Indonesian Banking Efficiency Before And During The Covid-19 Pandemic

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Abstract. The objective of this study is to evaluate the efficiency of Indonesian banking performance, an assessment that was rendered necessary by the sector's extensive COVID-19 pandemic impact. This study use the nonparametric technique of Data Envelopment Analysis (DEA) to determine the level of efficiency. On the basis of a constant return to scale (CRS) and a variable return to scale (VRS) with input and output orientations, efficiency can be determined. This study aims to determine the efficiency of Indonesian banks depending on their ownership before and after the Covid-19 outbreak. This analysis indicates that in 2020, the Indonesian banking industry, including state banks, regional banks, private banks, and international banks, will be inefficient. Comparatively, only regional banks have been unable to achieve efficiency in 2021, whilst all other banking categories have already achieved efficiency.

Keywords: Efficiency, Banking, Covid-19, Output Orientation

1 Introduction

Due to the Covid-19 epidemic, the banking sector confronts considerable hurdles, which might have a detrimental influence on the banking sector and the economy [1]. The current Covid-19 pandemic has shook the health industry as well as other sectors, like as the economic and banking sectors, resulting in increased economic costs. During the Covid-19 pandemic, the government made various efforts to keep all sectors operating, including a national economic stimulus policy implemented by the financial advisory authority. This policy aims to manage the stability of the financial and banking system in Indonesia, which is expected to restore the Indonesian economy and improve the financial performance of the banking sector in Indonesia [2].

Banking efficiency is extremely important, particularly in the midst of the Covid-19 pandemic, because the efficiency of banking performance is one measure of the health and effectiveness of banking operations. It refers to how banks must be able to maximize output while utilizing existing inputs, with efficiency resulting from differences between the observed and optimal quantities of inputs and outputs [3].

In addition, numerous stakeholders, including regulators, bank management, shareholders, and consumers or bank customers, have a vested interest in gauging the efficiency of the banking sector. It is critical for the regulator to assess the effectiveness of the banking sector in order to calculate the possibility of default because banks are a source of funding for the economy and affect economic productivity. Similarly, stockholders are concerned about the profitability of banks. In addition, clients will consider the quality of services provided and the costs of items sold by banks. Therefore, bank management must assess and produce efficiency in order to devise survival strategies in a competitive climate [4].

Several methods, including parametric and nonparametric comparisons, can be used to determine the efficiency of a bank by comparing the parameters of bank performance indicators with financial indicators [5]. The parametric method includes the Distribution-Free (DFA) method, the Thick Frontier (TFA) method, and the Stochastic Frontier (SFA) method. In comparison, the nonparametric technique is Data Envelopment Analysis (DEA) [6]. The measurement of bank efficiency can employ either a parametric or nonparametric technique, depending on the objectives of the analysis, because the two analytical approaches have the capacity to incorporate distinct inputs and outputs [7]. In addition, the variation of variables is not an issue, as the nonparametric method is more independent than other methods and can encompass a variety of variables [8], [9]. Efficiency in this study is measured using the Data Envelopment Analysis (DEA) approach. This method has numerous benefits, thus it does not necessitate the technical and uneconomical assumption of the production function framework and efficiency characteristics. The efficiency numbers may be utilized relative to one another or in a variety of frameworks [10]–[12].

The performance of the banking sector and other financial institutions is receiving more attention from researchers, especially when it comes to examining the effectiveness of financial performance in the banking sector [13]. Several prior researchers, such as Sufian (2011) in South Korea, Roy (2014) in India, Zenebe Lema (2017) in Ethiopia, Eyceyurt Batir et al. (2017) in Turkey, and Henriques et al. (2017) in Brazil, and who have examined this phenomenon Puteh et al. (2018) published in Indonesia, and Neves et al. (2020) published in Europe. In addition, Andrieş and Ursu (2016) who studied bank efficiency during and after the crisis, discovered that the crisis had a beneficial and significant effect on the inefficiency of European commercial banks.

Anagnostopoulos et al. (2020) discovered that conventional banks in the Middle East and North Africa were more efficient in the post-crisis period than Islamic banks. In the meantime, Rahmi and Putri (2019) found that the efficiency level of Islamic banking in Indonesia grew on average from 2007 to 2009, indicating that Islamic banking performance increased throughout the global financial crisis.

2 Literature Reveiw

Efficiency is the concept of attaining results with optimal use of resources, or a comparison between output and input [17], [22]. In financial efficiency studies, efficiency represents the difference between the actual output and the greatest production feasible for a given input level [23]. According to Farrell (1957)) (in 9), the concept of banking efficiency is comprised of both allocative and technical efficiency. Allocative efficiency describes a company's capacity to determine the appropriate input for achieving the desired result. Moreover, technical efficiency explains the company's performance in maximizing output from its inputs.

Theoretically, there are multiple ways to evaluate the efficiency of a bank: the profit approach, the intermediation method, and the production approach. The profit approach describes the bank's status as a profit-generating entity. The intermediation method characterizes the bank's role as an intermediate between the surplus and deficit parties. In addition, the production approach describes the bank's position as a business unit that generates financial services as output [23].

Data Envelopment Analysis (DEA) has been one of the methods most frequently used to evaluate a company's effectiveness [22]. An application of a linear program known as Data Envelopment Analysis (DEA) is used to assess the efficiency or performance of an entire unit. In other words, it is a technique that assists in identifying the company's performance along multiple dimensions in order to achieve the required production limit [23]. Since 1978, when Charnes first introduced Cooper and Rhodes [24], DEA has been used as a robust quantitative and analytical performance evaluation to measure firm efficiency in nearly every industry in the globe. Utilizing DEA, information on each unit of economic activity (UKE) is available, allowing for the identification of enterprises with best practices, which then serve as a baseline for other inefficient businesses [13], [18].

The two models used by DEA are constant return to scale (CRS) and variable return to scale (VRS). [9]. According to the CRS's assumption, if inputs grow, output will similarly increase. The VRS assumption, meanwhile, asserts that an additional input will not result in a rise in output, but it can be tiny or considerable [16]. The ratio of efficiency rating is between 0 and 1. A bank is deemed efficient if its ratio results in a number of 1 or 100 percent; conversely, a value of 0 indicates that the bank's efficiency is decreasing. Therefore, with the DEA measurement, each bank can establish the weight of their respective numbers and apply the predetermined weighting to provide the most accurate performance measure [9].

3 Research Methodology

The purpose of this study is to classify bank ownership in Indonesia into Government Banks, Regional Banks, Private Banks, and Foreign Banks utilizing data from the Financial Services Authority (OJK) to compare the efficiency conditions of the research object.

Quantitative secondary data obtained from the 2018-2021 Financial Services Authority (OJK) publication reports, literature studies, and other periodicals pertinent to the research issue comprise the research methodology. Third-party funding (dpk) and operational costs (bop) are inputs, whereas credit distribution (credit), loan interest income (pbkredit), and net profits are outputs (profit). Using a nonparametric The value of efficiency through the CRS and VRS models is calculated utilizing an analytical process under the Data Envelopment Analysis (DEA) technique.

4 Result & Analysis

The following is the result of calculating banking efficiency based on ownership in Indonesia using STATA software. Using the CRS methodology, it was determined that Government Banks and Foreign Banks may maximize credit distribution, loan interest revenue, and firm profits by employing third-party funds and operational costs prior to the pandemic in 2018 and 2019. Private banks, nevertheless, have been unable to achieve this level of efficiency, whereas Regional Banks were only able to be efficient in 2018, before turning inefficient in 2019. Then, during the pandemic in 2020, all banks based on ownership demonstrated inefficiency, and only Government Banks and Private Banks were able to regain efficiency in 2021.

Table 1. Banking Efficiency Levels Based on Ownership in Indonesia

Category	CRS				VRS			
	Before the Pandemic		During the Pandemic		Before the Pandemic		During the Pandemic	
	2018	2019	2020	2021	2018	2019	2020	2021
Government bank	1	1	0.9351	1	1	1	0.9836	1
Local bank	1	0.9702	0.9137	0.8946	1	0.9728	0.9246	0.9346
Private Bank	0.9414	0.9391	0.8808	1	0.9890	1	0.9447	1
Foreign Bank	1	1	0.7350	0.8195	1	1	0.7428	1

Source: processed data, 2022.

Using the VRS method and the Stata application to calculate the efficiency value, it was determined that prior to the pandemic, in 2018, only private banks were inefficient. Utilizing third-party funding and operational expenditures inefficiently to maximize credit distribution, loan interest income, and corporate profits in 2019 was unique to regional development banks. Except for Regional Development Banks, these banks maximized credit distribution, loan interest revenue, and business profits in 2021 by leveraging third-party capital and operating costs. During the epidemic, namely in 2020, Indonesian bank ownership did not attain an efficient state.

According to the extent of its growth rate before to the pandemic, namely in 2018 and 2019, Government Banks were on a level playing field with foreign banks. While Private Banks are dropping, Regional Development Banks are stable in 2018 and will expand in 2019. During the Covid-19 epidemic in 2020, all banks are inefficient based on their shareholders, but their growth rates are increasing. State Banks and Private Banks will revert to a steady magnitude in 2021, but Regional Development Banks and Foreign Banks will continue to expand.

Table 2. Banking Return Scale Based on Ownership in Indonesia

Category	Return Scale			
	Before the Pandemic		During the Pandemic	
	2018	2019	2020	2021
Government bank	Constant	Constant	Increasing	Constant
Local bank	Constant	Increasing	Increasing	Increasing
Private Bank	Decreasing	Decreasing	Increasing	Contant
Foreign Bank	Constant	Constant	Increasing	Increasing

Source: processed data, 2022.

Government Banks can boost Third Party Funds by Rp 154,732 billion in 2020 to maintain and achieve the projected level of efficiency, hence increasing the company's profit by Rp 23,012.9 billion. Regional Development Banks are anticipated to enhance credit distribution by Rp. 20,927.7 billion, resulting in a profit rise of Rp. 3,635.95 billion. A private bank must boost its Third-Party Funds by Rp. 231,237 million and its Operating Costs by Rp. For Foreign Banks, a rise in Operational Costs of Rp 217,802 million will result in an increase in Loan Interest Income of Rp 187,634 million.

When Regional Development Banks and Private Banks are inefficient in 2021, Regional Development Banks must be able to boost Third Party Funds by Rp 149,295 million in order to enhance the company's profit by Rp 5,707,75 million. In the meantime, Foreign Banks must contribute Third Party Funds totaling Rp. 80,374.4 million, resulting in an increase in lending to Rp. 26,386.5 million, additional Credit Interest Income of Rp. 6,437.13 million, and a profit rise of Rp. 3,877.77 million.

The impact felt by the banking industry has only recently emerged, so it can be said that there is a time lag between the spread of COVID-19 and the significant impact that has emerged on world economic development, including on the banking industry in Indonesia [25]. This is because the COVID-19 pandemic that is spreading around the world for the first time has an impact on the real business sector, however, they should keep their business as far as possible. Due to the fact that many business owner clients have trouble meeting

their financial responsibilities to banks, which leads to bad loans, the banking industry sector will be impacted when the pace of the economy slows down. One of the immediate effects of COVID-19 on the banking system is the rise in the ratio of non-performing loans (NPL) and financing freezes. [26].

Table 3. Slack Value of Banking Efficiency Based on Ownership in Indonesia

Period	Category	Input Slack		Output Slack		
		TPF	BOP	Credit	Credit Interest Income	Profit
2020	Government bank	154732	.	.	.	23012.9
	Local bank	.	.	20927.7	.	3635.95
	Private Bank	231237	553.225	.	.	6526.31
	Foreign Bank	.	217.082	.	187.634	.
2021	Government bank	.	.	.	.	.
	Local bank	149295	.	.	.	5705.75
	Private Bank	.	.	.	.	.
	Foreign Bank	80374.4	.	26386.5	6437.13	3874.77

Source: processed data, 2022.

Efforts that were then made by the government and the banking sector included providing relaxation to banking customers [27], either by reorganizing the business, extending the loan term, or giving impacted clients a grace period of three to six months in advance COVID-19 [28]. The restructuring policy has been carried out by many conventional banks and Islamic banks [29], restructuring, however, gives room to pay off debt or financing obligations so that these monies are not recorded as bad credit. It is not a write-off.

5   Conclusion

Based on the results of measuring the efficiency of Indonesian banking institutions based on their ownership with VRS and CRS approaches using output orientation, it was determined that none of the banks in Indonesia reached the level of efficiency during the Covid-19 pandemic in 2020, and that only Government Banks and Private Banks would regain efficiency in 2021, while Regional Development Banks and Foreign Banks remained inefficient. This circumstance was created by a decline in earnings resulting from a fall in the collection of third-party funds and an increase in operating expenses. Profits are earned by banks' core function as intermediary entities through the use of competitive advantages derived from lending risk. So that State Banks and Private Banks' attempts to ensure operational stability in 2021 are largely successful. After becoming inefficient in 2020, the two banks are once again efficient in 2021.

It is envisaged that banking management will continue to analyze and develop innovative breakthroughs in order to increase the efficiency of present banking performance, allowing banks that have attained the maximum efficiency level to maintain it. In order for banks to be able to exist in a competitive market, it is expected that inefficient banks will enhance their performance in delivering maximum output.

Researchers acknowledge that the results of this study are far from perfect due to limitations in the analytical methodologies employed and the selection of input and output variables. Therefore, it is desired that future research will employ a more effective analytical technique approach and utilize additional data and output components.

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