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Analysis of the Effect of Efficiency on Bankruptcy at the Rural Bank in Surabaya

Analisis Pengaruh Efisiensi pada Kebangkrutan pada Bank Perkreditan Rakyat di Surabaya

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Abstract

Unlike commercial banks, rural banks have their own uniqueness that they only provide basic banking services. It is important because, they serve more people with low financial literacy. This condition requires rural banks in a healthy condition to be able to serve the financial transaction needs of the community. This research attempts to see how efficiency relates to the potential for bankruptcy in rural banks. By using the Springate score to see the potential for bankruptcy and the DEA to calculate efficiency, this research concludes that the level of efficiency has no effect on the potential for bankruptcy in rural banks. While other variables in this research, namely total liabilities, total assets, operating costs and operating income have a significant effect on the potential for bankruptcy in rural banks.

Keywords: Bankruptcy, DEA, Efficiency, Rural Banking, Springate.

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Abstrak

Berbeda dengan bank umum, BPR memiliki keunikan tersendiri. Dalam operasionalnya sehari-hari, BPR hanya dapat memberikan layanan perbankan dasar. Namun, justru di situlah pentingnya BPR karena pada kenyataannya, BPR lebih banyak melayani masyarakat dengan tingkat pemahaman keuangan yang rendah. Kondisi tersebut menuntut BPR harus berada dalam kondisi yang sehat agar mampu melayani kebutuhan transaksi keuangan masyarakat. Penelitian ini melihat hubungan efisiensi dengan potensi kebangkrutan pada BPR di Surabaya. Dengan menggunakan metode perhitungan Springate score untuk melihat potensi kebangkrutan dan metode DEA untuk menghitung efisiensi, penelitian ini menyimpulkan tingkat efisiensi tidak berpengaruh terhadap potensi kebangkrutan pada BPR di Surabaya. Sedangkan variabel lain yang ditawarkan dalam penelitian ini, yaitu total liabilitas, total aset, biaya operasional dan pendapatan operasional berpengaruh signifikan terhadap potensi kebangkrutan pada BPR di Surabaya.

***Kata Kunci**: Kebangkrutan, DEA, Efisiensi, BPR, Springate.*

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INTRODUCTION

The Financial Services Authority of the Republic of Indonesia throughout 2023 has frozen businesses and revoked business licenses from several rural banks. The freezing of businesses was a response to conditions that did not allow the rural banks to operate healthily. In general, these rural banks went bankrupt due to inadequate business governance and fraudulent actions carried out by the managers of the rural banks. This institution emphasized that problems regarding poor governance were the main cause of the bankruptcy of these rural banks and were not related to the declining economic conditions due to the pandemic. Freezing and closing of operations by the Financial Services Authority against banks experiencing problems completely to protect the public from deeper losses (Makur & Astutik, 2023; Simanjorang & Nisa, 2023).

Citing data released by the The Financial Services Authority of the Republic of Indonesia (www.ojk.go.id, 2024), the number of rural banks operating in Indonesia continues to decline. The downward trend line is shown in the graph regarding the number of rural banks operating in Indonesia (Figure 1). The number of rural banks is expected to continue to decline in the future. This condition is in contrast to the efforts of the Financial Services Authority which actually wants rural banks to develop further. Several regulations issued by the Financial Services Authority basically provide sufficient space for rural banks to develop. Inclusiveness of financial institution services for the community as a whole is one of the reasons why the Financial Services Authority wants rural banks to continue to develop.

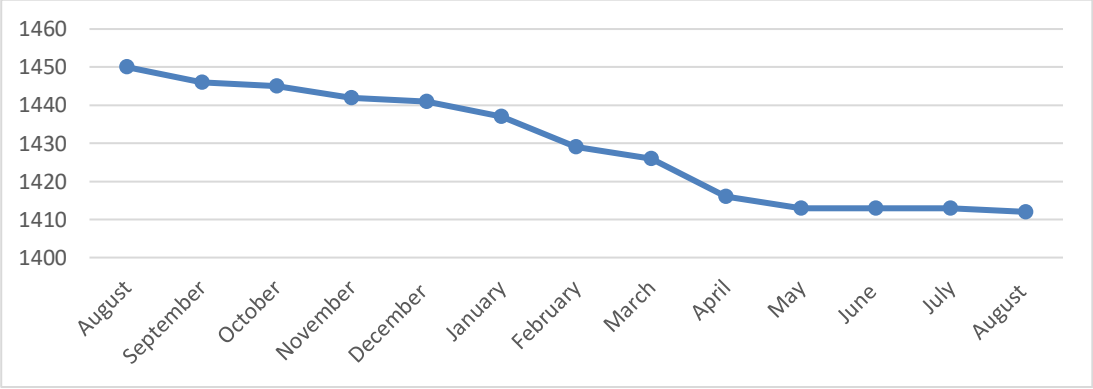


Figure 1. Number of Rural Banks from August 2022 to August 2023
Source: The Financial Services Authority of the Republic of Indonesia (processed), 2024.

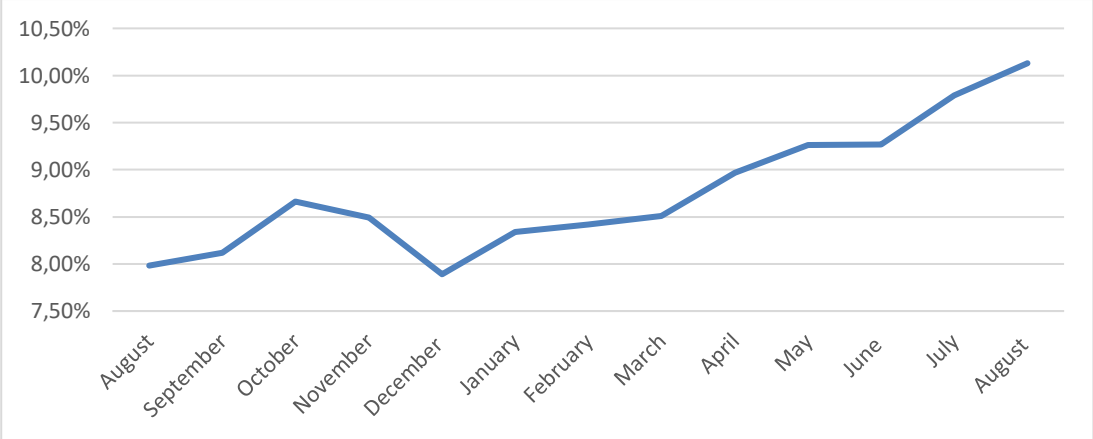


Figure 2. Non Performing Loan Ratio at Rural Banks August 2022 to August 2023
Source: The Financial Services Authority of the Republic of Indonesia (processed), 2024.

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The increase in the NPL ratio in rural banks (Figure 2) indirectly illustrates the inability of rural banks to operate normally and healthily. Furthermore, the increase in the NPL ratio in rural banks will result in banks not operating at an efficient level. This is because banks must spend more to lower the NPL ratio back to the limit permitted by the regulator. The increase in the NPL ratio can also be interpreted as meaning that banks will lose potential profits in the future due to defaults from credit customers (Kasmir, 2018; Warjiyo & Juhro, 2019). Bad credit which then leads to defaults is one of the causes of bankruptcy of rural banks and causes the closure of these rural banks (Saputra *et al*., 2019).

Kristiyanto (2022) reveals the importance of understanding efficiency in the banking business. Efficiency is one of the main determining factors in the banking business to survive, especially in difficult and unpredictable conditions. Several banks with small business scales choose to merge or acquire to pursue being able to operate on an efficient business scale (Santoso, 2010). However, the measurement of banking efficiency must take into account the size of the bank. In measuring efficiency using a non-parametric statistical approach, attention must be paid to the selection of bank groups to be tested. This is to avoid bias in the measurement results (Fathony, 2013). Efficiency is one of the keys for rural banks to continue to operate healthily. By operating efficiently, banks will have the opportunity to lower their credit interest rates, so that banks can be more competitive. Zhang (2023) revealed that efficient bank management and operations will affect many aspects. In addition to banks being more competitive, with efficient operations it will be easy for banks to expand their business scope.

Furthermore, Zhang (2023) trying to connect bankruptcy and efficiency. By using bankruptcy measurements developed by Altman, and then measuring efficiency using the SFA method, it was found that efficiency is one of the factors that can influence the potential for bankruptcy in banking. Řepková (2015) using the DEA approach to measure the level of efficiency and then relate it to banking performance and macroeconomic variables. The research concluded that company capitalization, liquidity risk and portfolio risk have a positive impact on banking efficiency, while ROA, interest rates and GDP have a negative impact on banking efficiency.

Fathony (2013) revealed that the scale of business will greatly affect banking efficiency. The larger the scale of business owned by the bank, the higher the level of efficiency. Thus, banks that have a larger business scale are more profitable compared to banks with a smaller business scale. This is reinforced by Kristiyanto (2022) which reveals that banks included in the BUKU 4 category tend to operate at a higher level of efficiency compared to banks outside the category. By using risk-based efficiency measurements, Prasetyia & Diendtara (2011) revealed that banks with stronger risk mitigation will tend to have better efficiency levels when compared to banks that do not carry out more in-depth risk mitigation. Misra (2024) also revealed that bank efficiency is not something that should be the main concern in the banking business, and further came to the conclusion that efficiency is not a factor that can determine bank profitability and thus, banks do not need to focus on efficiency. However, Dwiarti *et al*. (2021) actually reveals the opposite, in which companies that are able to maintain efficiency levels over a certain period of time will end up with better profitability levels.

A bank can be defined as a business entity whose main activity is collecting funds from the community and then distributing the funds that have been collected in the form of credit or loans (Kasmir, 2018; Siamat, 2005). According to the definition that has been presented, basically the banking business is a business that is based on public trust. Banking must be able to convince people who have excess funding to be willing to save with certain rewards. On the other hand, banking must

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also be able to manage the funds that have been collected by channeling them into credit or other funding schemes. The intermediation function as stated in the definition of a bank indicates that banking must be in a healthy state and able to operate well (Kristiyanto & Widodo, 2020; Ummah *et al*., 2021). If banking is not in the best condition, then the worst impact that will occur next is that the economy will not run as it should (Astiyah & Husman, 2007). In order to operate well, banks must be able to show good performance. One of the parameters used to measure whether the bank is healthy or not is by measuring whether the bank is in a state of bankruptcy or not (Putri *et al*., 2022).

Research on bankruptcy in banking generally focuses on large-scale banks while small and medium-scale banks receive less attention. Several previous studies have always focused on large-scale banks and operating in all countries. This research tries to focus on small-scale banks but have an impact on society. The main question of this research is whether the level of efficiency in rural credit banks is able to influence bankruptcy in rural credit banks. In addition, this research wants to see other factors that are theoretically able to influence the potential for bankruptcy. The variables in question are total liabilities, total assets, operating costs and operating income. This research also looks at the potential for bankruptcy of rural banks and the level of efficiency of rural banks. The selection of rural banks as the main subject of discussion in this research is because rural banks are designed to be able to serve people who cannot yet be served by commercial banks.

LITERATURE REVIEW

Bankruptcy is a condition when a company experiences insufficient funds to run its business. According to Bankruptcy Law No. 4 of 1998, a debtor who has two or more creditors and does not pay at least one debt that is due and collectible, is declared bankrupt by a court decision, either at his own request, or at the request of one or more of his creditors. Bankruptcy analysis is done to obtain early signs of bankruptcy. The earlier the signs of bankruptcy in a company are seen, the better it is for management because management can make improvements. Creditors and shareholders can prepare to overcome various bad possibilities.

Meanwhile, to measure bankruptcy itself, there are several methods that can be used, namely the Altman Z Score and Springate Score (Putri *et al*., 2022; Putri, 2019; Ullah *et al*., 2021). Although there are still several other bankruptcy prediction measures, these two measures are the ones most frequently used in several studies (Saputra *et al*., 2019).

Mardiasmo (2009) argues that efficiency is the achievement of optimal output using certain inputs, or conversely, by using the lowest level of input to achieve the most desired level of output. Efficiency is a comparison between output and input with predetermined performance standards or targets. The definition of efficiency itself is closely related to productivity. A simple measurement of efficiency can be done by using a comparison between the output produced in a production process to the input used. The operational activity process can be said to be efficient if a particular product or job can be achieved using the most minimal resources. The efficiency will be able to influence banking profitability (Misra, 2024). With a higher efficiency value, the bank has the possibility of obtaining higher profitability.

In addition to using efficiency, several other variables are considered capable of influencing profitability. These variables are related to a bank's financial ratio, which can then also affect bankruptcy in financial institutions, especially in Indonesia. Several variables that can affect are total assets, sales, debt, debt to equity ratio, net profit margin, and profitability (Dwiarti *et al*., 2021). Devi & Firmansyah (2018) revealed that the potential for bankruptcy is not only influenced by efficiency,

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but also by several other economic variables such as macroeconomic variables (i.e.: BI rate, and rupiah exchange rate), and banking financial ratios (i.e.: liquidity, NPF ratio, and company size). This confirms that the potential and risk of bankruptcy can be influenced by both macroeconomic variables and internal variables of the company.

The hypothesis used in this research are as follows: the level of efficiency has a positive and significant effect on the risk of bankruptcy; total liabilities have a negative and significant effect on the risk of bankruptcy; total assets have a positive and significant effect on the risk of bankruptcy; operating costs have a negative and significant effect on the risk of bankruptcy; and, operating income has a positive and significant effect on the risk of bankruptcy.

METHOD

This research uses a parametric and non parametric quantitative approach with secondary data referring to data issued by the Financial Services Authority of the Republic of Indonesia. Data was downloaded from the Financial Services Authority website (www.ojk.go.id). The data used is panel data which is a combination of time series data and cross-section data. The time span of this research was taken from 2015 to 2023. Based on data issued by the institution, there are 16 rural banks that have permits and operate in the city of Surabaya, but only 14 rural banks are able to provide complete financial information for further analysis. Therefore, this research uses research samples from 14 banks that are able to provide complete financial information.

Basically, this research tries to reveal whether the level of efficiency, total liabilities, total assets, operating costs and operating income will affect the level of bankruptcy or not. To be able to answer this, the basic modeling used in this research is as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 LnX_{2it} + \beta_3 LnX_{3it} + \beta_4 LnX_{4it} + \beta_5 LnX_{5it} + \varepsilon_{it} \quad \text{.....} \quad (1)$$

Based on equation (1), it can be explained that this research uses a dependent variable in the form of bankruptcy value which is measured using the Springate method. The independent variables used are efficiency values measured using DEA (X_1), total liabilities (X_2), total assets (X_3), operational costs (X_4) and operational income (X_5). The use of natural logarithms on the variables total liabilities, total assets, operating costs and operating income is for data smoothing (Verbeek, 2017).

The regression approach with panel data will have three possible data processing models, namely the Common Effect Model (CEM), Fixed Effect Model (FEM) and Random Effect Model (REM) (Verbeek, 2017). Several tests are needed to determine the most appropriate approach. Some of these tests are Chow test, Hausman Test and LM Test. The panel data approach does not require classical assumption testing as is the case with time series or cross-section data.

Determination of significance, both partial and simultaneous significance, can be seen by comparing the probability value with the value of the degree of error used. If the probability value is less than the value of the degree of error used, then the variable is declared to have a statistically significant effect (Verbeek, 2017). In this research, the error rate used is 0.05. If the p-value is lower than 0.05, then the variable is declared statistically significant.

The calculation of bankruptcy potential in this research refers to the modeling developed by Springate. This method is used because this method is a refinement of the method developed by Altman (Saputra *et al*., 2019; Masduki *et al*., 2019). Thus, the expected results will be better and closer to reality. The following is the formula used in calculating the S-score:

$$S\text{-}Score = 1.03X_1 + 3.07X_2 + 0.66X_3 + 0.4X_4 \quad \text{.....} \quad (2)$$

P-ISSN 2089-1989
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Based on equation (2), it can be explained that the calculation of the S-score value has the following components: X_1 is the value of working capital / total assets; X_2 is the value of net profit before tax and interest / total assets; X_3 is the value of profit before tax / total assets; and, X_4 is the value of sales / total assets. The test result criteria for the S-score are as follows: If the S-score is less than 0.862, the company is indicated to be bankrupt; and, if the S-score is more than 0.862, the company is in a healthy condition (Devi & Firmansyah, 2018; Saputra *et al*., 2019).

The calculation of efficiency in this research follows the DEA rules and approaches. There are two approaches in calculating efficiency using DEA, that is CCR and BCC models (Marjanović *et al*., 2018; Wasil *et al*., 2021). This study uses the CCR approach with the assumption that the comparison between input and output will not affect the level of productivity that has been achieved under constant conditions (Misra & Sahoo, 2024; Zhang, 2023). The input variables in this study are third party funds, total assets and administrative and general costs. The output variable in this study is operating income.

Efficiency measurement is basically comparing the inputs that have been used in the production process, so the basic modeling for DEA is as follows (Marjanović *et al*., 2018; Řepková, 2015; Wasil *et al*., 2021):

$$Efficiency = \frac{Output}{Input} \quad \text{.....} \quad (3)$$

Furthermore, the mathematical modeling for the model used in this research is as follows:

$$Efficiency = \frac{u_1 y_{1k} + u_2 y_{2k} + \cdots}{v_1 x_{1k} + v_2 x_{2k} + \ldots} \quad \text{.....} \quad (4)$$

However, this measurement still has limitations in the form of the difficulty of determining a balanced weight for all inputs and outputs. This limitation is bridged by the DEA approach, which allows the calculation of efficiency not only to be measured from the ratio of output and input, but also to include weighting factors measured from each output and input used. DEA assumes that each DMU will choose a weight that will maximize its efficiency ratio (maximize total weighted output / total weighted input) (Prasetyia & Diendtara, 2011; Santoso, 2010). Since each DMU uses a different combination of inputs and will produce different outputs, each DMU will choose a set of weights that reflect this diversity. In general, a DMU will assign high weights to inputs that are used infrequently and to outputs that can be produced in large quantities. Mathematically, efficiency in DEA is the solution of the following equation (Coelli et al., 2005):

$$Maximum\ Zk = \frac{\sum_{r=1}^{s} u_{rk} y_{rk}}{\sum_{i=1}^{m} v_{ik} x_{ik}} \quad \text{.....} \quad (5)$$

In DEA, nothing has an efficiency greater than one hundred percent or exactly 1, so the modification of equation (5) will be:

$$= \frac{\sum_{r=1}^{s} u_{rk} y_{rk}}{\sum_{i=1}^{m} v_{ik} x_{ik}} \leq 1 \quad \text{.....} \quad (6)$$

where:

$u_{rk} \geq 0 \,; r = 1,2, \ldots, s$

$v_{ik} \geq 0 \,; i = 1, 2, \ldots, m$

Solving the mathematical programming problem above will produce the maximum ZK value as well as the weight value (u and v) which leads to efficiency. If the calculation results show a Zk value

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Terakreditasi (SK No. 225/E/KPT/2022)

= 1, then the kth unit is said to be efficient relative to the other units. Conversely, if the Zk value is smaller than 1, then there are other units that are more efficient than the kth unit (Coelli *et al*., 2005).

If observed further, equation 6 is a fractional equation. To make the calculation easier, we can linearize the equation from equation (6). This step produces a new equation, as follows:

$$Maximum\ Zk = \sum_{r=1}^{s} u_{rk} y_{rk} \quad \text{.....} \quad (7)$$

The limitations faced:

$$\sum_{r=1}^{s} u_{rk} y_{rk} - \sum_{i=1}^{m} v_{ik} x_{ik} \leq 1 \; ; k = 1,2,3, \ldots, n \quad \text{.....} \quad (8)$$

$$\sum_{i=1}^{m} v_{ik} x_{ik} = 1 \quad \text{.....} \quad (9)$$

$u_{rk} \geq 0$; r = 1, 2, 3, ..., s ..... (10)

$v_{ik} \geq 0$; i = 1, 2, 3, ..., m ..... (11)

The number of outputs Y_{rk} produced by each DMU, and the number of inputs X_{ik} used, form the foundation of this evaluation. The variables *s* and *m* respectively represent the total amount of outputs produced and the number of inputs used by these DMUs. The efficiency is further refined by the weighted weights of both outputs and inputs: urk for the outputs and vik or the inputs. Finally, the optimal value Z_k serves as a critical indicator, revealing the relative efficiency of each DMU. This structured approach allows organizations to pinpoint areas of strength and opportunities for improvement, striving for optimal performance in their operations (Coelli *et al*., 2005).

RESULTS

The discussion of this research will begin with the results of the calculation of the S-score value obtained by each BPR. The results of the calculation of potential bankruptcy using the S-Score summarized in Table 1 show that the majority of BPRs in Surabaya are not under pressure of bankruptcy. There are several BPRs that were previously in a position of potential bankruptcy as indicated by an S-score value of less than 0.862, but this condition can be improved by bank management so that in the following year they were able to record an increase in the S-score value indicating that BPRs have begun to move away from bankruptcy. Several BPRs show quite fluctuating results, where a negative S-score indicates that the bank is in a deep state of bankruptcy (Masduki *et al*., 2019; Prasetyia & Diendtara, 2011). Although this can be improved in subsequent periods, this condition further strengthens the statement at the beginning of this article that BPRs are very vulnerable to bankruptcy.

In contrast to what the results of research by Fathony (2013) and Kristiyanto (2022) reveal that banks with a larger business scale tend to operate more efficiently, the results obtained in this study actually show that banks with a smaller business scale can show a more consistent level of efficiency. Furthermore, Table 2 explains that BPR East Java, the largest rural bank in Surabaya judging from the total assets owned, actually does not show efficient performance when compared to BPR Prima Kredit Utama and BPR Sili Corp Bank which are more consistent in showing efficient performance. Both banks are able to operate on an efficient scale for six years, even BPR Prima Kredit Utama is able to operate on an efficient scale for six consecutive years. Some of the rural banks in this study were seen to never operate in efficient conditions during the observation period. BPR East Java, BPR Danamas, BPR Guna Yatra, BPR Bina Kharisma Insani, and BPR Surya Arthautama are some of the rural banks that during the observation period of this study could not show efficient performance.

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Terakreditasi (SK No. 225/E/KPT/2022)

Tabel 1. The Results of S-Score Calculation

No	DMU	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	BPR Jatim	0.881	0.941	0.921	0.954	0.913	0.894	0.890	1.259	0.885
2	BPR Danamitra Surya	1.027	0.812	0.853	2.198	3.360	3.344	2.928	4.371	5.660
3	BPR Prima Kredit Utama	1.655	1.573	1.547	1.417	1.332	1.314	1.295	1.118	0.892
4	BPR Danamas	0.743	0.748	0.721	0.868	1.237	1.108	1.224	1.106	1.100
5	BPR Guna Yatra	1.529	1.255	1.188	5.486	4.483	3.635	3.053	2.043	1.779
6	BPR Kosanda	0.978	1.001	0.988	1.015	1.015	1.047	0.999	-3.701	7.998
7	BPR Bintang Mitra	1.887	1.457	1.382	1.402	1.476	1.215	1.159	0.987	1.103
8	BPR Central Niaga	0.839	0.861	0.826	0.823	0.839	0.781	0.702	0.807	0.754
9	BPR Bina Kharisma Insani	0.843	0.841	0.861	0.758	0.813	0.866	0.714	0.367	1.671
10	BPR Surya Arthaguna Abadi	1.105	1.169	1.159	1.628	0.914	0.424	0.453	0.668	0.943
11	BPR Sili Corp Bank	1.915	2.808	0.750	0.396	3.371	3.334	2.871	2.510	2.337
12	BPR Karya perdana Sejahtera	0.864	1.138	1.181	1.099	0.945	0.950	0.897	0.821	0.794
13	BPR Permata Artha Surya	2.047	1.319	-18.683	-20.850	1.747	8.155	9.224	10.438	11.163
14	BPR Surya Arthautama	0.900	0.873	0.943	0.863	0.846	0.840	0.742	1.071	1.035

Source: Secondary data (processed), 2024.

Tabel 2. The Results of DEA Calculation

No	DMU	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	BPR Jatim	0.721	0.705	0.731	0.811	0.784	0.679	0.886	0.247	0.973
2	BPR Danamitra Surya	0.551	0.575	0.699	0.831	0.837	0.740	1.000	0.706	0.890
3	BPR Prima Kredit Utama	0.845	1.000	1.000	1.000	1.000	1.000	1.000	0.297	0.980
4	BPR Danamas	0.524	0.573	0.520	0.656	0.553	0.820	0.784	0.227	0.967
5	BPR Guna Yatra	0.563	0.242	0.340	0.816	0.791	0.730	0.848	0.284	0.998
6	BPR Kosanda	0.822	0.752	0.820	0.888	1.000	1.000	1.000	1.000	1.000
7	BPR Bintang Mitra	1.000	0.760	0.967	1.000	1.000	1.000	1.000	0.641	0.989
8	BPR Central Niaga	0.895	0.868	0.846	0.863	0.911	0.729	1.000	0.358	1.000
9	BPR Bina Kharisma Insani	0.734	0.780	0.717	0.748	0.672	0.913	0.706	0.117	0.926
10	BPR Surya Arthaguna Abadi	0.631	0.762	1.000	1.000	1.000	1.000	0.202	0.161	0.953
11	BPR Sili Corp Bank	1.000	1.000	1.000	1.000	0.848	1.000	1.000	0.312	0.985
12	BPR Karya perdana Sejahtera	0.913	1.000	1.000	0.991	0.815	0.775	0.960	0.300	0.973
13	BPR Permata Artha Surya	1.000	0.983	0.569	1.000	0.739	1.000	0.491	1.000	0.913
14	BPR Surya Arthautama	0.746	0.725	0.776	0.812	0.891	0.911	0.901	0.281	0.989

Source: Secondary data (processed), 2024.

The data used in this study is panel data, so the next step is to choose the most appropriate approach for this study (Verbeek, 2017). In this research step, Chow test, Hausman test and LM test are needed.

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Terakreditasi (SK No. 225/E/KPT/2022)

Tabel 3. The Results of Chow Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.625595	(13,107)	0.0033
Cross-section Chi-square	34.885870	13	0.0009

Source: Secondary data (processed), 2024.

Tabel 4. The Results of Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	28.362003	5	0.0000

Source: Secondary data (processed), 2024.

Tabel 5. The Results of Panel Data Regression

Variable	CEM		FEM		REM	
	Coefficient	t-statistic	Coefficient	t-Statistic	Coefficient	t-statistic
Constant	9.029835	2.592160*	32.10665	4.278941*	9.029835	2.811157*
DEA Score	0.904878	0.685244	0.974863	0.743825	0.904878	0.743136
Total liabilities	0.425761	1.148152	1.651249	3.325024*	0.425761	1.245153
Total assets	-0.047084	-0.065263	-2.135856	-2.43207*	-0.047084	-0.070777
Operational Cost	-2.120377	-3.39713*	-4.304748	-5.70644*	-2.120377	-3.68443*
Operating Income	1.153658	1.801815	2.842392	3.56406*	1.153658	1.954040
Adjusted R^2	0.107635		0.241254		0.107635	
F Statistic	4.015435		3.208090		4.015435	
Prob (F-Stat)	0.002101		0.000091		0.002101	

*: significant at $\alpha = 0.05$
Source: Secondary data (processed), 2024.

Referring to the results displayed in Table 3, it can be concluded that between the CEM and the FEM, the FEM is better. This is indicated by the probability value which is less than the α value, which is 5 percent (Verbeek, 2017). Thus, the test is continued with the Hausman test to see whether the FEM or the REM is better to use in this research (Table 4). By seeing that the probability value is less than the α value of 5 percent, it can be concluded that the FEM is better when compared to the REM (Verbeek, 2017). Thus, from the two tests conducted, Chow test and Hausman Test, both refer to the same model, that is FEM. The LM test does not need to be carried out because whatever the results of the LM test will not affect the final decision.

Table 5 stated that of the five independent variables offered in this study, only one variable is insignificant, namely the efficiency value. Thus, in this research the efficiency value does not affect the potential for bankruptcy in rural credit banks in Surabaya. The other four independent variables are statistically significant so that they are stated to have an effect on the dependent variable.

Table 5 also explains some important points. First, total liabilities have a positive and significant effect on the S-score value (B = 1.651), which means that higher total liabilities will distance rural banks from potential bankruptcy. Second, total assets have a negative and significant effect on the S-score value (B = -2.43), which means that an increase in total assets will actually bring rural banks closer to bankruptcy. Third, operating costs have a positive and significant effect on the S-score value (B = 4.30), which means that an increase in operating costs will put pressure on rural banks and will bring them into a deeper potential bankruptcy. Fourth, operating income has a positive and significant

P-ISSN 2089-1989
E-ISSN 2614-1523
Terakreditasi (SK No. 225/E/KPT/2022)

effect on the S-score value (B = 2.84), which means that the higher the operating income, the further away from potential bankruptcy. The probability value of F-statistics which is below the α value (= 0.05), it can be concluded that the variables of efficiency value, total liabilities, total assets, operational costs and operational income together are able to influence the potential value of bankruptcy in rural banks. The determination coefficient found in this study was 24.12 percent, which indicates that the variation in the S-score value can be explained by the independent variables offered (Verbeek, 2017).

Discusssion

In general, the results of this research are able to reveal different results from previous studies. First, this research rejects previous studies that revealed that bank scale will affect the level of efficiency in banks. In this research, it was revealed that rural credit banks with a larger business scale could not show better efficiency performance when compared to rural credit banks with a smaller business scale. Furthermore, rural banks with a smaller scale in this research were actually able to show better efficiency performance.

Second, this research refutes the previously held assumption that efficiency will affect the bankruptcy rate of banks. If rural banks want to avoid bankruptcy, then the bank must operate efficiently. However, this research revealed that the level of efficiency does not affect the potential for bankruptcy in rural banks operating in Surabaya. However, it does not mean that banks can operate as is and forget how to operate efficiently. However, operating at an efficient level will be better than operating at an inefficient level.

Commercial banks and rural banks have very different complexities and services (Kasmir, 2018; Siamat, 2005). In terms of the customers they face, rural banks tend to face customers with lower levels of financial literacy compared to commercial banks. Rural banks, in accordance with the provisions issued by the government and the central bank, can only rely on retail customers when compared to commercial banks that can handle corporate customers with a wider range of services (Warjiyo & Juhro, 2019). These two basic things then make the results different in this research when compared to the two previous studies.

Several previous studies have revealed that company size will have an impact on more efficient operational levels (Devi & Firmansyah, 2018; Kristiyanto, 2022), but this does not happen in BPR in Surabaya. The results of this study indicate that company size does not guarantee more efficient operations. BPRs with larger company sizes actually showed inefficient performance in this study. Efficiency in this research has no impact on bankruptcy potential and this result is different from the results (Dwiarti *et al*., 2021). Research conducted by Dwiarti *et al*. (2021) shows that efficiency has an effect on the risk of bankruptcy in banking. However, the results of this study are the same as the results of the previous researches which states that efficiency does not necessarily have a significant impact on the potential or risk of bankruptcy (Ullah *et al*., 2021; Zhang, 2023).

Although efficiency cannot influence the potential for bankruptcy, by operating efficiently, there are at least several benefits that rural credit banks can take. Previous studies reveal several things that can be obtained by the company when the company is able to operate efficiently (Coelli *et al*., 2005; Zhang, 2023). Some of these things are: the company is able to reduce operational costs which ultimately lead to an increase in the company's profits, increased productivity in each production factor owned by the company, by operating efficiently the company is able to reduce operational costs, and can compete by offering better products than its competitors.

P-ISSN 2089-1989
E-ISSN 2614-1523
Terakreditasi (SK No. 225/E/KPT/2022)

Thus, the health and ability of banks to operate normally are very much needed in the economy in general (Simanjorang & Nisa, 2023). This is because banks are one of the superstructures in a country's economy. It is called a superstructure because without a healthy bank that is able to operate well, it is impossible for economic development to be carried out properly, and this also applies to rural banks (Kasmir, 2018; Kristiyanto & Widodo, 2020).

CONCLUSION

This research concluded that the bankruptcy pressure on rural banks in Surabaya during the observation period varied greatly. In some banks, bankruptcy has been indicated by a negative S-score value. The same conclusion also applies to the problem of efficiency in rural banks in Surabaya. The level of efficiency of rural banks in Surabaya during the observation period had different levels of efficiency. Some banks were able to show a level of efficiency, but some banks were unable to show a level of efficiency.

Of the five independent variables offered in this study, four independent variables are able to significantly influence the dependent variable. The four independent variables that are considered able to influence the value of potential bankruptcy in BPR in Surabaya are total liabilities, total assets, operating costs and operating income. On the other hand, efficiency is proven not to affect the potential for bankruptcy in BPR in Surabaya.

The results of this study that are not in line with previous studies open up space for further research in the same field. This study uses a measure of efficiency with the DEA approach which is a measure of relative efficiency in one group. In addition, research on bankruptcy is generally focused on large banks so that research on small-scale banks will experience difficulties in terms of data and comparison. For further research, it is recommended to use other approaches such as the Stochastic Frontier Approach (SFA). The use of other approaches will allow for different research results and enrich academic insight.

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