Published: 31 March 2022

# Non-parametric Efficiency of Islamic Rural Banks in Indonesia: The Impact of Covid-19 and Potential Improvements

**Aam Slamet Rusydiana[1], Mimma Maripatul Uula[2], Syahdatul Maulida[3]**
*[1]SMART Indonesia*
*[2]Tazkia Islamic University College*
*[3]Tazkia Islamic University College*

In the midst of economic challenges and uncertainty due to the pandemic, BPRS as part of the banking industry has a specific goal, namely to provide financial services and products to people with a weak economic level and also the MSME sector, therefore it is necessary to accelerate improvements in the Islamic rural banks (BPRS) industry. This study aims to measure the relative efficiency level of BPRS in Indonesia, see the impact of the pandemic on BPRS operations and compare the efficiency level of BPRS spread across Java and outside Java. This study uses a sample of 92 BPRS in Indonesia with an observation period from 2016 to 2021. This research method uses Data Envelopment Analysis (DEA) with secondary data sourced from the financial statements of each BPRS on the OJK official website. The input variables used include third party funds, fixed assets and operating expenses. Meanwhile, the output variable consists of financing provided and operating income. The results showed that the average BPRS in Indonesia from the 2016-2021 period fluctuated. Then the CRS and VRS analysis found that BPRS outside Java were more efficient than BPRS spread across Java. Then, based on the trend analysis, the efficiency of BPRS in Indonesia has a fluctuating trend. Furthermore, in the efficiency analysis during the Covid-19 pandemic, there was a continuous decline in the efficiency level of the BPRS, although the decline that occurred was still small. This study also analyzes the potential improvement for program improvement that causes inefficiency of the input and output variables. And in general, the biggest cause of BPRS inefficiency comes from the output variable, namely the financing provided. This study also provides recommendations to BPR practitioners, regulators, and academics as a basis for decision making in achieving optimal efficiency and for further research.

**Keywords: Efficiency; BPRS; Covid-19; Economic Recovery**
**JEL: G21**

**OPEN ACCESS**

*Correspondence:
Aam Slamet Rusydiana
aamsmart@gmail.com

Received: 19 February 2022
Accepted: 27 February 2022
Published: 31 March 2022

Citation:
(2021) Non-Parametric Efficiency of Islamic Rural Banks in Indonesia. Islamic Economics Methodology.1.1.

.

# INTRODUCTION

The world economy is experiencing uncertainty due to Covid-19 which has been declared a pandemic since the end of 2019. Social restrictions contributed to the cause of several countries plunged into recession. The financial crisis was inevitable, especially in the banking industry in Indonesia (Ningsih and Mahfudz, 2020; Diana et al., 2021). Whereas banking is one of the pillars of the economy because it relies on an intermediary institution that can distribute funds from the well-to-do to the needy (Bidari et al., 2020). This fundamental role is also owned by microfinance institutions such as BPRS, where these micro institutions have a specific goal of providing services and products to the micro sector that are not affordable by banks (Hosen & Muhari, 2013; Wasiaturrahma et al., 2020).

MSME is a micro sector that supports and has a vital role in the economy of Indonesia (Yasin & fiisabilillah, 2020). However, amid the economic challenges faced during the pandemic, the MSME sector has joined the Covid-19 pandemic (Tha, 2020). For this reason, considering the role of intermediation and the special objectives of the BPRS, it can be a momentum to support and encourage a strong economic recovery during challenges and uncertainty, by targeting directly the micro sector, especially MSMEs. The role of BPR cannot be underestimated, although the economic scale of BPR is relatively small, BPR has an important role in terms of broader financial services to the MSME sector (Hartono et al., 2008).

Sanjaya & Marlius (2017) revealed that BPRS, which is part of the banking industry ecosystem, often competes with other financial institutions. This makes BPRS develop strategies that can create competitive advantages and operate efficiently in the face of industrial competition. However, research that raises information related to the efficiency of BPRS is still very limited, this is due to too many previous studies that have focused on the theme of efficiency only focused on large banks, not on microfinance institutions such as BPRS (Agustina et al., 2019). The measurement of the level of efficiency is one of the parameters of banking performance that has been done before. However, as far as the author observes, no research specifically examines the efficiency level of BPRS in Indonesia during the period 2016 to 2021. Several previous studies such as Muhari and Hosen (2014) analyzed the efficiency level of BPRS in Indonesia by comparing the SFA and DEA methods with Camel. And research from Hadini and Wibowo (2001) analyzed the comparative efficiency of conventional banks and Islamic banks in Indonesia using Data Envelopment Analysis (DEA).

Based on the research above, no research specifically discusses the efficiency level of BPRS in Indonesia from 2016 to 2021, by analyzing the impact of Covid-19 on the efficiency and performance of BPRS. The purpose of this research is to measure the relative efficiency level of BPRS in Indonesia during the observation period of 2016 to 2021, compare the performance of BPRS spread throughout Indonesia and see the potential for improvement and development of BRS in Indonesia to encourage a strong national economic recovery by optimizing the intermediation function of BPRS.

# LITERATURE REVIEW

### Islamic Rural Banks

Islamic Rural Banks or abbreviated BPRS is one type of microfinance institution activities does not provide services in payment traffic in its operational (UU No. 10 of 1998 concerning Banking). Masrizal et al., 2022 in his research stated that BPRS carries out business activities by providing products and services that target the micro sector and people with low incomes. By upholding the operational principle of no usury, BPRS has similarities with other Islamic financial institutions (Iqbal, 1997). This is based on the Al-Qur'an and As-Sunnah which are the references in the implementation of Islamic bank operations, where interest which means usury is something that is prohibited in Islam. As revealed by Antonio (2001) in his book, usury means addition, but the addition in question is an addition taken without any replacement or balancing transaction that is justified by sharia. Even so, BPRS does not necessarily become a non-profit-oriented financial institution. BPRS has many alternative transactions to obtain funds and profits, namely by using profit-sharing products such as time deposit accounts and mudharabah accounts. Using this profit-sharing system will have implications for the income received by funding customers and banks (Devi & Firmansyah, 2018). More than that, the distribution of funds or lending in BPRS also conforms to the Shari'a such as the prohibition on distributing funds to industries that break the law and are unethical in liquor, pork, casinos, fake media, and other unethical industries (Ika & Abdullah, 2011).

### Banking Efficiency

According to Agustina et al. (2019) efficiency is a performance parameter that underlies the overall performance of an entity. Efficiency can also be defined as a financial concept to evaluate the extent to which inputs invested can obtain output (Belanes et al., 2015). The initial idea of measuring efficiency was developed by Farrell (1957). Efficiency measurement has been widely used as a measure of bank performance. Banks, like any other business, must consistently improve their operational efficiency. Efficiency measures the extent to which time, effort and expertise are sacrificed (Archer, 2010). Broadly, efficiency is defined as the capacity to complete tasks successfully (Silkman, 1986). Technically, the definition of efficiency is the calculation of the proportion of output produced to the input consumed. Efficient businesses make it possible to produce more output per unit of input than competing businesses.

Banking efficiency and performance have a reciprocal relationship. Banks with a high level of efficiency tend to have customer confidence to provide profitable results. Customers prefer more efficient banks because they incur fewer transaction costs than less efficient banks. More than that, the government also benefits from efficient banks to provide corporate taxes to the government. Therefore, there is a clear urgency for authorities and banks to maintain bank efficiency. There are various ways to increase efficiency, including increasing the concentration and profitability of microfinance institutions (Hartarska et al., 2013). In addition, an increase in the number of loans also increases efficiency, and vice versa, a small number of loans will cause inefficiency (Bos & Millone, 2015). Furthermore, the efficiency of Islamic microfinance institutions is influenced by the profit component or the amount of margin used (Amran et al., 2014).

### Previous Studies

This study uses previous research as a reference and reference related to the theme of banking efficiency. It is intended to be a basis for argument and material for further study. It was found in a study conducted by Nugrohowati R. N. I. (2019) which examined the efficiency level of BPRS in Indonesia during the period 2012 to 2015 according to regional zones, it was found that the average efficiency of BPRS in each region had not yet reached the optimal level of efficiency. The results of this study are also in line with research conducted by Prayitno (2018) which compares the efficiency of BPR with BPRS and shows where BPR is superior to Sharia BPR by 81.44 percent compared to 79.66 percent. In Hasbi and Apriyana's research (2021), BPRs once again showed better efficiency performance than BPRS during the Covid-19 pandemic. Seeing the condition of BPRS which is vulnerable compared to BPR, it is necessary to study more deeply and examine what factors cause this to happen. This has been done by Sadono, E. D. (2017) who measured technical efficiency and identified the factors that influence technical inefficiency at Islamic People's Financing Banks (BPRS) in East Java Province. NPF, in addition, the study explains that the technical efficiency of BPRS operations is 90.12 percent. This means that there is still 9.88 percent that can be optimized to improve the performance of the BPRS.

Masrizal et al. (2022) explain the reasons for factors that may affect the efficiency of a BPRS, namely that overall economic freedom has a strong beneficial impact on the efficiency of a BPRS and mention that when financial intermediaries operate in a less constrained environment, they tend to pursue competitive practices that increase operating rates and other efficiency metrics.

## METHODOLOGY

By using secondary data, this study took a sample with a purposive sampling technique. The DMUs that are the object of this research are BPRS in Indonesia which includes 100 BPRS spread throughout Indonesia during the period 2016 to 2021. The data is taken from the financial reports available on the official OJK website. The financial statements studied are balance and profit and loss reports which provide information on several input and output variables used in this study.

This research is non-parametric quantitative research using the Data Envelopment Analysis (DEA) method. With the output approach, this study aims to maximize output by maintaining the same amount of input. The input variables include operational costs, fixed assets and third-party funds. Operational costs consist of marketing, administration, research & development and other operational expenses, then third-party funds consist of wadiah savings, mudharabah savings and mudharabah deposits, as well as fixed assets in the form of fixed assets minus accumulated depreciation. While the output variables taken are operating income and financing in the form of mudharabah, murabaha, and musyarakah financing.

The relative level of productivity and efficiency of business units can be measured using DEA, which was created by Charnes, Cooper & Rhodes in 1978 and

later revised by Banker, Charnes & Rhodes in 1984. The benefit of using Data Envelopment Analysis (DEA) is that it can test a case that has a complex relationship between the input and output used which cannot be successfully solved by other analytical methods (Hadini & Wibowo, 2021). In addition, the Data Envelopment Analysis (DEA) method can also measure the value of efficiency using input variables and output variables produced in a company. Given this, Hadad et al. (2003) stated that DEA can provide more accurate results than financial ratio analysis.

According to research by Sharma et al. (2013), the DEA approach is used to measure technical efficiency, including the efficiency of financial institutions, in some empirical investigations related to efficiency. In addition, information about the inefficient Decision-Making Unit (DMU) in utilizing inputs, and what factors cause this inefficiency can be obtained with the DEA approach. The DEA approach can identify input or output variable values that must be met or modified to achieve the highest level of efficiency.

Since its introduction in 1984, two types of DEA models are often used, namely the Charnes, Cooper and Rhodes (CCR) DEA Model and the Banker, Charnes and Cooper (BCC) Model (Coelli et al., 2005). First, the Charnes, Cooper & Rhodes (CCR) Model, which conforms to the Constant Return to Scale (CRS) assumption, is one of the two fundamental models in the DEA method. It is assumed that the production function is fixed and that the change in output value from the resulting DMU is constant (same). Second, the Banker, Charnes & Rhodes (BCR) (VRS) model corresponds to the Variable Return to Scale (VRTS). This second model makes the opposite assumption to the previous model, namely that every change in the value of the DMU output is different from every change in the value of a particular input. Therefore, it can be stated that not every input will produce the same output value. To reflect banking activity, the CRV and VRS models are compared in this study to determine the level of banking efficiency.

This research is related to bank effectiveness. Bank efficiency can be assessed by comparing the costs incurred by different banks to produce the same level of production. An ineffective business will be eliminated from the market if there is ideal competition in the market. Only an effective business can survive in the market. According to Ascarya and Yumanita (2009), only effective banks will be able to compete successfully in the banking sector. Referring to the research by Bauer et al. (1998) the measure of the efficiency limit of financial institutions is measured based on the relative performance level of financial institutions against the best financial institution performance estimates in the industry, with a note that all these financial institutions must face the same market conditions. Apart from the banking industry, DEA can also be used to measure other financial industries such as the insurance industry (Rusydiana & Nugroho, 2017), as well as social institutions (Rusydiana et al., 2016).

# RESULTS

### Descriptive statistics of BPRS in Indonesia

Table 1 below represents input and output variables as well as descriptive statistics of input and output of Islamic People's Financing Banks (BPRS) in Indonesia which were sampled in this study during the 2016-2021 period.

**Table 1:** Descriptive statistics of BPRS in Indonesia

| Variable | Mean | Min | Max | StdDev |
|---|---|---|---|---|
| **Inputs** | | | | |
| Total assets | Rp3.748.661,94 | Rp1.518,00 | Rp85.360.753,00 | Rp8.954.125,76 |
| Operational costs | Rp7.873.957,83 | Rp92.984,00 | Rp170.389.239,00 | Rp13.446.979,19 |
| Third-party fund | Rp62.678.725,12 | Rp2.510,00 | Rp860.388.007,00 | Rp100.906.580,19 |
| **Outputs** | | | | |
| Total financing | Rp24.514.739,76 | Rp550,00 | Rp485.943.275,00 | Rp52.012.120,40 |
| Operating income | Rp10.460.299,41 | Rp20.972,00 | Rp157.589.095,00 | Rp17.209.618,38 |

### BPRS Panel Efficiency in Indonesia

The DEA method can measure the level of efficiency of BPRS in Indonesia every year and is investigated using the common frontlier. And table 2

below provides information on average BPRS Technical Efficiency (TE), Pure Technical Efficiency (PTE), and Scale Efficiency (SE) from 2016 (Panel A), 2017 (Panel B), 2018 (Panel C), 2019 (Panel D), 2020 (Panel kE) and 2021 (Panel F) and the year as a whole (Panel G).

**Table 2:** Panel Efficiency of BPRS in Indonesia

| Years/Type of Efficiency | Mean | MIN | MAX | Std. Dev |
|---|---|---|---|---|
| **Panel A (2016)** | | | | |
| TE | 0,502 | 0,083 | 1,000 | 0,182 |
| PTE | 0,575 | 0,200 | 1,000 | 0,201 |
| SE | 0,890 | 0,083 | 1,000 | 0,139 |
| **Panel B (2017)** | | | | |
| TE | 0,522 | 0,100 | 1,000 | 0,204 |
| PTE | 0,595 | 0,127 | 1,000 | 0,223 |
| SE | 0,886 | 0,457 | 1,000 | 0,123 |
| **Panel C (2018)** | | | | |
| TE | 0,488 | 0,054 | 1,000 | 0,197 |
| PTE | 0,567 | 0,064 | 1,000 | 0,228 |
| SE | 0,875 | 0,544 | 1,000 | 0,125 |
| **Panel D (2019)** | | | | |
| TE | 0,487 | 0,017 | 1,000 | 0,215 |
| PTE | 0,571 | 0,019 | 1,000 | 0,243 |
| SE | 0,864 | 0,404 | 1,000 | 0,137 |
| **Panel E (2020)** | | | | |
| TE | 0,459 | 0,017 | 1,000 | 0,210 |
| PTE | 0,546 | 0,030 | 1,000 | 0,242 |
| SE | 0,853 | 0,241 | 1,000 | 0,145 |
| **Panel F (2021)** | | | | |
| TE | 0,430 | 0,011 | 1,000 | 0,180 |
| PTE | 0,532 | 0,021 | 1,000 | 0,226 |
| SE | 0,823 | 0,337 | 1,000 | 0,163 |
| **Panel G (All Years)** | | | | |
| TE | 0,482 | 0,011 | 1,000 | 0,201 |
| PTE | 0,564 | 0,019 | 1,000 | 0,229 |
| SE | 0,865 | 0,083 | 1,000 | 0,141 |

Based on table 2 above, it is known that at BPRS the lowest TE value was obtained in 2021 (0.430) and the highest was in 2017 (0.522). Furthermore, for the PTE assumption, the lowest value is obtained in 2021 (0.532) and the highest in 2017 (0.595). Then for the SE assumption, the highest and
lowest values are sequentially in 2016 (0.890) and 2021 (0.823). And from these results, it can be interpreted that the average BPRS efficiency based on its efficiency score has fluctuated from year to year.

**Average Comparison of BPRS Efficiency in Java & Non-Java**

From the results of the DEA analysis, an average BPRS efficiency score in Indonesia was obtained from the 2016-2021 period. Below is a diagram of the

efficiency score assuming Technical Efficiency (CRS), Pure Technical Efficiency (VRS) and Scale Efficiency (SE).

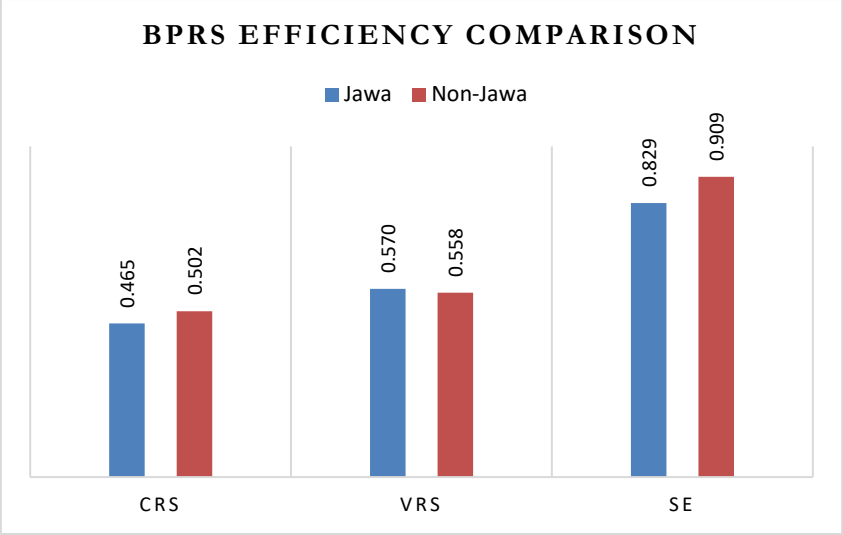


**Figure 1:** Comparison of BPRS efficiency in Java & non-Java

Based on table 2 above, it is known that at BPRS the lowest TE value was obtained in 2021 (0.430) and the highest was in 2017 (0.522). Furthermore, for the PTE assumption, the lowest value is obtained in 2021 (0.532) and the highest in 2017 (0.595). Then for the SE assumption, the highest and lowest values are sequentially in 2016 (0.890) and 2021 (0.823). And from these results, it can be interpreted that the average BPRS efficiency based on its efficiency score has fluctuated from year to year.

**Average Comparison of BPRS Efficiency in Java & Non-Java**

From the results of the DEA analysis, an average BPRS efficiency score in Indonesia was obtained from the 2016-2021 period. Below is a diagram of the efficiency score assuming Technical Efficiency (CRS), Pure Technical Efficiency (VRS) and Scale Efficiency (SE).

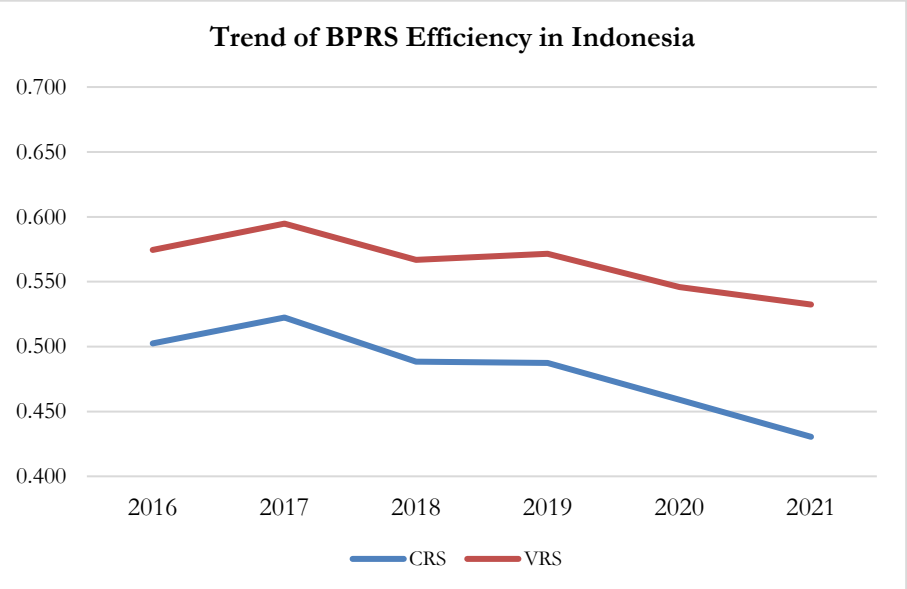


**Figure 2:** The trend of BPRS efficiency in Indonesia

From the figure above, it can be concluded that the efficiency of BPRS in Indonesia during the study period fluctuated. The efficiency of BPRS in Indonesia increased in 2017, which then decreased in 2018. Furthermore, the efficiency of BPRS began to improve, as shown in the graph in 2019 where the efficiency level began to increase again. However, from 2020 to 2021, the efficiency of the BPRS will decline again. In addition, from the picture above, it is also found that the CRS and VRS charts have similar patterns. Furthermore, the trend of BPRS efficiency in Indonesia during the study period can be said to be quite stable, this is because the average value of efficiency moves in the range of 0.400 to 0.600. That means, there is no significant increase, it's just that when compared between 2017 and 2021, the decrease that occurs is quite significant because 2021 is the lowest efficiency during the research period. This can happen because during that period the Covid-19 pandemic phenomenon occurred which was quite a shock to the banking industry.

**Indonesia BPRS Efficiency during Covid-19 Pandemic**

The emergence of the Covid-19 pandemic at the end of 2019 which then began to spread massively in 2020, has always been an interesting topic to discuss regarding the impact on the economy, one of which is the banking industry. For this reason, below is an illustration of the efficiency of BPRS in Indonesia during the Covid-19 pandemic period, starting from 2019-2021.

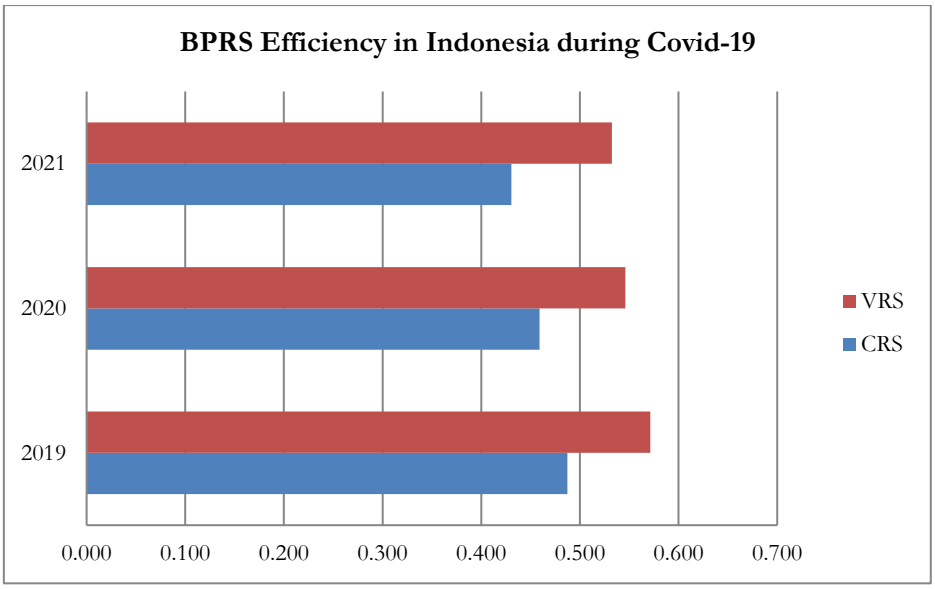


**Figure 3:** Indonesia BPRS efficiency during Covid-19

Based on Figure 3, it can be concluded that the Covid-19 pandemic has had quite an impact on the efficiency level of BPRS in Indonesia. The efficiency level of BPRS has continuously decreased from 2019 to 2021, both on the CRS and VRS assumptions. Even so, the decline that occurred was still relatively small. This explains that the BPRS is trying to maintain the stability of its efficiency during the pandemic. Apart from that, this also proves that BPRS is able to survive the shock caused by the pandemic.

**Potential Improvements**

The next analysis is the potential for improvement or better known as a potential improvement. These potential improvements provide an overview of the values that must be achieved by the DMU studied to achieve optimal efficiency. And from this value, it can also be found which variables cause inefficiency in BPRS. This potential improvement analysis uses the last year of observation, namely 2021, which is analyzed separately from previous years. Furthermore, based on the BPRS analysis using DEA, a table is obtained showing the amount of slack or gap difference between the original value and the projected value of efficiency in the BPRS data for each input and output variable used in this study. Through this difference, sources of inefficiency in BPRS can be identified. If a variable tends to be low, it can be said that BPRS is not fully efficient, because inputs can be reduced without reducing the existing output. The following is the result of the potential improvement analysis.

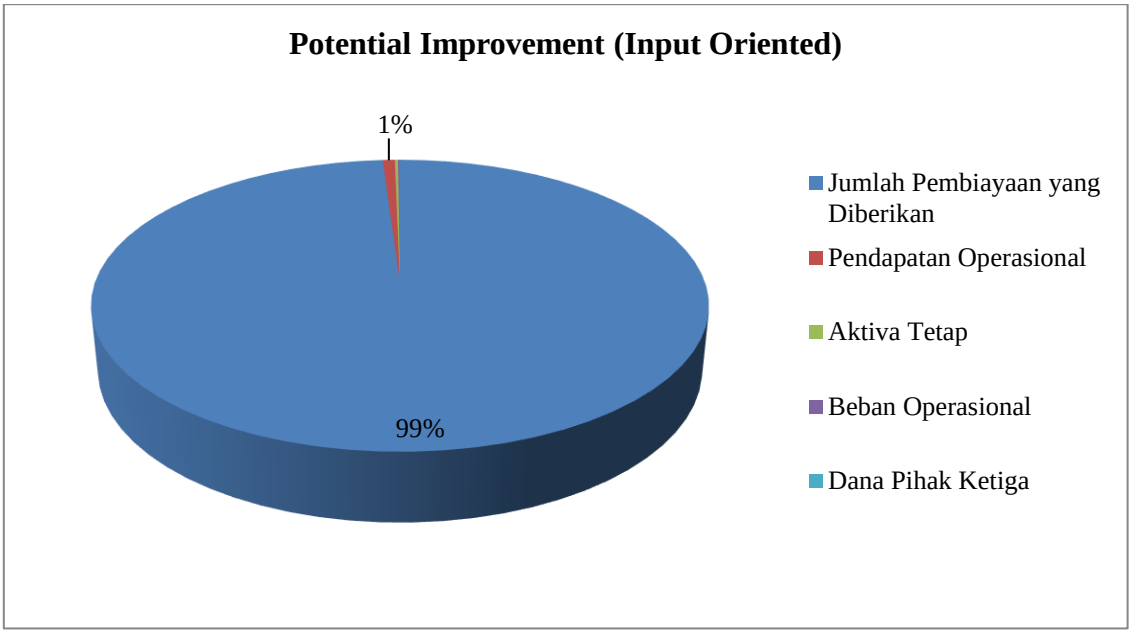


**Figure 4:** Potential Improvements of BPRS (input oriented)

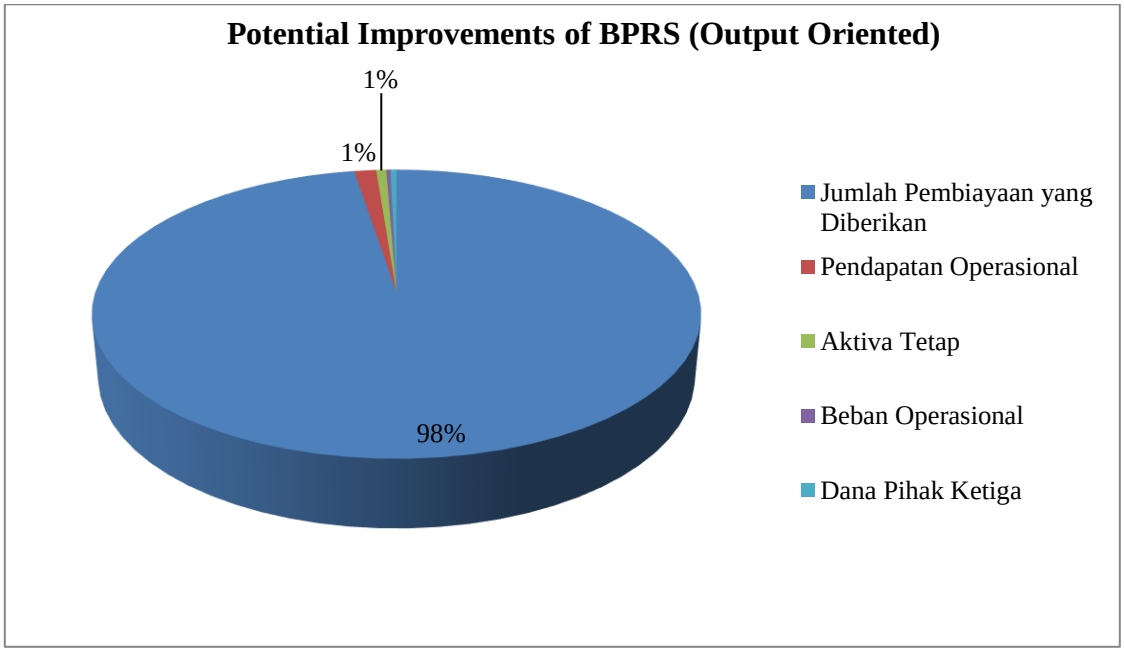


**Figure 5:** Potential Improvements of BPRS (output-oriented)

Figures 4 & 5 above provide information related to the potential improvement of a BPRS with an input and output approach. In general, using either the input or output approach, it can be seen that the cause of inefficiency comes from the input variables, namely fixed assets and the output variables, financing provided and operating income. Using the output approach (Figure 4), a BPRS in Indonesia can achieve the optimum level of efficiency if fixed assets are reduced by 1%. Then for the financing provided by the input approach, it needs to be increased by 99%, while with the output approach, the financing provided needs to be increased by 98%. As for operating income, both input and output approaches need to be increased by 1%. From these results, it can also be concluded that the biggest cause of inefficiency comes from the variable of financing provided.

**Benchmarking**

Next is the benchmarking analysis of BPRS in Indonesia. This analysis describes the BPRS with the highest number of referrals. The results of the analysis were obtained based on frontier analysis. The following are the results of the benchmarking of the BPRS.

**Table 3:** Benchmarking of BPRS in Indonesia

| DMU | Times |
|---|---|
| BPRS Lampung Timur_2019 | 475 |
| BPRS Al Ihsan Bandung_2016 | 356 |
| BPRS Muamalat Harkat Bengkulu_2019 | 307 |
| BPRS Mitra Cahaya Indonesia Sleman_2017 | 116 |
| BPRS Hijra Alami Jakarta Selatan_2017 | 79 |
| BPRS Dana Hidayatullah Yogyakarta_2017 | 52 |
| BPRS Rajasa Lampung Tengah (Perseroda)_2016 | 46 |
| BPRS Rahmania Dana Sejahtera Aceh/Bireuen_2020 | 45 |
| BPRS Hijra Alami Jakarta Selatan_2018 | 33 |
| BPRS Lampung Timur_2018 | 23 |
| BPRS Hijra Alami Jakarta Selatan_2021 | 12 |

From table 3 above, it is found that BPRS are often used as references or references for other BPRS. The BPRS with the highest number of referrals as well as being the bank most used as a reference by other banks is BPRS East Lampung in 2019 with 475 referrals, which was then followed by BPRS Al Ihsan Bandung in 2016, BPRS Muamalat Harkat Bengkulu in 2019, BPRS Mitra Cahaya Indonesia Sleman 2017, and so on. When viewed from the reference year, it can be concluded that the referenced BPRS year was dominated by 2017, then 2016 and then 2018 and 2019. This is sufficient to explain that the condition of BPRS efficiency before 2020 was better than in 2020 and 2021.

# FINDINGS

Based on the results of an efficiency analysis of BPRS in Indonesia during the 2016-2021 period using DEA, several interesting findings were obtained, as explained below.

The first finding in this study is based on the BPRS efficiency score chart, which explains that the efficiency level of BPRS during the study period when compared between the efficiency level of BPRS in Java Island and outside Java (non-Java) then BPRS outside Java (Non-Java) from the period 2016-2021 has a higher level of efficiency than BPRS which are spread across Java. This is seen based on the assumptions of CRS, VRS and SE. Where Technical Efficiency (CRS) and Scale Efficiency (SE) BPRS non-Java have the highest scores with each value of 0.502 and 0.909. Even though the assumption of Pure Technical Efficiency (VRS) for Javanese BPRS is superior to non-Javanese, the difference between the efficiency scores of the two is relatively small. The difference in BPRS efficiency that occurred between Java and non-Java was caused by the spread of Covid-19. Where the island of Java had the most cases of Covid-19 throughout the Covid-19 period (covid19.go.id., 2022), this caused social restrictions on the island of Java to be stricter than non-Java areas, and it can affect the efficiency level of BPRS in Java decreased. The results of this study are also consistent with Hasbi and Apriyana's research (2021) which states that the Covid-19 pandemic has greatly affected the performance of BPRs and BPRS in West Java in particular. The decrease in efficiency that occurred in a number of banking institutions in Indonesia was caused by a decrease in income from financing provided and indirectly affected the receipt of third-party funds (Notalin et al., 2021; Sholihah 2021). Moreover, Java Island is the center of the national economy. It is also undeniable that the distribution of BPRS on Java Island is more than non-Java Islands. This situation created strong competition between each BPRS, so it affected the efficiency level of BPRS in Java Island which decreased compared to BPRS outside Java Island.

The second finding is based on the trend of BPRS efficiency. BPRS efficiency levels have fluctuating trends from year to year. Efficiency increased in 2017, then decreased in 2018, and increased again in 2019. Until 2020-2021, the trend of BPRS efficiency has continued to decline. The period from 2020 to 2021 is a period of economic turmoil due to the pandemic. The emergence of the Covid-19 pandemic in Indonesia had a broad impact on the banking industry in Indonesia. Similar research results were also found by Notalin et al. (2021) that during the pandemic the level of efficiency

of Islamic banking institutions in Indonesia decreased from 2019 to 2020.

The third finding is based on the results of an analysis of the efficiency of BPRS during the Covid-19 pandemic. The efficiency level of BPRS has decreased during the Covid-19 period, namely from 2019-2021. This explains that the Covid-19 pandemic has had quite an impact on the efficiency level of BPRS in Indonesia. The results of this study support research from Notalin et al (2021) which suggests that the level of efficiency of Islamic banking institutions has decreased due to a decrease in the level of income from financing provided which affects the receipt of third-party funds which hampered. The efficiency level of Islamic banks has decreased during the pandemic, the economy is volatile so banks were required to achieve their targets, especially in musyarakah and mudharabah financing (Setyono et al., 2021). To overcome these problems, the government's role in making regulations or policies and bank management is urgently needed to maintain banking performance, especially in optimizing output levels and the intermediation function to maintain financial stability (Pratomo & Ramdani, 2021; Sholihah, 2021). In addition, in terms of maintaining financial system stability in banking, the role of the IDIC as an institution that guarantees customer deposits is expected to be active in maintaining the stability of the banking system in accordance with its authority, especially for the BPRS sector, which is a microfinance institution that is vulnerable to pandemics.

The fourth finding is based on the results of potential improvement. From the results of potential improvement, it was found that the biggest cause of inefficiency in BPRS using either input-oriented or output oriented was caused by the output variable, namely the total financing provided. And if the BPRS wants to optimize its efficiency level, the BPRS needs to encourage to increase the financing provided by 98% (output-oriented) and 99% (input-oriented), as well as operational income which needs to be increased by 1%. As for fixed assets according to the output approach, the BPRS must reduce it by 1%. So it can be concluded that the biggest cause of inefficiency comes from the variable of financing provided. The results of this study are also in line with the research of Yasin & Fisabilillah (2020) which revealed that during the pandemic the collection of third-party funds (DPK) decreased and the distribution of financing decreased as well. This is due to the disruption of the bank intermediation function during the Covid-19 pandemic (Ningsih & Mahfuz (2020). Furthermore, Hidayah & Purnomo (2014) also explained that the cause of inefficiency in banking institutions can be caused by banks not being able to achieve output in accordance with their targets. The lack of maximum financing provided by the bank to customers or the public can be overcome by innovating the types of financing or credit products, which can later generate an operating profit.

And the last finding is the result of benchmarking found 11 DMU with the most referrals. The three BPRS with the most references are the BPRS East Lampung in 2019, BPRS Al Ihsan Bandung in 2016 and BPRS Muamalat Harkat Bengkulu in 2019. And based on the benchmarking results it was also found that the efficiency condition of the BPRS before 2020 was better than in 2020 and 2021. This is of course It is a challenge for the BPRS industry to operate professionally and accountably in managing its resources, particularly in the input and output variables. Bustami (2013) explains that accountability and professionalism have a significant effect on audit quality. Furthermore, Ilhamsyah (2018) also explains the same thing, where professionalism has a positive and significant effect on the quality of banking internal audits. That means, with high professionalism, banks can produce quality audit reports or bank finances. Therefore, the banking sector is expected to describe the actual banking conditions without any bias or cover-up. This aims to increase public trust in the BPRS.

# CONCLUSION

## Conclusion

The purpose of this study is to measure the efficiency level of BPRS in Indonesia during the 2016-2021 period. The analysis used in this research is Data Envelopment Analysis (DEA). Based on the results of the analysis, it was found that based on the efficiency score, the efficiency level of the BPRS fluctuated. Furthermore, when viewed from the analysis of CRS and VRS, there is no BPRS in Indonesia that has reached the optimal level of efficiency. Then, based on the trend analysis, the efficiency of BPRS in Indonesia has a fluctuating trend. Furthermore, the emergence of Covid-19 is also one of the phenomena analyzed in this study. The results of the analysis found that during the Covid-19 pandemic period, namely 2019-2021, there was a continuous decrease in efficiency levels, although the decline that occurred was still small.

In the analysis of potential improvement, it was found that the BPRS in Indonesia can achieve the optimum level of efficiency if fixed assets are reduced by 1%, financing provided and operating income need to

be increased by 98% and 1%, respectively. The biggest cause of inefficiency is the variable of financing provided. And in the Benchmaring analysis, 11 BPRS were obtained with the highest number of referrals. The three BPRS with the most referrals are BPRS East Lampung in 2019, BPRS Al Ihsan Bandung in 2016 and BPRS Muamalat Harkat Bengkulu in 2019.

**Recommendations**

**1. Banking practitioners**

It is hoped that the BPRS in Indonesia can improve and pay attention to the efficiency level of their banks and make improvements to the causes of inefficiency which in this study is the total financing provided. In addition, BPRS is also expected to be more transparent in the publication of its financial statements. The management of the BPRS must optimize the use of company resources in order to obtain optimal output so that the level of bank efficiency can be achieved. This can increase public confidence in the BPRS. BPRS needs to innovate and integrate with digital technology, given the increasingly fierce competition in the banking industry.

2. Regulators

It is hoped that LPS will pay more attention to the efficiency of Indonesian BPRS, considering that BPRS is a micro-scale bank with relatively low capital and is vulnerable to being affected by economic turmoil and can lead to bankruptcy. It is hoped that the IDIC will be able to maintain the financial stability of the BPRS and pay attention to the development of the existing human resources in it to be able to manage the company's resources properly. LPS needs to increase public understanding of the importance of LPS's role in BPRS, so that people will understand and feel safe to keep their money in BPRS because it is guaranteed by LPS. This can increase public confidence in formal banking institutions.

3. Academia

This research is inseparable from shortcomings, for that academics are expected to be able to update this research, for example by further analyzing the causes of BPRS inefficiency in Indonesia, measuring the productivity level of BPRS, analyzing the financial performance of BPRS or using other research variables that are more comprehensive. In addition, academics can use other analytical tools such as the DEA Two-Stage Approach, MPI for productivity measurement (Rani et al., 2017), and to get more comprehensive analysis results to be able to get solutions that are right on target.

# REFERENCES

Agustina, D., Sholihin, M., & Fithria, A. (2019). The Efficiency of Indonesian Islamic Rural Banks: A Stochastic Frontier Analysis. International Journal of Islamic Economics and Finance, 1(2), 229–248. https://doi.org/10.18196/ijief.1212

Archer, T.S. (2010). The Efficiency Theory: Improving Society by Eliminating Wasteful Programs, Restructuring the Economy, and Fixing Education. CreateSpace Independent Publishing Platform, New York

Archer, T.S. (2010). The Efficiency Theory: Improving Society by Eliminating Wasteful Programs, Restructuring the Economy, and Fixing Education. CreateSpace Independent Publishing Platform, New York.

Ascarya, & Yumanita, D. (2009). Intermediation Efficiency Analysis of Islamic Rural Banks in Indonesia : Two Stage DEA Approach. February 2009.

Bidari, A. S., Simangunsong, F., & Siska, K. (2020). SEKTOR PERBANKAN di COVID19. Jurnal Pro Hukum : Jurnal Penelitian Bidang Hukum Universitas Gresik, 9(1), 1–9. https://doi.org/10.55129/jph.v9i1.1129

Bos, J.W.B., Millone, M. (2015). Practice What You Preach: Microfinance Business Models and Operational Efficiency, 70. World Development, 28-42.

Bustami, A. (2013). *Fesionalisme Auditor Terhadap Kualitas Audit (Studi Empiris pada Kantor Akuntan Publik di DKI Jakarta).*

Diana, S., Sulastiningsih, S., & Purwati, P. (2021). Analisis Kinerja Keuangan Perbankan Syariah Indonesia Pada Masa Pandemi Covid-19. Jurnal Riset Akuntansi Dan Bisnis Indonesia, 1(1), 111–125. https://doi.org/10.32477/jrabi.v1i1.327

Farell, M.J. (1957). The measurement of productive efficiency. Journal of the Royal Statistical Society, 120(3), 253-290.

Hadini, M. L., & Wibowo, D. (2021). Komparasi Efisiensi Bank Konvensional Dan Bank Syariah Di Indonesia Berdasarkan Data Envelopment Analysis (Dea). Jurnal Ilmu Dan Riset …. http://jurnalmahasiswa.stiesia.ac.id/index.php/jira/article/view/3723

Hartarska, V., Shen, Xu., & Mersland, R. (2013). Scale Economies and Input Price Elasticities in Microfinance Institutions. Journal of Banking and Finance, 37(1), 118131.

Hartono, I., Djohar, S., & Daryanto, H. K. (2008). Analisis Efisiensi Bank Perkreditan Rakyat Di Wilayah Jabodetabek Dengan Pendekatan Data Envelopment Analysis. In Manajemen & Agribisnis (Vol. 5 no.2, pp. 52–62).

Hidayah, N., & Purnomo, D. (2014). Tingkat efisiensi perbankan konvensional dan perbankan syariah di indonesia. *Seminar Nasional Dan Call for Paper (Sancall 2014)*, *Sancall*, 307–316.

Hosen, M. N., & Muhari, S. (2013). Efficiency of the Sharia Rural Bank in Indonesia Lead to Modified Camel. International Journal of Academic Research in Economics and Management, 2(5). https://doi.org/10.6007/IJAREMS/v2-i5/298

Ika, S.R. & Abdullah, N. (2011). A Comparative Study of Financial Performance of Islamic Banks and Conventional Banks in indonesia. International Journal of Business and Social Science, 2(15), 199-207.

Iqbal, Z. (1997). Islamic Financial Systems, Finance & Development, 0034(002), A012.

Masrizal, Sukmana, R., Fianto, B. A., & Gultom, R. Z. (2022). Does economic freedom fosters Islamic rural banks efficiency? Evidence from Indonesia. *International Journal of Productivity and Performance Management*. https://doi.org/10.1108/IJPPM-11-2021-0660

Ningsih & Mahfudz, M. S. (2020). Dampak Pandemi Covid-19 Terhadap Manajemen Industri Perbankan Syariah: Analisis Komparatif. Point, 2(1), 1–10. https://doi.org/10.46918/point.v2i1.576

Nugrohowati, R. N. I. (2019). Measuring The Efficiency of Indonesian Sharia Rural Banks: Two Stage Approach. Jurnal Ekonomi Pembangunan: Kajian Masalah Ekonomi Dan Pembangunan, 20(1), 28–49. https://doi.org/10.23917/jep.v20i1.6692

Pratomo, D., & Rahmat Fajar Ramdani. (2021). Analisis Pertumbuhan Kinerja Keuangan Perbankan Syariah dan Konvensional di Era Pandemi Covid-19. *Derivatif: Jurnal Manajemen*, *15*(2).

Rani, L., Rusydiana, A., & Widiastuti, T. (2017, November). Comparative analysis of Islamic bank's productivity and conventional bank's in Indonesia period 2008-2016. In *1st International Conference on Islamic Economics, Business and Philanthropy (ICIEBP 2017)* (pp. 118-123).

Rusydiana, A. S., & Nugroho, T. (2017). Measuring efficiency of life insurance instution in Indonesia: Data envelopment analysis approach. *Global Review of Islamic Economics and Business*, *5*(1), 012-024.

Rusydiana, A. S., Maliha, H., & Al-Parisi, S. (2016). Efficiency measurement of Zakat Institution Program: Case Study Dompet Dhuafa Indonesia. *IJIBE (International Journal of Islamic Business Ethics)*, *1*(1), 28-43.

Sadono, E. D. (2017). Efficiency of Islamic Rural Banks ( ) in East Java Province , Indonesia Introduction Indonesian rural bank namely Bank Perkreditan Rakyat ( BPR ) is a part of the banking system that plays a significant role in the economic development. Tazkia Islamic Finance and Business Review, 11(1), 1–14.

Sanjaya Marlius. (2018). Peranan Laporan Keuangan Dalam Kebijaksanaan Pemberian Kredit Kepada Calon Nasabah Pada PT. BPR Batang Kapas. Jurnal Akademi Keuangan Dan Perbankan, 1–12

Sharma, D. (2013). Efficiency and Productivity of Banking Sector: A Critical Analysis of Literature and Design of Conceptual Model. Qualitative Research in Financial Markets, 5(2), 195–224. https://doi.org/10.1108/QRFM-10-2011-0025

Sholihah, E. (2021). Efisiensi Kinerja Keuangan Sektor Perbankan Indonesia di Masa Pandemi Covid-19. *Jurnal Riset Manajemen Sains Indonesia*, *12*(2), 287–304.

Silkman, R.H. (1986). Measuring Efficiency: An Assessment of Data Envelopment Analysis. Jossey-Bass, San Francisco

Thaha, A. F. (2020). *Dampak Covid-19 Terhadap UMKM Di Indonesia*.

Wasiaturrahma, Sukmana, R., Ajija, S. R., Salama, S. C. U., & Hudaifah, A. (2020). Financial performance of rural banks in Indonesia: A two-stage DEA approach. *Heliyon*, *6*(7), e04390. https://doi.org/10.1016/j.heliyon.2020.e04390

Yasin, A., & Ladi Wajuba Perdini Fisabilillah. (n.d.). *Analisis Komparasi Kinerja Keuangan Bank Perkreditan Rakyat (BPR) Sebelum dan Pada Pandemi Covid-19*. 142–152.

## APPENDIX

**Appendix 1:** Efficiency score of BPRS (Java)

| DMU | CRS | VRS | SE |
|---|---|---|---|
| BPRS Al Ihsan Bandung | 0.785 | 0.803 | 0.966 |
| BPRS Al Mabrur Babadan Ponorogo | 0.290 | 0.313 | 0.907 |
| BPRS Al Salaam Amal Salman Kota Depok | 0.476 | 0.704 | 0.688 |
| BPRS AlMasoem Bandung | 0.535 | 0.787 | 0.674 |
| BPRS Amanah Insani Bekasi | 0.285 | 0.411 | 0.685 |
| BPRS Amanah Rabbaniah Bandung | 0.689 | 0.864 | 0.802 |
| BPRS Amanah Sejahtera Gresik | 0.272 | 0.347 | 0.787 |
| BPRS Amanah Ummah Bogor | 0.328 | 0.399 | 0.823 |
| BPRS Arta Leksana Banyumas | 0.321 | 0.338 | 0.950 |
| BPRS Artha Amanah Ummat Semarang | 0.244 | 0.253 | 0.948 |
| BPRS Artha Madani Bekasi | 0.269 | 0.356 | 0.758 |
| BPRS Artha Surya Barokah semarang | 0.481 | 0.598 | 0.812 |
| BPRS Attaqwa Tanggerang | 0.342 | 0.362 | 0.942 |
| BPRS Baiturridha Pusaka | 0.484 | 0.726 | 0.666 |
| BPRS Baktimakmur Indah Sidoarjo | 0.864 | 0.998 | 0.865 |
| BPRS Barokah Dana Sejahtera Yogyakarta | 0.514 | 0.738 | 0.692 |
| BPRS Berkah Ramadhan Tanggerang | 0.215 | 0.337 | 0.684 |
| BPRS Bina Amwalul Hasanah Depok | 0.470 | 0.756 | 0.639 |
| BPRS Bina Finansia kota semarang | 0.459 | 0.470 | 0.976 |
| BPRS Buana Mitra Perwira | 0.409 | 0.524 | 0.784 |
| BPRS Cilegon Mandiri | 0.335 | 0.467 | 0.693 |
| BPRS Dana Hidayatullah Yogyakarta | 0.662 | 0.671 | 0.985 |
| BPRS Dharma Kuwera Klaten | 0.376 | 0.382 | 0.985 |
| BPRS Formes Sleman | 0.275 | 0.278 | 0.987 |
| BPRS Gala Mitra Abadi Grobogan | 0.594 | 0.618 | 0.961 |
| BPRS Gunung Slamet Cilacap | 0.576 | 0.669 | 0.887 |
| BPRS Harta Insan Karimah Bekasi | 0.284 | 0.494 | 0.551 |
| BPRS Harta Insan Karimah Parahyangan | 0.475 | 0.941 | 0.502 |
| BPRS Harta Insan Karimah Surakarta | 0.497 | 0.597 | 0.832 |
| BPRS Harta Insan Karimah Tangerang | 0.533 | 0.936 | 0.569 |
| BPRS Harum Hikmahnugraha | 0.456 | 0.580 | 0.789 |
| BPRS Hijra Alami Jakarta Selatan | 0.898 | 0.905 | 0.991 |
| BPRS Insan Cita Artha Jaya Bogor | 0.391 | 0.429 | 0.899 |
| BPRS Insan Madani Sukoharjo | 0.258 | 0.300 | 0.853 |
| BPRS Karya Mugi Sentosa Surabaya | 0.506 | 0.733 | 0.697 |
| BPRS Lantabur Tebuireng | 0.661 | 0.841 | 0.790 |
| BPRS Mitra Amal Mulia | 0.205 | 0.215 | 0.940 |
| BPRS Mitra Cahaya Indonesia Sleman | 0.595 | 0.660 | 0.886 |
| BPRS Mitra Harmoni Kota Malang | 0.693 | 0.750 | 0.933 |
| BPRS Mitra Harmoni Kota Semarang | 0.733 | 0.804 | 0.908 |
| BPRS Mitra Harmoni Yogyakarta | 0.761 | 0.874 | 0.869 |
| BPRS Muamalah Cilegon | 0.668 | 0.730 | 0.912 |

| | | | |
|---|---|---|---|
| BPRS Mulia Berkah Abadi Tanggerang | 0.141 | 0.150 | 0.858 |
| BPRS Musyarakah Ummat Indonesia Tangerang | 0.619 | 0.638 | 0.969 |
| BPRS Patriot Bekasi | 0.394 | 0.534 | 0.751 |
| BPRS Saka Dana Mulia Kudus | 0.362 | 0.381 | 0.945 |
| BPRS Sukowati Sragen | 0.408 | 0.579 | 0.706 |
| BPRS Suriyah | 0.301 | 0.378 | 0.799 |
| BPRS Tanmiya Artha Kota Kediri | 0.471 | 0.490 | 0.960 |
| BPRS Unisia Insan Indonesia Kota Yogyakarta | 0.374 | 0.378 | 0.988 |

**Appendix 2:** Efficiency score of BPRS (non-Java)

| DMU | CRS | VRS | SE |
|---|---|---|---|
| BPRS Adeco Langsa Aceh | 0.532 | 0.629 | 0.855 |
| BPRS Al Washliyah Medan | 0.310 | 0.316 | 0.982 |
| BPRS Al-Yaqin Simalungun Sumut | 0.373 | 0.394 | 0.944 |
| BPRS Aman Syariah | 0.475 | 0.488 | 0.977 |
| BPRS Aman Syariah Lampung Timur | 0.477 | 0.496 | 0.961 |
| BPRS Amanah Bangsa Simalungun | 0.299 | 0.357 | 0.829 |
| BPRS Asad Alif Kendal | 0.377 | 0.388 | 0.973 |
| BPRS Bahari Berkesan Ternate | 0.445 | 0.467 | 0.955 |
| BPRS Baiturrahman Aceh Besar | 0.479 | 0.520 | 0.900 |
| BPRS Bandar Lampung | 0.483 | 0.579 | 0.833 |
| BPRS Bangka Belitung | 0.262 | 0.543 | 0.483 |
| BPRS Barkah Gemadana Kab Banjar Kalsel | 0.369 | 0.380 | 0.972 |
| BPRS Berkah Dana Fadhlillah (Perseroda) Kampar Riau | 0.542 | 0.584 | 0.927 |
| BPRS Bobato Lestari Kota Tidore Kepulauan Maluku Utara | 0.422 | 0.588 | 0.819 |
| BPRS Dinar Ashri Kota Mataram NTB | 0.733 | 0.924 | 0.799 |
| BPRS Fajar Sejahtera Bali Kab Badung Bali | 0.444 | 0.459 | 0.970 |
| BPRS Gayo Aceh Tengah | 0.438 | 0.467 | 0.937 |
| BPRS Gebu Prima Medan | 0.539 | 0.549 | 0.983 |
| BPRS Haji Miskin Kab Tanah Datar Sumbar | 0.722 | 0.766 | 0.943 |
| BPRS Hasanah Pekanbaru Riau | 0.379 | 0.387 | 0.980 |
| BPRS Hikmah Wakilah Aceh | 0.752 | 0.903 | 0.835 |
| BPRS Kota Juang Aceh Jeumpa | 0.477 | 0.511 | 0.934 |
| BPRS Kotabumi (Perseroda) Lampung Utara | 0.484 | 0.729 | 0.670 |
| BPRS Lampung Timur | 0.893 | 0.901 | 0.988 |
| BPRS Manfaatsyariah Penajam Paser Utara | 0.161 | 0.167 | 0.963 |
| BPRS Mentari Pasaman Saiyo Pasaman Barat Sumbar | 0.439 | 0.460 | 0.955 |
| BPRS Metro Madani Kota Metro Lampung | 0.499 | 0.586 | 0.854 |
| BPRS Mitra Agro Usaha Bandar Lampung | 0.516 | 0.567 | 0.914 |
| BPRS Mitra Amanah Palangkaraya Kalteng_2016 | 0.547 | 0.574 | 0.949 |
| BPRS Muamalat Harkat Bengkulu | 0.520 | 0.578 | 0.876 |
| BPRS Patuh Beramal Kota Mataram NTB | 0.713 | 0.754 | 0.946 |
| BPRS PNM Patuh Beramal Kota Mataram | 0.486 | 0.517 | 0.947 |

| | | | |
|---|---|---|---|
| BPRS Pudu Arta Insani Deli Serdang | 0.394 | 0.397 | 0.991 |
| BPRS Rahmah Hijrah Agung Aceh | 0.518 | 0.562 | 0.921 |
| BPRS Rahmania Dana Sejahtera Aceh Jeumpa/Bireuen | 0.579 | 0.595 | 0.968 |
| BPRS Rajasa Lampung Tengah (Perseroda) | 0.610 | 0.652 | 0.925 |
| BPRS Serambi Mekah Langsa Aceh | 0.583 | 0.638 | 0.918 |
| BPRS Sindanglaya Kotanopan Deli Serdang Sumut | 0.442 | 0.494 | 0.911 |
| BPRS Taman Indah Darussalam Aceh | 0.686 | 0.745 | 0.907 |
| BPRS Tani Tulang Bawang Barat Lampung | 0.672 | 0.699 | 0.957 |
| BPRS Tengku Chiek Dipante Pidie Aceh | 0.428 | 0.464 | 0.930 |
| BPRS Way Kanan (Perseroda) Lampung | 0.579 | 0.655 | 0.877 |