

Measuring the Efficient of Islamic Rural Bank in Java Island Based on Stochastic Frontier Analysis (SFA) Method

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Keyword: Cost Efficiency, Profit Efficiency, Islamic Rural Bank, Stochastic Frontier Analysis.

Abstract: The aim of this research is to measure the efficiency of Islamic rural bank in Java from 2011- 2015. The method applied is Stochastic Frontier Analysis (SFA) to know the level of cost efficiency and alternative profit efficiency of Islamic rural bank. The are 12 Islamic rural banks as sample, with 7 variables: total cost, total profit, cost of labor, cost of fund, cost of capital, total financing, and total of productive assets. The result shows efficiency of Islamic rural bank indicated that there is no Islamic rural bank with perfect value (value of efficiency =1) in cost efficiency and alternative profit efficiency. The average of cost efficiency for 5 years is 0.9449, the highest 0.9705 is by the Amanah Ummah Islamic rural bank. And the lowest value 0.8918 is by Situbondo Islamic Rural Bank. The average of profit efficiency is 0.7536, with the highest value 0.8775 is by the Islamic rural Bank Sukowati Sragen and the lowest is 0.5413 is owned by the Bina Amanah Satria Islamic rural bank.

1 INTRODUCTION

Islamic Economics is becoming part of the whole the objective of BPRS is to serve people who are unable to access modern banking services. The more demand of commercial banks to small and rural towns. So the BPRS competition with commercial banks will increase. The role of BPRS is important for the development of real sector business units in various regions and the function of BPRS as one of the financial intermediation institutions. BPRS must be well maintained so as not to lose competition with commercial banks, especially in the microfinance segment.

There are several reasons why researchers use BPRS in Java as a research object. Firstly, in Sharia Financial Development Report 2015 regionally, sharia banking is still concentrated in 4 provinces in Java: Special Capital District of Jakarta, West Java, East Java and Central Java both from fund raising and financing distribution. The contribution of the 4 provinces reached 75.94% for fund raising and 71.82% for financing distribution. Secondly, according to the Head of BPS, Java is still the center of national economic growth. Compared to other regions, Java contributes 58.29 percent of the national gross domestic product (GDP), the high role of Java to the national economic growth sustained

by three regions. Provinces of Special Capital District of Jakarta, East Java, and West Java account for the largest share of GDP. Therefore, BPRS is considered as one of the right financial institutions to facilitate it. Based on the background and reasons written by the researcher, the selection of the background will answer whether the BPRS in Java has operated efficiently. There are two approach in measuring economics performance, namely financial performance and efficiency performance, as stated by Abidin (2007). The measurement method to evaluate financial performance is using Capital (C), Asset Quality (A), Management (M), Earning (E), Liability (L) and Sensitivity Market to Risk (S) or as known as CAMELS method (Erol et al., 2014).

On the other hand efficiency performance is very important to measure monetary policy including tool to increase the real sector of economy. The efficiency in banking industry are measured by applying some financial ratios such as return on equity (ROE), return on asset, asset turn over and return on permanent capital. But if efficiency measurement are derived from accounting ratios, the source of inefficiency is difficult to find out (Sutawijaya and Lestari, 2009). To measure how much cost-efficiency and profit efficiency BPRS in Java, the method used by researchers is Stochastic Frontier Analysis (SFA) which is based on the

consideration that these methods are still rarely used in the efficiency research of Sharia Society Financing Bank.

The formulation of the problem in this research is how is the level of cost efficiency and profit efficiency in BPRS in Java in 2011-2015 by using SFA method and what input and output components affecting cost efficiency and profit efficiency of BPRS.

The purpose of this research is to figure out, measure and analyze cost efficiency and profit efficiency of BPRS in Java and to know what input and output component affecting efficiency cost and efficiency of profit at BPRS.

2 LITERATUR REVIEW

2.1 Efficiency Concept in Islamic Perspective

Efficiency is defined as the ratio between output and input, or the amount generated from one input that is used (Iswardono, 2000). This efficiency concept is very important in Islamic bank as it also comply with Islamic principle in fulfilling *maqashid Syariah* or the goal of Islamic law. (Kamaruddin, 2008). Efficiency according to Hansen and Marynne (2003) can be achieved in three ways: (1) with smaller inputs producing the same output, (2) with the same input producing larger outputs, or (3) The smaller ones produce larger outputs.

2.2 Stochastic Frontier Approach (SFA)

Measuring the efficiency value of financial institutions will use a frontier in the SFA approach. The explanation of this frontier can be in the form of cost function, profit or production relation of a number of input, output and environmental factors and take into account the existence of random error. A bank is said to be inefficient if the cost of a bank is higher than the cost of the frontier bank operating at its best performance level (best practice). Aigner et al. (1977) suggested the stochastic frontier function which is an extension of the deterministic original model to measure unexpected effects (stochastic frontier) within the production limits. Coelli and Rao (2003), stated several reason why applying SFA is suggested: (i) involved disturbance term, mismeasurement and exogen shock that out of

control, (ii) enviroental variabels are easily to be applied (iii) able to conduct hiphotesis test using statistic tools, (iv) easier to identify "outliers", (v) cost frontier and distance function can be used to measure business efficiency with many output.

2.3 The Comparison of SFA and Other Efficiency Approach

The efficiency measurement method can be classified into two, they are parametric and non-parametric approach. The parametric approach is a statistical approach that takes into consideration the type of distribution or distribution of data by viewing the data whether it spreads normally or not. Generally if the data is not normally spreads, the data must be done by non-parametric statistics method, or conducted a transformation in advance so that the data follow the normal distribution. Efficiency with non parametric approach can apply data envelopment analysis (DEA) method and disposal hull (FDH) that has general assumption where random error did not exist (Berger and Humphrey, 1997). SFA is one of the parametric methods that can be used.

2.4 Specification of Input and Output

To measure the efficiency with the SFA approach, it can be done through an output-oriented approach for technical efficiency measurement, and an input-oriented approach for cost efficiency measurement. To measure efficiency with SFA, can be used output-oriented approach to measure technical efficiency, and input-oriented approach to measure cost efficiency. Technical efficiency measure based on production frontier, while cost efficiency measured based on cost frontier (Khumbakar and Lovell, 2000). To determine input-output process in banking industry is important since there are no devine concencuss to identify the input and output variabel to measure bank efficiency. Berger and Mester (1997) stated that identification input and output relation in financial activities of the financial institution can be done by several approach namely: 1)asset approach, 2) Production approach, and 3) intermediation approach. In this research is the price of labor (personal expense/ total asset), the price of funds (share of profit/ total third party funds, and capital price (administration and general costs and other costs/ fixed assets). While the output in this research is total financing and other earning assets. The total financing consists of Debts (*Murabahah, Salam, Istishna, Ijarah and Multijasa*), and Shared

Financing (*Musyarakah and Mudharabah*). The other earning assets consist of Bank Indonesia *Wadiah* Certificates, Placements with Other Banks, and Owned Securities.

3 METHODOLOGY

Finally, complete content and organizational editing before formatting. Please take note of the following items when proofreading spelling and grammar:

3.1 Research Approach

This approach uses quantitative approach, this efficiency calculation method requires estimation of cost function and profit function econometrically, then residual value from estimation of cost function and profit function is used to calculate efficiency value by using method of Stochastic Frontier Analysis (SFA). Variable in this research are: Total Cost, Total Profit, Price of Labor, Fund Price, Capital Price, Total Financing, Other Earning Assets according to Srairi (2009). In this research, the used data is secondary data. The used data is in the form of quarterly financial statements that have been published from the official website of Bank Indonesia that is www.bi.go.id, the website of the Financial Services Authority is www.ojk.go.id. The data processing is done by using Eviews 6 software.

3.2 Population and Sample

In this research, the used sampling collection is purposive sampling. Population in this research is BPRS in Java registered in Bank Indonesia in the period of 2011-2015. The used sample is collected based on the provisions that have been determined by the researcher. Below is the list of the qualified BPRS:

4 RESULTS AND DISCUSSIONS

4.1 Description of Research Results

The calculation of profit efficiency and cost efficiency of sharia financing bank of Java use intermediation approach. The objects in this research were 12 BPRS of Java registered in the Financial Services Authority within the 2011-2015 timeframe, so that the descriptive statistics BPRS of the sample are presented in table 1 below:

Table 1: Descriptive Statistic of Cost Function and BPRS Profit Variables.

| Variabel | Mean | Std. Dev | Maximum | Minimum |
|----------|-------------|-------------|-------------|-------------|
| TC | 8815363.967 | 11189951.66 | 60307133 | 229389 |
| Π | 980319495.8 | 1204383528 | 5756385000 | 11824000 |
| Y1 | 0.033335478 | 0.020769327 | 0.10699502 | 0.005428859 |
| Y2 | 0.067233579 | 0.058839467 | 0.602588765 | 0.00836036 |
| Y3 | 0.672810944 | 0.462732018 | 2.397661013 | 0.047829489 |
| P1 | 84943033.05 | 97013178.35 | 412456182 | 4700186.00 |
| P2 | 13891464692 | 16276018738 | 1.03297 | 498455000 |

4.2 Cost Efficiency Level of Stochastic Frontier Approach (SFA) Method

Table 2: Formation Result in Translog Cost Function.

| Variabel | Coefficient | Std. Error | t-Statistic | Prob./Sig |
|----------|-------------|------------|-------------|-----------|
| C | 6.210932 | 0.440270 | 14.10710 | 0.0000 |
| Y1? | 0.599935 | 0.025649 | 23.39040 | 0.0000 |
| Y2? | 0.290242 | 0.019371 | 14.98322 | 0.0000 |
| Y3? | 0.078727 | 0.021147 | 3.722942 | 0.0002 |
| P1? | 0.821483 | 0.021885 | 37.53694 | 0.0000 |
| P2? | 0.197383 | 0.014748 | 13.38355 | 0.0000 |

The constant of TC is 6.210932. This means that if the input and output variables are considered constant. For input and output variables in the cost function are as follows:

4.2.1 Price of Labor

Based on the table above, it is known that input of price of labor shows positive value of regression coefficient 0,599935 shows that if exponent of price of labor have increase equal to unit, hence total cost will increase by 0,59935.

4.2.2 Fund Price

Shows positive value of regression coefficient 0,290242 it means that if the exponent of fund price have increase equal to unit, hence total fund will increase by 0,290242.

4.2.3 Capital Price

The last input in the form of capital price also shows the positive value of regression coefficient 0.672810944 indicate that if exponent of capital price have increase equal to unit, hence total cost will have increase by 0,672810944.

4.2.4 Total Financing

Based on the table 2, it is known that the total financing variable has a regression coefficient of 0.821483 indicating that if total exponent of total

financing have increase equal to unit, hence total cost will increase by 0.821483.

4.2.5 Other Earning Assets

Another earning asset value is a positive regression coefficient of 0.197383 indicating that if the exponents of other earning assets have increase equal to unit, hence total cost will increase by 0.197.

4.2.6 Analysis of Stochastic Frontier Analysis

The model of analysis used in this research is panel data model, it is intended to consider the observation period of a bank and will result in the value of efficiency level both Cost Efficiency and Alternative Profit Efficiency based on the research in the period for 5 years. The panel data model used to estimate the efficiency function uses the fixed effect model. The following is cost efficiency results with SFA method on 12 BPRS:

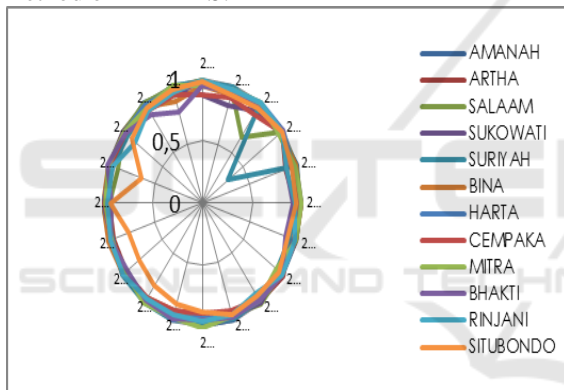


Figure 1: Cost Efficiency on 12 BPRS.

The figure 1 shows BPRS Suriyah is the most inefficient bank in cost, although the value of its Cost Efficiency tends to be stable it can be seen from the movement of BPRS Suriyah chart above. BPRS Sukowati Sragen is one of the banks that has a positive Cost Efficiency trend, which initially has a Cost Efficiency of 0.8665 in the first quarter of 2011, in the fourth quarter of 2015 to 0.9573. Overall almost all BPRS have a positive trend that has an increase in the value of Cost Efficiency. Unlike the BPRS Suriyah although it experienced a decline in the value of efficiency, BPRS Suriyah actually increased in the fourth quarter of 2015 with a score of 0.9891 or greater than the value in the first quarter of 2011 which amounted to 0.9790.

4.3 Profit Alternative Efficiency Level of Stochastic Frontier Approach (SFA) Method

Table 3: Results Formation in Translog Functions profit .

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|--------|
| C | 6.988475 | 1.696603 | 4.119098 | 0.0001 |
| Y1? | -0.317617 | 0.098839 | -3.213478 | 0.0015 |
| Y2? | 0.200792 | 0.074648 | 2.689853 | 0.0077 |
| Y3? | 0.180391 | 0.081489 | 2.213679 | 0.0279 |
| P1? | 0.753170 | 0.084334 | 8.930832 | 0.0000 |
| P2? | 0.036729 | 0.056833 | 0.646257 | 0.5188 |

In the regression equation above, the TP constant is 6.988475. This means that if the input and output variables are considered constant. In the frontier function as described in the table 3, the estimation results for the input and output variables in the profit function are as follows:

4.3.1 Price of Labor

Based on the above table on labor price input has a regression coefficient of -0.317617 and shows a negative value, this means that if the price of labor exponents increased by units, then the total profit will decrease by 0.317617.

4.3.2 The Price of Funds

The price of funds shows a positive value, and has a regression coefficient of 0.200792 indicates that if the exponent price of funds increased by units, then the total profit will increase by 0.200792.

4.3.3 Capital Price

The last input in the form of capital price shows a positive value, regression coefficient of 0.180391 indicates that if exponent price of capital increased by unit, then the total cost will increase by 0.180391.

4.3.4 Total Financing

The total financing variable has a regression coefficient of 0.753170, indicating that if total exponent of financing has increased unit, then total profit will increase by 0.180391.

4.3.5 Other Earning Assets

Another earning asset value is positive, has a regression coefficient of 0.036729 indicates that if the exponent of other productive assets increased by

unit, then the total profit will increase by 0.036729. Profit Efficiency can see in figure 2

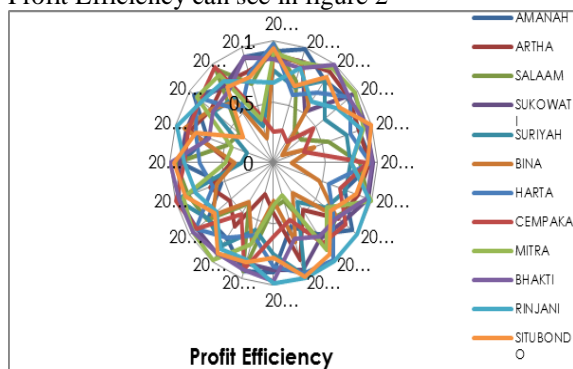


Figure 2: Profit Efficiency.

5 CONCLUSIONS

It can be concluded that the average cost efficiency of BPRS in Java in the period of 2011-2015 is equal to 0.9449 or 94.49% and experiencing cost inefficiency as 5.51%. BPRS Situbondo is the most inefficient bank in cost that is with average cost efficiency score of 0.8918 or 89.18% and experienced cost inefficiency of 10.82%. While BPRS Amanah Ummah became the most efficient bank during the research period, which is getting the average cost efficiency score of 0.9705 or 97.05% and cost inefficiency of 2.95%. The efficiency cost in BPRS in Java has a downward or fluctuate trend value. Summary of estimation results of cost and profit efficiency can see in table 4.

Table 4: Summary of Estimation Results of Cost and Profit Efficiency.

| | Average | Best | Value | Worst | Value |
|-------------------------------|---------|----------------------|--------|-------------------------|--------|
| Cost efficiency | 0.9449 | BPRS Amanah Ummah | 0.9705 | BPRS Situbondo | 0.8918 |
| Alternative profit efficiency | 0.7536 | BPRS Sukowati Sragen | 0.8775 | BPRS Bina Amanah Satria | 0.5413 |

The average of profit efficiency score of BPRS in Java during the research period in 2011-2015 is 0.7536 or 75.36%. BPRS Sukowati Sragen become the most efficient bank in generating profit that is with profit efficiency score equal to 0.8775 or 87.75%, after that followed in second and third position by BPRS Bhakti Sumekar, BPRS Bumi Rinjani Kepanjen, that is with efficiency score equal to 0.8686 or 86.86 %, and 0.8449 or 84.49%. BPRS Bina Amanah satria became the most inefficient bank in generating profit, that is with a score of 0.5413 or 54.13% .. The profit efficiency of BPRS in

Java has a downward trend. Based on the research period of 2011-2015, the average value of profit efficiency tends to decrease and the peak occurs in 2011 first quarter with an average efficiency score of 0.8225 or 82.25%. During the research period the average profit efficiency has decreased by 0.6460 or 64.60%. The regression result shows that the Total Financing variable has the largest regression coefficient value and has significant effect on the translog cost function and the translog profit function. This indicates that the amount of financing distributed by the BPRS in the research sample.

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