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Assessing the Efficiency of Sharia Rural Banks: A Comparative Study Using DEA Frontier

Hardiyansyah Maulana[1], Dhidhin Noer Ady Rahmanto[2], Novi Febriyanti[3], M. Zidny Nafi' Hasbi[4], Tyagita Dianingtyas Sudibyo[5,6]

[1,2,3,4] *Alma Ata University of Yogyakarta, Indonesia*
[5] *Universitas PGRI Yogyakarta, Indonesia*
[6] *Doctor of Philosophy (PhD) Students in management UniSHAMS, Malaysia*

Corresponding email: dhidhin@almaata.ac.id

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ABSTRACT

The COVID-19 pandemic has posed challenges across various sectors, including banking, which has affected Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. This study aims to evaluate the factors influencing operational efficiency in Sharia Rural Banks (BPRS) in the Central Java and DIY Provinces. The research employs a quantitative descriptive approach, utilizing secondary data from the BPRS's 2023 quarterly financial reports obtained from the Financial Services Authority (OJK). Efficiency is measured using the DEA Frontier Application with a Variable Return to Scale (VRS) model, with scores ranging from 0 to 1, where a score of 1 represents full efficiency. The analysis of 20 BPRS reveals that the average efficiency in DIY (0.940) surpassed that of Central Java (0.881), indicating significant regional differences in banking performance. These findings suggest that BPRS in DIY are better at optimizing resources and managing operational costs compared to their counterparts in Central Java. The study's results offer practical implications for policymakers and bank management to develop targeted strategies aimed at improving banking efficiency, enhancing financial services, and ensuring sustainable growth. By addressing regional disparities, stakeholders can better allocate resources and strengthen the resilience of BPRS to support the economic recovery of MSMEs in line with Sharia principles.

ARTICLE INFO

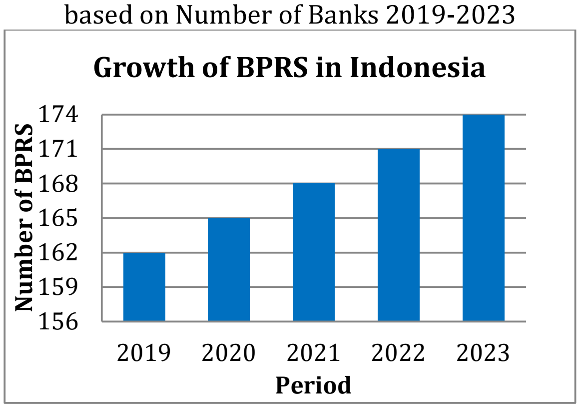
Keywords:
Sharia Rural Banks, efficiency, DEA Frontier

Introduction

The banking industry is one of the main pillars of a country's economy and plays a vital role in influencing public economic activity (Putri et al., 2022). Banks serve as an essential bridge between entities with surplus funds and those in need of financial resources (Koiri & Erdkhadifa, 2022). Financial institutions, both banks and non-banks, act as the primary foundation of Indonesia's economy (Rusydiana et al., 2023) . Public trust and engagement in the financial sector can significantly drive economic development, especially within the finance industry (Putri et al., 2022). When these functions operate effectively, the utilization of funds becomes more optimal and efficient, thereby boosting productive activities and ultimately enhancing public welfare (Hidayah et al., 2020).

The presence of the Sharia People's Financing Bank (BPRS) in Indonesia complements the array of Islamic banks. BPRS, within Indonesia's banking system, is a financial institution that meets the public's financing needs without interest or usury, adhering to Sharia principles (Abdul Aziz, 2020; Marzukoh et al., 2023). As an intermediary institution, BPRS collects and distributes public funds to improve the standard of living (Hasbi et al., 2021) . BPRS plays a crucial role in supporting the national economy by operating on a smaller scale and significantly contributing to the growth of Micro, Small, and Medium Enterprises (MSMEs) (Hidayah et al., 2020). In addition to accelerating economic activity within society, BPRS fosters comprehensive economic growth (Arief et al., 2019). The following is the BPRS growth data in Indonesia based on amount bank :

Figure 1. Growth Data (BPRS) in Indonesia based on Number of Banks 2019-2023



Source : www.ojk.go.id

The growth of Sharia Rural Banks (BPRS) in Indonesia has shown a positive trend over the past four years (OJK, 2021). The number of BPRS increased from 162 in 2019 to 174 in 2023, with the addition of 12 new banks during this period. This increase reflects growing public trust and demand for Islamic banking services (Auliani & Perwithosuci, 2023).

The emergence of the COVID-19 pandemic had a negative impact not only on the health sector but also on various other sectors, including the economy and banking industry (Ubaidillah & others, 2024) . The pandemic's effects included a decline in purchasing power and consumption, a weakening of the entrepreneurial sector, threats to banking and financial institutions, and risks to the sustainability of micro, small, and medium enterprises (MSMEs) (Jasika & Muharrami, 2024; Mega et al., 2024). The government's policy on restricting public activities as part of the pandemic response further contributed to the decline in economic activity (OJK, 2021).

According to Marsondang et al., (2019), a company's performance, particularly in the financial sector like banking, is largely determined by its efficiency. Therefore, it is crucial to measure the factors that influence efficiency levels. Various methods can be used to analyze a company's performance, one of which is by evaluating the efficiency of its operations (Wastuti, 2020) . When measuring efficiency, banks must assess how to achieve optimal output levels with available inputs or minimize input levels for a specific output. This deeper analysis allows the identification of reasons behind inefficiencies within the company (Hidayah et al., 2020).

Efficiency in banking serves as a key indicator for evaluating performance, revealing whether a bank is performing well or not (Hidayah et al., 2020). As such, efficiency is an important aspect that reflects overall banking performance (Fathurrahman & Rahmadani, 2024). Efficiency analysis is a commonly used parameter for assessing organizational performance (Arifah, 2023). It plays a crucial role because financing activities without attention to efficiency factors can affect a bank's profitability. Furthermore, efficiency is also a primary indicator for evaluating the performance of BPRS (Firmansyah et al., 2022)

This study focuses on the efficiency of Sharia Rural Banks (BPRS) in Central Java Province and DI Yogyakarta following the COVID-19 pandemic, a topic that has received little attention in previous research. Most existing studies have examined BPRS efficiency under normal conditions. For example, Sari & Juniyanto, (2024) discussed the decline in efficiency of Islamic Commercial Banks in Indonesia after the pandemic using the Data Envelopment Analysis (DEA) method, but did not specifically address BPRS (E. Sari & Juniyanto, 2024). Another study by Aufa et al., (2022) employed a non-parametric DEA approach to measure the efficiency of BPRS and conventional banks in Central Java, but it did not focus on the post-pandemic period (Aufa et al., 2022). Furthermore, Miranti et al., (2022) highlighted a decline in BPRS efficiency in East Java during the pandemic using a two-stage DEA method but did not provide a comparative analysis of efficiency before and after the pandemic (Miranti et al., 2022).

Recent studies have primarily focused on the efficiency of BPRS under normal economic conditions, which does not account for the unprecedented strains faced by the banking sector during the pandemic. "While previous research has examined efficiency levels in conventional and Islamic banks within other Indonesian regions, few studies offer a focused, comparative analysis of BPRS efficiency pre- and post-pandemic in Central Java and DI Yogyakarta. Recent findings, such as those by Aufa et al., (2022) and Sari & Juniyanto, (2024), show efficiency declines in broader banking sectors but lack insight into specific post-pandemic adaptations by BPRS institutions. By exploring these gaps, this study provides a timely perspective on the resilience and operational adjustments of BPRS, thereby contributing valuable insights for financial policymakers and stakeholders supporting MSME recovery and growth in a post-pandemic environment (Auliani & Perwithosuci, 2023; Marsondang et al., 2019)

This study addresses the pressing issue of operational efficiency within Sharia Rural Banks (BPRS) in Indonesia, particularly in Central Java and DI Yogyakarta. The COVID-19 pandemic has significantly impacted Indonesia's banking sector, challenging institutions to maintain efficiency while supporting MSMEs through recovery efforts (Rusydiana et al., 2023) . With MSMEs being a key driver of economic stability, understanding the efficiency of BPRS operations is crucial for ensuring optimal resource allocation and financial resilience. This study aims to evaluate how BPRS has managed its efficiency post-COVID-19, filling an urgent need for insights into how these banks are adapting to new economic demands (Abdul Aziz, 2020).

In this context, my research addresses this gap by examining the operational efficiency of BPRS in Central Java and DI Yogyakarta after the COVID-19 pandemic. Using a DEA Frontier approach, this study offers a comprehensive comparison of efficiency the post-pandemic periods an analysis that has not yet been explored in depth in previous studies.

Literatures Review

Efficiency Theory

Efficiency is a crucial concept in evaluating organizational performance. It is defined as the use of appropriate methods to achieve objectives without excessive consumption of time, energy, or resources (KBBI, 2019). Efficiency not only encompasses usability and relevance but also the capability to perform tasks accurately. In an organizational context, efficiency serves as an important indicator of an organization's ability to maximize outcomes from limited resources (Arifah, 2023).

Pareto Koopmans (1950) emphasized that an organization is considered efficient if it can increase output without adding input or produce the same output while reducing the number of inputs (Mirdehghan & Fukuyama, 2016). This demonstrates the ability to minimize resource usage while maintaining productivity. Hidayah et al., (2020) further highlighted that an efficient company is one that optimizes its resource management to achieve better performance. Efficiency focuses not only on cost reduction but also on increasing output with the same level of input.

According to Aureli et al., (2019), efficiency can be viewed as the ratio of output to input, indicating how effectively a company utilizes its resources to achieve the desired outcomes. Therefore, efficiency is a key element in creating competitive advantage, enabling companies to survive in a competitive environment by maximizing profits from minimal resources(Sari et al., 2023).

Efficiency remains a cornerstone in evaluating organizational performance, and recent studies have expanded upon traditional views. For instance, Aureli et al., (2019) view efficiency as a ratio of output to input, allowing organizations to gauge resource utilization effectiveness within competitive environments. Expanding on this, Rusydiana et al., (2023) argue that efficiency in banking enhances investor trust by ensuring low transaction costs and greater profitability. Other recent studies emphasize that organizational efficiency must adapt to contemporary challenges, such as economic volatility and technological advancements, which directly affect resource allocation and productivity in the banking sector (Fathurrahman & Rahmadani, 2024; Hidayah et al., 2020)

Measurement of Efficiency in Banking

Measuring efficiency in banking is crucial for evaluating operational performance, as it reflects a bank's ability to manage resources optimally to achieve maximum results at minimal cost. Efficient banks tend to attract trust from depositors and investors, as efficiency is associated with lower transaction costs and increased profitability (Fathurrahman & Rahmadani, 2024; Rusydiana et al., 2023). High efficiency also benefits various stakeholders, including customers, investors, and the government, as efficient banks provide assurance that invested funds are well-managed (Hidayah et al., 2020).

Fry, (1998) identified four key factors that support efficiency in the banking sector: information arbitration, accuracy in asset evaluation, the ability to anticipate risk, and functional efficiency. Conversely, inefficiencies in banks can arise due to lengthy bureaucratic processes, improper allocation of resources, and failure to achieve economies of scale. Inefficient bureaucracy increases operational costs, while errors in resource allocation result in excessive input without corresponding output. Banks that fail to capitalize on economies of scale may struggle to compete with more efficient banks that are able to expand their operations effectively (Deswarti et al., 2023; Rabbaniyah & Afandi, 2019).

In banking, efficiency measurement has developed beyond traditional metrics to encompass more nuanced approaches that consider both input and output variables. For example, Salama, (2022) introduced the output and input approach to efficiency in banking, focusing on maximizing results with limited resources. The production, asset, and intermediation approaches allow banks to define efficiency based on different operational aspects, such as asset creation and fund allocation(Rabbaniyah & Afandi, 2019). This study applies three specific input variables (Fixed Assets, Third Party Funds, and Operational Expenses) and output variables (Profit and Revenue-Sharing Financing Operations) to align with Sharia banking practices, where profit-sharing is central to evaluating Islamic bank efficiency (Hidayah et al., 2020).

Efficiency Output and Input Approach

Efficiency in banking can be measured using two main approaches: the output approach and the input approach. The output approach focuses on how banks maximize the results achieved from existing resources, while the input approach emphasizes minimizing the number of inputs used to reach the same level of output. Efficiency in banking is assessed by the bank's ability to manage resources optimally, allowing the bank to produce maximum output with minimal operational costs (Salama, 2022).

In this study, three input variables are used: Fixed Assets, Third Party Funds (DPK), and Operational Expenses. Fixed assets include properties such as land and buildings that support bank operations. DPK refers to the funds collected from the public, while operational expenses cover administrative costs and employee salaries (Hidayah et al., 2020).

For output variables, this research uses Profit and Revenue-Sharing Financing Operations. Profit-sharing financing is a primary product of Islamic banks, adhering to Sharia principles such as contracts involving sales, leasing, and profit-sharing agreements. Operational income refers to the bank's receipts from activities such as fund distribution and other transactions (Hidayah et al., 2020).

There are three main approaches to defining the internal input-output relationships in banking: the production approach, the asset approach, and the intermediation approach. The production approach considers savings as the output generated by the bank, while the intermediation approach views savings as an input that is processed into assets that generate output. The asset approach, on the other hand, focuses on the bank's role as a credit creator, where the output is the bank's ability to allocate funds in the form of loans or investments (Rabbaniyah & Afandi, 2019).

Data Envelopment Analysis (DEA)

Data Envelopment Analysis (DEA) is a non-parametric method used to measure the efficiency of Economic Activity Units (UKE) by comparing the input-output ratio among units or Decision-Making Units (DMUs). DEA is widely used in the banking sector because it can identify the input-output variables that cause inefficiency and measure efficiency comprehensively. There are two main models in DEA: Constant Return to Scale (CRS) and Variable Return to Scale (VRS). The CRS model assumes a constant input-output ratio, while the VRS model allows for variations in the input-output ratio under certain conditions, such as imperfect competition or financial constraints (Hidayah et al., 2020; Othman et al., 2016).

Recent global and local challenges, such as the COVID-19 pandemic, underscore the need for banks to maintain operational efficiency under new economic pressures. Hasbi et al., (2021)highlights how efficiency-focused strategies became essential in enabling banks to adapt and remain competitive in shifting markets. Additionally, contemporary tools like Data Envelopment Analysis (DEA) have gained traction for their effectiveness in identifying inefficiencies in banks' input-output processes. DEA models, including Constant Return to Scale (CRS) and Variable Return to Scale (VRS), allow banks to tailor efficiency evaluations to current conditions, such as market imperfections or financial constraints, enhancing banks' capacity to remain resilient and adaptive (Othman et al., 2016).

Methods

This study adopts a quantitative approach, utilizing numerical data for statistical analysis. It specifically focuses on panel data, which combines observations from multiple subjects over several time periods, to analyze the efficiency of Sharia Rural Banks(BPRS). The research examines the operational efficiency of BPRS during the four quarters of 2023, with an emphasis on banks located in Central Java and DI Yogyakarta (DIY) provinces. Using secondary data from financial reports, the study provides insights into the performance of these banks in the post-COVID-19 landscape.

A comparative descriptive design is employed to assess and compare the efficiency of different BPRS. The study uses secondary data, sourced from the official website of the Financial Services Authority (OJK). Key variables considered in the evaluation of operational performance include Fixed Assets, Operating Costs, Third-Party Funds, Profit-Sharing Financing, and Operating Income. These variables are critical for evaluating the banks' performance, especially in the context of economic challenges brought on by the pandemic.

The population for the study consists of BPRS registered with the OJK in Central Java and DIY. A sample of 20 BPRS was selected using clustering techniques, based on the availability of financial reports for 2023. The rationale for this selection is twofold:

1. Data Availability: Only the financial reports of 20 BPRS banks provided the necessary completeness and consistency of data for the full four quarters of 2023. Other registered BPRS institutions did not meet these data requirements, as their reports were incomplete or unavailable in the OJK database. This limitation in data availability necessitated focusing on institutions with complete data to ensure reliable and comparable results (Fathurrahman & Rahmadani, 2024).
2. Representativeness and Feasibility: The selected 20 banks represent a diverse range of operational scales and geographic locations within the two regions, which strengthens the study's comparative descriptive design. This clustering approach ensures that the sample remains manageable for detailed analysis while capturing a broad overview of operational efficiency in the Central Java and DIY regions.

These banks are distributed across various cities and regencies, providing a broad dataset that allows for a detailed comparison of operational efficiency between the two regions.

Data collection was conducted using the secondary data method, primarily through financial reports available on the OJK's website. The analysis was carried out using Data Envelopment Analysis (DEA), a non-parametric method ideal for evaluating the relative efficiency of decision-making units with multiple inputs and outputs. The study specifically employs the Variable Return to Scale (VRS) model of DEA, applying the BCC model developed by Banker, Charnes, and Cooper. This model accounts for non-optimal conditions commonly found in the banking sector. Efficiency scores range from 0 to 1, with 1 indicating full efficiency and values below 1 reflecting inefficiency.

Results

Based on the financial reports from the first, second, third, and fourth quarters of 2023, 20 Sharia Rural Banks (BPRS) were evaluated to assess their operational efficiency. Descriptive analysis using variables such as fixed assets, third-party funds (DPK), operational expenses, profit-sharing financing, and operational income provides insights into the performance characteristics of BPRS in Central Java and DIY Provinces. Overall, the trends in fixed assets and DPK indicate steady growth throughout the year, reflecting the banks' increasing ability to raise funds and make long-term investments. Meanwhile, profit-sharing financing and operational income showed significant improvement from the first to the fourth quarter, indicating better business activity and improved efficiency in fund utilization by the BPRS.

In Central Java Province, fixed assets and DPK steadily increased from March to December 2023. Profit-sharing financing grew from IDR 221,917 million in the first quarter to IDR 233,998 million in the fourth quarter, while operational income peaked in December 2023 at IDR 138,796 million. A similar trend was observed in DIY, where both profit-sharing financing and operational income saw significant improvements. Operational income for BPRS in DIY increased from IDR 31,382 million in the first quarter to IDR 138,752 million in the fourth quarter. These figures indicate that BPRS in both Central Java and DIY successfully improved their efficiency and operational performance throughout 2023.

In this study, the efficiency of 20 BPRS in Central Java and DIY, all registered with the Financial Services Authority (OJK) in 2023, was measured. The research employed the DEA Frontier application using an input-oriented intermediation approach with the assumption of Variable Return to Scale (VRS). After processing the data, efficiency scores for each bank were obtained. A score of 1 or 100% indicates that a bank is considered efficient in optimizing its resources, while a score below 1 reflects a lower level of efficiency.

Table 1. BPRS Efficiency Value in DIY Province
Quarter I, II, III and IV of 2023

No	BPRS Name	Quarterly				Average of Each BPRS
		March	June	September	December	
1.	Buana Mitra Perwira	1	1	1	1	1

2.	Asad Alif	0.864	0.795	0.551	0.907	0.779
3.	Artha Surya Barokah	1	1	0.777	0.887	0.916
4.	Artha Mas Abadi	1	1	0.677	1	0.919
5.	Bumi Artha Sampang	0.933	0.846	0.672	0.960	0.852
6.	Bina Finansia	0.570	0.540	0.366	0.765	0.560
7.	Dana Amanah Surakarta	1	1	1	1	1
8.	Al Mabrur Klaten	1	1	1	1	1
9	Mitra Harmoni Kota Semarang	1	1	0.691	0.948	0.909
10.	Insan Madani	1	0.501	1	1	0.875
Average achievement per quarter		0.936	0.868	0.773	0.946	0.881

Sumber: Data diolah Aplikasi DEA Frontier

Based on the calculations, the efficiency scores for each BPRS were obtained. Table 1 presents the results of the efficiency measurements for Sharia Rural Banks (BPRS) in the provinces of Central Java and DIY, as registered with the Financial Services Authority (OJK) for the first, second, third, and fourth quarters of 2023. Efficiency was calculated using a method that distributes the weighted sum of outputs relative to the weighted sum of inputs.

In Table 1, the data shows that in the first quarter of 2023, 7 BPRS achieved a technical efficiency score of 1 or 100%, meaning these BPRS are categorized as efficient. Meanwhile, 3 BPRS did not reach this level of efficiency, categorizing them as inefficient. These include BPRS Asad Alif (0.864), Bumi Artha Sampang (0.933), and BPRS Bina Finansia (0.570).

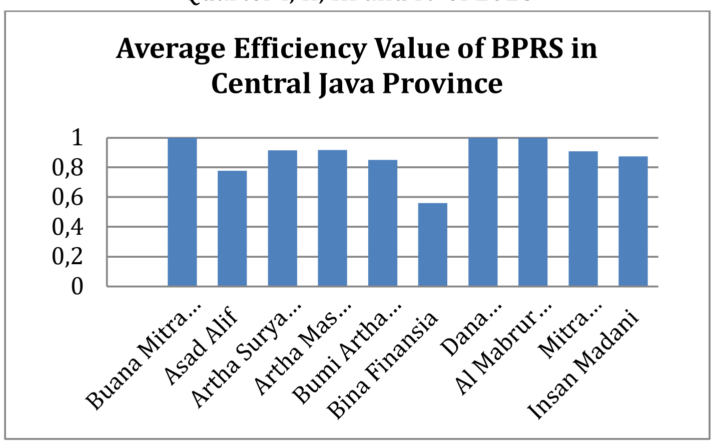
In the second quarter of 2023, the number of BPRS achieving full efficiency declined to 6. The BPRS that reached 1 or 100% efficiency were BPRS Buana Mitra Perwira, Artha Surya Barokah, Artha Mas Abadi, Dana Amanah Surakarta, Al Mabrur Klaten, and BPRS Mitra Harmoni Semarang City. However, 4 BPRS remained inefficient, including Asad Alif (0.795), Bumi Artha Sampang (0.846), Bina Finansia (0.540), and Insan Madani (0.501).

In the third quarter of 2023, the number of efficient BPRS further decreased to 4. The BPRS that maintained 1 or 100% efficiency were BPRS Buana Mitra Perwira, Dana Amanah Surakarta, Al Mabrur Klaten, and Insan Madani. On the other hand, 6

BPRS were classified as inefficient, namely Asad Alif (0.551), Artha Surya Barokah (0.777), Artha Mas Abadi (0.677), Bumi Artha Sampang (0.672), Bina Finansia (0.366), and BPRS Mitra Harmoni Semarang City (0.691).

In the fourth quarter of 2023, the number of efficient BPRS increased again. However, 5 BPRS remained in the inefficient category, including Asad Alif (0.907), Artha Surya Barokah (0.887), Bumi Artha Sampang (0.960), Bina Finansia (0.765), and Mitra Harmoni Semarang City (0.948).

Figure 2. Graph of the Average Efficiency Value of Each Bank Financing in Central Java Province Middle Quarter I, II, III and IV of 2023



Source : Processed Data

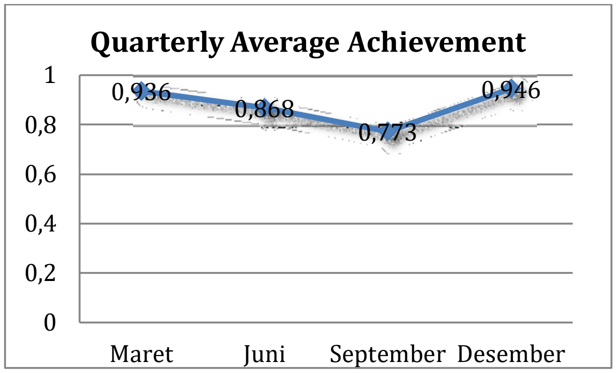
Based on Chart, in March, June, September, and December of 2023, three BPRS consistently achieved an efficiency score of 1 or 100%: BPRS Buana Mitra Perwira, Dana Amanah Surakarta, and Al Mabrur Klaten. These three BPRS maintained their efficient status with a perfect score in all four quarters (I, II, III, and IV) of 2023.

In addition, BPRS Artha Mas Abadi and Insan Madani recorded efficiency scores of 1 three times during the year, a feat not achieved by other BPRS. BPRS Artha Surya Barokah and Mitra Harmoni Semarang City reached full efficiency twice in 2023.

Of the 10 BPRS sampled in Central Java, three BPRS—BPRS Asad Alif, Bumi Artha Sampang, and BPRS Bina Finansia—never achieved an efficiency score of 1 or 100% throughout the research period. Overall, the efficiency levels of the Sharia Rural Banks in Central Java showed fluctuations over the course of the year. This variability is also evident at the individual level for each BPRS, as illustrated in Graph.

Figure 3. displays the average quarterly efficiency scores for each BPRS in Central Java during the study period, highlighting the trends and fluctuations in technical efficiency:

Figure 3. Average Efficiency Value Graph All BPRS in Java
Mid Quarter I, II, III and IV of 2023



Source : Processed Data

Throughout 2023, the technical efficiency of the Sharia Rural Banks (BPRS) in Central Java experienced fluctuations, and at no point did it reach a perfect score of 1. The highest recorded efficiency score was in December, with a value of 0.946, while the lowest occurred in September, with a score of 0.773. Overall, the average efficiency of BPRS in Central Java during 2023 was 0.881, which falls short of the optimal score of 1 or 100%.

Table 2. BPRS Efficiency Value in DIY Province
Quarter I, II, III and IV of 2023

No	BPRS Name	Quarterly				Average of Each BPRS
		March	June	September	December	
1.	Margirizki Bahagia	1	1	1	0.584	0.896
2.	Bangun Derajad Warga	1	1	0.977	0.877	0.963
3.	Dana Hidayatullah	0.924	0.876	0.793	0.902	0.873
4.	Mitra Amal Mulia	1	0.803	0.872	0.827	0.875
5.	Madina Mandiri Sejahtera	1	1	1	1	1
6.	Harta Isan Karimah Mitra Cahaya Indonesia	1	1	1	1	1
7.	Mitra Harmoni Yogyakarta	0.921	0.892	1	1	0.953
8.	Cahaya Hidup	0.754	0.922	1	1	0.919

9.	Unisia Insan Indonesia	0.873	0.909	0.951	0.972	0.926
10.	Barokah Dana Sejahtera	1	1	1	1	1
Average achievement per quarter		0.947	0.940	0.959	0.916	0.940

Source : Processed data DEA Frontier Application

In Table 2, the data for the first quarter of 2023 shows that 6 BPRS achieved a technical efficiency level of 1 or 100%, meaning they were categorized as efficient. These BPRS include BPRS Margirizki Bahagia, Bangun Kesejahteraan Warga, Mitra Amal Mulia, Madina Mandiri Sejahtera, Harta Insan Karimah Mitra Cahaya Indonesia, and BPRS Barokah Dana Sejahtera. Meanwhile, 4 other BPRS did not reach the technical efficiency level of 1 and were thus categorized as inefficient. These were BPRS Dana Hidayatullah (0.924), Mitra Harmoni Yogyakarta (0.921), Cahaya Hidup (0.754), and BPRS Unisia Insan Indonesia (0.873).

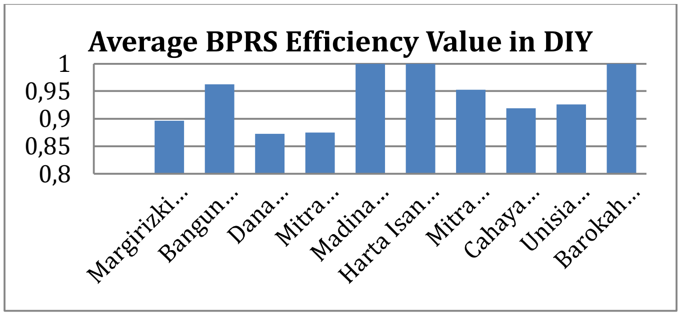
In the second quarter of 2023, the number of efficient BPRS decreased to 5 BPRS, including BPRS Margirizki Bahagia, Bangun Kesejahteraan Warga, Madina Mandiri Sejahtera, Harta Insan Karimah Mitra Cahaya Indonesia, and Barokah Dana Sejahtera. However, 5 other BPRS remained inefficient, namely BPRS Dana Hidayatullah (0.876), Mitra Amal Mulia (0.803), Mitra Harmoni Yogyakarta (0.892), Cahaya Hidup (0.754), and BPRS Unisia Insan Indonesia (0.909).

In the third quarter of 2023, the number of efficient BPRS increased back to 6 BPRS: BPRS Margirizki Bahagia, Madina Mandiri Sejahtera, Harta Insan Karimah Mitra Cahaya Indonesia, Mitra Harmoni Yogyakarta, Cahaya Hidup, and Barokah Dana Sejahtera. On the other hand, 4 BPRS were still categorized as inefficient: Bangun Kesejahteraan Warga (0.977), BPRS Dana Hidayatullah (0.793), Mitra Amal Mulia (0.872), and BPRS Unisia Insan Indonesia (0.951).

In the fourth quarter of 2023, the number of efficient BPRS dropped again to 5 BPRS, similar to the second quarter. The remaining 5 BPRS that were classified as inefficient include BPRS Margirizki Bahagia (0.584), Bangun Kesejahteraan Warga (0.877), BPRS Dana Hidayatullah (0.902), Mitra Amal Mulia (0.827), and BPRS Unisia Insan Indonesia (0.972).

Figure 4 shows the average quarterly technical efficiency scores for each BPRS in DIY throughout the study period :

Figure 4. Graph of the Average Efficiency Value of Each Bank Sharia People's Financing in the Province DIY Quarter I, II, III and IV of 2023



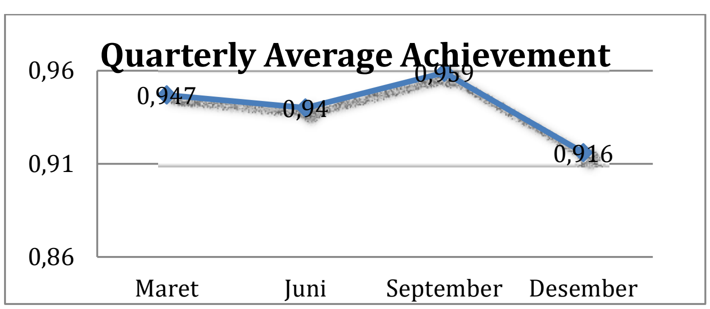
Source : Processed Data

Based on Chart, during March, June, September, and December of 2023, three BPRS consistently achieved an efficiency score of 1 or 100%: BPRS Madina Mandiri Sejahtera, Harta Insan Karimah Mitra Cahaya Indonesia, and Barokah Dana Sejahtera. These three BPRS remained in the efficient category throughout all four quarters of 2023.

Additionally, BPRS Margirizki Bahagia achieved an efficiency score of 1 three times during the year, a feat not matched by other BPRS in 2023. BPRS Bangun Kesejahteraan Warga, Mitra Harmoni Yogyakarta, and Cahaya Hidup reached full efficiency twice, while BPRS Mitra Amal Mulia achieved a perfect score of 1 or 100% only once during the year.

Out of the 10 BPRS sampled in DIY, only BPRS Dana Hidayatullah and BPRS Unisia Insan Indonesia did not achieve an efficiency score of 1 at any point during the research period. Overall, the development of efficiency levels for Sharia Rural Banks in DIY shows fluctuations in performance, as observed in Figure 4 illustrates the average quarterly technical efficiency scores for each BPRS in Central Java during the study period:

Figure 5. Average Efficiency Value Graph All BPRS in DIY Quarter I, II, III and IV of 2023



Source : Processed Data

Throughout 2023, the technical efficiency of the Sharia Rural Banks (BPRS) in the Special Region of Yogyakarta (DIY) experienced fluctuations and did not reach the maximum score of 1 during any of the quarters. The highest efficiency score was recorded in September, with a value of 0.959, while the lowest occurred in December, with a score of 0.916. Overall, the average efficiency of BPRS in DIY throughout 2023 was 0.940, still below the maximum efficiency score of 1 or 100%.

The analysis of efficiency scores reveals that several BPRS in Central Java and DI Yogyakarta (DIY) did not achieve full efficiency throughout 2023. Specific factors contributing to inefficiency among these banks include:

Operational Cost Management

One primary factor in inefficiency was high operational costs relative to output, as seen in BPRS such as Bina Finansia and Dana Hidayatullah. These banks had comparatively high administrative and employee expenses without corresponding gains in output (e.g., profit-sharing financing or operational income). High operational expenses can significantly impact efficiency, especially when the revenue generated from core activities remains stable or increases at a slower rate (Fathurrahman & Rahmadani, 2024).

Inadequate Asset Utilization

Some BPRS, such as BPRS Asad Alif and Bumi Artha Sampang, displayed lower efficiency due to underutilization of fixed assets. Despite possessing substantial fixed assets, these banks struggled to maximize revenue from these resources. Inefficiencies in asset utilization may stem from limited business activities or operational constraints that prevent these banks from fully leveraging their assets for income-generating activities (Salama, 2022).

Fluctuations in Third-Party Funds (DPK)

Third-party funds, which are critical for financing and investment activities, also contributed to inefficiency in certain banks. Banks with inconsistent growth in DPK, such as BPRS Mitra Amal Mulia and Unisia Insan Indonesia, faced difficulties maintaining consistent financing levels, which impacted their operational income and overall efficiency. Fluctuations in DPK can affect a bank's ability to plan long-term investments and increase output sustainably (Rusydiana et al., 2023).

Variable Profit-Sharing Financing Performance

Profit-sharing financing, a key product for Sharia banks, did not consistently perform across all BPRS. In banks like Mitra Harmoni Yogyakarta, inconsistencies in profit-sharing financing impacted their ability to generate steady operational income. This variability in a critical revenue stream reflects potential inefficiencies in financing structures or customer repayment rates, which directly impacts the bank's efficiency score (Hidayah et al., 2020).

External Economic Pressures Post-Pandemic

The post-pandemic economic landscape added unique pressures that may have impacted some banks more than others. The fluctuating economic recovery pace across Central Java and DIY influenced demand for banking services and customer ability to meet repayment obligations. Consequently, BPRS with less resilient customer bases, such as BPRS Bina Finansia, experienced efficiency setbacks compared to banks with more stable income streams (Supriatin et al., 2019).

Overall, these findings suggest that operational expenses, asset utilization, DPK growth, profit-sharing financing performance, and external economic factors each play a critical role in determining efficiency levels among BPRS. Future efforts to enhance operational efficiency could focus on optimizing cost structures, improving asset use, and ensuring consistency in third-party funds and financing income, especially during economic recovery periods.

Conclusion

Based on the results of this research, there is a significant difference in operational efficiency between the Sharia Rural Banks (BPRS) in the Special Region of Yogyakarta (DIY) and Central Java. The average operational efficiency of BPRS in DIY from the first to the fourth quarter of 2023 reached 0.940, which is higher than the average efficiency of 0.881 recorded for BPRS in Central Java. This difference suggests that BPRS in DIY manage their resources and operations more effectively and efficiently compared to those in Central Java. Various factors, such as differences in operational management, market conditions, and competition levels, may contribute to this disparity.

Furthermore, the study reveals that BPRS in DIY consistently improved across various input and output variables, including fixed assets, third-party funds (DPK), profit-sharing financing, and operational income. The significant improvements in profit-sharing financing and operational income indicate that BPRS in DIY are better able to utilize the funds collected, thereby increasing productivity and efficiency. In contrast, BPRS in Central Java showed lower efficiency scores, which could be attributed to higher operational costs or suboptimal utilization of assets and collected funds, hindering their operational performance.

The results indicate that certain factors exert a more significant influence on operational efficiency among Sharia Rural Banks (BPRS) in Central Java and the Special Region of Yogyakarta (DIY). The most influential factors affecting efficiency include profit-sharing financing performance, operational costs, and third-party funds (DPK) growth. The comparison of operational efficiency between BPRS in DIY and Central Java highlights that BPRS in DIY excel in resource management and operational strategies. The higher efficiency in DIY may be linked to factors such as better internal policies, more advanced technology, or more effective risk management practices. This research provides important insights for BPRS management in Central Java to reassess their operational strategies and enhance efficiency to boost future competitiveness. The findings also underscore that improving operational efficiency is a key factor in supporting the sustainability and growth of the Islamic banking sector, particularly in developing regions.

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