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Determinants of Regional Owned Rural Banks Efficiency Level in Indonesia

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ABSTRACT

The efficiency level of regional owned rural banks is one of the determinants in measuring financial performance each year. In term of local government, the measurement of the level of efficiency can be used in determining strategic policies for the development of regional owned rural banks, especially in capital participation and collaboration with fintech lending. Measuring the level of efficiency with input and output variables with 160 regional owned rural banks in Indonesia in 2020 by purposive sampling with the Data Envelopment Analysis (DEA) method, 66 regional owned rural banks are found in efficient conditions. Analysis using logistic regression is used to analyze the tendency of the factors that determine the efficiency level of regional owned rural banks in Indonesia. This study found that Equity to Total Asset Ratio (EAR) and Total Assets had a positive and significant effect, while Non-Performing Loans (NPL) and Loan to Deposit Ratio (LDR) factor has no significant effect on the efficiency level of regional owned rural banks in Indonesia. Therefore, in improving the performance of regional owned rural banks in Indonesia, it is necessary to have the role of local governments in capital participation and discipline in the disbursement of funds selectively to debtors.

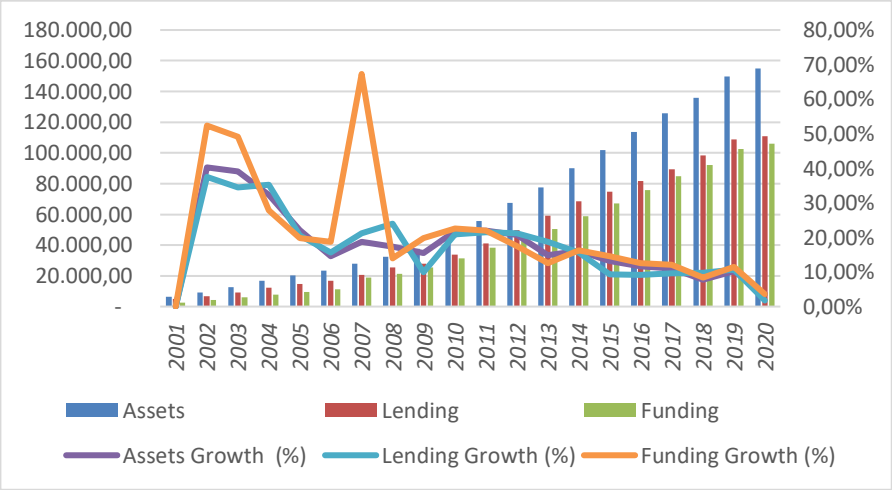
Keywords: Regional Owned Rural Banks, Efficiency Level

INTRODUCTION

Rural Banks (Badan Perkreditan Rakyat/ BPR) are one of the financial institutions that play an important role in regional development in encouraging an increase in Gross Domestic Regional Product (GDRP) and reducing poverty levels (Devi, 2016). This is inseparable from the target of BPR as an intermediary entity that can only collect and distribute funds for the lower middle segment as well as with a regional scope (Purnomolastu & Ratna, 2018). When BPR are compared with Conventional Commercial Banks, they are very far away in asset strength, which is 1.57% compared to 94.16% of total national banking assets (OJK, 2021). Therefore, Bank Indonesia (BI) as the central bank and the Financial Services Authority (OJK) as regulator, supervisor and licensing provider for financial services provide certain policies for BPR operations in Indonesia.

After improvement of policies regarding BPR from year to year, the performance of BPR during the last two decades (post 1998 reform) has always improved. Several indicators that can be used to monitor the development of a BPR like the number of assets, lending and funding can be seen in the annual financial report. The developments of BPR during the period 2001-2020 in Indonesia are as follows:

Figure 1. Development of BPR 2001-2020



Source: OJK (2021)

Assessment of banking performance is very important to carry out because an understanding of whether a bank has been efficient or not in allocating resources will provide the basis for making policy designs. In previous studies, the ratios of ROA, ROE, NPL and others were used to measure banking efficiency (Claessens et al., 2001 and Lin & Zhang, 2009). However, the use of these ratios may not reflect an accurate level of efficiency. For example, high operational costs may reflect the skill of employees to obtain large loans or to direct the business better (Li, 2020).

DEA is a data-oriented approach in evaluating the performance of Decision Making Unit (DMU) by changing multiple inputs into multiple outputs (Cooper et al., 2011). In simple terms, the DEA measurement is expressed by a ratio of output to input which is a unit of efficiency measure. The efficiency score of each unit is relative because it depends on the other efficiency levels in the sample studied. The value of the efficiency of the sample is not negative and in the range 0 to 1 where the value of 1 is the perfect efficient value and 0 is the least efficient.

Anwar et al. (2018) conducted a study on efficiency at BPRs in West Java during the 2012-2016 with evaluation based on ownership and area. Based on ownership, the average efficiency of regional BPRs is better than private BPRs. Research conducted by Lingjuan et al. (2017) in Jiangsu Province, China also research the operational efficiency of BPRs by region and ownership using the DEA method. The results of study are that BPRs in the southern Jiangsu region have the highest average operating efficiency and BPRs with joint stock ownership have the highest average operational efficiency of BPRs, followed by government-owned BPRs.

Equity to Total Assets Ratio (EAR) is an indicator used to see the attachment between capital owners on the sustainability of the business being run. The higher the proportion of capital in a business, the higher the owner's attachment to the continuity of his business and the role of the owner in influencing management. Likewise, the relatively small proportion of capital can cause the owner to be less disadvantaged if his business goes bankrupt (Ambarriani, 2003).

The debtor's inability to pay its obligations makes credit quality worse which is reflected in the NPL ratio. The NPL ratio which is experiencing an upward trend and the ROA ratio which is experiencing a downward trend is one of the problems that must be resolved by BPR. These two ratios indicate a decrease in the performance of the BPR, one of which could be due to the inefficiency of the performance of the BPR. This has been studied by Berger & Mester (1997) and Istinfarani & Azmi (2020) which state that NPL has a negative and significant effect on the level of bank efficiency.

Loan to Deposit Ratio (LDR) is one of the indicator used to see the effectiveness of BPR's financial performance. Wasiaturrahma et al. (2020) get the results if the LDR has a negative effect on the efficiency of the BPR, which means that the larger the LDR of the BPR, the lower the efficiency. However, research conducted by Ghozali & Subandi (2014) and Yusniar (2011) showed the opposite result.

The size of a BPR cannot be separated from the number of assets. It is hoped that with a large number of assets, BPRs are able to get even greater profits. Previous studies have had different results where Wasiaturrahma et al. (2020) did not find that there was an effect between bank size and the efficiency level of BPRs in Indonesia. However, the research conducted by Barry et al. (2011) and Noor et al. (2012) get the results that bank size has a positive and significant relationship to the level of banking efficiency.

Performance assessment in efficiency can be one of the considerations in assessing the feasibility of a BPR to provide funding to Fintech Lending where aspects of capital, information technology infrastructure and governance must be fullfilled. Meanwhile, the factors that affect the level of efficiency of BPRs can be used as material in evaluating the performance of BPRs in the future in improving their performance. In addition, researchers also have not found research that focuses on analyzing the efficiency level of regional owned rural banks (regional BPRs) and the factors that affect the efficiency level of regional BPRs in Indonesia and this becomes a research gap on previous studies.

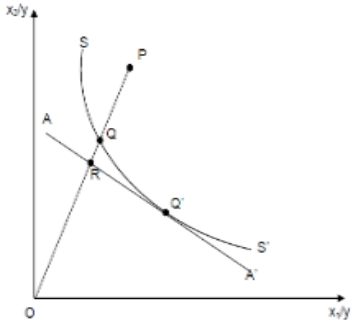
LITERATURE REVIEW

According to Law No. 10 of 1998 concerning banking, BPR is a bank that carries out activities conventionally or based on sharia principles which in its activities does not provide services in payment traffic. Regional BPR is one of the businesses carried out by the regional government through capital ownership (*Perusahaan Umum Daerah*) or

equity participation (*Perusahaan Perseroan Daerah*) called Regional Owned Enterprises (*Badan Usaha Milik Daerah/ BUMD*). The purpose of establishing BUMD is to provide benefits for regional economic development, implementation of public benefits and profit on business. Meanwhile, the establishment of BPRs by local governments is also intended to expand financial access to the public and to finance micro, small and medium enterprises with good governance.

The concept of efficiency was first introduced by Farrell (1957) who illustrated the application of agricultural production in the United States. This efficiency concept proposes a simple case, namely how to do efficiency with two production factors (inputs) to produce one output or a more complex one with many inputs and outputs in a production. Riko H & Dhadhang S (2019) explain that efficiency is one of the benchmarks in evaluating the performance of a company's operations with the principle of comparison between the amount of production and the inputs used.

Figure 2. Efficiency Measurement Concept



Source: Farrel (1957)

According to Silkman (1986); Ario (2005) in Muharam & Pusvitasari (2007), efficiency measurement can be done with three approaches. First, the ratio approach used to measure efficiency is calculated by comparing the number of outputs with the number of inputs used. The weakness of this approach is that if there are many inputs and many outputs to be calculated, because if it is done together it will lead to a lot of calculation results so that the assumptions are not firm. Second, the regression approach produces a relationship that can be used to produce the level of output produced by the Economic Activity Unit (UKE) for certain inputs. This approach also cannot overcome if there are many outputs because it can only include one output indicator in a regression equation. Third, measurement of efficiency with frontier approach is distinguished into two types of frontier approaches, namely parametric and non-parametric.

The parametric frontier approach can be measured by two methods, namely the Distribution Free Approach (DFA) and the Stochastic Frontier Approach (SFA). While the non-parametric frontier approach can be measured by non-parametric statistical tests using the Data Envelopment Analysis (DEA) method with Constant Return to Scale (CRS) model and Variable Return to Scale (VRS) model using input oriented or output oriented. The frontier approach is more focused on calculating the performance of financial institutions in the last few decades which measures deviations from performance in the "best practice" of an institution within efficient limits if these companies are in the same market conditions (Bauer et al, 1998).

RESEARCH METHOD

This study uses cross section data from regional BPR in Indonesia during 2020 period that report in OJK website with two processes analysis, DEA analysis and binary logistic regression. The sampling technique in this study was carried out using a purposive non-probability sampling technique with certain considerations in accordance with the criteria of BPR, where most (more than 50%) of the shareholders are held and controlled by the local government, reported the 2020 report on the OJK website, did not suffer losses and incur expenses for its operational activities. Based on data, up to 2020 there where 204 regional BPR in Indonesia and after categorization, 160 regional BPR were used as research sample.

The input variable for DEA analysis are interest expenses, expenses for allowance for earning assets, marketing expenses, administrative and general expenses and other operational expenses, while the output variables are interest revenue and other operational revenue. The determination of input and output variables is based on operational process of BPR and Cobb Douglas production function. This study is different from Wasiaturrahma et al. (2020) where the efficiency of the BPR production approach does not use non-operational expenses and adds a marketing expense variable as one of the input variables.

After getting the value of DEA (Variable Return to Scale), the value will be dependent variable for binary logistic regression with two categories, Y=1 for efficient regional BPR and Y = 0 for inefficient regional BPR. The independent variable are EAR, NPL, LDR and total assets. In addition, all variables are in the form of ratio except total assets with natural logarithms. Variable details can be seen in Table 1.

Table 1. Variables (Input and Output) and Definition (Dependent Variable)

Variable	Definition
Interest Expenses	Expenses incurred for customers or other parties related to fund-raising activities (Bank Indonesia, 2010)
Expenses For Allowance For Earning Assets	Reserve expense formed to accommodate possible losses arise as a result and not receive back part or all of earning assets (maximum 1.25% risk-weighted assets) (Shintya & Darmawan, 2015)
Marketing Expenses	Marketing expenses incurred which include the giving of gifts that cannot be attributable, advertising in the context of promotion, and transaction fees for credits that are not approved (Bank Indonesia, 2010)
Administrative and General Expenses	Various burdens arise to support BPR operational activities (Bank Indonesia, 2010)
Other Operational Expenses	Operational costs that are not included in one of the operational costs (Bank Indonesia, 2010)
Interest Revenue	Income derived from investing BPR funds in productive assets, where interest income includes fees minus costs directly related to lending that are borne by the BPR (transaction fees) (Bank Indonesia, 2010)
Other Operational Revenue	Various income arising from activities that support BPR operational activities (Bank Indonesia, 2010)

Table 2. Independent Variables

Variable	Definition
EAR	The ratio between the amount of capital divided by total assets which serves to maintain liquidity and operational continuity (Ambarriani, 2003)
NPL	Non-performing loans are caused by two factors, both internal due to the analysis process or the debtor himself as a result of not making payment obligations, either intentionally or unintentionally (Kasmir, 2013)
LDR	Comparison between the amount of credit disbursed with the amount of funds collected from the public which illustrates how far the bank has used money from depositors to lend to debtors (Pandia, 2012)
Total Assets	The size of the bank and is described by assets which are defined as all assets owned by individuals or groups that are tangible or intangible, which have a value that will benefit all people or companies (PSAK, 2011)

DEA method output-oriented return to scale variable model is used to obtain technical efficiency scores using data in table 3 with the following model:

$$Min\ \phi\ s.t.$$
$$\sum_j \lambda_j x_{jm} \leq \phi x_{j0m} \quad ; m = 1,2,\dots,M$$
$$\sum_j \lambda_j x_{jn} \geq \phi x_{j0n} \quad ; n = 1,2,\dots,N$$
$$\lambda_i \geq 0\ ; j = 1,2,\dots,j$$

where ϕ : DEA efficiency inverse; x_{jm} : input m from DMU j; j_0 : DMU; x_{jn} : output n for DMU j; λ_j : variable to be calculated from the data. VRS model assumes that the company does not or has not operated at an optimal scale. In addition, the assumption used is that each additional input does not produce a proportional amount of output, which can be greater or less than the additional input.

Binary logistic regression is a data analysis method used to find the relationship between the response variable (y) which is binary and the predictor variable (x) (Hosmer & Lemeshow, 2000). The response variable y consists of 2 categories, namely efficient and inefficient, which are denoted by y=1 (efficient) and y=0 (inefficient). The general form of binary logistic regression is:

$$\log \frac{\pi_i}{1-\pi_i} = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \cdots + \beta_p x_{pi}$$

or

$$\text{logit}\ (\pi_i) = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \cdots + \beta_p x_{pi}$$

To ensure that the logistical model formed is meaningful, it is necessary to first examine the significance of the model in its entirety or partially (Gujarati & Porter, 2013). Parameters resulting from logistic regression were analyzed using odds ratios or tend ratios. Odds ratio is used to find out how much tendency an observation with certain characteristics (x=1) to experience a successful event (Y=1), which is how many times

compared to observations with other characteristics (X=0). The amount of the odds ratio is calculated by the formula:

$$OR = \exp\left\{\sum_{j=1}^{p} \beta_j (x_{1j} - x_{0j})\right\}$$

RESULTS

In 2020, the number of regional BPRs in Indonesia is 204 BPRs with a distribution of 128 BPRs (62,75%) located in Java-Bali, followed by Sumatra, Kalimantan, Nusa Tenggara, Sulawesi and Papua as many as 76 BPRs (37,25%). Tables 3 and 4 describe a brief description of the input-output variables and the logit model variables in the study.

Table 3. Descriptive analysis of input and output of DEA model (in Million IDR)

Variable	Mean	STD	Min	Max
Interest Expenses	9.846,62	13.603,18	39,31	127.355,02
Expenses For Allowance For Earning Assets	2.663,28	3.972,03	9,38	27.087,00
Marketing Expenses	517,33	841,10	1,25	4.508,71
Administrative and General Expenses	13.506,10	16.324,77	1.000,34	162.029,38
Other Operational Expenses	467,71	646,97	3,67	3.995,10
Interest Revenue	30.274,61	36.601,85	1.281,92	328.416,21
Other Operational Revenue	2.402,05	2.793,51	30,79	17.006,83

Source: OJK (2021)

Based on table 3, it is known that the standard deviation of the input-output variable is very high. It is caused by the distribution of the data varies greatly. One thing that can be used as a reference is the difference in the minimum, maximum and average values for each variable. Based on the interest expenses of regional BPRs, the upper 25% of the quartile represents more than 60% of the interest expenses of the entire sample of observations.

After input and output data are completed, we calculate the score of efficiency with DEA analysis and found 66 Regional BPR's in efficient level and 94 other in the inefficient level. In Java-Bali, 40 BPR's (31,25%) is efficient from 128 BPR's while 26 BPR's (34,21%) in the outside.

Table 4. Descriptive analysis of variable in logit model

Variable	Mean	STD	Min	Max

TE-VRS	0,91	0,097	0,671	1
EAR	0,246	0,148	0,095	0,757
NPL	5,79	4,55	0,1	21,58
LDR	1,35	0,79	0,59	5,89
Ln Total Assets	18,62	1,20	15,91	21,73

Source: OJK (2021)

Binomial logistic regression analysis is used to see the tend of the determinants of the efficiency level of regional BPRs in Indonesia using categorization efficient (Y=1) and inefficient BPR (Y=0) to be dependent variable. After calculating the determinant of efficiency level, the result of regression is in the below:

Table 5. Results of Binary Logistic Regression (Odds Ratio)

Variable	Odds Ratio	SE
EAR	381,10**	748,18
NPL	1,00	0,04
LDR	1,53	0,44
Ln Total Assets	1,64**	0.35

Pseudo R^2 : 0,095
LR Chi^2 : 20.58
Observation : 160
Notes: **significant at 5%

From table 5, it can be seen that the Equity to Total Aset Rasio (EAR) has a tend to increase level efficiency regional BPR's and significant. The greater capital ownership, the higher potention to increase level efficiency. High capital is cheap funds for BPR because there is no need to pay interest such as loans from other parties or bank deposits from depositors. This is in accordance with research conducted by Ambarriani (2003). NPL and LDR do not have a tendency to increase the efficiency level of regional BPRs, this is in line with research conducted by Muazaroh et al. (2012) who found that NPL had no significant effect on bank profit efficiency and Perwitaningtyas & Pangestuti (2015) who found no effect between LDR and bank efficiency. Total assets have a tendency to increase the efficiency level of regional BPRs according to the research of Muazaroh et al. (2012); Yusniar (2011); Perwitaningtyas & Pangestuti (2015) and Ghozali & Subandi (2014).

DISCUSSION

This study reveals that the involvement of local governments in participating in increasing the efficiency level of regional BPRs is very necessary. One way that can be done is to provide additional capital for BPRs to develop their business so that the level of efficiency can increase. In addition, the function of BUMD for community businesses is increasingly felt with the support of business financing and can indirectly improve the level of welfare of the community. For local governments themselves, BUMD business development can be a source of local revenue.

Although additional capital tends to increase the efficiency level of regional BPRs, the current challenges for BPR business are getting bigger. In addition to competing with commercial banks, one of the visible challenges is the level of NPL BPRs which on

average are quite high (>5%) even though the NPL model does not have a significant tendency to affect the efficiency level of regional BPRs. Likewise, with NPL, LDR also does not have a significant tendency to affect the efficiency level of regional BPRs. However, with an average ratio of 135%, regional BPRs must be careful because the amount of disbursement of funds is greater than the amount of funds raised so that the risk in disbursement is quite high. BPR's total assets tend to increase the efficiency of BPR because some of the retained earnings can be used to expand business by channeling funds to the public.

CONCLUSION

Based on the results and discussion above, there are several important points that can be drawn. Regional BPRs in 2020 mostly made profits amid the Covid19 pandemic (78.43%). By using the DEA analysis, it is found that most regional BPRs in Indonesia are still not at an efficient level and most of them are in Java-Bali. Therefore, the approval of regional BPR and fintech lending in cooperation can be done carefully. By using binomial logistic regression, it is found that the variables EAR and Ln Total Assets have a tendency to increase the efficiency level of regional BPRs in Indonesia and are significant while the NPL and LDR variables do not have a tendency to increase the efficiency level of regional BPRs. From these results, the policy that can be carried out by local governments is to increase share ownership in regional BPRs so that the level of regional efficiency increases with all regional BPR business plans that will be carried out correctly and must be done and all of requirements are completed.

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DECLARATION OF CONFLICTING INTERESTS
Authors have no potential conflict of interest.

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