



## **EFFICIENCY AND OWNERSHIP STRUCTURE: EVIDENCE FROM RURAL BANKS IN INDONESIA**

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### **ABSTRACT**

This paper aims at examining whether ownership structure, which is represented by ownership concentration and type of ownership, affects the technical efficiency of both Islamic and conventional rural banks in Indonesia. First, this study estimates the efficiency score of Islamic and conventional rural banks using Stochastic Frontier Analysis (SFA). The findings suggest that the gap of efficiency level holds among the Islamic Rural Banks (BPRS), yet unobservable in the case of their conventional counterparts (BPR). Management of BPRS is under a big question as the results also indicate that the Islamic microfinance institutions' inefficiency is getting more severe over time. Second, by using Generalized Linear Model (GLM), this study points out that ownership concentration can explain the inefficiency of BPRS. Relationship between ownership and efficiency appears in cubic polynomial, instead of traditional linear form. It shows that expropriation and alignment effects are jointly embedded in the BPRS. This allows derivation of minimum and maximum turning point of BPRS ownership, which would be very beneficial for policy recommendations.

JEL Classification: G21, G34

Key words: Microfinance, Islamic rural bank, Technical efficiency, Ownership structure, Non-linear relationships

### **1. INTRODUCTION**

This study is an attempt at examining the effect of ownership structure on the efficiency of Islamic rural banks in the biggest Muslim population country, Indonesia. Islamic rural bank is an important institution in Islamic finance (IF), as it is preserving the hope of re-embedding the social objective which is currently still detached from IF practices (Ahmed, 2013). The model is conceivably better

compared to other types of Islamic mode of financing, such as cooperative and non-profit organization, in terms of outreach and business sustainability. However, in practice, Islamic rural banks are still inefficient because of lack of managerial skills (Seibel and Agung, 2006; Servin, Lensink, and van den Berg, 2012). The consequence might be hazardous for Islamic rural banks, as given the presence of embedded withdrawal and reputational risks in the model (Ahmed and Khan, 2007), rational customers who demand higher professionalism more than Islamic form of the institution may abandon the model.

It is argued that one cause of Islamic rural bank inefficiency is lack of managerial competency. In that regard, the ownership structure can be the main factor determining managerial performance, and thus institutional efficiency. Studies pertaining to good governance and agency problems clearly suggest that ownership structure does matter in every firm's performance (Jensen and Meckling, 1976; Claessens et al., 2002). However, the role of ownership structure in the Islamic rural banks is rarely examined by previous studies.

This study, therefore, bridges the abovementioned gap. In the first stage, Stochastic Frontier Analysis (SFA) is utilized to determine the cost efficiency of Indonesian Islamic rural banks (or *Bank Perkreditan Rakyat Syariah*, BPRS) as well as that of conventional rural banks (*Bank Perkreditan Rakyat*, BPR). In the second stage, the obtained efficiency score is utilized to examine whether ownership structure is priced in both BPRS and BPR efficiency.

Indonesia is used as the unit analysis for some plausible reasons. First, Indonesia is the biggest Muslim country with "the most diverse financial sector in the world" (Ahmed, 2013). This condition leads to high competition among the same type as well as the cross-type of financial organizations. Second, the country has high dependency on presence of micro, small and medium enterprises (Berry, Rodriguez, and Sandee, 2002; Mourougane, 2012; Masyita and Ahmed, 2013), yet still lacks the appropriate mode of financing to support them (Huda, 2012). Finally, the country faces geographical challenges, namely 17,508 islands separated from one another (Central Intelligence Agency, 2015), leads to difficulty in providing a just financial inclusion to its citizens. Those reasons hence locate BPRS as an important financial institution in the country.

The rest of this paper will be arranged as follows. Section 2 reviews literature pertaining to this topic. Section 3 elucidates data and methodology while results and discussion are presented in section 4. Section 5 concludes this study and section 6 gives some policy

recommendations. Finally, section 7 proposes recommendations for future research.

## 2. LITERATURE REVIEW

### 2.1 ISLAMIC BANKS AND MICROFINANCE INSTITUTIONS

Islamic banks (IBs) have experienced immense growth, not only in Muslim countries but also in some non-Muslim countries. However, to date, development of IBs still leaves a substantial gap between theory and practice (Asutay, 2007). Theoretically, beyond conventional banks, which focus only on the economic objective, IBs are supposed to incorporate legal and social objectives in their business as well. The legal objective represents their adherence to *sharī'ah* law, which includes fulfilment of right term and condition (form) and accomplishment of *maqāṣid al-sharī'ah* (objectives of the Islamic law) (substance). While social objective portrays IBs' concern to serve the basic needs (necessities) for all segments of clients (poor, middle-income and affluent), in practice Ahmed (2011) asserts that the latter objective has not been incorporated yet by IBs. Instead, IBs tend to focus only on *sharī'ah* compliance form and nothing on the social dimension substance.

Divergence between theory and practice does not exist without reasons. Practical argument claims that IBs are not a social business; instead, as a common business they must focus on satisfying their shareholders through performing well, particularly in terms of financial performance. It is argued that accomplishing sustainability of IBs, through maintaining good financial performance, and polishing their outreach, through expanding operations to rural areas and providing financial service to the poor, are a trade-off as both are impossible to be attained simultaneously (Hermes, Lensink, and Meesters, 2011). In consequence, in order to achieve sustainability, IBs must reduce their costs and risks by means of, among others, exclusion of non-bankable people without traceable financial records and those unable to provide collateral for banks.

One of the proposed solutions to address the abovementioned problems is providing different financial services to the poor (see ADB, 2000). Islamic finance then came up with various types of so-called Islamic microfinance institutions (IMFIs), where they generally can be divided into three types. The first type is non-profit organizations (NGO) such as Rescue in Bangladesh and Peramu Foundation in Indonesia. The second one is cooperative organization

such as Takaful T&T Friendly Society in Trinidad and Tobago and Bank Rakyat Ar-Rahnu Programme in Malaysia. The last one is for-profit organization such as Rural Development Scheme of IBBL in Bangladesh (commercial bank) and Bank Perkreditan Rakyat Syariah (BPRS) in Indonesia (rural bank) (see Ahmed, 2013).

Among other types of IMFIs, Islamic rural bank offers some important advantages. First, it has more robust source of funding since regulation allows collection of deposit from third party as in commercial banks (Seibel and Agung, 2006). It is worth noting that limited funding source is the main problem for non-profit organizations and cooperative types of IMFIs. That limitation forces them to utilize external funding sources, which are somewhat scant (such as international aid), with bureaucratic delay (such as government subsidies) and against their ideology (such as the interest-based scheme for IMFIs). Second, Islamic rural banks provide more professional and well-trained employees since they have bigger source of funds and economies of scale, thus allowing employees to receive appropriate training (Ahmed, 2004; Enu-Kwesi, Koomson, and Baah-Mintah, 2013). This advantage, in contrast, may not be fulfilled by the rest of IMFIs. Therefore, Islamic rural bank might be considered as the most favorable IMFI model in terms of sustainability.

## 2.2 ISLAMIC RURAL BANK IN INDONESIA

In Indonesia, the emergence of rural bank (BPR) was formally initiated in 1989 through the President's Decision No. 38, National Act No.7/1992 and National Act No. 10/1998 (Ahmed, 2013). The first BPR was formed in 1989 followed by the emergence of BPRS two years later (Seibel and Agung, 2006; Seibel, 2008). According to OJK (2015), until October 2015, the number of BPR in Indonesia has reached 1,644 banks with total assets equal to IDR 98,628 billion (equivalent to around USD 7.45 billion) or accounting for 1.61% of commercial bank total assets. The same source shows that total assets of BPRS was Rp 7,303 billion (equivalent to around USD 552 million), which is equivalent to 0.12% of commercial bank total assets.

Although BPRS is statistically inferior compared to conventional rural bank and commercial bank, the role of BPRS in Indonesia's economy is prominent for the following reasons. First, unlike BPR, BPRS owners tend to have social missions besides commercial orientations (Seibel and Agung, 2006). This is reflected by means of financing and assisting the poor enterprises and

underprivileged people. Second, unlike the commercial banks, BPRS can be a solution to fill the gap of financing source for small and medium enterprises (SMEs), especially those demanding Islamic compliant financing. The BRPS role is important because SME contribution in Indonesia is very high (Masyita and Ahmed, 2013); yet they still suffer lack of access to appropriate financing.

### 2.3 ISLAMIC RURAL BANKS' EFFICIENCY

Islamic rural banks' efficiency has not received much attention in the academic literature yet, even though Shawtari, Saiti, and Razak (2015) emphasize that, in Islamic financial institutions, efficiency deserves even more concern than profitability. Donkor and Tweneboah-Kodua (2013) also support that statement as they find that all critical factors of rural bank success could be summarized by the single word "efficiency".

The scant research on rural bank efficiency has concluded that Islamic rural bank efficiency is questionable. This is true particularly in some countries such as Indonesia, Bangladesh, Sri Lanka, India, Kenya, Malawi and Ghana (see Hulme and Mosley, 1996; Khankhoje and Sathye, 2008). In Indonesia, Seibel (2008) investigated some reasons behind the poor efficiency of BPRSs, including: (i) governance and management problems; (ii) inadequate internal control; (iii) lack of popular demand; (iv) neglect of more profitable market segments; and (v) lack of mastery of Islamic banking practice.

### 2.4 MEASURES OF EFFICIENCY

Efficiency is a financial concept of evaluating to what extent the invested (inputs) capitals yield outcomes (Belanes, Ftiti, and Regaieg, 2015). A process is considered as technically efficient when it is able to reach as many outcomes as possible given some set of inputs or to utilize as minimum as possible inputs to produce some set of outputs. Literature suggests two common approaches to measuring technical efficiency. First is the non-parametric approach by using Data Envelopment Analysis (DEA), which was firstly introduced by Farrell (1957), even though its popularity came from the significant work by Charnes, Cooper, and Rhodes (1978). The second one is the parametric approach by using Stochastic Frontier Model (SFA), which was developed independently by Aigner, Lovell, and Schmidt (1977) and Meeusen and Broeck (1977).

The two approaches differ in some aspects. SFA uses certain econometric technique to estimate the production function's error, which, in turn, will be converted into the efficiency value. In contrast, DEA uses a non-parametric linear programming technique to get the efficiency value. Also, SFA employs stochastic frontier with a probability distribution, whilst DEA employs deterministic (non-stochastic) frontier. Finally, SFA has a single output or an a priori weighted average of multiple outputs, whereas DEA has more than one output or has no a priori weight; instead, it assumes input-output separability.

This study opts for Stochastic Frontier Analysis (SFA) because of the following advantages. First, SFA allows noise in the inefficiency measurement (Belanes, Ftiti and Regaieg, 2015). Second, it also ensures higher reliability of the estimated efficiency (Battese and Coelli, 1995). Furthermore, unlike DEA which assumes the distance between banks and frontier is completely because of inefficiency, SFA assumes the difference between the two is due to randomness by mean of assigning a distribution to stochastic component of the model; hence allowing better inference (Aiello and Bonanno, 2015). Finally, SFA contains explanations as to what factors are driving the efficiency (Viverita and Ariff, 2011), which is also the concern of this study.

## 2.5 EFFECT OF OWNERSHIP STRUCTURE ON RURAL BANK EFFICIENCY

Ownership structure can be considered as a determinant of efficiency through two channels. First, ownership represents the character of firm's decision-making through type of owners. Second, ownership may proxy agency problems in the firm through concentration of ownership (Jensen and Meckling, 1976). Therefore, this study segregates ownership structure into two dimensions, namely (i) type of ownership and (ii) concentration of ownership.

From a general perspective, ownership type of bank can be categorized as (i) state-owned, (ii) private-owned, and (iii) foreign-owned. The bulk of studies conducted have pertained to the effect of different ownership type on performance. However, the majority of them focused on the context of banks in general, instead of rural banks, and that of performance in general instead of efficiency in particular.

For instance, Sturm and Williams (2004), Bonin, Hasan and Wachtel (2005), Micco, Panizza and Yanez (2007), Berger, Hasan and Zhou (2009), Delis and Papanikolaou (2009), Ferri (2009), Lin

and Zhang (2009) and Cornett et al. (2010) show that state-owned banks underperformed private and foreign banks. Moreover, some studies also look at Indonesia as the country of analysis. Muazaroh et al. (2012) document that foreign banks are more efficient compared to domestic bank due to scale efficiency advantage. Parinduri and Riyanto (2014) and Subandi (2014) argue that state-owned bank is the least efficient bank compared to joint venture and foreign bank.

Those studies conclude that type of ownership is priced in the efficiency of the bank. However, in terms of rural bank, type of ownership is obviously different, particularly in the sense that their ownership is rarely foreign and many of them are of institutional ownership (such as the so-called *yayasan* or trust). Seibel and Agung (2006) further mention that BPRS ownership type varies from owned by individuals, foundations and companies. This study, thus, categorizes the rural bank ownership type into (i) state-owned (municipal); (ii) institutional; and (iii) individual ownership. In this regard, institutional investor probably has more experience and is well trained to conduct BPRS business; hence making the business more efficient compared to private owned (individual) BPRS (Reddy and Yin, 2012). Moreover, municipal-owned BPRS may have same characteristics with the state-owned ones in which they may not be doing business to maximize profit and efficiency only (Shleifer and Vishny, 1997). Instead, they might conduct it to support the government agenda.

Furthermore, literature also concerns the different effect of low and high concentration on firm performance. Jensen and Meckling (1976) argue that performance will be negatively related to low ownership concentration yet, in contrast, positively related to high one. Other studies are also conducted by Cho (1988), who reports significant relationship between ownership concentration and firm's investment activities; Salami (2011), who argues for positive relationship between ownership concentration and efficiency; and Hassan, Othman, and Mukaramah (2014), who suggest that a firm with higher ownership concentration experiences higher efficiency compared to that with lower one.

Whereas BPRS diverges with other institutions in terms of ownership type, it is supposed to converge with them in terms of ownership concentration except the fact that their ownership structures are typically augmented with some major owners. BPRS can be considered as other businesses as usual, in which, according to the theory, the more concentrated the ownership the higher the possibility

that majority shareholders use BPRS to satisfy their own interest, in other words expropriate the minority interests.

## 2.6 OTHER DETERMINANTS OF RURAL BANK EFFICIENCY

This study controls three other main determinants of rural bank's efficiency, namely: capital structure, liquidity and risk management variables; along with regional (i.e., province) fixed effect.

### 2.6.1 CAPITAL STRUCTURE

This study defines capital structure as the ratio of equity over the total assets of rural bank. Staikouras, Mamatzakis and Koutsomanoli-Filippaki (2008) and Sokic (2015) document positive effect of ratio equity to assets on bank efficiency. Higher equity to total assets ratio is associated with higher risk for shareholders, hence this encourages them to supervise bank management in order to nurture higher efficiency.

### 2.6.2 LIQUIDITY

Cash to total assets ratio delineates rural bank's liquidity (Staikouras, Mamatzakis and Koutsomanoli-Filippaki, 2008). Although its role in stability is important, holding liquid assets is costly for rural banks, and thus implies high opportunity cost (Maddaloni, 2015). If a rural bank decides to keep liquid assets, the bank is prevented from expanding its financing activities, and thus profitability is forestalled. Hence, as well recognized in the financial literature, there is negative relationship between liquidity and profitability. Thus, the relationship between liquidity and efficiency should be negative as well.

### 2.6.3 RISK MANAGEMENT

This study measures risk management in terms of non-performing financing (or non-performing loan for conventional rural banks) ratio which reflects the quality of rural bank's fund (loan). Huges and Master (1998) and Sokic (2015) document negative relationship between loan quality and efficiency. The relationship is completely plausible because the higher NPF means the lower risk management quality of rural bank, and thus leads to inefficiency. However, others have suggested that Non Performing Fund does not significantly affect efficiency (Muazaroh et al., 2012).



### 3. DATA AND METHODOLOGY

This study can be divided into two stages. The first stage is calculation of efficiency score for each BPRS and BPR, while the second one is examining the effect of ownership structure on efficiency.

#### 3.1 DATA SELECTION

The data selection is conducted as follows. First, this study sets the period according to availability of BPRS data in Bank Indonesia (BI, Indonesian Central Bank) and *Otoritas Jasa Keuangan* (OJK, Indonesian Financial Service Authority). The data are only available from 2011 to 2015 quarterly. Furthermore, the sample of BPR is determined based on region (province) and based on availability of BPRS in that particular region. In order to make appropriate comparison, this study uses only the sample of BPR in the region in which the data of BPRS is available. Finally, banks which the variable used is not available are excluded.

#### 3.2 MEASURE OF EFFICIENCY SCORE

The Stochastic Frontier Analysis (SFA) is used to calculate efficiency score for each BPRS and BPR. SFA allows computation of efficiency in terms of cost and profit, though the literature suggests consistent result using both cost and profit efficiency (Berger, Hasan, and Zhou, 2009). Therefore, this study emphasizes only on the cost efficiency as an efficiency measure rather than redundantly utilizing both. Cost efficiency measures how close rural bank is predicted to the best practice (minimum cost) parameter under the same outputs and surroundings. This implies that the minimum cost will be determined by the best performance in the sample.

The efficiency is measured through total cost function, which, by definition, relies on input price, output volumes, environmental factors, efficiency, and random error (Berger and Mester, 1997) as follows.

$$(1) \quad C_{it} = C(P_{it}, Y_{it}, Z_{it}, u_{it}, v_{it})$$

where  $C$  measures variable rural bank total cost,  $P$  is the vector of price,  $Y$  is the vector of output volumes,  $Z$  is a vector of surroundings,  $u$  depicts inefficiency factor and  $v$  indicates random error. Furthermore, this study estimates efficiency levels by specifying

translog of total cost function (see Sokic, 2015). Thus, the total cost function can be written as follows.

$$(2) \quad \ln C_{it} = \alpha_0 + \sum_j \alpha_j \ln(P_j)_t + \sum_k \beta_k \ln(Y_k)_t + \frac{1}{2} \sum_j \sum_l \phi_{jl} \ln(P_j)_t \ln(P_l)_t + \frac{1}{2} \sum_k \sum_m \varphi_{km} \ln(Y_m)_t \ln(Y_m)_t + \sum_j \sum_k \gamma_{jk} \ln(P_j)_t \ln(Y_k)_t + \sum_s \delta_s \ln(Z_s)_t + \ln u_{it} + \ln v_{it}$$

Equation (2) has two output variables, namely total loan ( $Y_1$ ) and other earning assets ( $Y_2$ ), and two input variables, namely price of fund ( $P_1$ ) and price of labor ( $P_2$ ). In addition, the model also includes Islamic rural bank's specific variables ( $Z_s$ ) to control heterogeneity of risk preferences. It consists of ratio equity to total assets ( $CAP$ ), ratio cash to assets ( $LIQ$ ) and non-performing financing to total assets ( $NPF$ ). Table 1 shows the summary of the variables used in (2).

TABLE 1  
Variables and Operational Definitions

Var.	Var. Name	Operational		Category
		BPRS	BPR	
$C$	Total cost	Operational and non-operational expense	Operational and Non-operational expense	Cost
$Y_1$	Total loans	Total Financing	Total Loans	Output
$Y_2$	Other earning assets	Other assets	Other Assets	
$P_1$	Price of funds	Total profit sharing for third party divided by total assets	Total interest expense divided by price total assets	Input
$P_2$	Price of labor	Ratio of total salary to total assets	Ratio of total salary to total assets	
$CAP$	Equity to assets	Ratio total equity to total assets	Ratio total equity to total assets	Bank-specific variables
$LIQ$	Cash to assets	Ratio total cash to total assets	Ratio total cash to total assets	
$NPF$	Non-performing financing	Net performing loan to total assets	Net performing loan to total assets	

The model is estimated using the maximum likelihood estimation (MLE) technique. This model assumes that the random

error variable ( $v$ ) is independently and identically distributed  $N(0, \sigma_v^2)$  besides assuming the independent  $u$  variable is non-negative truncations of the  $N(0, \sigma^2)$ . According to Battese and Coelli (1995), the technical efficiency of rural bank is obtained by  $e^{-u_i}$ .

### 3.3 DETERMINANT OF EFFICIENCY

This study uses three categories of the right-hand side variables as determinant of efficiency, namely rural bank ownership as the main variable, rural bank specific variables and region-specific variable. First, rural bank ownership variable is divided into type and concentration ownership. As in the prior studies, the former is measured by dummy, which has value of one for state ownership, two for institutional ownership and zero for otherwise (see Utama and Jatmiko, 2015). For measuring ownership concentration, we use percentage of the highest share owned by the owners.

Besides ownership structure variable, this study also examines some Islamic rural bank's specific factors, including capital structure (CAP), Liquidity (LIQ) and risk management variable (NPF). CAP is measured by ratio of total equity to total assets. LIQ is calculated by ratio of total cash to total assets. While NPF is computed as ratio of net performing loan to total assets (see Table 1).

Finally, this study utilizes province fixed effect (DREG) in order to control heterogeneity at the regional level. Thus, the model of determinant of rural bank efficiency is represented by (3):

$$(3) \quad EFC_{it} = \beta_0 + \beta_1 OWNT_{it} + \beta_2 OWNC_{it} + \beta_3 CAP_{it} + \beta_4 LIQ_{it} + \beta_5 NPF_{it} + DREG_i + \xi_{it}$$

## 4. RESULT AND DISCUSSION

### 4.1 DESCRIPTIVE ANALYSIS

Table 2 represents the summary statistics of the variables used in this study for both BPRS and BPR. After adjustment, this study utilizes 152 BPRS and 120 BPR, from 20 provinces in Indonesia.

From a general perspective, total cost to total assets of BPRS is higher than that of BPR. BPRS has average total cost of 18.6%, while BPR has only 12.3%. However, the variation of total cost BPR is slightly higher than BPRS as reflected from the value of standard deviation. This indicates that the cost of BPRS tend to be consistently higher than that of BPR.

TABLE 2  
Summary Statistic for Variables

Var.	Mean		St. Dev.		Minimum		Maximum	
	BPRS	BPR	BPRS	BPR	BPRS	BPR	BPRS	BPR
<i>C</i>	0.186	0.123	0.118	0.142	0.007	0.000	1.698	2.830
<i>P</i> <sub>1</sub>	0.037	0.034	0.027	0.042	0.000	0.000	0.534	0.846
<i>P</i> <sub>2</sub>	0.044	0.041	0.030	0.054	0.002	0.000	0.271	1.133
<i>Y</i> <sub>1</sub>	0.699	0.738	0.164	0.146	0.013	0.000	1.831	1.912
<i>Y</i> <sub>2</sub>	0.234	0.225	0.130	0.146	0.002	0.000	0.976	0.967
<i>LIQ</i>	0.017	0.016	0.016	0.034	0.000	0.000	0.172	0.605
<i>CAP</i>	0.185	0.497	0.143	0.786	0.000	0.000	1.107	10.868
<i>NPF</i>	0.018	0.017	0.035	0.054	0.000	0.000	1.261	1.294

Note: The number of observations for BPRS and BPR are 2,441 and 2,250, respectively.

Furthermore, the output variables, namely  $Y_1$  (price of fund) and  $Y_2$  (price of labor), and Input variables, namely  $P_1$  (total loan) and  $P_2$  (other earning assets), for both models have only little differences. In general, BPRS unsurprisingly have higher input price factors than BPR. It may be caused by higher profit sharing and salary expense. In addition, the rural bank specific variables, namely Liquidity and Non-Performing Financing, between the two are also not significantly different. The only difference is located in the Capital Structure choice. The proportion of capital to the liabilities of BPR is more proportional compared to those of BPRS, which, in contrast, has high accumulation of source of funding in terms of liabilities.

#### 4.2 EFFICIENCY RESULT

In the first stage, this study determines the efficiency score of BPRS and BPR using SFA. Tables 3.1 and 3.2 delineates the summary statistic besides providing comparison between the two with respect to the type of owners, ownership concentration and both. Concentration of ownership is divided also into Low, Mid and High category which respectively represent less than or equal to 30%, more than or equal to 70% and between 30% and 70%.

From a general perspective, SFA suggests that inefficiency does matter in BPRS. This is in the sense that there is significantly different level of inefficiency between one and other BPRS. Time invariant model of SFA is utilized since the result indicates the inefficiency score of BPRS as a whole changes over time. The results

document that the value of eta ( $\eta$ ) for the BPRS model is -0.115 (with  $z$  value of -2.82, which is significant at 1%). This indicates the degree of inefficiency of the BPRS is getting more severe over time.

TABLE 3.1  
Summary Statistic of BPRS Efficiency Score

	Mean	StDev	Min.	Max.	Obs.
	BPRS	BPRS	BPRS	BPRS	BPRS
All	0.686	0.040	0.638	0.930	2,441
Private	0.687	0.040	0.638	0.930	1,810
State-owned	0.670	0.033	0.638	0.771	297
Institution	0.692	0.043	0.638	0.805	334
Low	0.692	0.038	0.638	0.805	675
Mid	0.682	0.036	0.638	0.853	1,080
High	0.689	0.048	0.638	0.930	740
Private - Low	0.687	0.033	0.638	0.785	627
Private - Mid	0.685	0.037	0.638	0.853	850
Private - High	0.697	0.055	0.638	0.930	387
State - Low	-	-	-	-	-
State - Mid	0.667	0.020	0.648	0.698	38
State - High	0.671	0.034	0.638	0.771	259
Institution - Low	0.751	0.053	0.671	0.805	48
Institution - Mid	0.673	0.030	0.638	0.741	192
Institution - High	0.703	0.029	0.649	0.748	94

Furthermore, consistent with theory, institution ownership is associated with higher efficiency, while state-owned tends to have the lowest efficiency in BPRS. The ownership concentration is seemingly priced in the efficiency of BPRS. It is shown by the fact that the least concentrated BPRS has the highest efficiency score, which is 69.2%, while the lowest one is pertains to the middle concentrated BPRS, which is 68.2%. The relation between BPRS ownership concentration and efficiency is reckoned to be non-linear; rather it probably has a U-curve shape.

In addition, another analysis can be drawn from combining the dimension of ownership structure. For instance, for the private and institutional BPRS, the highest efficiency may be accomplished through the highest and the lowest concentration of ownership, respectively. Private owners with highly concentrated ownership BPRS have, on average, efficiency score of 69.7% while institutional owners with the low concentrated ownership BPRS have 75.1% efficiency on average.

**TABLE 3.2**  
**Summary Statistic of BPR Efficiency Score**

	Mean	StDev	Min.	Max.	Obs.
	BPR	BPR	BPR	BPR	BPR
All	0.639	0.022	0.632	0.729	2,250
Private	0.639	0.022	0.632	0.729	1,515
State-owned	0.638	0.022	0.632	0.729	430
Institution	0.639	0.022	0.632	0.729	305
Low	0.639	0.022	0.632	0.729	397
Mid	0.638	0.022	0.632	0.729	908
High	0.639	0.022	0.632	0.729	992
Private - Low	0.639	0.023	0.632	0.729	355
Private - Mid	0.638	0.021	0.632	0.729	655
Private - High	0.639	0.022	0.632	0.729	505
State - Low	0.639	0.021	0.632	0.729	22
State - Mid	0.639	0.023	0.632	0.729	86
State - High	0.638	0.021	0.632	0.729	322
Institution - Low	0.638	0.022	0.632	0.729	20
Institution - Mid	0.639	0.023	0.632	0.729	120
Institution - High	0.639	0.022	0.632	0.729	165

Another interesting finding from Table 3.1 is that government ownership in BPRS is mostly above 30%.<sup>1</sup> The presence of government in the institution is in most cases taking over the control of the Islamic rural bank and imposing their interest and that is likely to downgrade their efficiency. It is evident that the efficiency score of government BPRS is always below that of any other ownership category.

On the other hand, the abovementioned relationship is not the case for BPR. The difference of inefficiency is seemingly not observable in the BPR as one and others might arguably have quite similar value of inefficiency. In other words, unlike in BPRS, SFA fails to observe the inefficiency of BPR. This can be concluded from the fact that all the statistics in the Table 3.2 are identical regardless of the ownership type of BPR. It is, thus, a strong indicator that ownership types are seemingly not priced as determinant of efficiency.

#### 4.4 THE EFFECT OF OWNERSHIP STRUCTURE ON EFFICIENCY

In the second part, this study examines the effect of ownership structure on efficiency of both BPRS and BPR.

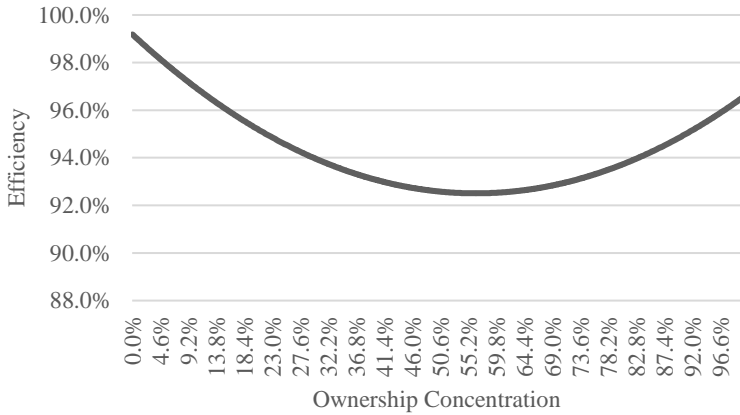
##### 4.4.1 THE EFFECT OF OWNERSHIP CONCENTRATION ON BPRS EFFICIENCY

Table 4 reports the regression results of BPRS efficiency. The estimation results show a very good measure of fit which is shown by Log pseudolikelihood of every model. The relationship between ownership concentration and efficiency is not linear. It is shown by Panel 1 in which OWNC by itself has no significant effect on efficiency. The standard error for OWNC is 0.01 and the coefficient is  $8.304 \times 10^{-4}$ , thus the coefficient has no difference with zero.

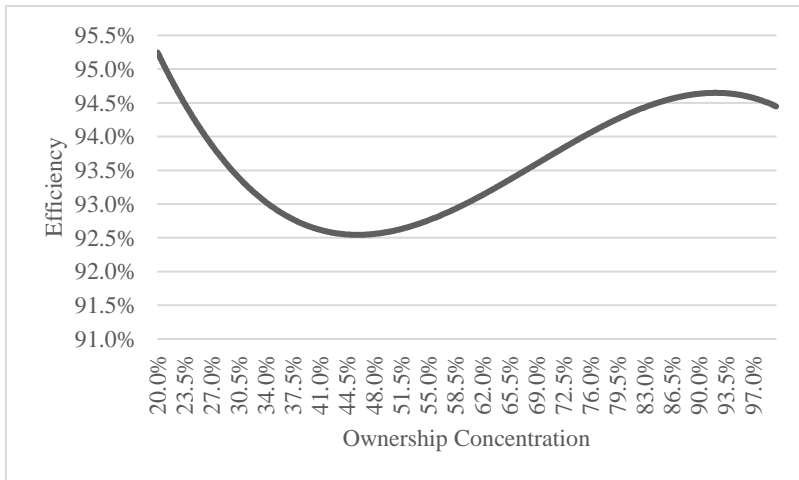
Panel 2 uses the quadratic approach to prove the non-linear relationship between ownership concentration and efficiency and the result suggests a quadratic relation between the two. It is reflected by OWNC and  $OWNC^2$  which strongly affect the efficiency with the negative and positive signs respectively. Thus, the relationship between the two is U-shaped and the minimum point of OWNC, *ceteris paribus*, is 56.42%. The increase of ownership concentration until 56.42% in BPRS will result in inferior efficiency and this will turn into better performance when it is higher than 56.42% (see Figure 1).

Furthermore, this study examines the possibility of the relationship being in the form of polynomial cubic so that it has both minimum and maximum turning point. Panel 3 shows that the relationship between OWNC and efficiency is not merely quadratic, rather they have cubic relationship. All the variables of interest, namely OWNC,  $OWNC^2$  and  $OWNC^3$ , are statistically significant at the 1%, 5% and 10% level, respectively. The fact that OWNC and  $OWNC^3$  have negative value indicates that the model has two turning points which consist of both minimum and maximum turning point. From the complete model Panel 6, we know that the minimum turning point of ownership structure is 45.86% while the maximum one is 92.16%. It implies at least three following general consequences. First, the increase of ownership concentration until 45.86% will decrease the efficiency level. Second, BPRS will get benefits from increase of ownership concentration in the range of 45.86% to 92.16% in the form of increase in efficiency level. Finally, after reaching 92.16% of ownership concentration, the effect returns to decrease in the efficiency level (see Figure 2).

**FIGURE 1**  
**Quadratic Relation between Ownership Concentration and Efficiency**



**FIGURE 2**  
**Cubic Relation between Ownership Concentration and Efficiency**



From the agency theory perspective, the result shows the presence of the alignment and expropriation effect in BPRS. The alignment effect takes place in the medium to high concentrated ownership, which is between 45.86% and 92.16%. It may happen since the owners have more concern in the big portion of share they have. Thus, when the BPRS is not performing efficiently, they will perceive highly the percentage of loss. Subsequently, they conduct their business carefully, which in turn leads to the more efficient



operational practice. This argument is supported by the fact that the majority of BPRSs are privately owned (see Table 3.1). They may typically manage their BPRS by themselves, and in consequence, will have more control to manage the business in their own favour.

Furthermore, the expropriation effect may occur under two conditions. First, it may happen while the ownership is too diffuse (i.e., the concentration in ownership is below 45.86%). In this case, increase in ownership concentration allows the majority shareholders to take advantage from expropriating the minority shareholder. Second, it may occur when more than or equal to 92.16% of share are owned by one entity. In this case, an increase in the ownership surprisingly leads to decrease in cost efficiency. It is argued that the expropriation takes place because investors have own interest beyond maximizing profit. It is supported by the finding that half of BPRS, which have at least 92.16% ownership concentration, are owned by government. Prior literature suggests that government tends to have another purpose that leads to decrease in cost efficiency.

#### 4.4.2 EFFECT OF OWNERSHIP TYPE ON BPRS EFFICIENCY

In contrast with concentration ownership (OWNT), there is no evidence supporting the relationship between ownership type and efficiency in BPRS. Panel 7 to 10 in Table 4 show that there is no significant effect of different ownership type on BPRS efficiency. Standard error of ownership type in all models are equal to 0.01, that is not significant at any confidence levels, thus marginal effect of the variables of interest is not different from zero. Therefore, although the previous section (see Section 4.2) suggests that the two are related, the regression results conclude otherwise. None of the three ownership types offers superior management skills in BPRS.

#### 4.4.3 OTHER DETERMINANTS OF BPRS COST EFFICIENCY

This study also documents whether capital structure (CAP), liquidity (LIQ) and non-performing financing (NPF) are priced in the BPRS cost efficiency. Table 4 Panel 4 to 6 and Panel 8 to 10 yield the robust conclusions. Capital structure and Liquidity are significantly priced in the BPRS's efficiency while no statistical evidence supports for NPF. Capital structure positively affects efficiency while liquidity has negative relationship with efficiency.

TABLE 4  
Regression Result Determinant of Efficiency BPRS

	1	2	3	4	5	6	7	8	9	10
Intercept	0.94 0.02***	0.99 0.02***	1.03 0.03***	1.02 0.03***	1.03 0.03***	1.03 0.03***	0.94 0.02***	0.93 0.02***	0.94 0.02***	0.94 0.02***
OWNC	-0.00 0.01	-0.24 0.06***	-0.51 0.38***	-0.56 0.18***	-0.54 0.18***	-0.54 0.18***				
OWNC <sup>2</sup>		0.21 0.05***	0.81 0.22**	0.91 0.37**	0.88 0.37**	0.88 0.37**				
OWNC <sup>3</sup>			-0.36 0.18*	-0.44 0.22**	-0.43 0.22*	-0.42 0.22**				
OWNT							0.00 0.01	0.00 0.01	0.00 0.01	-0.00 0.01
CAP				0.09 0.03**	0.09 0.03**	0.09 0.03**		0.08 0.03***	0.08 0.03**	0.08 0.03***
LIQ					-0.61 0.26**	-0.61 0.26**			-0.70 0.26***	-0.70 0.26***
NPF						-0.04 0.13				-0.05 0.14
Regional	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Log pseudo	-1,011	-1,011	-1,011	-1,011	-1,011	-1,011	-1,011	-1,011	-1,011	-1,011
Obs.	2,441	2,441	2,441	2,441	2,441	2,441	2,441	2,441	2,441	2,441

Note: OWNC stands for Ownership Concentration whilst OWNT represents Ownership Type. Regional is fixed effect for province. The value below coefficient is standard error and \*, \*\*, \*\*\* represent significant at 10%, 5% and 1%, respectively.

TABLE 5  
Regression Result Determinant of Efficiency BPR

	1	2	3	4	5	6	7	8
Intercept	0.57 0.01***	0.56 0.02***	0.56 0.01***	0.56 0.01***	0.57 0.01***	0.56 0.01***	0.56 0.01***	0.56 0.01***
OWNC	-0.00 0.01	-0.00 0.01	-0.00 0.01	-0.00 0.01				
OWNT					-0.00 0.00	-0.00 0.00	-0.00 0.00	-0.00 0.00
CAP		0.11 0.03***	0.11 0.03***	0.12 0.03***		0.11 0.03***	0.11 0.00***	0.12 0.03***
LIQ			-0.01 0.11	-0.00 0.11			-0.01 0.11	-0.00 0.11
NPF				-0.18 0.05***				-0.18 0.05***
Regional	YES	YES	YES	YES	YES	YES	YES	YES
Log pseudo	-970	-970	-970	-970	-970	-970	-970	-970
Obs.	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250

Note: OWNC stands for Ownership Concentration whilst OWNT represents Ownership Type. Regional is fixed effect for province. The value below coefficient is standard error and \*, \*\*, \*\*\* represent significant at 10%, 5% and 1%, respectively.

#### 4.4.4 DETERMINANTS OF BPR COST EFFICIENCY

In terms of BPR, Table 5 depicts regression result for the ownership concentration (Panel 1 to 4) and ownership types (Panel 5 to 8). In contrast with BPRS, the results prove the preliminary result on the inefficiency descriptive analysis, that there is no relationship between ownership structure, either ownership concentration or ownership type, and BPR cost efficiency. Neither ownership concentration nor ownership type has economical and statistical effect on efficiency. This is consistent with the analysis in the previous section (see Section 4.2).

Moreover, the result suggests that capital structure is priced on efficiency. Consistent with the BPRS finding, the result shows significant positive effect of capital structure. However, the marginal effect of capital structure for the BPR model is higher than for the BPRS model, which is 0.12 for the former and 0.09 for the latter. It means that the change of capital structure in BPR is more sensitive than that in BPRS. Furthermore, NPF has negatively significant effect on efficiency. Although, it may be different from the finding in the BPRS model, the sign of coefficient remains consistent. Finally, unlike in BPRS, there is no evidence that BPR liquidity has relationship with efficiency.

### 5. CONCLUSION

This research examines the effect of ownership structure on the efficiency of (Islamic) rural bank (BPRS and BPR) in the world largest Muslim country, Indonesia. To this end, the first stage of this study utilizes Stochastic Frontier Analysis (SFA) to estimate cost efficiency score and the second one uses Generalized Linear Method (GLM) to examine the relationship between ownership structures, which consists of ownership concentration and ownership type, and (Islamic) rural bank efficiency. Some appealing findings are documented as follows.

SFA documents that inefficiency does matter in the case of BPRS only, while it seems not the case for BPR. The inefficiency of BPRS is getting worse over time. The findings also suggest that, from two dimensions of ownership structure, only ownership concentration is priced on the BPRS's efficiency. The relationship between ownership concentration and efficiency is not linear; rather it is following a cubic relationship. In this regard, the minimum turning point of the model is 45.86% while the maximum one is 92.16%. Thus,

the expropriation effect may occur under two conditions: (i) when ownership concentration is below the minimum turning point 45.86% and (ii) when ownership concentration is above maximum turning point 92.16%. On the other hand, the alignment effect happens in the range between minimum and maximum turning point.

Finally, some other determinants of efficiency, namely capital structure; liquidity; and risk management, are also examined. Capital structure does matter in both BPRS and BPR efficiency. Its positive sign shows that the moral hazard theory operates. The higher capital structure ratio implies the higher risk perceived by shareholders and, hence they incentivize them to supervise rural bank management to foster higher efficiency. On the other hand, liquidity is only priced on BPRS's efficiency whilst NPF is only priced on BPR's efficiency. The impact of liquidity on efficiency is negative; the more liquid the BPRS the lower the funds available for financing, hence the low efficiency. It is also the case for the impact of NPF to BPR. The higher NPF represents less risk management efficiency of rural bank, and hence leads to less overall technical efficiency.

## 6. POLICY IMPLICATION

The abovementioned findings suggest that government support more on the development of BPRS in Indonesia. BPRS inefficiency is proved to be getting more severe over time. The management practice of the Islamic mode of financing is under a very big question mark. OJK and BI could implement their support through providing more massive managerial training, especially to address the problem of different management treatment for the *sharī'ah* related operations and risks. Furthermore, unlike commercial banks, the practice of Islamic rural bank remains ill regulated. OJK must provide a solid regulatory framework for BPRS, particularly pertaining to governance and risk management. One of the regulatory frameworks for governance might be derived from the result of this study. The fact that the ideal concentration of ownership for BPRS is located between 45.86% and 92.16% implies, in general, the moderate level of ownership concentration in the hand of private owners is good since it leads the owners to have more concern to develop their BPRS.

## 7. RECOMMENDATIONS FOR FUTURE RESEARCH

This study has examined efficiency of BPRS in Indonesia as the main unit of analysis. As many countries in the world are also benefiting

from the presence of Islamic rural banks as one alternative for microfinance, comparative study between Islamic rural bank efficiency in countries such as Indonesia and Bangladesh, for instance, can arguably add valuable insight for both academics and practice. The confirmatory study using non-parametric measure of efficiency, such as DEA, might also be useful for ensuring robustness.

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### ENDNOTES

1. The minimum share of government ownership in BPRS and BPR are 35.32% and 24.59%, respectively.

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