0.121	-2.320
	[0.23011]	[-0.89200]
NPF(-1)	0.021	0.863
	-0.007	-0.129
	[3.06705]	[6.69449]
NPF(-2)	-0.013	-0.012
	-0.009	-0.182
	[-1.33022]	[-0.06708]
NPF(-3)	-0.007	0.096
	-0.007	-0.138
	[-0.93147]	[0.69787]
C	0.304	3.203
	-0.106	-2.037
	[2.85278]	[1.57280]
R-squared	0.557	0.847

Adj. R-squared	0.512	0.831
Sum sq. resids	0.032	11.558
S.E. equation	0.023	0.443
F-statistic	12.367	54.275
Log likelihood	158.661	-36.155
Akaike AIC	-4.596	1.308
Schwarz SC	-4.364	1.540
Mean dependent	0.974	4.270
S.D. dependent	0.033	1.077
Determinant resid covariance (dof adj.)		0.000
Determinant resid covariance		0.000
Log likelihood		122.804
Akaike information criterion		-3.297
Schwarz criterion		-2.833

Vector Autoregression Estimates

Date: 03/05/13 Time: 06:35

Sample (adjusted): 5 69

Included observations: 65 after adjustments

Standard errors in () & t-statistics in []

	EFF	NPF
EFF(-1)	0.804	-0.359
	-0.133	-2.483
	[6.06236]	[-0.14460]
EFF(-2)	-0.185	0.119
	-0.169	-3.160
	[-1.09871]	[0.03767]
EFF(-3)	0.154	-4.826
	-0.165	-3.084
	[0.93704]	[-1.56460]
EFF(-4)	-0.152	3.206
	-0.124	-2.317
	[-1.22602]	[1.38376]
NPF(-1)	0.020	0.864
	-0.007	-0.129
	[2.89038]	[6.67731]

NPF(-2)	-0.012	-0.034
	-0.010	-0.180
	[-1.27623]	[-0.18850]
NPF(-3)	-0.005	0.091
	-0.010	-0.183
	[-0.53997]	[0.49869]
NPF(-4)	-0.001	0.012
	-0.007	-0.139
	[-0.11002]	[0.08511]
C	0.364	2.038
	-0.119	-2.233
	[3.04947]	[0.91279]
R-squared	0.570	0.850
Adj. R-squared	0.508	0.829
Sum sq. resids	0.031	10.745
S.E. equation	0.023	0.438
F-statistic	9.263	39.778
Log likelihood	156.702	-33.732
Akaike AIC	-4.545	1.315
Schwarz SC	-4.244	1.616
Mean dependent	0.974	4.242
S.D. dependent	0.033	1.059
Determinant resid covariance (dof adj.)		0.000
Determinant resid covariance		0.000
Log likelihood		123.085
Akaike information criterion		-3.233
Schwarz criterion		-2.631