

# **Determinants of Sharia Banks' Efficiency in Indonesia:**

## **A Panel Data Analysis**

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### **ABSTRACT**

*Nowadays, the development of Sharia Banks (SB) in Indonesia has shown positive results. However, the development of SB is still slow because their competitiveness levels are lower than those of conventional banks, which is proven by the small market share. One attempt to gain competitiveness is by maintaining efficiency that could constantly and significantly boost the development. This paper aims to estimate factors that affect the efficiency of Sharia banks in Indonesia. The use of panel data of 11 public SB from 2012 – 2016 and random effect regression illustrate how CAR, ROA, ROE, NPF, FDR and Number of Branches (NB) affect efficiency. In particular, we use Operating Expense Ratio (OER) to determine the efficiency level of Sharia Banks. The estimation finds that ROA, FDR, NB have a negative correlation toward OER, NPF has positive effect, and CAR as well as ROE do not significantly affect OER.*

**Keywords:** Efficiency; OER; Sharia Bank; Panel Data; Random Effect Regression.

**JEL Classification:** G21, G29, N25

## 1. INTRODUCTION

Islam is one of the world's largest and fastest growing religions with 7.3 billion followers and mostly located in Asia and Pacific BBC Indonesia, 2017. In Indonesia, around 207 million people are embracing Islam (more than 85% of the total population) Badan Pusat Statistik, 2010. This large number of Muslims population has made Indonesia a potential market for Islamic financial development.

In general, the development of Islamic finance market in Indonesia in last decades has promising results and is quite encouraging. Although it is still relatively small on national scale, the development of Indonesian Islamic finance industry has shown significant growth in the international level, which is ranked 6<sup>th</sup> based on its total financial assets Global Islamic Finance Report, 2017. This achievement is supported by the rapid growth of Sharia banking industry in Indonesia. Evidently, it can be seen from Graph 1, that from 2012 to 2017, total assets, deposits (third-party funds), and financing of Sharia Banks (SB) have been increasing.



Source: Otoritas Jasa Keuangan (2017c).

**Figure 1: The Development of Total Assets, Third-Party Funds, and Financing of Sharia Banks in Indonesia from 2012 - 2016**

However, the existence of SB in Indonesia is still foreshadowed by the conventional banking system, because most of them are operating in dual banking system. This happens because SB still have a relatively small market share. For instance, in 2016, the SB' total market share was only around 5.33%, even though it was 0.46% higher from

the previous year. In comparison, the market share held by the conventional banks was around 94.67% in the same year.

Based on this phenomenon, it appears that conventional banks are still dominating the banking system in Indonesia. In order to compete with conventional banks, SB need to improve and maintain their efficiency. Many studies emphasize that efficiency is important because it can be used as an indicator to assess the bank's ability to maintain performance as the agency in charge of collecting and distributing public funds (See, For example, Widiarti et al., 2015, Wheelock & Wilson, 1999, Hidayati et al., 2017, Muharam & Pusvitasari, 2007, Bisri, 2016, Subandi & Ghozali, 2014, and Weill, 2003). Moreover, efficiency can also be used as a measurement of banks' ability to optimize the output so that SB can provide benefits to customers. In this case, efficiency measurement in the banking industry is paramount.

Firdaus and Hosen (2013) argued that the measurement of the level of efficiency in the Sharia banking industry is very necessary because it can be used to analyze the competitiveness of a bank in the national banking competition. In particular, Widiarti et al. (2015) said that efficiency in the SB is extremely important as it can be used to measure performance. Pambuko (2016) also stated that efficiency must be measured in order to analyze the growth in banking industry. Lastly, Hidayati et al. (2017) emphasized that the measurement of efficiency can be used by the SB as an indicator in minimizing the risks of their operations.

Theoretically, Coelli et al. (2005) stated that there are two senses of efficiency based on economics, such as, economic efficiency and technical efficiency. Economic efficiency has a macro point of view while technical efficiency has a micro viewpoint. The technical relationship in turning inputs into outputs is the restriction of the relationship which is faced by the technical efficiency, so that for improvement it requires only micro-decisions such as internal resource allocation.

Moreover, Muharam and Pusvitasari (2007) argued that there are three approaches in measuring efficiency, such as the ratio, regression, and frontier approach. The measurement of ratio approach is estimated by calculating the ratio between the use of output and input. The value will goes high if the use of output and input are optimal and minimal respectively. The approach using regression can be done by modelling level of output as a function of the different levels of input. Last, the frontier approach can be done through parametric and non-parametric measurement. The parametric measurement uses parametric statistical tests whereas the calculation involves the use of Stochastic Frontier

Approach (SFA) and the Distribution-Free Approach (DFA). In contrast, the non-parametric measurement performs by using DEA (Data Envelopment Analysis).

Previous studies on the measurement of the efficiency of SB, generally found that it is yet to be optimal. In this case, Pratikto and Sugianto (2011) found that the average value of the efficiency of SB in Indonesia decreased after the global crisis. Interestingly, Havidz et al. (2017) proved that the technical efficiency of Islamic banks has always been fluctuated whereas in the first quarter of 2011 the value of efficiency was very low even though at the end of the quarter of 2012 the efficiency of Islamic banks was starting to rise again. Another study conducted by Effendi (2016) found that SRB are more efficient than SB. Moreover, Farandy et al. (2017) in which they found that from 10 SB in Indonesia, there were only 2 SB that have reached an optimal efficiency between 2011 and 2014.

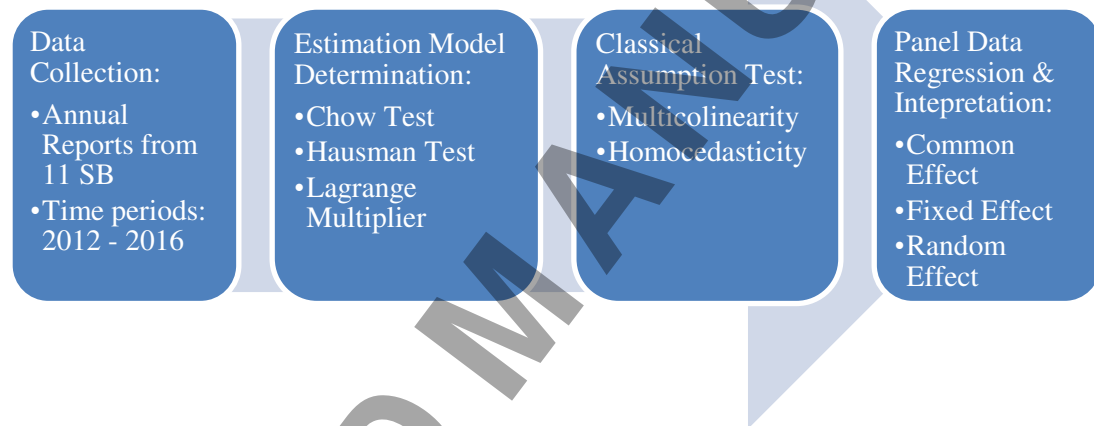
Based on the factors that might be associated to the efficiency of SB, some previous findings showed inconsistent results. For instance, Pambuko (2016) found that CAR (Capital Adequacy Ratio), FDR (Financing to Deposit Ratio), ROA (Return on Assets), NPF (Non Performing Finance) and NIM (Net Interest Margin) had positive impacts on the value of efficiency. This finding supports previous studies in Sufian and Noor (2009), Fathony (2012), Ahmad and Noor (2011), Subandi and Ghazali (2014), and Lutfiana and Yulianto (2015). Another factors such as good corporate governance (GCG) of SB negatively affect the value of efficiency. However, Pambuko (2016) also observed the magnitude of the GDP (Gross Domestic Product) and inflation in which both of them have insignificant effect toward efficiency. Similarly, Hidayati et al. (2017) found that CAR and financing products from SB have a positive influence on the efficiency, while in Third Parties Funds TPF showed the reverse. In contrast, Firdaus and Hosen (2013) found that CAR, NPF, and the Number of Branches (NB) owned by SB negatively affect the value of efficiency, even though ROA, ROE (Return on Equity), and the value of assets have positively associated.

From many literatures, the use of OER (Operating Expense Ratio) as an approach for efficiency is still yet to be found. In this case, under the regulation of the Otoritas Jasa Keuangan (Financial Services Authority) number 6 / POJK No.03 / 2016 Article 21 paragraph 2 which states that the achievement of the level of bank efficiency among others measured through the variable OER and the ratio of NIM Otoritas Jasa Keuangan, 2017a. Thus, based on above explanation, this study aims to observe the determinants of the efficiency of SB in Indonesia between the year of 2012 to 2016 and using OER ratio as our dependent variable. We use CAR, ROA, ROE, NPF, FDR, and NB as independent

variables. The independent variables are constructed based on previous studies (see, for example, Sufian & Noor, 2009; Ariyani, 2010; Ahmad & Noor, 2011; Sardar et al., 2011; Pambuko, 2016; Firdaus & Hosen, 2013; Mu'izzuddin & Isnurhadi, 2013; Rozzani & Rahman, 2013; Subandi & Ghozali, 2014; Lutfiana & Yulianto, 2015; Bisri, 2016; and Havidz et al., 2017).

Finally, this paper is organized as follows. Section II discusses the method used in this research while section III presents our main results. The final section concludes.

## 2. RESEARCH METHODS



**Figure 2: Scheme of Panel Data Analysis**

We use Panel Least Square method to estimate the factors that affect efficiency of SB. There are some advantages about the use of this method. First, it allows the estimation to control for variables that cannot be observed or measured such as difference in business practice across individual (SB in our case). Moreover, it will produce more degree of freedom and more sample variability than cross-sectional data or time series. Lastly, panel data can minimize the effects of aggregation bias, from aggregating individuals into broad groups (Wooldridge, 2010).

According to Baltagi (2005), there are three approaches that can be used to estimate panel data, such as common/pooled effect, fixed effect, and random effect model. The common effect model is a simple panel data regression approach, where it is assumed that there are no unique attributes of individuals within the measurement set, and no universal effects across time. On the other hand, fixed effect model assumes that there are unique

attributes of individuals that do not vary across time. These attributes may or may not be correlated with the individual dependent variables. Lastly, random effect model assumes that there are unique, time constant attributes of individuals that are not correlated with the individual regressors.

In order to choose the most appropriate model, we use Chow test, Hausman test, and Lagrange Multiplier test. Chow test is performed to determine the accuracy of the estimation model of pooled or fixed. Hausman test is conducted to specify the accuracy of the estimation model between Fixed and Random. Lastly, Lagrange multiplier test was done in order to determine the accuracy of the estimation model between pooled and random (For details, see Baltagi, 2005 and Wooldridge, 2010).

### 2.1. Data

We use secondary panel data obtained from the annual report published by 11 SB in Indonesia namely, BCA Syariah, BJB Syariah, BNI Syariah, BRI Syariah, Bank Mega Syariah, Bank Muamalat Indonesia, Bank Panin Syariah, Bank Syariah Bukopin, Bank Syariah Mandiri, Bank Victoria Syariah and Maybank Syariah. For each SB, we employed 5 years (2012 – 2016) time periods which make a balanced panel and 55 total observation.

### 2.2. Regression Model Specification

The panel data regression model used is as follows:

$$OER_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 ROA_{it} + \beta_3 ROE_{it} + \beta_4 NPF_{it} + \beta_5 FDR_{it} + \beta_6 NB_{it} + U_{it}$$

Where, OER is operating expense ratio, CAR is capital adequacy ratio, ROA is return on Asset, ROE is return on equity, NPF is nonperforming financing, FDR is financing deposit ratio, and NB is number of branches.  $\beta_0$  is intercept term, i and t subscripts represent the individual and time period respectively.  $\beta_1$  to  $\beta_6$  are the coefficient for the independent variables and U stands for error term.

## 3. RESULTS AND DISCUSSIONS

Based on the panel data test (Chow Test, Lagrange Multiplier Test, and Hausman Test) we found that the best estimator for regression model is Random Effect (See: Appendix 1). The regression output of random effect is as follow:

### The Random Effects Model

*Dependent variable: OER*

Independent variable	Coefficient	t-statistic	P-value
$CAR_{it}$	0.0200493	0.076627	0.9392
$ROA_{it}$	-2.453846**	-2.258981	0.0285
$ROE_{it}$	0.0933112	0.519697	0.6057
$NPF_{it}$	1.473187***	3.104377	0.0032
$FDR_{it}$	-0.368337***	-3.11442	0.0031
$NB_{it}$	-0.001280*	-1.709881	0.0937
Constant	1.275523***	11.28857	0.0000

R-squared = 0.777    F-stat = 27.954\*\*\*

\*\*\*, \*\*, and \* are statistically significant at 1%, 5%, and 10% level respectively

Based on the estimation result, the relationship between ROA and OER is significantly negative at five percent level and if there is one percent increase of ROA, it will decrease OER approximately by 2.5 percent, *ceteris paribus*. This result is obvious since ROA measures how profitable a SB' assets is in generating revenue. A high revenue will lower OER and that will increase efficiency of SB. This estimation is in line with the findings by Pambuko (2016), Firdaus and Hosen (2013), Sardar et al. (2011), and Sufian and Noor (2009).

The effect of NPF on OER is obviously positive and significant at one percent level. When NPF increases by one percent it will increase OER by approximately 1.5 percent, meaning that when there is an increase in debt service default, SB suffer more of inefficiency. This finding is supporting the study of Pambuko (2016), Firdaus and Hosen (2013), Sufian and Noor (2009), and Ahmad and Noor (2011).

Similar finding on FDR which has a reverse correlation toward OER where one percent increase of FDR decreases OER significantly by around 0.37 percent at one percent level. This result is in line with the findings of Lutfiana and Yulianto (2015), Sufian and Noor (2009), Subandi and Ghazali (2014) and Pambuko (2016). Moreover, based on Financing Development of SB in Indonesia from the beginning of 2016 until the end of 2017 (See: Appendix 2), there were three highest financing products of SB, such as *Murabahah*, *Musyarakah*, and *Mudharabah*. In this case, the FDR of SB is generated by these three products, which was highly dominated by *Murabahah*, because it is considered as a low-risk product.

Surprisingly, variable NB has a negative effect toward OER significantly at 10 percent level. It means that despite the tiny coefficient it has, it is likely to increase efficiency of SB. This finding is in line with the advice from Otoritas Jasa Keuangan (Financial Service Authority of Indonesia). It is written in Sharia Financial Roadmap 2017 – 2019, in which opening more branches might increase financial inclusion Otoritas Jasa Keuangan, 2017b. The increase of financial inclusion can be expected to increase efficiency of SB, in which more sharia financial products can be more distributed across regions. This particular result is a new finding because most of the previous studies found that NB has no significant effect on efficiency (See, For example, Lutfiana & Yulianto, 2015, Jackson & Fethi, 2000, Firdaus & Hosen, 2013).

Lastly, we find that variable CAR and ROE is not statistically significant. The insignificant effect of CAR is in line with the finding by Mu'izzuddin and Isnurhadi (2013) and that of ROE is in line with the finding by Lutfiana and Yulianto (2015).

#### 4. CONCLUSIONS

The purpose of this research is to determine the factors affecting OER of BUS as an indicator of efficiency. We find that ROA, NPF, FDR, and NB are significantly affect OER. The first three variables are supporting the previous studies. Interestingly, NB affect OER negatively, meaning that when SB open more branches, their efficiency will likely to increase. This is a new finding since there is no other study that has the same result. Moreover, NPF has a positive effect on OER. It is obvious since an increase in debt service default will decrease efficiency of SB. On the other hand, we found that CAR and ROE have insignificant effect on OER.

Based on the above conclusion, SB need to be more cautious in placing and distributing funds to *Mudharib* to ensure liquidity and improve profitability in SB. In order



to maintain their efficiency, SB must focus in increasing the amount of financing that is provided for the productive sectors and should be able to suppress or manage NPF value at a rational level. In addition, SB also need to increase and expand the number of Islamic financial products which can be distributed into different segments and manage by numbers of branches in many regions in Indonesia.

## 5. ACKNOWLEDGMENT

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## 7. APPENDIXES

### 1. Panel Data Test

#### a. Chow Test

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.582314	(10,38)	0.0171
Cross-section Chi-square	28.519133		100.0015

#### b. 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	3.995258		60.6773

#### c. Lagrange Multiplier

Lagrange Multiplier Tests for Random Effects

Null hypotheses: No effects

Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

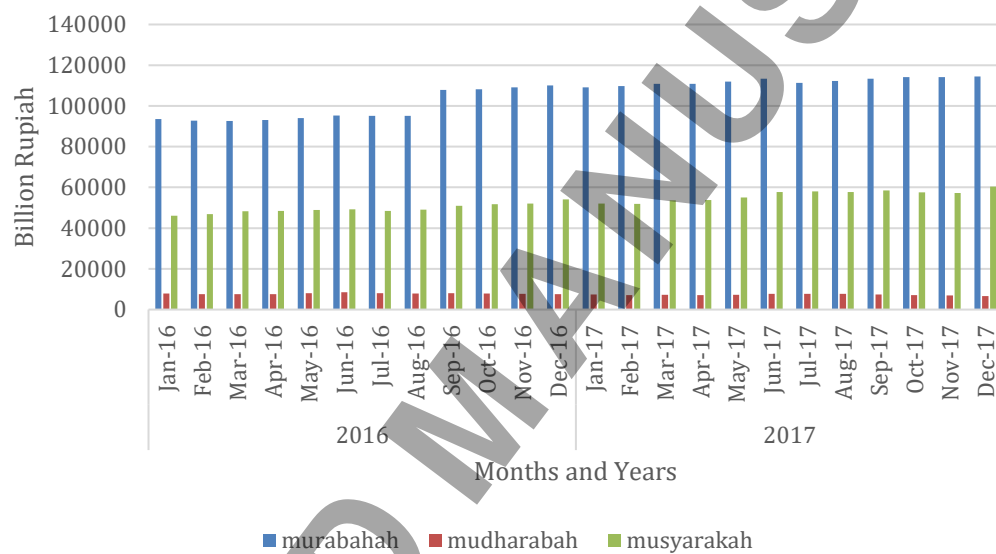
	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	5.692926 (0.0170)	0.351710 (0.5531)	6.044636 (0.0139)
Honda	2.385985 (0.0085)	0.593051 (0.2766)	2.106497 (0.0176)
King-Wu	2.385985	0.593051	1.776582

	(0.0085)	(0.2766)	(0.0378)
Standardized Honda	3.415219	0.928871	-0.309590
	(0.0003)	(0.1765)	
Standardized King-Wu	3.415219	0.928871	-0.515513
	(0.0003)	(0.1765)	--
Gourierieux, et al.*	--	--	6.044636
			(< 0.05)

\*Mixed chi-square asymptotic critical values:

1%	7.289
5%	4.321
10%	2.952

2.



Source: Otoritas Jasa Keuangan (2017c).

**Figure 3: Financing Development of SB in Indonesia 2016 - 2017**