Efficiency Analysis Of Islamic Rural Banks (BPRS) In Bengkulu And Lampung Provinces Using The Data Envelopment Analysis Approach

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ABSTRACT
Purpose: This study analyzes the efficiency of Islamic Public Financing Banks (BPRS) in Bengkulu and Lampung Provinces during 2019–2023 by examining two BPRS in Bengkulu and four BPRS in Lampung with the largest assets and operating for more than five years.
Design/methodology: This research employs a quantitative approach using financial reports of BPRS in both provinces. Samples were determined through purposive sampling based on asset size and operational period. Efficiency was measured using the Data Envelopment Analysis (DEA) method, which applies a linear programming system to construct a non-parametric frontier. The input variables were Third-Party Funds (DPK) and Operational Costs, while the output variables consisted of Fixed Assets, Financing, and Operational Income..
Findings: The results indicate that several BPRS experienced inefficiencies. In Bengkulu, BPRS Maslahat Dana Syariah Nusantara was inefficient in 2022 due to high operational costs (+10.03%), low financing (-84.20%), and reduced operational income (-78.36%) caused by the COVID-19 pandemic. In Lampung, inefficiency was found in BPRS Kota Bumi (2019) due to high costs (-12.13%) and suboptimal financing and income; BPRS Metro Madani (2021–2022) due to rising costs (+4.51%) and mismatched financing growth; and BPRS Lampung Timur (2020) due to declining income (-4.91%). Overall, Lampung BPRS demonstrated higher efficiency, with an average score of 0.85 compared to Bengkulu's 0.70, attributed to broader market access and stronger financial performance in urban-based BPRS.
Practical Implication: The study highlights key challenges affecting BPRS efficiency, such as frequent regulatory changes and the economic impact of the COVID-19 pandemic. Strengthening fund allocation, improving cost management, and leveraging government policies on financial inclusion can enhance efficiency and market competitiveness.
Originality/Value: This research provides new insights into the efficiency of BPRS in Bengkulu and Lampung by comparing their performance within a regional context. The findings underscore the strategic role of BPRS in supporting financial inclusion and ensuring compliance with sharia principles, while offering recommendations for improving operational sustainability.
Keywords: Efficiency, Islamic Banking, BPRS, DEA

A. INTRODUCTION

Islamic banking plays a vital role in promoting financial inclusion and economic empowerment by enforcing the halal concept in all transactions(Al-Ghalabi et al., 2024; Oudat et al., 2023). In Indonesia, Islamic banks have experienced significant growth, supported by rising public awareness of sharia-compliant finance(Afkar, 2014; Cahyono et al., 2021). Islamic banking can be interpreted as a bank that operates based on a profit-sharing system that provides benefits for both the community and the bank(Siregar, 2009). Islamic banking offers fairness in transactions, ethical investment and promotes the values of cooperation and brotherhood in

production and encourages global economic growth(Gazi et al., 2024; Nurdiana, 2020). Although Islamic banks operate based on non-riba principles, an in-depth assessment of some of the challenges that can hinder their development is still needed, especially in terms of operational effectiveness and the ability of Islamic banks to adapt to a dynamic business environment

The positive trend shows that the Islamic banking sector has an important role in encouraging national economic growth.(Pambuko et al., 2024; Wahyuni et al., 2023). Nevertheless, despite the steady increase, the market share of Islamic banking remained at only 7.44% as of December 2023, with total assets of IDR 892.17 trillion, compared to 7.09% in 2022. This figure is disproportionately low when contrasted with the Muslim majority of approximately 87% of the populatio. Islamic banking has become one of the main pillars for financial inclusion and economic empowerment, particularly in supporting micro and small entrepreneurs(Arisandy et al., 2025; Asnaini et al., 2023; E. S. Wahyuni et al., 2023)

Efficiency is a key determinant of banking performance, as it reflects the ability to transform inputs into outputs effectively (Qabajeh et al., 2023; Syairozi, M. I. et al., 2017). In the context of Islamic banking, efficiency can be classified into technical, scale, price, and allocative efficiency (Othman et al., 2016; Setyono et al., 2021).

Efficiency in financial institutions emphasises more on the intermediation function, which measures the comparison between the output produced from the input that has been determined.(Syairozi, M. I. et al., 2017). In general, the output in question is revenue, or supporting factors such as the amount of financing, the number of credit accounts and so on, while the input in question is generally the budgeted cost or supporting factors such as third party funds, the amount of cash and so on.(Qabajeh et al., 2023; Saadoon Almshabbak & Chouaibi, 2023).. Efficiency will arise if the input that has been determined produces maximum output, while financial institutions will be considered inefficient if they cannot produce the expected output from the total budgeted input.(Istaiteyeh et al., 2024; Jarbou et al., 2024; Mortadza et al., 2024). Although many studies have examined the efficiency of Islamic commercial banks, relatively fewer have focused on BPRS in Bengkulu and Lampung. This gap is significant, particularly considering that BPRS often operate with limited resources but have a direct impact on community-level financial inclusion.

Therefore, this study aims to measure the efficiency of BPRS in Bengkulu and Lampung for the period 2019–2023 using the Data Envelopment Analysis (DEA) method. Specifically, the research seeks to identify efficient and inefficient BPRS, analyze the variables contributing to inefficiency, and provide recommendations for improving operational performance. The results of this analysis are expected to be a reference for policy makers in formulating strategies to improve BPRS efficiency and competitiveness in the future.

B. LITERATURE REVIEW

A study (Nurdiana, 2020) conducted research on the efficiency of Islamic banking and conventional banking in Indonesia for the 2014-2018 period. Based on the results of the study, it shows that there is a significant difference in efficiency between Islamic banking and conventional banking. During the 2014-2018 period, the average BOPO efficiency obtained by Islamic banking was 97.04%, then conventional banking was 89.82%. Both experienced inefficiency because the value of BOPO exceeded the provisions set by Bank Indonesia of 89%.

Research conducted by (Istaiteyeh et al., 2024) with the title Efficiency Assessment and Performance Determinants: Jordanian Bank Study Using DEA and Tobit Regression, by exploring the efficiency of the Jordanian banking industry from 2006 to 2021, using a two-way approach. Firstly, it assessed the efficiency scores of 15 commercial banks, comprising 13 conventional and 2 Islamic institutions, through data envelopment analysis (DEA). With the results revealing a significant relationship between return on assets, return on equity, GDP growth, and efficiency. In addition, Islamic banks show higher efficiency compared to conventional banks, there is an insignificant relationship with credit risk, bank size, and the ratio of loan loss allowance to net profit. Previous studies also emphasized that efficiency in Islamic financial institutions cannot be separated from consumer behavior and market dynamics (Harpepen, 2022; Kustin Hartini, 2024), as well as the alignment with maqasid shariah principles and legal frameworks (Isnaini, 2023; Jayusman et al., 2022)

Study that reveals the importance of efficiency analysis in the context of managing Islamic financial institutions. According to (Hasan & Dridi, 2011), operational efficiency is one of the key indicators in assessing the performance of Islamic banks. Their research shows that efficient Islamic banks tend to have higher levels of profitability and are able to provide better services to customers. This is in line with the basic principles of Islamic banking which emphasize fairness and transparency in financial transactions

C. METHOD

This study is a quantitative study with a non-parametric approach using the DEA method to measure the level of efficiency of BPRS as a Decision Making Unit (UPK) or DMU (Decision Making Unit)(Othman et al., 2016). The data sources in this study are primary data and secondary data. Primary data is data that comes from the main source of financial reports published by the OJK. While secondary data comes from journals, research reports, books and other scientific sources that are relevant to the research theme. The data period used for 5 years, namely in the range of 2019 - 2023 because in that period it shows the performance of BPRS before the pandemic, during the pandemic and after the Covid-19 pandemic. The population used is the Sharia People's Financing Bank (BPRS) in Bengkulu and Lampung. Meanwhile, the sample of this research is reviewed from the highest assets and operating above 5 years, in Bengkulu including BPRS Maslahat Dana Syariah Nusantara and BPRS Muamalat Harkat. While BPRS in Lampung found 4 (four) BPRS that can be used as sample objects in DEA analysis research, namely: PT BPRS Kota Bumi, PT BPRS Metro Madani, PT BPRS Bandar Lampung, and PT BPRS Lampung Timur, and has assets above 100 billion. The sampling technique uses purposive sampling, based on certain criteria and considerations (Jogiyanto, 2017: 73). Input variables in this study include: Third Party Funds and Operations, while the output variables include: Fixed Assets, Financing, and Operating Income.

DEAP is a mathematical method used to measure the technical efficiency of a unit of economic activity (SEE) and compare it to other SEEs. The software used is DEAP version 2.1(Coelli et al., 2005). The standard for measuring bank efficiency is as follows:

The following is the model of CRS - DEA in measuring efficiency:

$$\text{Min } \theta, \lambda \ \theta$$

Subject to:

$$-q + Q\lambda \geq 0;$$

$$\theta xi - X\lambda \geq 0;$$

$$\lambda \geq 0$$

Description of Equation 3.4.1:

θ = technical efficiency value
λ = weight
-q = output of the i-th DMU
Q = Total output multiplied by weight
X = Total inputs multiplied by weight

Each company in the context of this research is BPRS divided into 3 based on the concept of *return to scale* (RTS) which maximises the balance of *profit* from *marginal revenue* and *marginal cost*. According to Siswanto and Arafat (2004), each company will experience one of the three conditions of *return of scale*, namely *increasing return to scale* (IRS), *constant return to scale* (CRS) and *decreasing return to scale* (DRS)(Coelli et al., 2005). If a company is in IRS condition, it means that the addition of 1% input will add more than 1% output and therefore the company will definitely continue to increase its production capacity compared to companies in CRS or DRS condition. with increasing returns to scale (IRS) for example BPRS increases the number of employees or expands its facilities, they may find that their productivity increases significantly, perhaps even twice as much as the increase in input made. constant returns to scale (CRS). In this condition, a 1% increase in input will produce exactly the same increase in output of 1%. BPRS that runs a stable and proven business model. While decreasing returns to scale (DRS). In this condition, a 1% increase in input will actually produce an increase in output of less than 1%. This can happen when the company experiences problems in managing resources or when the scale of its operations has become too large, causing inefficiencies. A BPRS that has expanded its operations significantly without improving the management systems or technology that supports it may face challenges in terms of coordination and communication between departments. These conditions can be categorised based on the following references:

1. The IRS condition is when $\Sigma\lambda < 1$ from the CCR model and λ is the DEA efficiency score.
2. The CRS condition is when the CCR efficiency value = 1 or $\Sigma\lambda = 1$ for the CCR model.
3. DRS condition when $\Sigma\lambda > 1$ from CCR model.

D. RESULT AND DISCUSSION

Based on the output results using DEAP 2.1, the are derived from input variables consisting of Third Party Funds (DPK) and Operations Costs, while the output variables include Fixed Assets, Financing, and Operating Income. Based on these variable, efficiency score are obtained through the DEA method.

In this study, each Decision Making Unit (DMU) represents the performance of indvidual BPRS financial reports from 2019 to 2023. In Bengkulu Province, the analysis includes BPRS Maslahat Dana Syariah and BPRS Muamalat Harkat, yielding 10 DMUs. Meanwhile, in Lampung Province, the analysis includes BPRS Kota Bumi, BPRS Metro Madani, BPRS Bandar Lampung, and BPRS Lampung Timur, resulting in 20 DMUs. A DMU is considered efficient if it achieves a score of 1 (100%), while scores below 1 indicate inefficiency(Othman et al., 2016).

The efficiency estimation was conducted using Banxia Frontier Analyst software, which allows for the calculation and comparison of inputs and outputs. In this context, DPK serves as an uncontrolled input, while human resources and other operating costs are controlled inputs. The relative efficiency scores of the DMUs in both Bengkulu and Lampung Provinces are presented in Table 1

Table 1. DEA-Based Efficiency Score of BPRS in Bengkulu and Lampung Provinces

Province	DMU	Efficiency Score	Condition
Bengkulu	DMU1	100%	Efficient
	DMU2	100%	Efficient
	DMU3	100%	Efficient
	DMU4	56.1%	Inefficient
	DMU5	100%	Efficient
	DMU6	100%	Efficient
	DMU7	100%	Efficient
	DMU8	100%	Efficient
	DMU9	100%	Efficient
	DMU10	100%	Efficient
Lampung	DMU11	100%	Efficient
	DMU12	100%	Efficient
	DMU13	100%	Efficient
	DMU14	100%	Efficient
	DMU15	100%	Efficient
	DMU16	100%	Efficient
	DMU17	95.3%	Inefficient
	DMU18	100%	Efficient
	DMU19	100%	Efficient
	DMU20	100%	Efficient

Source: Processed data, 2024

The results indicate that nine DMUs were efficient, while one DMU was inefficient. Inefficiency was identified in PT BPRS Maslahat Dana Syariah Nusantara in 2022, although in the three preceding years the bank had consistently maintained full efficiency. Meanwhile, PT BPRS Muamalat Harkat consistently recorded 100% efficiency during the five-year observation period, showing a stable positive trend.

The efficiency scores of efficient DMUs can serve as benchmarks for improving inefficient DMUs. Through DEA, the required percentage adjustments in inputs or outputs are identified to reach the efficiency frontier. These findings provide practical insights for policy improvements in BPRS operations

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Table 2. Efficiency Summary of BPRS in Bengkulu and Lampung Province for the period 2019-2023

Province	Bank	Year	Efficiency Score	Inefficient Variable	Improvement Needed
Bengkulu	BPRS Maslahat Dana Syariah Nusantara	2019	100%	-	-
		2020	100%	-	-
		2021	100%	-	-
		2022	56.1%	Operating Cost	-10.03%

				+84.20%
				+78.36%
	2023	100%	-	-
BPRS Muamalat Harkat	2019-2023	100%	-	-
Lampung	BPRS Metro Madani	2019	100%	-	-
	2020	100%	-	-
	2021	62.1%	Financing	+45.0%
	2022	71.4%	Operating Income	+38.5%
	2023	100%	-	-
BPRS Kota Bumi	2019	87.9%	Operating Costs	-12.13%
			Financing	+4.19%
			Operating Income	+6.24%
	2020-2023	100%	-	-
BPRS Bandar Lampung	2019-2023	100%	-	-
BPRS Lampung Timur	2019	100%	-	-
	2020	95%	Operating Income	+5.2%
	2021-2023	100%	-	-

Source: Processed data, 2024

Based on the table 2, PT Bank Pembiayaan Rakyat Syariah Maslahat Dana Syariah Nusantara is inefficient in 2022 because the Operating Costs are too large and are not supported by operating income and need to be reduced by 10.03% in 2022. Another issue comes from financing in 2022, which is very small, not reaching the desired target of 84.20%. and the issue that becomes inefficient performance in 2022 is from the operating income sector of 78.36%, this is because billing to customers is not optimal due to the covid 19 pandemic, so that economic conditions have also decreased. Besides, PT Bank Pembiayaan Rakyat Syariah Muamalat Harkat always runs efficiently from 2019 to 2023 it is evidenced by the value of DMU 6, DMU 7, DMU 8, DMU 9 and DMU 10 which are consistently at 100%.

In Lampung Province, the DEA covered PT BPRS Kota Bumi, PT BPRS Metro Madani, PT BPRS Bandar Lampung, and PT BPRS Lampung Timur, and has assets above 100 billion from 2019 to 2023, so that there are 20 (twenty) DMUs obtained. The results show that BPRS Bandar Lampung consistently performed efficiently across all years. BPRS Metro Madani was inefficient in 2021 (efficiency score of 62.1%, requiring a 45% increase in financing) and in 2022 (efficiency score of 71.4%, requiring a 38.5% increase in operating income), while in other years it remained efficient. BPRS Kota Bumi experienced inefficiency in 2019, driven by high operating costs (requiring a 12.13% reduction), limited financing (+4.19%), and suboptimal operating income (+6.24%), while in subsequent years efficiency was restored. BPRS Lampung Timur was inefficient in 2020 (95%), primarily due to declining operating income (–4.91%) despite an increase in DPK, indicating that funds should have been better allocated to financing activities to generate revenue.

Overall, these results suggest that while most BPRS in both Bengkulu and Lampung operated efficiently during the observation period, occasional inefficiencies highlight the importance of controlling operational costs, enhancing financing activities, and strengthening income generation. Efficiency improvements should integrate technological innovation and customer-oriented strategies(Arisandi et al., 2023; E. S. Wahyuni et al., 2025), while maintaining ethical and sharia-based considerations (Mardiansyah et al., 2025; Nopiantika et al., 2024).

E. CONCLUSION

Based on the results of the research it was found that on average all BPRS in Bengkulu and Lampung operate efficiently, but for BPRS in Bengkulu PT Maslahat Dana Syariah Nusantara Islamic People's Financing Bank experienced inefficient conditions in 2022 because the Operating Costs were too large and not supported by operating income and needed to be reduced by 10.03% in 2022. Another issue comes from financing in 2022 which is very small not reaching the desired target of 84.20%. and the issue that becomes inefficient performance in 2022 is from the operating income sector of 78.36% this is because the collection to customers is not optimal due to the covid 19 pandemic, so that economic conditions have also decreased.

Meanwhile, BPRS in Lampung, such as PT Kota Bumi Sharia People's Financing Bank, experienced inefficient conditions in 2019 because the Operating Costs were too large and not supported by operating income and needed to be reduced by 12.13% in 2019. For BPRS Metro Madani in 2021, it shows that it is inefficient to experience an increase in Operating Costs of 4.51%, but this is still considered reasonable because it is proportional to the increase in Operating Income from the previous year of 0.25%. the next issue in 2022 is inefficient with an increase in Third Party Funds of 1.38% but the addition of financing increases dramatically to 7.47% which results in the operating income target having to increase by 11.98%. And for BPRS Lampung Timur in 2020 showed inefficiency experiencing a decrease of 4.91% Operating Income even though in the same year the third party funds increased, funds should have been allocated to landing financing so that it could increase revenue.

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