BANK SPECIFIC FACTORS AFFECTING THE EFFICIENCY OF REGIONAL DEVELOPMENT BANK IN INDONESIA

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ABSTRACT

Regional Development Banks (RDB) are part of the banking industry which has an important role in regional development. Therefore, RDB performance is important to be evaluated, and efficiency is an important indicator in measuring performance. The purpose of this study is to analyze the level of efficiency of the Regional Development Bank (RDB) in Indonesia and internal factors that influence the level of efficiency. Based on data of 26 RDBs in the study from 2011Q1 to 2019Q4, this study uses non-parametric frontier methodology analysis, Data Envelopment Analysis (DEA) and the Tobit model to investigate the determinants of technical efficiency. This analysis aims to explain the variations in calculated efficiencies to a set of internal explanatory variables. The results showed that most RDBs were technically inefficient during the study period. Furthermore, the internal variables that affect are size, capital adequacy ratio (CAR), loan to deposit ratio (LDR), return on asset (ROA).

Keywords: Bank Specific Factors, Data Envelopment Analysis (DEA), Regional Development Bank, Technical Efficiency, Tobit Model

INTRODUCTION

The financial sector plays an important role in a country's economy. In Indonesia, the financial sector especially the banking industry has a dominant role, seen from the dominance of banking assets in 2019 reaching 76.99% of the total financial system assets in Indonesia, which consists of the banking and non-banking sectors (insurance, pension funds, finance companies, guarantee companies, and pawnshops) (OJK, 2019). The important role of the banking industry will affect national economic growth so that banking performance needs to be considered for its stability and efficiency (Sathye, 2011).

Efficiency in the banking world is one of the parameters of performance that is quite popular, widely used because it is an answer to the difficulties in calculating performance measures, how to get the optimal level of output with the existing input levels, or get the minimum input level with the level of output certain (Fadhlullah, 2015). Efficiency is an important measure of bank operational conditions and is one of the key indicators of a bank's success, individually after comparing with the entire banking industry (Wheelock and Wilson, 1995).

Based on ownership, commercial banks in Indonesia consist of state-owned banks (BUMN), Private Banks (BUSN), Regional Development Banks (RDB), and Foreign banks and Joint venture Banks. One of the banks in the spotlight is the RDBs where RDB is currently not developing as rapidly as Conventional Banks (Sutanto, 2015). RDB contribution to total assets and third party funds compared to national commercial banks is relatively low at 8.38% and 8.41% (Indonesian banking statistics, 2019).

RDB is part of the national banking industry which has an important role, especially in regional development. RDB was founded in 1962 based on Law No. 13 of 1962 concerning Basic Provisions for Regional Development Banks. The establishment of the RDB is intended to provide funding for the implementation of regional development within the framework of National Development. Regional development is part of a national development program that is directed to pay attention to the potential and drive the economy in the region.

According to Bulbul et al (2013) that banks operating at the regional level are expected to be able to support the local economy and the community, and to run the bank's business normally so it will help the financial sector be more sustainable. Based on the Decree of the Minister of Home Affairs (Kepmendagri) No. 62 of 1999 article 3 concerning the guidelines for the organization and work procedures of the Regional Development Bank that the RDB has the function of (1) Driving the creation of economic growth and regional development, (2) Regional cash holders and / or saving money regions and (3) one source of regional original income. Based on this, RDB has different characteristics from other bank groups (BUMN, BUSN, Foreign and Mixed Bank). However, banking regulations in Indonesia equate the functions and roles of RDB with other commercial banks so that RDB must be able to compete with other commercial banks.

Another problem faced by RDB related to ownership is that RDB is a Regional Government owned company or part of a Regional Government Owned Enterprise (BUMD) as a company that is highly dependent on the Regional Government (Yusuf, M, 2018). Most RDBs shares are owned by local governments. Dependence of RDBs on local governments is an obstacle for RDBs in developing performance and pushing RDBs to be inefficient due to the high intervention from the local government. The existence of political intervention pushes banks to become less efficient and makes it difficult for banks to compete with other commercial banks (Hadad et al, 2012). RDBs failure will have a systemic impact on the regional economy (Yonnedi and Panjaitan, 2019).

The development of RDB performance from 2011-2019 showed a declining growth. In terms of assets, RDB grew by 9.38% (yoy) but the condition declined when compared to the position in 2011 of 27.29% (yoy). Asset growth, which was largely supported by growth in third party funds by 11.09% (yoy), also decreased compared to 2011's position of 28.29% (yoy). In addition, RDB credit growth of 10.21% (yoy) also experienced the same thing from the 2011 position of 22.34%. RDB credit itself is dominated by consumer loans by 69.26% and productive loans by 30.74%.

In general, RDB performance based on financial ratios also showed a decline from the 2011-2019 position. RDB performance compared to the performance of national banks is also still quite low. The RDB liquidity ratio reflected in the Loan Deposit Ratio (LDR) showed an increase in 2019 of 88.1% compared to 2011 of 74.74%. The increase was inseparable from the increase in fund raising but which was accompanied by high lending. While. The quality of RDB lending is still maintained with low credit risk (Non-Performing Loan-NPL) (below the 5% threshold) of 2.62% in 2019. However, it tends to increase compared to 2011 which amounted to 1.75%. This resulted in a decrease in profitability (ROA) in 2019 to 2.15% compared to 2011 which was 3.36%. Operational efficiency in RDB which is reflected in the ratio of Net Interest Margin (NIM) and Operational Expenses to Operational Income (BOPO) also shows a fairly high number. NIM still shows a fairly high figure of 5.95% in 2019 although it has decreased compared to 2011 which was 8.1%. BOPO also showed an increase in 2019 of 79.56% compared to 2011 of 79.14%.

The role of RDB which is quite important in regional economic development as an intermediary institution encourages RDB to be able to improve its performance (Abidin and Endri, 2009). One of the programs in the Indonesian Financial Services Sector Master Plan (MPSJKI) for 2015-2019 is to develop regional economic potential through strengthening the function and role of RDB in supporting regional economies (MPSJKI, 2015). This program has also been aligned with the national economic development program launched by the government National Long-Term Development Plan (RPJPN) 2005-2025 and the National Medium-Term Development Plan (RPJMN) 2015-2019. This shows that the role of RDB is a concern of various parties because the success of national development is an aggregation of the success of regional development, where the strengthening of the national economy is certainly the result of the accumulation of economic strengthening in the region.

The work program launched in developing RDB is the implementation of the RDB Transformation program which was launched by the president in May 2015. Transforming RDB has a vision of becoming a bank that is highly and powerfully engineered and contributes significantly to sustainable growth and equitable distribution of the regional economy. This program will further develop the overall RDB through strengthening the foundation through good governance and business and risk management so that going forward the RDB will become a more competitive, stronger and contributive bank for regional development. One way to encourage RDB to be more competitive is by increasing efficiency through optimizing the internal factors of RDB.

Studies on efficiency RDBs in Indonesia showed that the average efficiency of 15 Sharia Regional Development Banks (RDB) in 2008-2012 using parametric methods (SFA) was 53,21% (Fadhlullah, 2015). From 2013 to 2018 RDB efficiency continued to increase but was still in the low category (Vistarani, 2018). Sparta (2017) in his research showed that the efficiency of RDB banks in Indonesia during the 2008-2012 period, which was shown by the BOPO average, was 72,45 %. During this period, the Aceh RDB received the most inefficient bank title with a BOPO of 92,98% and the South Sulawesi RDB was awarded the most efficient bank RDB with a BOPO of 54,03%. The most efficient RDB banks for 2008, 2009, 2010, 2011 and 2012 were BDKI, BSTR, BACH, BSUA and BSSN respectively. Whereas the most inefficient RDB banks for 2008, 2009, 2010, 2011 and 2012 were BSST, BSTA, BKTm, BSTA and BSTA. The results of this study indicate that none of the RDB banks on the island of Java has total assets greater than the RDB banks outside of Java that get the title of the most efficient RDB bank in Indonesia.

 Efficiency is one of the most important indicators in measuring bank performance. This is because efficiency generally describes the performance of a bank to act rationally in minimizing potential risks and influencing bank profitability. Recent research shows that efficiency is an important factor in banking competition where efficient banks have competitive advantages and lower costs than inefficient banks (Spong et al 1995). With a higher level of efficiency, banking performance will be better in allocating financial resources which will later have an effect on increasing investment and economic growth (Weill, 2003).

Measurement of the level of efficiency cannot only be based on financial ratios. Calculation of efficiency using inaccurate financial ratios (Hadad et al, 2003). Firdaus and Hosen (2013) argue that the measurement of efficiency using a BOPO ratio does not describe the level of efficiency of a bank because the calculation of the level of efficiency using a BOPO ratio is Partial Efficiency. Efficiency will be clearer if it is related to the concept of output-input comparison not only with partial calculations (Berger and Humphrey, 1997).

This study uses the Data Envelopment Analysis (DEA) method, in measuring the level of operational efficiency. DEA method is a method for calculating the ratio of output and input ratios for all units compared in a population. According to Hadad et al (2003) that the DEA method can obtain more accurate results compared to using financial ratio analysis. DEA is a non-parametric approach which is basically a linear programming technique. DEA identifies the units to be evaluated, the inputs and outputs of those units. Next, we calculate the productivity value and identify which units do not use inputs efficiently or do not produce output effectively so that we can obtain which inputs and outputs of these units are reduced or increased.

LITERATURE REVIEW

BANK EFFICIENCY

Efficiency is defined as the ratio between input and output, and the amount of output produced per unit of input shows great efficiency, while the maximum output produced per unit of input shows optimal efficiency (Sherman and Zue, 2006; Hasibuan, 1994). According to Gordo (2013), efficiency is the relationship between input and output. There are 3 factors that cause efficiency, namely (1) if the same input produces a larger output, (2) a smaller input produces the same output and (3) a larger input produces a larger output. Measurement of efficiency determines how a company can maximize output and profits by minimizing costs (Mokhtar et al, 2008).

Chen (2001) revealed the concept of efficiency is divided into four types, namely scale efficiency, scope efficiency, pure technical efficiency, and allocative efficiency. Scale efficiency measures the level of efficiency seen from the scale of a bank's business, which is usually described by the amount of bank assets. Scope efficiency or scope efficiency measures the level of efficiency as seen from the scope of the bank's business as measured by the scope of economies. If there is scope of economies, it means that banks that have multiple products are more efficient than specialist banks. Technical efficiency measures efficiency by maximizing output and allocative efficiency measures efficiency by choosing the right input combination.

Measurement of the level of efficiency can be done using two approaches, namely parametric and non-parametric approaches (Coelli, 1996). The parametric approach uses stochastic econometrics and is able to estimate errors thereby reducing disruption in the measurement of the level of efficiency. According to Berger and Mester (1997) that the parametric approach is divided into the Stocastic Frontier Approach (SFA), Thick Frontier Approach (TFA), and Distribution Free Approach (DFA) methods. While the non-parametric approach uses a non-stochastic approach and tends to combine disturbance and inefficiency in measuring the level of efficiency. This approach is known as the Data Envelopment Analysis (DEA) method. Both methods use different approaches to achieve efficiency. The parametric approach produces a stochastic cost frontier, while the DEA approach produces a production frontier (Hadad et al, 2003). In conducting an analysis of the non-manufacturing sector in this case the banking sector, measurement with the non-parametric analysis is most appropriate.

BANK FACTORS OF TECHNICAL EFFICIENCY

Capital Adequacy Ratio (CAR) shows the ability of capital owned by banks to be able to survive. CAR is a bank performance ratio that serves to measure the bank's capital adequacy in supporting its assets. Capital owned by banks is expected to have a positive effect on the level of banking efficiency because banks with high capital levels are technically more efficient and have sufficient reserves to minimize the impact of increased credit risk (Isik and Hasan, 2003; Casu and Molyneux, 2003). The higher capital owned by a bank will increase the level of efficiency (Pasiouras, 2008; Mamatzakis et al, 2015; Rosman et al., 2014). However, some research also shows that the lower bank capital will increase efficiency (Zhang et al., 2012; Ariff and Can, 2008; Girardone et al., 2004)

Non-Performing Loan (NPL) which is a proxy of credit risk. A high level of NPL is a depiction of the quality of low credit management, whereas a low NPL illustrates good credit management. NPL has a negative effect on the level of bank efficiency because a more efficient bank has better credit quality or a relatively small NPL value so that there are no additional costs in dealing with bad loans will reduce the level of efficiency (Hughes and Master, 1993; Garza-Garcia JG, 2012, Karim et al, 2010; Firdaus and Hosen, 2013; Ata and Bugan, 2016). According to Muljwan et al. (2014) that NPL has a negative and insignificant influence because the greater the credit risk will cause banks to tighten profit opportunities and will reduce their operational efficiency.

Return on Assets (ROA) is proxy of profitability. Banks that have high ROA describe a high level of efficiency. That is because more efficient banks are able to produce high returns. Research by Casu and Molyneux (2003), Garza-Garcia J.G, (2012) shows that profitability ratios (ROA) affect the level of bank efficiency. Profitability plays an important role in increasing the scale of efficiency. It will increasingly encourage more depositors and encourage an increase in the number of credit debtors. Contrary to the results of the study of Hou et al (2014) that the level of efficiency and profitability has a negative relationship.

Loan to Deposit Ratio (LDR) is proxy of liquidity. LDR which is expected to have a positive effect on the level of banking efficiency because the higher the lending, the greater the bank's profit opportunities, so that banks can increase their business scale and efficiency (Luo and Liu, 2011; Vu and Turnell, 2011). Credit distribution has a positive effect on the level of banking efficiency because for banks, credit is the main source of income, so the higher income can reflect banks more efficiently, although credit extended by banks will depend on the development of credit risk itself (Non-Performing Loans) (Garza-Garcia JG, 2012).

Another factor affecting bank efficiency is Net Interest Margin (NIM). NIM is the difference between interest income and interest expense. NIM can have a positive or negative effect on the level of bank efficiency. A high NIM can occur because of an improved level of efficiency, which means there is a positive relationship (Ata and Bugan, 2016). While negative relationships occur among others if the level of banking competition is low and can cause bank efficiency to be low (Kunt and Huizinga, 1999). Muljwan et al. (2014) said that a bank can more efficiently increase its NIM because the bank can reduce interest costs or increase interest income.

The size of the bank is the scale of the company regarding the size of the company seen from: total assets, value of shares, number of sales, and others. The size of the bank is reflected in the size or size of the bank. The greater the size of a bank is expected to further increase the efficiency of the bank. Size is projected by total assets which are variables to be used in research on bank efficiency levels. Banks that have a greater asset value tend to be able to pay lower input costs than competing banks so that it affects the level of efficiency (Bonin et al, 2004; Hauner, 2005; Sufian, 2009; Hassan et al, 2004; atan and Catalbas, 2005; Ata and Bugan, 2016). However, there are several studies that prove that the smaller the size of the eating level the better the efficiency (Hou et al, 2014; Ariff and Can, 2008)

Bank third party funds consist of savings, current accounts and time deposits or deposits. Deposits are components of third party funds which are expensive because they have a higher interest rate compared to savings and current accounts. The higher the deposit, the interest expense paid will increase so that it will have an impact on the level of efficiency. Bank third party funds consist of savings, current accounts and time deposits or deposits. Deposits are components of third party funds which are expensive because they have a higher interest rate compared to savings and current accounts.

METHODOLOGY

Data and Variable

This research is a quantitative descriptive study with the type of data that will be used in this study is panel data which is a combination of cross section data, namely 26 RDBs in Indonesia and time series data, during the period 2011Q1-2019Q4. The data used are secondary data sourced from the monthly financial statements of each RDB obtained from Indonesian Banking Statistics, Financial Reports of the Bank's Publications by the Financial Services Authority, and Bank's Annual Financial Reports by the RDB. Variable input-output combination to measure the efficiency level of an individual bank consists of: inputs deposits, interest expenses and non-interest expenses; while output loans, interest income and net non-interest income.

Data Envelopment Analysis

 Data Envelopment Analysis (DEA) is a non-parametric mathematical program used for frontier estimation. The DEA methodology has two approaches: DEA with input orientation, namely the approach by changing the proportion of inputs to produce outputs with a fixed value, and DEA with output orientation, ie approaches with fixed inputs can produce large outputs. DEA in the research of Chames, Cooper and Rhodes (1978) is a measure of efficiency for each decision making unit (DMU) which is the maximum ratio between weighted output and weighted input. Each weight used in the ratio is determined by the limitation that the same ratio for DMU must have a value of less than one or equal to one. In addition to producing efficiency values ​​for each DMU, ​​DEA also shows units that are a reference for inefficient units. DEA is very effective to be used to measure the performance of DMUs which in operation involve a lot of inputs and outputs.

𝐸𝑓𝑓𝑖𝑐𝑖𝑒𝑛𝑐𝑦 𝑜𝑓 𝐷𝑀𝑈 =$\frac{\sum\_{k=1}^{n}µ\_{k}y\_{rj}}{\sum\_{i=1}^{m}v\_{i}x\_{ij}}$

Subject to:

≤$\frac{\sum\_{k=1}^{n}µ\_{k}y\_{rj}}{\sum\_{i=1}^{m}v\_{i}x\_{ij}}$ 1; j= 1,2, 3…………n

µk, vi ≥ 0; r= 1.2. 3,…………n

Information:

k = DMU

m = number of inputs

n = number of outputs

xij = i DMU i input value j

yrj = r DMU output value j

µk = weight of DMU k for the evaluated DMU

vi = DMU weight j for the calculated DMU

There are two models that form the basis of DEA measurements, namely the Charnes, Cooper and Rhodes (CCR) models and the Banker, Charnes and Cooper (BCC) models. DEA calculations using the CCR model are based on the constant return to scale (CRS) assumption, while the BCC model is based on the variable return to scale (VRS) assumption.

In the CCR model, each DMU will be compared to the existing DMU, with the assumption that the internal and external conditions are the same. This model assumes that the ratio of the addition of input and output is proportional to the optimal scale, meaning that the addition of input causes the addition of the same amount of output

The BCC model is a development of the CCR model. This model assumes that the company does not or has not yet operated at an optimal scale. The assumption of this BCC model is the ratio of the addition of input and output varies. The addition of inputs causes the addition of output with varying proportions.

The CCR model calculates the level of efficiency by comparing output weights to input weights per each DMU unit and this model combines technical efficiency and scale efficiency calculations for each DMU. CCR modeling allows each DMU to determine the weighting of each input and output. However, due to imperfect competition, limited funds and others, DMU did not operate optimally.

It is assumed that xi and yr respectively represent inputs and outputs with indices i = 1, 2, ..., I and r = 1, 2, ..., R. If u and v are respectively the weights of inputs and outputs, then respectively each DMU has input and output weights.

Maximization θ =$ \frac{\sum\_{r=1}^{s}u\_{r}y\_{ro}}{\sum\_{i=1}^{m}v\_{i}x\_{io}}$

Subject to : $\frac{\sum\_{r=1}^{s}u\_{r}y\_{rj}}{\sum\_{i=1}^{m}v\_{i}x\_{ij}}$ ≤ 1,

$u\_{r}\geq $0; r= 1, 2,…, s; $v\_{i}\geq $0; i = 1, 2, …, m; j=1, 2,..., n; $y\_{rj}\geq $0; j=1, …., n.

Where:

$x\_{ij }$**=** input value to 1 in unit j

$v\_{i}$ = weighting for input to *i*

$y\_{rj}$= output value to r

$u\_{r}$ = weighting for input to *i*

The BCC model is a model developed by Banker et al. (1984). The formulated model is based on the results of the modification of the CCR model which evaluates a limit on each DMU evaluated. The BCC development is a dual model of the DEA model, stated.

Maximization $θ\_{B}$ =$ \frac{\sum\_{r=1}^{s}u\_{r}y\_{rj}}{\sum\_{i=1}^{m}v\_{i}x\_{ij}}$

Subject to: $\frac{\sum\_{r=1}^{s}u\_{r}y\_{rj}}{\sum\_{i=1}^{m}v\_{i}x\_{ij}}$ ≤ 1,

$u\_{r}\geq $0; r= 1, 2,…, s; $v\_{i}\geq $0; i = 1, 2, …, m; j=1, 2,..., n; $y\_{rj}\geq $0; j=1, …., n.

Keterangan:

$x\_{ij }$**=** input value to 1 in unit j

$v\_{i}$ = weighting for input to *i*

$y\_{rj}$= output value to r

$u\_{r}$ = weighting for input to *i*

The BCC model has fewer decision variables than the CCR model, namely λj = 1, 2, ..., n. In order to obtain a special set of weights per DMU for each input and output. BCC model is a DEA model with the principle of Variable Returns to Scale (VRS). The DEA-CRS program can be easily modified into the DEA-VRS model by only adding convexity constraints, namely Ʃ λj = 1.

In this study using the VRS model in which an evaluation of the DMU is done by overall efficiency with the assumption that all DMUs are operating at an optimal scale.

Panel Tobit Method

Efficiency scores obtained using DEA (first stage) will then be analyzed with several other variables using the Tobit panel model (second stage). At this stage an analysis of factors that influence the level of efficiency will be carried out. Efficiency values ​​are analyzed with several internal and external variables to determine the relationship and nature of the relationship between variables. According to Bogetoft and Otto (2011) that the approach is often used in knowing variations in efficiency related to a series of variables used.

In the Panel Tobit method assumed that the independent variables have an infinite value (non-censored) and the dependent variable has a censored value. In addition, this method assumes no autocorrelation, no heteroscedascity, no perfect multicollinearity, and the mathematical model used is correct (Firdaus and Hosen, 2013). The use of the Tobit regression model is due to the value of the dependent variable, namely technical efficiency which lies between 0 and 1. The equations of the model are as follows:

**EFFit** = α + β1 CAR it + β2 LDR it - β3 NIM it - β4 NPL it + β5 ROA it + β6 SIZE it –β8 DEP it ε

Where: EFF: Banking Efficiency, Size: Total Asset Logarithm, CAR: Capital Adequacy Ratio, LDR: Loan Deposit Ratio, NPL: Non Performing Loan, ROA: Return On Assets, NIM: Net Interest Margin, DEP: Composition of Deposit to third party funds.

RESULT

The Measurement of Efficiency by Using Data Envelopment Analysis

Measurement of the level of RDB efficiency in the first stage (first stage) uses a non-parametric approach with the DEA method. The assumption used in this study is VRS (variable return to scale). This is because the internal and external conditions of all RDBs are relatively unequal, meaning that the addition of inputs causes the addition of output by different amounts. VRS is suitable for banking industry activities (Irawati, 2008). In addition, this study uses an input-oriented intermediation approach because the input is the primary decision variable (Coelli et al, 1998). Orientation on the input means that the calculation of the level of efficiency of the bank if the input is used to a minimum without reducing the output produced in other words the orientation of the input is done by minimizing input while output remains.

DMU can be said to be technically efficient if it has an efficiency score equal to 1 or 100% meaning that the DMU in this case the RDB no longer wastes the use of its inputs and outputs. In addition, DMU can be said to be inefficient if the efficiency score is less than 1, which is between 0 <output / input <1 or less than 100%, which means that banks are still not able to optimally utilize their production capabilities. In the calculation using DEA will obtain a relative efficiency score between each DMU that is the object of research.

Gambar 1. Average level of Efficiency RDBs in period 2011Q1-2019Q4

Source: Output DEA

Figure 1 shows the average efficiency level of 26 RDBs in Indonesia every quarter per year based on DEA calculations. The movement of the level of efficiency shown during the study period of 2011Q1-2019Q4 fluctuated. Unstable economic conditions become one of the obstacles in increasing its efficiency. In general, RDBs in Indonesia operate at an average level of efficiency of 98.39%. The highest level of efficiency occurred in 2014Q3 with a score of 99.41%.

There was an increase in the score of RDB’s technical efficiency levels from 97.50% in 2011Q1 to 98.83% in 2019Q4. This shows an improvement in the level of efficiency in the RDB during the study period. In addition, there was a decrease in the level of efficiency in 2015-2016. A fairly high decrease occurred in the second quarter of 2016 with an efficiency level of 97.11%. This condition is inseparable from the influence of unstable economic conditions and policies adopted by Bank Indonesia to reduce the impact of the global crisis which began to have an impact in Indonesia.

Based on the results of the measurement of efficiency of 26 RDB shows that the level of bank efficiency that reaches 100% is not consistent every year. There are 7 RDBs of 26 RDBs or 26.92% which are consistently categorized as the most efficient RDB with an optimal efficiency level of 100% compared to other RDBs, namely Bank Jawa Barat and Banten, Bank Jatim, Bank Kaltim, Bank Bali, Bank Papua, Bank Sulteng, and Bank Sultra. RDB which has reached the optimum level of efficiency can be interpreted that RDB has been able to optimize all its resources. RDBs that have reached the optimum efficiency score will be a benchmark for other RDBs.

Meanwhile, 19 RDB or 73.08% are still categorized as low efficiency levels with a score of less than 1 or below 100%, namely Bank DKI, Bank DIY, Bank Jateng, Bank Jambi, Bank Aceh Syariah, Bank Sumut, Bank Riau and Kep . Riau, Bank Sumselbabel, Bank Lampung, Bank Kalsel, Bank Kalbar, Bank Sulselbar, Bank NTB, Bank NTT, Bank Maluku, and Bank Bengkulu. This condition can be interpreted that the RDB has not been able to optimize its resources. The low number of RDBs which are categorized efficiently shows that most of the RDBs still do not pay attention to business continuity.

The low level of RDB’s efficiency during the study period is in line with the results of research by Abidin and Endri (2009), Yonnedi and Panjaitan (2019), Rosyada (2011) that the number of RDBs that are at the optimum efficiency level is quite low. The research results of Defung et al (2017) also show that most RDBs are not technically efficient where the efficiency measure is below the efficiency frontier. When compared with other bank groups, based on the results of research by Hadad et al (2013) in 1995-2003 between categories of banks concluded that the most efficient bank groups are the State-owned Bank, Private Bank and Foreign Bank.

**Table 2. Average Level of efficiency RDBs In 2011Q1-2019Q4**



Source: Output DEA

 Based on the average RDB efficiency level data shows that 3 RDBs with the lowest efficiency score ranking, namely Bank Kalsel, Bank Sumselbabel, and Bank DIY with an average score of 93.70%, 94.95%, and 95.78%. RDBs have a lot of resources but they are not optimal in their use both in input and output. The results of the DEA output present potential information that RDB can develop to improve efficiency. From the input side, Bank Kalsel needs to develop interest expenses, non-interest expenses, and third party funds. Fund raising is very closely related to the interest expense (cost of funds). The collection of third party funds that is not accompanied by lending causes a high interest expense that is not proportional to the interest income earned. The average growth of third party funds in Bank Kalsel of 8.79% and credit growth of 14.18%. Credit growth is higher than the growth of third party funds. However, the average proportion (2011Q1-2019Q4) of third party funds and credit distribution was 74.89% below the national average of 77.45% so that the Bank Kalsel needs to increase its credit distribution. This condition is thought to be caused by the proportion of Bank Kalsel’s third party funding sources mostly in the form of Demand Deposits of 49.51% in 2011Q1-2019Q4. Bank Kalsel focuses on placing low-cost funds in current accounts. Current accounts are considered to have the lowest interest costs, but current accounts are placement of funds with high volatility or funds that tend to be volatile. The relatively small proportion of savings and deposits becomes quite difficult for RDB to extend long-term credit or investment.

 In terms of Output, Bank Kalsel, Bank Sumselbabel and Bank DIY need to increase operating income other than interest. Based on financial data, the proportion of operating income other than interest is compared to total assets in Bank Kalsel, Bank Sumselbabel and Bank DIY respectively 0.51%, 0.99% and 0.39%. When compared to national commercial banks with a proportion of operating costs other than interest at 2.30%, it shows that operating income other than RDB’s interest is still relatively low. RDBs need to develop and optimize their products or services so that they can increase fee base income for RDB such as transfer services, electronic banking, ATM cards, savings, save deposit boxes, and others. Implementation of information technology can be an alternative in increasing RDB operational income.

 The potential improvement of the highest efficiency in non-interest operating income of 32%. Source of non-interest income is through fee base income. An increase in non-interest income will drive a lower NIM. Development of services to customers can increase fee base income such as transfer services, savings, ATM cards, and others. However, the development of these services still faces obstacles, especially in the RDB. Based on the grouping of commercial banks based on business activities, the position of 2019 shows that 21 RDBs of 26 RDBs are in BUKU[[1]](#footnote-1) 1 and BUKU 2. This condition affects the ability of RDB to develop business activities. RDB business activities are limited in accordance with core capital owned by RDB. Banks with BUKU 3 and BUKU 4 tend to have a wider range of business activities compared to BUKU 1 and BUKU 2. Therefore, one way to develop RDB through this capital increase.

**Figure 2. *Potential Improvement* of RDB**

Source: Output DEA

The Measurement of Efficiency Determinant Using Tobit Panel

 Measurement of factors that increase RDB’s efficiency by using the tobit panel method. Table 19, namely CAR, LDR, NIM, NPL, ROA, bank size (assets), Deposit Composition to total third party funds, and credit composition to total assets.

Table 2. Bank Factors of Regional Development Bank’s Efficiency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Variable* | *Coefficient* | *Std. Error* | *z-Statistic* | *Prob.*  |
| C | 80.358 | 2.821 | 28.482 | 0 |
| CAR | 0.055 | 0.021 | 2.584 | 0.010\*\* |
| LDR | 0.042 | 0.008 | 5.031 | 0.000\* |
| NIM | 0.005 | 0.107 | 0.044 | 0.965 |
| NPL | -0.007 | 0.055 | -0.136 | 0.891 |
| ROA | 0.843 | 0.141 | 5.986 | 0.000\* |
| ASET | 0.693 | 0.153 | 4.516 | 0.000\* |
| DEP | -0.009 | 0.010 | -0.942 | 0.346 |

 Table 2 shows the results of the study that internal factors that influence the level of efficiency are CAR variables. CAR has a positive influence and a 5% confidence level means that the higher the CAR ratio, the higher the level of efficiency. CAR shows the ratio of bank capital adequacy to Risk Weighted Assets (ATMR). CAR of all RDBs in Indonesia tends to be stable above the 8% threshold, which is equal to 21.19% in 2019 meaning there are no RDBs that have problems with CAR. The highest CAR in December 2019, Bank NTB of 42.72% and the lowest CAR, Bank Sulutgo of 16.27%. CAR is able to reflect the ability of banks to deal with unexpected risks. This is in line with the results of research by Lotto (2019), Das and Gos (2006) so that banks need to be encouraged to have sufficiently high capital capacity to minimize risk exposure and improve bank operational efficiency.

 Variable liquidity with a Loan to Deposit Ratio (LDR) proxy has a positive and significant effect on the 1% real level of RDB’s efficiency, cateris paribus. LDR is a ratio that measures the ability of banks to meet short-term obligations by comparing the savings and credit provided by banks. Bank Indonesia sets the LDR limit between 79% -92%. Based on December 2019 position data, the LDR of RDB tends to be safe at 88.10%, but when compared with the average LDR of commercial banks at 94.43% is low (Indonesian banking statistics, 2019). The low LDR of RDB is because the role of RDB in lending is still not optimal. The higher the LDR illustrates the higher the lending, the greater the opportunity for banks to obtain profits, so banks can increase business scale and efficiency (Luo and Liu, 2011; Vu and Turnell, 2011). The results of Ally, Z and Patel G's (2014) research also showed that the bank's higher ability to convert deposits to loans illustrates that banks will be more efficient. However, according to Muljawan et al (2014) an increase in credit must still be accompanied by an increase in funding sources because if it will not increase the risk of liquidity that will cause a decrease in the level of efficiency.

 The profitability variable with ROA proxy has a positive effect on the 10% confidence level on the RDB efficiency level. A high ROA ratio shows that RDB profitability is increasing. RDB which is able to produce high profits can be indicated as an efficient RDB. This is in accordance with the results of Garza-Garcia J.G (2012) research that shows that ROA as a proxy for profitability has a positive effect on the level of bank efficiency, meaning that banks that have high profits will make banks more efficient. Banks with high profitability ratios can attract customers so as to increase the collection and distribution of funds (Ally, Z and Patel G, 2014; Sambracos and Maniati, 2015). In addition, with high profitability banks are able to manage assets more effectively and efficiently so as to reduce credit risk. Therefore, efficient banks can use their funds to get higher returns compared to inefficient banks (Maudos, et al. 2002).

The variable size reflected by ln total assets has a positive and significant effect on the level of efficiency of the RDB at the level of 5%, cateris paribus. The greater the assets owned by the bank, the bank has the ability to obtain high profits (Santosa, 2018). In line with the research of Berger, Hasan, and Zhou (2009), Wheelock and Wilson (1995) that there is a positive relationship between total assets and the level of bank efficiency. Large banks have a high level of efficiency because they have more ability to manage their resources (Hughes et al, 2001). In addition, banks that have high levels of assets will increase economies of scale that have an effect on improving efficiency. Banks that have large assets have adequate infrastructure, technology and resources to support bank operations. In addition, the bank also has a fairly extensive office network and diverse service products so that the bank has more efficient inputs in producing optimal output. The bank also tends to be able to pay lower input costs than its competitor banks, thereby affecting the level of efficiency by considering the services provided (Hauner, 2005; Sufian, 2009; Hassan et al, 2004; Atan and Catalbas, 2005; Sambracos and Maniati, 2015; Ata and Bugan, 2016). This condition will cause banks to grow more and have an impact on increasing profits. Banks that have the largest total assets in the group are BJB and RDB East Java with total assets of Rp.117.36 trillion and Rp 76.80 trillion respectively. Both RDBs have a constant efficiency level of 100% in the study period 2011-2019.

The NIM variable has a positive but not significant effect on RDB efficiency. This shows that NIM does not significantly contribute to RDB efficiency. Ally, Z and Patel G (2014) say that NIM is a proxy for the level of profitability of a bank. According to him there is a positive relationship between NIM and bank efficiency. banks that have high profitability will tend to attract customers to place their funds and the quality of loans distributed has good quality so that this condition will affect the level of bank efficiency. According to Muljawan et al (2014) that a bank can be more efficient by increasing its NIM because it can reduce interest expense or increase its interest income.

The NPL variable reflects the level of bank credit risk, showing a negative and not significant effect. Banks that have a credit risk level will tend to have a low level of efficiency (Casu et al, 2004; Carvallo and Kasman, 2005). NPL means an increase in efficiency will increase. A high NPL causes banks to create high Allowance for Impairment Losses (CKPN) that will increase costs and increase bank profitability, thereby increasing efficiency. However, RDB NPL is not significant to the level of efficiency. This condition is caused by the higher the required credit from a high NPL, the bank will tend to tighten its lending. The average RDB NPL is still below the 5% threshold. Based on December 2019 position data, the RDB NPL was 2.62%. The low NPL in RDB is because most of the credit is channeled to the non-productive or consumptive sector in lending to employees. The average lending to the consumer sector was 69.15% compared to the productive sector.

Variable composition of deposits against the composition of the comparison is negative and not significant. Deposits are an instrument for placement of funds with high interest compared to savings and current accounts. The higher the composition of deposits on total party funds, the level of efficiency will decrease. High interest costs will increase lending. Credit distribution will increase, but credit quality is poor. The average composition of RDB deposits

to total third party funds in 2011-2019 was 38.37%. The high deposit composition at Bank Sulutgo was 63.40%, BJB was 50.61% and Bank Sumbar was 50.32%. However, the composition of RDB’s deposits to this efficiency was not significant. This is because the interest rates determined by the RDB are adjusted to the applicable banking industry interest rates and are not given specific rates for interest rates. In addition, in order to improve the performance, RDBs increase placement in expensive funds.

CONCLUTIONS

 This study aims to analyze the level of efficiency of Regional Development Banks (RDB) in Indonesia and internal factors that influence the level of efficiency. The method used in this study uses two-stage Data Envelopment Analysis (DEA). In the first stage, the efficiency level of 26 RDBs was measured during the 2011Q1-2019Q4 period. The inputs used in this study are third party funds, interest expenses and non-interest expenses, while the output used is total credit, interest income and non-interest income. The main cause of RDB inefficiency is in output, namely non-interest income, while in the input is the interest expense. One way to increase non-interest income is to increase capital. Capital limitations cause RDB to experience capital restrictions. In addition, the excess input interest expense is due to low interest income. One way to overcome this is by increasing interest income through lending especially for credit to the Small, Micro and Medium Enterprises (MSME) sector, so that this is expected to encourage regional economic growth.

 The second stage shows the factors that influence the level of efficiency in RDB using the panel tobit method. Factors that have a positive and significant effect on RDB efficiency include Capital Adequacy Ratio (CAR), Loan Deposit Ratio (LDR), Return On Assets (ROA) and Size (total assets).

 The managerial implication in this research is that the Financial Services Authority (OJK) is expected to be able to encourage RDB and regional governments to increase their capital. The increase in capital can encourage RDB to increase the scope of business activities and services to increase so as to encourage an increase in non-interest income. In addition, encouraging RDB to increase lending to all sectors both productive and consumptive so that it is expected to increase interest expense.

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