Performance Analysis Of Regional Development Efficiency Banks In Indonesia Using Data Envelopment Analysis (DEA) Approach

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ABSTRACT: Most Regional Development Banks (BPD) in Indonesia recorded positive performance throughout the first quarter of 2021 even though the Covid-19 pandemic has not ended. In fact, many banks have recorded double-digit net profit growth.

This study aims to determine the level of technical efficiency in Regional Development Banks (BPD) for the 2019-2020 period. The data used in this study is secondary data sourced from the publications of Bank Indonesia and OJK, namely the Balance Sheet and Income Statement. The sampling technique is done by purposive sampling method, namely the technique of determining the sample with certain considerations or criteria. The sample in this study includes 26 BPD throughout Indonesia.

The data analysis technique used is Data Envelopment Analysis, which uses a non-parametric approach Data Envelopment Analysis (DEA). The input variables in this study include Third Party Funds (Deposits), Overhead Costs, Interest Expense. Meanwhile, the output variables include loans, interest income, and operating income other than interest.

The results of the research analysis in the first stage (first stage) / DEA show that the average BPD in Indonesia is still not consistently efficient in carrying out its operational activities. This shows that the operational costs of BPD are still quite high.

KEYWORDS - *Efficiency, Data Envelopment Analysis (DEA), Regional Development Bank (BPD)*

I. INTRODUCTION

The ongoing Covid-19 pandemic poses challenges for all business sectors in various regions. The severe impact of the pandemic has also spurred the financial sector, especially the Regional Development Bank (BPD) to play an active role in revitalizing the regional economy. Most Regional Development Banks (BPD) recorded positive performance throughout the first quarter of 2021 even though the Covid-19 pandemic has not ended. In fact, many banks have recorded double-digit net profit growth.

It is important to determine strategies that can be applied to new normal conditions. Founder and Chairman of MarkPlus, Inc. Hermawan Kartajaya through his whitepaper Surviving The Corona, Preparing The Post revealed that in order to survive in this time of crisis, companies must be prepared because everything will not be the same again. Here are some strategies for BPD to continue to grow.

Based on BPD SI's financial report data until September 2021, it is stated that BPD in Indonesia is still experiencing growth. This is indicated by an increase in several financial posts. First, the asset position of BPD SI as of September 2021 reached IDR 850.87 trillion, an increase of 5.62 percent yoy compared to the previous same period of IDR 805.01 trillion. Furthermore, the position of Third Party Funds (DPK) is also qualified where as of September 2021 it reached Rp.669.9 trillion, up 3.39 percent (yoy) compared to the previous Rp.647 trillion.

Then the credit that was successfully disbursed by BPD reached IDR 507.02 t as of September 2021, or an increase of 6.11 percent (yoy). The credit growth is clearly better than national banking credit which only grew 3.12 percent in the same period. Likewise with profit, BPD SI's profit increased 7.72% to Rp9.87 trillion.

Based on research by Abidin and Endri (2009) supported by Sutanto's (2015) research on BPD efficiency with DEA analysis, it shows that not all BPDs have achieved efficiency with an average efficiency level of 93.2 percent. Fathista's research (2015) and supported by Himawan (2015) on the technical efficiency of BPD shows that in general BPD has not shown high efficiency, with efficiency levels of 99.9% and 93.2%, respectively.

Efficiency is one of the parameters of banking performance which theoretically underlies all company performance. The ability to maximize available inputs to produce high output is a measure of expected performance. In banking, the condition is how to get the existing input by minimizing the level of input. To see the inefficiency of a bank, it can be identified the level of output and input by further analyzing the factors causing it (Sarjono, 2008).

Because there is a relationship between the financial sector and the stability of the country's economy. Efficiency in the financial sector shows economic growth. In its policy, Bank Indonesia targets three main corridors, namely: First, maintaining financial system stability. Second, strengthening banking resilience and competitiveness. Third, strengthening the intermediation function.

Various studies, both from within the country and abroad, have been carried out to further examine the determinants of banking efficiency, or in other words the factors that affect banking efficiency. However, the results of the research that have been carried out have brought different results.

Differences in the results of previous studies make many people to conduct research related to the efficiency level of BPD techniques in Indonesia. In this study, researchers will use the Data Envelopment Analysis (DEA) method to measure the technical efficiency of Development Banks and Regions throughout Indonesia.

The DEA method measures technical efficiency for all DMUs. The efficiency level has a relative score depending on the efficiency level of other units in the sample population. The efficiency level score is 0 to 1. A unit is said to be relatively efficient if its value is equal to 1 (efficiency value = 100%). Conversely, if the value is less than 1, then the unit is considered relatively inefficient (Silkman, 1986). The DEA method has two approach models, namely the CCR model which is called the CRS (Constant Return to Scale) model. CRS assumes CRS reflects the fact that output will change in the same proportion as input changes which means that if there is an increase in input n times, output will also increase n times.

II. LITERATURE REVIEW

The ongoing Covid-19 pandemic poses challenges for all business sectors in various regions. The severe impact of the pandemic has also spurred the financial sector, especially the Regional Development Bank (BPD) to play an active role in revitalizing the regional economy. Most Regional Development Banks (BPD) recorded positive performance throughout the first quarter of 2021 even though the Covid-19 pandemic has not ended. In fact, many banks have recorded double-digit net profit growth.

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This model was made based on the review of the literature for this paper and is shown in Figure 1.



Figur 1. Framework

This type of research is quantitative research, namely research that emphasizes testing research variables with numbers and analyzing data using statistical procedures.

The data used in this study is secondary data for the period 2019-2020 sourced from the Indonesian Banking Statistics (SPI) at the OJK. The data was processed using the MaxDEA7 software to get the efficiency score of each BPD observed during the period from 2019 to 2020.

In this study, the data collection method used two methods, namely: Literature Study, Online Research (Internet Research), and Secondary Research (Secondary Research). The author uses the data collection method with the following techniques:

1. Literature Study

Literature study or literature study is an activity that cannot be separated from a research. Almost all research requires literature or literature study. Although people often distinguish between library research and field research, both still require library research. According to Nazir (1998:112), literature study is an important step where after a researcher determines the research topic, the next step is to conduct a study related to theories related to the research topic.

There are many benefits of a literature study in the process of making a research paper. One of them is to come up with the latest ideas in research. Because no research is 100% new, there will inevitably be a wedge of duplication from previous research.

By studying the literature study, you can look for research ideas, research novelty, sharpen ideas, and find suitable methods.

2. Online Research

In this study, the authors collect various additional data and information from the internet related to research, so it is hoped that the data and information can support further data processing in this study.

3. Secondary Research

Secondary research, or secondary research (secondary research) is a type of research using data sources from external parties, not original data sources. In this study, the authors used secondary data obtained from the Indonesian Banking Statistics (SPI) available at the OJK.

The sampling technique is done by purposive sampling method, namely the technique of determining the sample with certain considerations or criteria. The criteria for sampling are as follows:

1. All BPDs that have published reports at the Financial Services Authority (OJK) during the 2019-2020 period.

2. Banks that do not have complete financial statements during the observation period are not included in the research object.

The following is a list of Regional Development Banks (BPD) registered with OJK and Asbanda during the 2019-2020 period in table 1:

No.	Bank
1	BPD Aceh
2	BPD Bali
3	BPD Bengkulu
4	Bank DKI
5	BPD Jambi
6	BPD Jawa Tengah
7	BPD Jawa Barat danBanten
8	BPD JawaTimur
9	BPD Kalimantan Timur
10	BPD Kalimantan Tengah
11	BPD Kalimantan Barat
12	BPD Kalimantan Selatan
13	BPD Lampung
14	BPD Maluku
15	BPD Nusa Tenggara Barat
16	BPD Nusa Tenggara Timur
17	BPD Papua
18	BPD Riau Kepri
19	BPD Sulawesi Tenggara
20	BPD Sulawesi Selatan dan Sulawesi Barat
21	BPD Sulawesi Tengah
22	BPD Sulawesi Utara
23	BPD Sumatera Barat
24	BPD Sumatera Selatan dan Bangka Belitung
25	BPD Sumatera Utara
26	BPD Yogyakarta

Table 1. List of Regional Development Banks/ Decision Making Units (DMU)

III. METHODOLOGY

In this study, using the DEA method using Banxia Frontier Analysis (BFA) Software to determine the efficiency level of Regional Development Banks during 2019-2020. The DEA method is a non-parametric border model using a linear model.

The DEA method measures technical efficiency for all DMUs. The efficiency level has a relative score depending on the efficiency level of other units in the sample population. The efficiency level score is 0 to 1. A unit is said to be relatively efficient if its value is equal to 1 (efficiency value = 100%). Conversely, if the value is less than 1, then the unit is considered relatively inefficient (Silkman, 1986). The DEA method has two approach models, namely the CCR model which is called the CRS (Constant Return to Scale) model. CRS assumes CRS reflects the fact that output will change in the same proportion as input changes which means that if there is an increase in input n times, output will also increase n times.

The second approach model is the Banker, Charnes, Cooper, or BCC model which assumes that the unit is operating or not at an optimal scale. The addition of input and output is not the same as if there is an

increase in input by n times, it will not cause output to increase n times. The output can be increased or decreased from the value; the BCC model is also referred to as the Variable Returns to Scale (VRS) model. VRS reflects the fact that production technology can exhibit increasing, constant, and decreasing returns to scale. The model used in this study is the BCC or VRS model because the sample of this study is a bank where various financial constraints and competition can cause the company to not operate optimally and the BCC model is more appropriate to be used to analyze the efficiency of service companies.

The shape of the DEA-VRS model is almost the same as the shape of the DEA-CRS model, only in the CRS model there is an additional constraint function. Assuming a number of n UKEs and each having m inputs and s outputs, where the relative efficiency score of the UKE p is obtained from the model proposed by Charnes et al (1978):



where k = 1...s, j = 1...m, I = 1...n, yki = average output k produced by UKE, xji = average input j used by UKE, vk = k output weighted, uj = weighted input j.

IV. RESULT AND DISCUSSION

In this study using DEA analysis, the model used in this study is the BCC or VRS model because the sample of this study is a bank where various financial constraints and competition can cause the company to not operate optimally and the BCC model is more appropriate to be used to analyze bank efficiency.

Based on the results of an analysis of the efficiency performance of BPD throughout Indonesia using the DEA method during the 2019-2020 period, the average efficiency increase from 89% to 94%, but still below the maximum value of 100% (see table 4.7). A bank can achieve the highest level of efficiency of 100% if the bank has been able to make efficiency in the use of its inputs and or has been able to utilize all the capabilities and resources it has to produce its outputs, then on the other hand, banks with efficiency values below 100% must be able to immediately perform efficiency in the use of inputs and must maximize all potential capabilities possessed to produce output.

	No	Bank	Year		Moon	
	NO	Dalik	2019	2020	Weall	
	1	BPD DKI	100%	87%	93%	
	2	BPD Aceh	100%	74%	87%	
	3	BPD Bali	100%	100%	100%	
	4	BPD Bengkulu	100%	100%	100%	
	5	BPD Jambi	100%	100%	100%	
	6	BPD Jawa Barat danBanten	100%	100%	100%	
	7	BPD Jawa Tengah	69%	89%	79%	
	8	BPD JawaTimur	80%	75%	77%	
	9	BPD Kalimantan Barat	93%	100%	96%	
	10	BPD Kalimantan Selatan	75%	94%	84%	
	11	BPD Kalimantan Tengah	100%	100%	100%	
	12	BPD Kalimantan Timur	100%	100%	100%	
	13	BPD Lampung	60%	88%	74%	
	14	BPD Maluku	74%	100%	87%	
	15	BPD Nusa Tenggara Barat	69%	87%	78%	
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 Table 2 Level of Technical Efficiency of Regional Development Banks throughout Indonesia for the period 2019-2021

16	BPD Nusa Tenggara Timur	82%	100%	91%
17	BPD Papua	100%	100%	100%
18	BPD Riau Kepri	66%	89%	78%
19	BPD Sulawesi Tengah	85%	100%	93%
20	BPD Sulawesi Tenggara	100%	92%	96%
21	BPD Sulawesi Utara	93%	100%	97%
22	BPD Sulselbar	78%	86%	82%
23	BPD Sumatera Barat	100%	100%	100%
24	BPD Sumatera Utara	100%	95%	97%
25	BPD Sumselbabel	100%	100%	100%
26	BPD Yogyakarta	100%	100%	100%
Mean		89%	94%	92%

According to the DEA calculation data from Table 4.7 above, it can be explained that most of the BPD are still not efficient in carrying out their operational activities. This shows that the operational costs of BPD are still quite high. Especially now that all banks, both in Indonesia and globally, are still facing the economic crisis caused by the COVID-19 virus pandemic. Therefore, it is very necessary for the attention of all stakeholders to immediately make comprehensive strategies and policies to improve the performance of BPD throughout Indonesia.

The efficiency value in DEA ranges from zero to one. An efficient DMU will have a value of 1 or 100%. Table 2 shows that there are 10 BPDs that have an efficiency level that is still stable at 100% from 2019-2020, namely: BPD Bali, BPD Bengkulu, BPD Jambi, BPD JabarBanten, BPD Jambi, BPD Kalteng, BPD Kalteng, BPD Kaltim, BPD Papua, BPD West Sumatra, BPD Sumsel Babel, BPD Yogyakarta.

And there are 5 BPDs that show improvement in efficiency values from before with an average efficiency value of 80-90% in 2019, then in 2020 reaching 100%, including: BPD Kalbar, BPD Maluku, BPD NTT, BPD Sulteng, and BPD Ignite.

Furthermore, there are 4 BPDs that experienced a decrease in efficiency levels from the previous efficiency value reaching 100% in 2019, decreasing in 2020, namely: BPD DKI 87%, BPD Aceh 74%, BPD Sultra 92%, BPD Sumut 95%. And there are BPDs that do not show improvement in efficiency values from 2019-2020, including: Central Java BPD 89%, East Java BPD 75%, South Kalimantan BPD 94%, Lampung BPD 88%, NTB NTB BPD 87%, Riau Kepri BPD 89%, BPD South Sulawesi 86%.

According to Abidin &Endri (2009), for BPDs that have not been able to produce optimal performance, the efficiency level is still below 100%. So, it means that the BPD in its operational activities has not been efficient in terms of utilizing all its potential capabilities to produce maximum output. Therefore, BPDs that are not yet efficient must increase their total lending and total income by utilizing digital banking technology, as well as digital marketing to promote BPD's products.

V. CONCLUSIONAND RECOMMENDATIONS

5.1. Conclusion

- 1) Based on the DEA calculation data in table 1, it can be explained that the average BPD in Indonesia is still not consistently efficient in carrying out its operational activities. This shows that the operational costs of BPD are still quite high.
- 2) Based on table 1 at the end of the 2020 period, there were 10 BPDs that had an efficiency level that was still stable at 100% from 2019-2020.
- 3) And there are 5 BPDs that show improvement in efficiency values from before with an average efficiency value of 80-90% in 2019, then in 2020 it will reach 100%.
- 4) Furthermore, there are 4 BPDs that experienced a decrease in efficiency levels from the previous efficiency value reaching 100% in 2019, decreasing in 2020.

5.2. Recommendations

- For BPDs with medium and small assets to be able to achieve an optimal level of 100% efficiency, BPD should take policies related to consolidation efforts in order to create a strong banking structure, enlarge business scale and increase competitiveness through innovation capabilities, and can contribute significantly to the national economy.
- 2) In the era of information technology, BPD does not only compete with other banks, but also with financial technology companies (fintech) that are able to meet the needs of financial products instantly.

For example, through providing loans to regional civil servants, with interest rates or yields that are no less competitive.

- 3) This research uses a nonparametric approach and can be developed with a parametric approach, for example; Stochastic Frontier Analysis (SFA), Thick Frontier Approach (TFA) and Distribution-Free Approach (DFA).
- 4) The input-output specification in this study uses an intermediation approach, this research can also be developed using an asset approach or a production approach.
- 5) This research can also be developed by including factors that affect bank efficiency performance, for example; bank size (market size), level of profitability, and market share (market share).

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