

Comparative Analysis on Efficiency of Rural Bank and Islamic Rural Bank in Yogyakarta

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This research aims to ascertain the efficiency levels of BPRs (Rural Banks) and BPRSs (Islamic Rural Banks) within the province of D.I. Yogyakarta. The sample utilized in this study comprises 49 BPR and 12 BPRS situated in D.I. Yogyakarta, spanning the research period of 2017-2021. The analytical approach employed is the non-parametric Data Envelopment Analysis (DEA), utilizing secondary data sourced from bank financial reports. The determination of input and output variables in this study adopts an intermediary approach. The input variables encompass fixed assets, operational expenses, and third-party funds, while the output variables encompass the quantity of disbursed financing and operational income. The findings of this research reveal a fluctuating trend within BPRs and BPRSs in Yogyakarta over the course of years. Based on the CRS (Constant Returns to Scale) and VRS (Variable Returns to Scale) scores, it is discernible that the efficiency levels of both BPRs and BPRSs experienced a reduction during the Covid-19 pandemic. The study's insights have the potential to stimulate informed decision-making and policy refinement, ultimately fostering a more robust financial sector and bolstering economic recovery efforts in the post-Covid-19 landscape.

Keywords: Efficiency, Rural Bank, Islamic Rural Bank, DEA, Covid-19 Pandemic

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INTRODUCTION

The Covid-19 pandemic, which began to spread to Indonesia at the end of 2019, not only had an impact on the health sector, but also caused global economic conditions to experience a severe shock, and was even able to put pressure on the position of the financial markets and the global banking sector (Diana et al., 2021). Economic development in a country is highly dependent on the dynamic development and real contribution of the banking sector. When the banking sector slumped, the national economy also slumped. Likewise, when the economy stagnates, the banking sector is also affected where the intermediary function does not work as it should (OJK, 2021). The bank intermediary function is to collect funds from the public and channel them back in the form of loans or credit to real business sectors in business development efforts, which aim to support the implementation of national development in the context of increasing equitable distribution of development and its results, economic growth and national stability, towards improving the standard of living of the people at large. Given this important role, banks are required to be able to achieve performance and maintain business continuity (Risantyo, 2022).

To prevent the spread of Covid-19 the government has created and implemented a social distancing policy. The existence of this policy caused many business sectors to not be able to operate normally so that business sectors that had loans at a bank experienced difficulties in making payments. If it is left unchecked, it will affect the level of credit collectibility. Meanwhile, the soundness level of a bank is heavily influenced by the value of a bank's bad loans (OJK, 2021). Based on OJK data, the number of BPRs and BPRS in Indonesia has decreased. As of September 2021, the number of BPRs and BPRS is 1,646, with details of 1,481 BPRs and 165 BPRS spread throughout Indonesia. This number shows a decrease, in 2019 the number of BPRs and BPRS was 1,709, then in 2020 it decreased again to 1,669. Meanwhile, the largest number of BPRs and BPRS are located on the islands of Java and Bali.

The fundamental role of the banking industry, especially BPR and BPRS which has a specific objective, namely providing financial services and products to people with a weak economy and the MSME sector, it is necessary to accelerate improvements in these two types of banks (Muhari & Hosen, 2014). As is known, that MSME is one of the strategic sectors and the largest contributor to national

GDP (Yasin & Fisabilillah, 2020). For this reason, in the effort to recover the national economy, the role of BPRs or BPRS cannot be underestimated, even though the economic scale of these banks is still small, in terms of their ability to provide broader financial services to the MSME sector in Indonesia is very important (Hartono et al., 2008).

The author chose DI Yogyakarta as the research population because its economic development is increasing every year. Yogyakarta's economy based on data from BPS in the first quarter of 2021 has experienced an increase, even better economic growth compared to Java or the national one with a value of -0.83% respectively; yoy and -0.74%; yoy (BI, 2021) and in the first quarter of 2022 it grew again by 2.91 percent compared to quarter 1-2021 (BPS, 2022). Furthermore, looking at Yogyakarta's GRDP, according to expenditure in the first quarter of 2022, it was dominated by household consumption of 62.19% and the business field that grew the highest was the agricultural sector, amounting to 30.61% (BPS, 2022). This explains that the need for financing in Yogyakarta is relatively high and of course also affects the potential of BPRs and BPRS in channeling funds in the form of financing. For this reason, it is important to conduct this research in order to measure the level of efficiency of banks, especially BPRs and BPRSs in order to find out whether banking performance is progressing or regressing. If banking efficiency is maximum, the banking performance will increase or progress, and vice versa (Fauzi, 2018).

Research related to the efficiency of BPRs and BPRS in Indonesia has been carried out by several previous researchers, including Almas (2018) who discussed the comparison of efficiency levels between BPRs and BPRS in East Java in 2014-2017. Hasbi & Apriyana (2021) analyze related efficiency level at BPR and BPRS in West Java in 2019-2020. Sugiani (2018) analyzes comparison of efficiency levels between BPR and BPRS in Tangerang in 2014-2016. Widiyaningtias & Dura (2022) analyzed a comparison of the efficiency levels of BPRs and BPRS in East Java before and during the 2019-2020 Covid-19 outbreak. Prayitno (2018) studied comparison of the efficiency levels of BPRs and BPRS in Indonesia in 2012-2017. Layyinaturrobanayah et al., (2019) analyzed BPR efficiency level in Bali in 2012-2016. Fauzi (2018) discusses the efficiency level of BPRS in Central Java Province in 2012-2016. Pebrianti (2021) analyzes BPRS efficiency level in West Javayear 2014-2018. Mohari &

[Hosen \(2014\)](#) analyzed the level of cost efficiency of BPRS in Indonesia year 2011-2013.

Based on these studies, no one has specifically discussed the comparison of efficiency levels at BPRs and BPRS in the DI Yogyakarta area. In addition, there are no research years during the 2017-2021 period. As an effort to recover the national economy, inclusive data is needed. This research was conducted using a sample of 49 BPRs and 12 BPRS in DI Yogyakarta Province during the 2017-2021 period. BPR and BPRS performance measurement in this writing uses the Data Envelopment Analysis (DEA) method. The application of the DEA method is useful for obtaining values in the form of efficiency levels which are calculated by comparing the output results with the resources used as inputs.

LITERATURE REVIEW

The author explores several previous studies that support this research as material for consideration and basis for arguments. In several studies, there are various differences in taking a variable to determine input and output to determine the level of efficiency of BPR and BPRS. One of them is research researched by [Al-Qorni \(2014\)](#) which focuses on 52 BPRs and 8 BPRS located in Yogyakarta. This study states that BPRS are on average more efficient than BPRs. This is due to the fact that the average source of inefficiency in BPRs comes from credit and operational income which is higher than that of BPRS.

This is in line with [Hasbi & Apriyana's research \(2021\)](#) which examined the efficiency levels of 6 BPRs and 6 BPRS in West Java during the Covid-19 pandemic. The results of this study are that the best efficiency performance during the Covid-19 pandemic was shown by BPRs, while the best level of efficiency during the Covid-19 pandemic was BPRS. Likewise with the research of [Naufal & Firdaus \(2017\)](#) which examined 12 BPRS in the Greater Jakarta area for the 2015-2016 period and showed that overall these BPRS had fluctuating efficiency levels. The inefficiency of several BPRs is caused by the fact that the existing inputs are not optimal, so that the output is not optimal.

Different results were obtained in [Prayitno's research \(2018\)](#) which showed results where BPRs were superior by 81.44% compared to Sharia BPRs by 79.66%. Factors that influence the state of inefficiency are the input and output variables in the study. The input variables are third party funds, total assets, and operating expenses which have not reached the

maximum, as well as the output variables, namely credit/financing and operating income which have not been maximized. In another study, BPR again showed a higher level of efficiency compared to BPRS. This research was investigated by [Almas \(2018\)](#) who analyzed 5 BPRs and 5 BPRS in East Java province. The results stated that there were 2 efficient BPRs while none of them were efficient.

Furthermore, there is research from [Hidayah et. al \(2020\)](#) which has the same research location as the author, namely DI Yogyakarta. This research focuses on the efficiency of BPRS in Central Java and Yogyakarta. The results of this study were that there were 6 efficient BPRS from 33 BPRS that were studied. The inefficiency of BPRS in research is caused by a lack of productive financing distribution. These results are not much different from the research examined by [Septiani & Rani \(2020\)](#). They analyzed BPRS registered with the OJK during the 2012-2018 period using the DEA method. The results of his research stated that BPRS during the 2012-2018 period were still running inefficiently. Only one BPRS is operating stably. Efforts are needed to increase output and optimize input as a solution to the existing BPRS inefficiencies. Then the next research comes from [Wanunda & Hosen \(2015\)](#) with the results of the study namely that BPRS is divided into 2 quadrants, namely the dog quadrant (high efficiency and low profitability) and the sleeper quadrant (low efficiency and high profitability). The results of the analysis state that efficiency has a negative relationship with profitability.

RESEARCH METHOD

The approach used in this study is descriptive quantitative, with the analytical tool Data Envelopment Analysis (DEA). The Data Envelopment Analysis (DEA) method is a non-parametric approach to assess the level of efficiency of a company in using inputs to maximize the output produced ([Hadini & Wibowo, 2021](#)). DEA was first developed by [Charnes, Cooper & Rhodes \(1978\)](#) which was later redeveloped by [Banker, Charnes & Rhodes \(1984\)](#) to measure the level of efficiency and production of a business unit. According to [Hadini & Wibowo \(2021\)](#), the advantage of using Data Envelopment Analysis (DEA) is that it can analyze a case that has a complex relationship between the inputs and outputs used which cannot be solved properly by other analytical tools. Therefore, [Hadad et al. \(2003\)](#), states that DEA is able to produce more accurate results when compared to financial ratio analysis.

Based on research by [Sharma et al, \(2013\)](#), in various empirical studies related to efficiency, the DEA method is used to measure technical efficiency, including the efficiency of financial institutions. Furthermore, through the DEA method, information can also be obtained regarding Decision Making Units (DMUs) that are inefficient in using inputs and what variables cause these inefficiencies. And finally, from the DEA method it can be seen the value of the input or output variables that must be achieved or adjusted in order to achieve the maximum level of efficiency.

There are two basic models in the DEA method, namely first, the Charnes, Cooper & Rhodes (CCR) model which is in line with the Constant Return to Scale (CRS) assumption, where the change in the output value of the resulting DMU is constant (same) with the proportion of adding a certain output value, it means the production function is fixed. Second, the Banker, Charnes & Rhodes (BCR) model is in line with the Variable Return to Scale (VRS). The assumption of this second model is the opposite of the first model, namely every change in the output value of the DMU is different for every change in the magnitude of a certain input value. So, it can be concluded that for each input it does not necessarily produce the same output value. Therefore, in this study, the level of banking efficiency is calculated by comparing the CRV and VRS models, to reflect banking activity.

This research will provide an overview regarding the level of efficiency of BPRs and BPRS in DI Yogyakarta with the 2017-2021 research period. The data used is secondary data with the type of panel data in the form of quarterly financial reports of BPRs and BPRS in Yogyakarta consisting of balance sheets and profit and loss reports. The data collection method uses library research, which comes from various literary sources such as articles, books, scientific journals and BPR and BPRS financial reports on the official website of the OJK (Financial Services Authority) from 2017-2021.

The population and sample of this study are Rural Banks (BPR) and Sharia Rural Banks (BPRS) in Yogyakarta, totaling 55 BPRs and 12 BPRS registered with OJK. However, because there are several banks with limitations and do not publish their financial reports, the final sample for this study is 49 BPRs and 12 BPRS in Yogyakarta. Then, the variables used in this study refer to the results of research by [Hadad et al, \(2003\)](#) and [Almas \(2018\)](#), with the input variables used being Total Assets, Operational Costs and Third Party

Funds. Then the output variable consists of Credit or Financing Provided and Operating Income.

Input variables:

- Total Assets, namely cash, placements with other banks, loans or financing of fixed assets and inventory
- Operating expenses consist of marketing expenses, research and development expenses, allowance for possible losses on productive assets, administrative and general expenses, and other operating expenses.
- Third Party Funds at BPRS are in the form of Mudharabah deposits, Wadiah savings and Mudharabah savings.

output variables:

- The credit/financing used is Mudharabah financing, Murabahah financing and Musyarakah financing. Then, for credit in the form of all types of credit given.
- Operating income, namely, in the form of total operating income from the bank used as the research sample.

The data that has been collected is processed using MaxDEA software. The software will calculate the efficiency score of each BPR and BPRS in each research period or year. A BPR and BPRS are said to be efficient if the score obtained is 1. However, if the score obtained is close to zero then the BPR or BPRS is increasingly inefficient. The results of data processing are in the form of descriptive statistics, efficiency panels, average efficiency, and potential improvements which include slack movement which is used as a target for improving bank efficiency levels in order to achieve maximum efficiency. The processing results will be presented in tabular form and analyzed to obtain research conclusions and suggestions from the research that has been done. Research using DEA on Islamic banking efficiency can be found at [Ikhwan \(2022\)](#), [Aufa et al, \(2022\)](#), and [Maulida \(2022\)](#).

RESULTS AND DISCUSSION

Table 1 and Table 2 provide an overview regarding input variables and output variables as well as input and output descriptive statistics for Rural Credit Banks (BPR) and Sharia Rural Banks (BPRS) in DI Yogyakarta used in this study during the 2017-2021 period.

Table 1: Descriptive Statistics of Yogyakarta Rural Banks (BPR)

Variable	Means	Std. Dev	Min	Max
Inputs				
Fixed assets	4,556,050	8,739,654	2,309	48,181,878
Operating Expenses	12,489,243	15,512,780	573,139	89,800,034
Third-party funds	108,018,182	154,828,372	1,210,309	711,918,442
output				
Amount of Funding Provided	101,518,489	153,498,407	297,281	792,975,445
Operating Income	15,786,598	19,877,489	33,804	96,529,366

Table 2: Descriptive Statistics of Yogyakarta Islamic People's Financing Bank (BPRS)

Variable	Means	Std. Dev	Min	Max
Inputs				
Fixed assets	1,927,879	2,697,662	249,388	17,654,981
Labor Expenses	4,026,397	1,874,758	727,594	8,163,362
Third-party funds	49,319,294	35,919,212	6,187,301	141,273,002
output				
Amount of Funding Provided	11,954,576	14,218,870	402,937	68106375
Operating Income	5,514,923	3,036,355	1,096,568	14,507,137

Summary of BPR and BPRS Efficiency Panel Scores per Year

With the DEA method, the efficiency of BPRs and BPRS in Yogyakarta has been checked annually and investigated using the common frontier. The table

below (Table 3) shows the average Technical Efficiency (TE), Pure Technical Efficiency (PTE), and Scale Efficiency (SE) of BPR and BPRS from 2017 (Panel A), 2018 (Panel B), 2019 (Panel C), 2020 (Panel D), 2021 (Panel E) and the entire year (Panel F).

Table 3: Summary Statistics of Efficiency Score (TE, PTE and SE) per year

Years/Type of Efficiency	Means		min		MAX		STDEV	
	BPR	BPRS	BPR	BPRS	BPR	BPRS	BPR	BPRS
Panel A (2017)								
TE	0.721	0.879	0.194	0.609	1,000	1,000	0.168	0.134
PTE	0.799	0.910	0.400	0.651	1,000	1,000	0.149	0.126
SE	0.906	0.965	0.194	0.879	1,000	1,000	0.124	0.039
Panel B (2018)								
TE	0.730	0.844	0.380	0.514	1,000	1,000	0.141	0.146
PTE	0.809	0.886	0.381	0.550	1,000	1,000	0.150	0.142
SE	0.908	0.952	0.532	0.852	1,000	1,000	0.098	0.048
Panel C (2019)								
TE	0.680	0.741	0.466	0.300	1,000	1,000	0.141	0.211
PTE	0.836	0.790	0.470	0.309	1,000	1,000	0.153	0.204
SE	0.825	0.935	0.585	0.736	1,000	1,000	0.143	0.073
Panel D (2020)								
TE	0.681	0.613	0.476	0.234	1,000	1,000	0.145	0.208
PTE	0.820	0.710	0.502	0.235	1,000	1,000	0.149	0.238
SE	0.839	0.882	0.593	0.502	1,000	1,000	0.132	0.139
Panel E (2021)								
TE	0.681	0.725	0.476	0.402	1,000	1,000	0.145	0.200
PTE	0.820	0.797	0.502	0.444	1,000	1,000	0.149	0.211

SE	0.839	0.912	0.593	0.705	1,000	1,000	0.132	0.079
Panel F (All Years)								
TE	0.698	0.760	0.194	0.234	1,000	1,000	0.152	0.206
PTE	0.815	0.819	0.381	0.235	1,000	1,000	0.151	0.202
SE	0.864	0.929	0.194	0.502	1,000	1,000	0.132	0.089

From the table it can be seen that the lowest average Technical Efficiency (TE) score for BPRs was in 2019 (0.680). Meanwhile, BPRS is in 2020 (0.613). Then for the highest TE average score in BPRs in 2017 (0.721) and BPRS in 2017 (0.879). Then, on the average BPR and BPRS Pure Technical Efficiency (PTE) in Yogyakarta, it is known that the highest BPR PTE was in 2019 (0.836) and the lowest was in 2017 (0.799). And for BPRS, the highest PTE was in 2017 (0.910), while the lowest was in 2020 (0.710). Based on this, it can be concluded that the level of efficiency of BPR and BPRS in Yogyakarta tends to fluctuate every year and no BPR or BPRS has yet achieved maximum efficiency.

Based on the average CRS and VRS table for BPRs each year, it is known that no BPR in Yogyakarta has reached the maximum efficiency level (1,000) in the 5 year observation period. However, when viewed from the highest CRS score, BPR Artha Berkah Cemerlang obtained the highest average CRS score compared to other BPRs in Yogyakarta, namely (0.994). And, the lowest average CRS score was obtained by BPR Danagung Bakti with a CRS value of 0.518. Then, based on the VRS assumption, it is known that BPR Artha Berkah Cemerlang has the highest average VRS score with a value of 0.995. Furthermore, the lowest VRS score is BPR Sindu Adi with an average VRS score of 0.565.

BPRS Efficiency in Yogyakarta

Table 4: Average BRPS Efficiency Score in Yogyakarta

DMU	CRS	VRS
BPRS Bangun Drajat Warga	0,896	0,962
BPRS Barokah Dana Sejahtera	0,967	0,969
BPRS Cahaya Hidup	0,784	0,955
BPRS Dana Hidayatullah	0,883	1,000
BPRS Danagung Syariah	0,445	0,464
BPRS FORMES	0,711	0,749
BPRS Madina Mandiri Sejahtera	0,733	0,769
BPRS Margirizki Bahagia	0,738	0,796
BPRS Mitra Amal Mulia	0,534	0,580
BPRS Mitra Cahaya Indonesia	0,848	0,917
BPRS Mitra Harmoni Yogyakarta	0,726	0,769
BPRS Unisia Insan Indonesia	0,858	0,893

Based on the average CRS table at BPRS in Yogyakarta each year, it is known that none of the BPRS in Yogyakarta achieved the maximum efficiency level (1,000) during the observation period. However, when viewed from the highest CRS score, BPRS Barokah Dana Sejahtera obtained the highest average CRS score compared to other BPRS, namely (0.967). And, the lowest average CRS score was obtained by BPRS Danagung Syariah with a CRS value of 0.445.

Then, based on the VRS assumption, it is known that there are BPRS in Yogyakarta that have reached the maximum efficiency level (1,000), namely BPRS Dana Hidayatullah. Furthermore, the lowest VRS average score is BPRS Danagung Syariah with an average VRS value of 0.444.

Comparison of BPR and BPRS Efficiency Trends in Yogyakarta

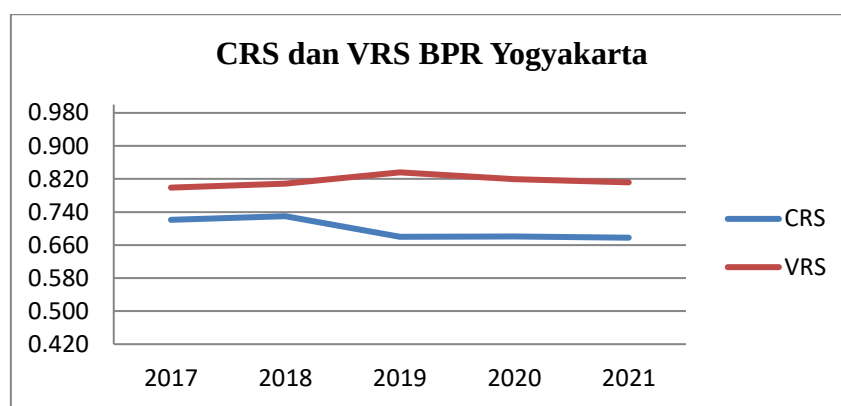


Figure 1: BPR Efficiency Trends in Yogyakarta

Figure 1 provides information regarding the trend of BPR efficiency in Yogyakarta from 2017 to 2021. Judging from the efficiency graph, it is known that the Technical Efficiency (CRS) shows a trend that tends to be stable, as well as the average value of the VRS score. From the figure it is also known that there is a similar pattern from the CRS and VRS assumption graphs at BPR Yogyakarta. The efficiency value of BPR Yogyakarta initially increased until 2019 on the VRS assumption, then the level of efficiency decreased in

2020 to 2021, although the decrease occurred only slightly. And on the CRS assumption in 2018, it shows an increase in the level of efficiency. Then, in 2019 the efficiency level decreased until 2021.

Furthermore, this research also observes the efficiency trend of BPRS in Yogyakarta. The results of the CRS and VRS trend analysis can be seen in the image below.

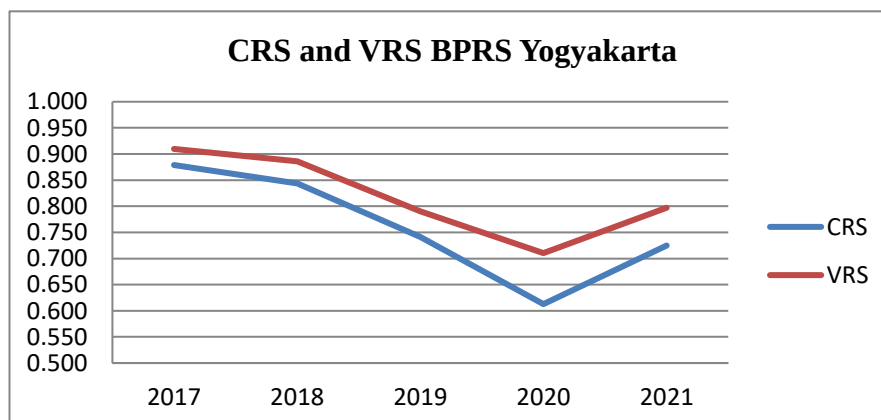


Figure 2: BPRS Efficiency Trends in Yogyakarta

Figure 2 provides information regarding the trend of BPRS efficiency in Yogyakarta from 2017 to 2021. Judging from the efficiency chart, it is known that the Technical Efficiency (CRS) shows a quite drastic decline, as well as the average value of the VRS score. From this figure it is also interesting to find that there is a similar pattern from the CRS and VRS assumption graphs at BPRS Yogyakarta. Based on observations, the efficiency value of BPRS Yogyakarta has decreased in 2018, both on the CRS and VRS

assumptions. Then the level of efficiency again experienced a significant decline in 2020, in which year the Covid-19 pandemic had spread in Indonesia. Until 2021 the efficiency level of BPRS in Yogyakarta based on the CRS and VRS assumptions will increase again with a fairly high increase.

Next is a comparative analysis of the efficiency of BPR and BPRS in Yogyakarta. This comparison uses the average CRS efficiency score over the 5 year observation period. The results are as follows.

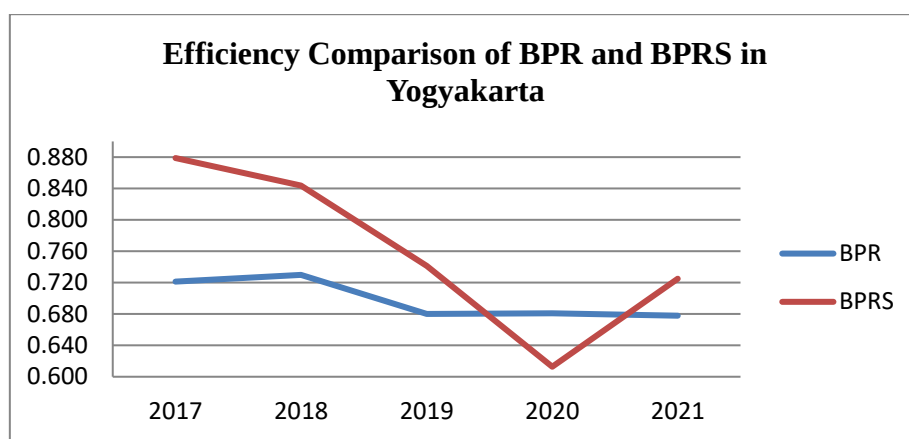


Figure 3: Comparison of BPR and BPRS Efficiency in Yogyakarta

Judging from Figure 3 above, it can be concluded that the efficiency value of BPRS is higher than that of BPRs in Yogyakarta, even though in 2020 the efficiency level of BPRS has dropped drastically beyond that of BPRs. The efficiency level of BPRS decreased from 2018 to 2020 and will increase again in 2021. Meanwhile, BPRs began to experience a decline in 2019 and continued until 2021, even though the decline that occurred was relatively small.

Comparison of BPR and BPRS Efficiency Levels in Yogyakarta During the Covid-19 Period

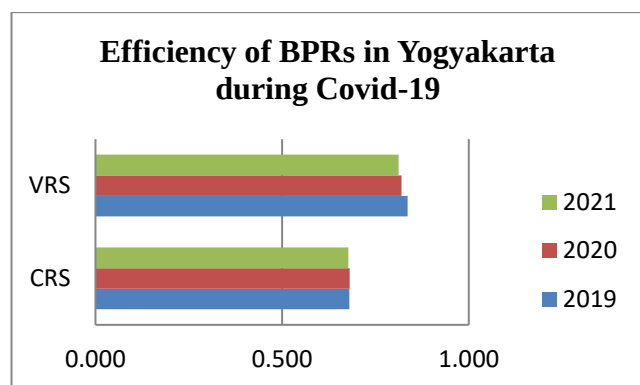


Figure 4: BPR Efficiency in Yogyakarta During the Covid-19 Pandemic

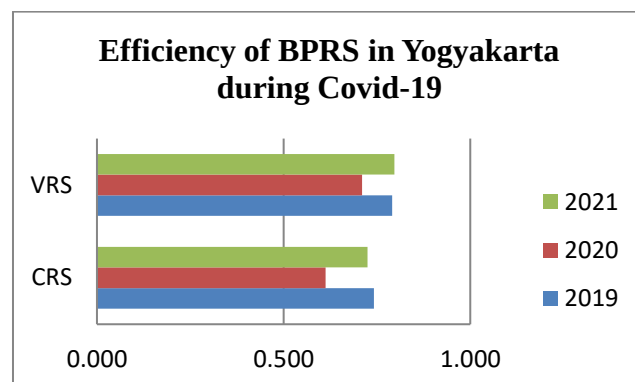


Figure 5: BPRS Efficiency in Yogyakarta During the Covid-19 Pandemic

Based on figures 4 and 5 above, it can be concluded that the BPR and BPRS in Yogyakarta on the CRS (Constant Return to Scale) and VRS (Variable Return to Scale) analysis experienced a decrease in efficiency. In 2019 BPRs and BPRS in Yogyakarta showed an increase in efficiency levels. However, in the end because the Covid-19 pandemic began to enter Indonesia at the end of 2019 and spread massively in 2020, the level of efficiency of the two types of banks has decreased, especially in BPRS there has been a significant decrease in efficiency. Then in 2021, BPRS efficiency will start to improve again. In contrast to BPR, where the decline in the level of efficiency occurs continuously until 2021, even though the decline that occurs only shows a small value.

Potential Improvements

The DEA method, in addition to producing the efficiency level of a unit being analyzed, can also generate potential improvements (Potential Improvements) in order to obtain values that must be corrected in order to achieve optimal efficiency levels. With this Potential Improvement analysis, it is possible

to know which variables need to be improved in order to reach this optimal level. This analysis uses the last period of observation and is analyzed separately from other periods to get an idea of the value to be achieved. In other words, from this potential improvement it can be seen that the source of the inefficiency originates. The following are the results of Potential Improvement measurements.

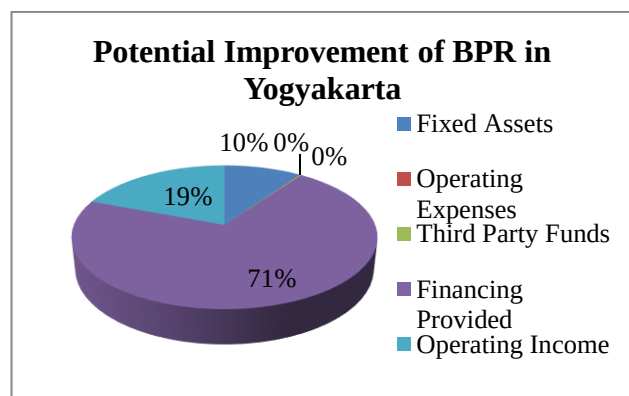


Figure 6: Potential Improvement of BPR in Yogyakarta

From Figure 6 it can be seen general information related to input variables and output variables that are not efficient at BPR Yogyakarta. The input variable that causes inefficiency in BPR Yogyakarta only comes from fixed assets. Then the output variable of BPR inefficiency consists of financing provided and operating income. In the potential improvement analysis picture, it is found that if BPRs in Yogyakarta want to achieve an optimal level of efficiency, fixed assets need to be reduced by 10%. Furthermore, in the output variable, the amount of financing provided needs to be increased by 71% and operational income increased by 19%. Furthermore, related to the analysis of the potential improvement of BPRS in Yogyakarta, as shown below.

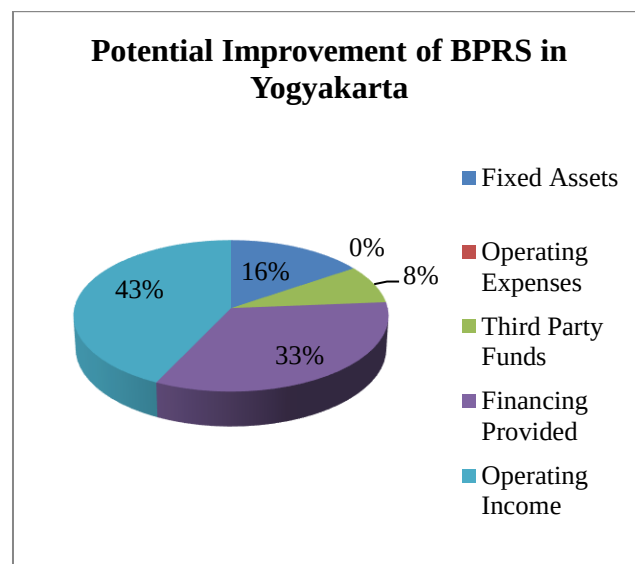


Figure 7: BPRS Potential Improvement in Yogyakarta

Judging from Figure 7, if the BPRS in Yogyakarta wants to achieve optimal efficiency then fixed assets need to be reduced by 16% and third party funds reduced by 8%. Then, the financing provided needs to be increased by 33% and operating income increased by 43%.

Finding

Based on the results of research related to the efficiency of Rural Banks (BPR) and Islamic Rural Banks (BPRS) in Yogyakarta with a research period of 2017 to 2021, several findings were obtained that could be used by regulators as policy makers, banking management as an effort to improve BPRs and BPRS or academics for further research.

The first finding is based on the table and graph of CRS and VRS scores which provide information related to the average development of the efficiency level of BPR and BPRS in Yogyakarta every year from the period 2016 to 2021. Based on the table, it is known that the efficiency of BPR and BPRS in Yogyakarta fluctuates every year. And seen from the efficiency score graph, the movement of the BPR efficiency graph tends to be stable, but still shows a decrease in efficiency even though the decrease is small. While in BPRS, there was a significant decrease in efficiency, especially in 2020, where in that year the Covid-19 pandemic began to spread massively in Indonesia. Then, when compared between the efficiency level of BPR and BPRS in Yogyakarta, it can be concluded that the efficiency level of BPRS is higher than BPR in Yogyakarta. The results of this study are similar to research from [Ramly & Hakim \(2017\)](#) which explains that the number of conventional banks that

achieve efficiency is still below the average efficiency of Islamic banks. This is because conventional banks still cannot optimize the management of credit and third party funds, and the cost of funds is too high for banking operations. Likewise, research from [Al Qorni \(2016\)](#) explained that BPRS was more efficient than BPR. This happens because the source of BPR inefficiency comes from credit and operating income that is higher than BPRS.

The second finding is based on the observation year of the emergence of Covid-19 in Indonesia, namely from 2019. It is known that the efficiency level of BPR and BPRS in Yogyakarta has decreased during the Covid-19 pandemic. As research from [Notalin et al. \(2021\)](#) states that Covid-19 has an impact on the decline in the efficiency level of Islamic Commercial Banks due to a decrease in income from financing provided, which has an effect on inhibiting investment by third parties. The same thing was also stated by [Sholihah \(2021\)](#) who explained that both Conventional Commercial Banks and Islamic Commercial Banks during the Covid-19 pandemic experienced a substantial decline in efficiency levels. The cause of the decline in the level of banking efficiency is the decline in the level of income from channeling financing and raising funds, while on the other hand banking operating costs continue to increase in order to meet the daily operational needs of banks. Furthermore, research from [Hasbi & Apriyana \(2021\)](#) explains that the Covid-19 pandemic has an impact on the performance of BPR and BPRS in West Java, for this reason banks must maintain good liquidity in order to remain able to operate during the pandemic. Seeing the impact of the pandemic on banking efficiency, it is very necessary to improve efforts from banks to achieve optimal efficiency levels.

Apart from banking, regulatory or policy support is also needed from the government in order to maintain banking financial stability and reduce the negative impact caused by the Covid-19 pandemic. As [Pratomo & Ramdani \(2021\)](#) explain, there needs to be a role for the regulator to further optimize policies in terms of financing in order to stimulate and stimulate the economy. This is certainly in line with the main function of the financial industry, especially banking as a support for channeling funds to the public. Especially during the Covid-19 pandemic, where many business sectors needed financial assistance to continue their business. On the other hand, the role of banking management is also very much needed in maintaining company performance, especially in optimizing the

output of the resources they have ([Sholihah, 2021](#)). [Tahliani \(2020\)](#) advises banks to develop new strategies and adapt to circumstances in order to be able to see opportunities and respond to existing challenges. Such as adjusting business patterns to digitizing banking services, both in terms of financing and raising funds.

The third finding is related to the potential improvement of BPR and BPRS in Yogyakarta in the 2021 period. Based on the results of the efficiency analysis, a table shows the amount of slack (the difference between the original value in the data and the projected efficiency value) in each variable used in this study (input and outputs). Slack is used to identify where the sources of inefficiency are coming from. If a variable tends to be low, it can be said that the BPR or BPRS is not fully efficient, because inputs can be reduced without reducing the existing output. Based on the analysis of potential improvement from BPRs in Yogyakarta, if BPRs want to achieve optimal levels of efficiency then fixed assets need to be reduced by 10%. Next on the output variable, the amount of financing provided needs to be increased by 71% and operating income increased by 19%. Then, for BPRS in Yogyakarta to achieve optimal efficiency, fixed assets need to be reduced by 16% and third party funds reduced by 8%. As well as for the financing provided it needs to be increased by 33% and operational income increased by 43%. The results of this study are supported by research from [Sholihah \(2021\)](#) which explains that during the pandemic the level of banking efficiency has decreased due to decreased levels of income from disbursing financing and raising funds. As well as research from [Yasin & Fisabilillah \(2021\)](#) during the pandemic there was a decrease in lending by BPRs so that the benefits obtained were not optimal, bearing in mind that the main advantage of BPR comes from lending. Likewise with research from [Ningsih & Mahfuz \(2020\)](#), which explained that during the pandemic there was a decrease in the collection and financing of funds from the banking sector, which of course affected the level of bank efficiency.

Based on the potential improvement analysis, it was concluded that the biggest cause of inefficiency in BPRs and BPRS in Yogyakarta is derived from output variables, namely financing provided to customers at BPRs, as well as operating income at BPRS. Banking has a vital role in the national economy. Where, banking plays a role in providing injections of funds to the public or the business sector in helping economic growth. Through financing channeled by banks, it will help the business sector,

especially MSMEs in Yogyakarta, which are the focus of BPRs and BPRS to further improve and develop their businesses. And in turn, it will be able to increase income and the economy as an effort in national economic recovery.

CONCLUSION

The purpose of this study is to analyze and compare the efficiency levels of Rural Credit Banks (BPR) and Islamic Rural Banks (BPRS) in Yogyakarta during the period 2017 to 2021 using Data Envelopment Analysis (DEA). Based on the results of the study it was found that every year there are fluctuations in the level of efficiency. When compared, the efficiency of BPRS is higher compared to BPR in Yogyakarta. The efficiency of BPRs tended to stabilize, experiencing a slight decline, while BPRS experienced a significant decline, which then increased again beyond the efficiency level of BPRs. Then, from the CRS and VRS analysis in 2020, the average efficiency level of BPRs and BPRS has decreased due to the Covid-19 pandemic which has started to spread massively in Indonesia.

Furthermore, the potential improvement of BPRs and BPRS in Yogyakarta in the 2021 dataset. The Potential Improvement graph explains that, BPRs want to achieve an optimal level of efficiency, so fixed assets need to be reduced by 10%. Furthermore, in the output variable, the amount of financing provided needs to be increased by 71% and operational income increased by 19%. Meanwhile, for BPRS in Yogyakarta to achieve optimal efficiency, fixed assets need to be reduced by 16% and third party funds reduced by 8%. As well as for the financing provided it needs to be increased by 33% and operational income increased by 43%.

RECOMMENDATION

Based on the results of the research and the conclusions that have been described, this study provides several recommendations that can be utilized by several related parties, including:

1. For Banking Parties, especially in DI Yogyakarta

- For banking management, it is hoped that they will continue to improve their efficiency, for banks that are already efficient, it is hoped that they will be able to maintain their efficiency for the coming year by paying attention to sources of inefficiency, as well as improving input management in order to obtain maximum output.

- Banking is expected to be more transparent in the publication of its financial reports in order to increase public trust
- Particularly for BPRs, it is hoped that they will continue to increase their financing to customers because they are the biggest source of bank inefficiencies. This happens because, the main advantage of BPR comes from lending, for that it needs to be optimized.
- For BPRS, it is expected to optimize the financing provided to customers as well as operating income. Because these two things are important components in Islamic banking, especially in fee-based income because their role is still quite small in BPRS. In addition, the financing provided by banks plays an important role in the recovery of the national economy because the target of BPRs or BPRS is to target low-income communities and MSMEs.

2. For the Government/Regulator

- It is hoped that the regulators will pay more attention to the variables that cause inefficiencies to be evaluated, so that BPRs or BPRS in Yogyakarta can increase their efficiency.
- Paying attention to the quality of human resources in the banking industry so that banking performance will be even better in the future. For example by conducting training for BPR and BPRS staff especially in Yogyakarta.
- OJK or BI provide encouragement to Commercial Banks in channeling financing to customers through BPR or BPRS mediation, especially in Yogyakarta. Limiting the operational area for BPRs or BPRS in one district so that BPRs or BPRS in that area do not compete with each other. If in one district or region there is more than one BPR or BPRS, it would be better if the respective BPR or BPRS merged. The aim is to strengthen capital and facilitate business expansion.
- OJK must take an active role in sustainable financing, in order to provide financial support to financial institutions, especially banks, and to increase the competitiveness of the banking sector, especially BPRs and BPRS.

3. For Academics

- It is hoped that further research will expand research variables, use other methods or

approaches that are still relevant to research, and discuss what factors affect the efficiency or inefficiency of BPR and BPRS in Yogyakarta, so that the discussion will be wider and can provide benefits for related parties.

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APPENDIX

Appendix 1. BPR Efficiency Score in Yogyakarta (CRS)

CRS					
DMU	2017	2018	2019	2020	2021
BPR Alto Makmur	0,870	0,886	0,735	0,830	0,803
BPR Ambarketawang Persada	0,992	0,916	0,615	0,621	0,622
BPR Arga Tata	0,822	0,673	0,686	0,595	0,572
BPR Arta Agung	0,795	0,723	0,561	0,557	0,588
BPR Artajaya Bhaktimulia	0,719	0,702	0,557	0,744	0,932
BPR Artha Berkah Cemerlang	1,000	1,000	1,000	1,000	0,968
BPR Artha Mlatiindah	0,755	0,772	0,582	0,582	0,591
BPR Artha Parama	0,755	0,724	0,590	0,515	0,504
BPR Artha Sumber Arum	0,648	0,588	0,667	0,636	0,647
BPR Arum Mandiri Kenanga	0,194	0,532	0,653	0,689	0,783
BPR Arum Mandiri Melati	0,652	0,724	0,971	0,983	0,934
BPR Bank Bantul (Perseroda)	0,870	0,893	0,730	1,000	0,699
BPR Bank Gunung Kidul (Perseroda)	0,871	0,880	0,713	0,691	0,697
BPR Bank Sleman (Perseroda)	0,886	0,905	0,772	0,752	0,701
BPR Berlian Bumi Arta	0,795	0,809	0,861	0,779	1,000
BPR Bhakti Daya Ekonomi	0,705	0,671	0,535	0,597	0,520
BPR Bhumikarya Pala	0,610	0,566	0,626	0,582	0,611
BPR BP Kulon Progo	0,958	0,817	0,579	0,569	0,556
BPR Chandra Muktiartha	0,795	0,772	0,607	0,620	0,619
BPR Dana Berkah Pusakatama	1,000	1,000	0,889	0,952	1,000
BPR Danagung Abadi	0,585	0,632	0,501	0,477	0,505
BPR Danagung Bakti	0,585	0,587	0,466	0,476	0,474
BPR Danagung Ramulti	0,685	0,685	0,537	0,573	0,423
BPR Dewa Arthaka Mulya	0,702	0,767	1,000	1,000	1,000
BPR Gamping Artha Raya	0,649	0,650	0,594	0,550	0,604
BPR Karangwaru Pratama	0,655	0,726	0,901	0,665	0,624
BPR Kartikaartha Kencanajaya	0,656	0,611	0,580	0,615	0,615
BPR Kurnia Sewon	0,758	0,787	0,586	0,632	0,659
BPR Lestari Darmo Mulyo	0,565	0,764	0,773	0,630	0,648
BPR Lestari Jogja	0,486	0,704	0,955	0,963	0,410
BPR Madani Sejahtera Abadi	0,852	0,872	0,691	0,719	0,719
BPR Mataran Mitra Manunggal	0,374	0,549	0,593	0,625	0,527
BPR Mlati Pundi Artha	0,649	0,650	0,594	0,550	0,604
BPR Natasha Bintang Anugrah	1,000	0,856	0,632	0,693	0,682
BPR Nusamba Banguntapan	0,519	0,463	0,645	0,563	0,608
BPR Nusamba Temon	0,633	0,590	0,638	0,572	0,598
BPR Nusantara Artha Makmur	0,531	0,604	0,549	0,476	0,570
BPR Nusumma Jogja	0,530	0,380	0,469	0,755	0,728
BPR Panca Arta Monjali	0,827	0,860	0,715	0,712	0,747

BPR Profidana Paramitra	0,649	0,673	0,594	0,552	0,585
BPR Sejahtera Arthatama Mandiri	0,756	0,835	0,942	0,806	0,802
BPR Shinta Daya	0,784	0,791	0,673	0,658	0,687
BPR Shinta Putra Pengasih	0,748	0,758	0,649	0,670	0,661
BPR Sindu Adi	0,576	0,578	0,525	0,575	0,554
BPR Ukabima Nindya Raharja	1,000	0,950	0,779	0,793	0,928
BPR Universitas Gajah Mada	0,744	0,637	0,610	0,632	0,551
BPR Walet Jaya Abadi	0,585	0,638	0,778	0,838	0,924
BPR Wijayamulya Santosa	0,632	0,615	0,593	0,519	0,552
Perumda BPR Bank Jogja	0,946	1,000	0,829	0,782	0,876
Mean	0,721	0,730	0,680	0,681	0,678

Appendix 2. BPR Efficiency Score in Yogyakarta (VRS)

DMU	VRS				
	2017	2018	2019	2020	2021
BPR Alto Makmur	0,897	0,886	0,818	0,889	0,867
BPR Ambarketawang Persada	1,000	0,937	0,935	0,893	0,926
BPR Aрга Tata	0,917	0,738	0,689	0,606	0,584
BPR Arta Agung	0,859	0,962	0,799	0,801	0,728
BPR Artajaya Bhaktimulia	0,805	0,732	0,577	0,783	0,960
BPR Artha Berkah Cemerlang	1,000	1,000	1,000	1,000	0,974
BPR Artha Mlatiindah	0,969	0,951	0,990	0,982	0,981
BPR Artha Parama	0,805	0,726	0,785	0,645	0,599
BPR Artha Sumber Arum	0,684	0,599	0,695	0,691	0,708
BPR Arum Mandiri Kenanga	1,000	1,000	0,759	0,735	0,836
BPR Arum Mandiri Melati	0,700	0,812	1,000	1,000	0,952
BPR Bank Bantul (Perseroda)	0,932	0,976	1,000	1,000	0,842
BPR Bank Gunung Kidul (Perseroda)	0,995	1,000	0,984	0,963	0,887
BPR Bank Sleman (Perseroda)	1,000	1,000	1,000	0,904	0,897
BPR Berlian Bumi Arta	0,795	0,811	0,870	0,839	1,000
BPR Bhakti Daya Ekonomi	0,804	0,766	0,894	0,955	0,842
BPR Bhumikarya Pala	0,642	0,629	0,694	0,630	0,641
BPR BP Kulon Progo	1,000	0,977	0,841	0,701	0,677
BPR Chandra Muktiartha	0,986	0,960	1,000	0,988	1,000
BPR Dana Berkah Pusakatama	1,000	1,000	0,890	0,956	1,000
BPR Danagung Abadi	0,650	0,698	0,774	0,735	0,714
BPR Danagung Bakti	0,759	0,654	0,796	0,753	0,711
BPR Danagung Ramulti	0,764	0,746	0,859	0,824	0,747
BPR Dewa Arthaka Mulya	0,702	0,770	1,000	1,000	1,000
BPR Gamping Artha Raya	0,706	0,707	0,596	0,553	0,614
BPR Karangwaru Pratama	0,769	0,915	1,000	0,961	0,943
BPR Kartikaartha Kencanajaya	0,710	0,641	0,588	0,616	0,617
BPR Kurnia Sewon	0,784	0,796	0,807	0,812	0,859
BPR Lestari Darmo Mulyo	0,583	0,766	0,778	0,640	0,665
BPR Lestari Jogja	0,593	1,000	1,000	1,000	0,497

BPR Madani Sejahtera Abadi	0,900	0,938	1,000	0,985	0,985
BPR Mataran Mitra Manunggal	0,400	0,552	0,665	0,666	0,573
BPR Mlati Pundi Artha	0,706	0,707	0,596	0,553	0,614
BPR Natasha Bintang Anugrah	1,000	0,961	0,998	1,000	1,000
BPR Nusamba Banguntapan	0,699	0,654	0,960	0,821	0,864
BPR Nusamba Temon	0,812	0,789	0,852	0,810	0,842
BPR Nusantara Artha Makmur	0,631	0,708	0,571	0,502	0,623
BPR Nusumma Jogja	0,555	0,381	0,470	0,758	0,737
BPR Panca Arta Monjali	0,839	0,876	0,919	0,889	0,930
BPR Profidana Paramitra	0,806	0,809	0,863	0,802	0,787
BPR Sejahtera Arthatama Mandiri	0,773	0,908	1,000	1,000	1,000
BPR Shinta Daya	0,889	0,887	0,966	0,913	0,887
BPR Shinta Putra Pengasih	0,748	0,762	0,822	0,836	0,812
BPR Sindu Adi	0,581	0,582	0,531	0,576	0,554
BPR Ukabima Nindya Raharja	1,000	0,968	1,000	0,973	1,000
BPR Universitas Gajah Mada	0,817	0,717	0,888	0,803	0,813
BPR Walet Jaya Abadi	0,587	0,638	0,795	0,842	0,930
BPR Wijayamulya Santosa	0,645	0,625	0,653	0,589	0,569
Perumda BPR Bank Jogja	0,955	1,000	1,000	1,000	1,000
Mean	0,799	0,809	0,836	0,820	0,812

Appendix 3. Average BPR Efficiency Scores in Yogyakarta

DMU	CRS	VRS
BPR Alto Makmur	0.825	0.871
BPR Ambarketawang Persada	0.753	0.938
BPR Arga Tata	0.669	0.707
BPR Arta Agung	0.645	0.830
BPR Artajaya Bhaktimulia	0.731	0.771
BPR Artha Brilliant Blessings	0.994	0.995
BPR Artha Mlatiindah	0.657	0.975
BPR Artha Parama	0.618	0.712
BPR Artha Sumber Arum	0.637	0.675
BPR Arum Mandiri Kenanga	0.570	0.866
BPR Arum Mandiri Melati	0.853	0.893
BPR Bank Bantul (Perseroda)	0.838	0.950
BPR Bank Gunung Kidul (Perseroda)	0.771	0.966
BPR Bank Sleman (Perseroda)	0.803	0.960
BPR Berlian Bumi Arta	0.849	0.863
BPR Bhakti Daya Ekonomi	0.606	0.852

BPR Bhumikarya Pala	0.599	0.647
BPR BP Kulon Progo	0.696	0.839
BPR Chandra Muktiartha	0.683	0.987
BPR Dana Berkah Pusakatama	0.968	0.969
BPR Danagung Abadi	0.540	0.714
BPR Danagung Bakti	0.518	0.735
BPR Danagung Ramulti	0.581	0.788
BPR Dewa Arthaka Mulya	0.894	0.894
BPR Gamping Artha Raya	0.609	0.635
BPR Karangwaru Pratama	0.714	0.918
BPR Kartikaartha Kencanajaya	0.615	0.635
BPR Kurnia Sewon	0.684	0.811
BPR Lestari Darmo Mulyo	0.676	0.687
BPR Lestari Jogja	0.704	0.818
BPR Madani Sejahtera Abadi	0.771	0.962
BPR Mataran Mitra Manunggal	0.534	0.571
BPR Mlati Pundi Artha	0.609	0.635
BPR Natasha Bintang Anugrah	0.773	0.992
BPR Nusamba Banguntapan	0.560	0.800
BPR Nusamba Temon	0.606	0.821
BPR Nusantara Artha Makmur	0.546	0.607
BPR Nusumma Jogja	0.572	0.580
BPR Panca Arta Monjali	0.772	0.891
BPR Profidana Paramitra	0.611	0.813
BPR Prosperous Arthatama Mandiri	0.828	0.936
BPR Shinta Daya	0.719	0.908
BPR Shinta Putra Kasih	0.697	0.796
BPR Sindu Adi	0.562	0.565
BPR Ukabima Nindya Raharja	0.890	0.988
Gajah Mada University BPR	0.635	0.807
BPR Walet Jaya Abadi	0.753	0.759
BPR Wijayamulya Santosa	0.582	0.616
Perumda BPR Bank Jogja	0.887	0.991

Appendix 4. BPRS Efficiency Score in Yogyakarta (CRS)

CRS					
DMU	2017	2018	2019	2020	2021
BPRS Build Citizen Degree	1,000	0.842	0.969	0.950	0.716
BPRS Barokah Dana Sejahtera	0.923	1,000	0.913	1,000	1,000
BPRS Light of Life	0.954	1,000	0.571	0.502	0.893
BPRS Hidayatullah Fund	1,000	1,000	0.940	0.771	0.705
BPRS Danagung Syariah	0.620	0.669	0.300	0.234	0.402
BPRS FORMES	0.796	0.748	0.933	0.565	0.513
BPRS Madina Mandiri Prosperous	1,000	0.808	0.553	0.482	0.823
BPRS Margirizki Happy	0.857	0.805	0.771	0.554	0.705
BPRS Mitra Amal Mulia	0.609	0.514	0.523	0.549	0.473
BPRS Mitra Cahaya Indonesia	0.879	0.807	1,000	0.556	1,000
BPRS Mitra Harmoni Yogyakarta	1,000	0.961	0.689	0.443	0.537
BPRS Unisia Insan Indonesia	0.908	0.969	0.736	0.747	0.932
Means	0.879	0.844	0.741	0.613	0.725

Appendix 5. BPRS Efficiency Score in Yogyakarta (VRS)

VRS					
DMU	2017	2018	2019	2020	2021
BPRS Build Citizen Degree	1,000	0.953	1,000	0.984	0.874
BPRS Barokah Dana Sejahtera	0.927	1,000	0.920	1,000	1,000
BPRS Light of Life	1,000	1,000	0.775	1,000	1,000
BPRS Hidayatullah Fund	1,000	1,000	1,000	1,000	1,000
BPRS Danagung Syariah	0.651	0.683	0.309	0.235	0.444
BPRS FORMES	0.822	0.780	1,000	0.600	0.546
BPRS Madina Mandiri Prosperous	1,000	0.816	0.654	0.501	0.873
BPRS Margirizki Happy	0.945	0.944	0.797	0.558	0.735
BPRS Mitra Amal Mulia	0.654	0.550	0.577	0.588	0.532
BPRS Mitra Cahaya Indonesia	1,000	0.903	1,000	0.681	1,000
BPRS Mitra Harmoni Yogyakarta	1,000	1,000	0.713	0.570	0.561
BPRS Unisia Insan Indonesia	0.918	1,000	0.741	0.808	1,000
Means	0.910	0.886	0.790	0.710	0.797