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Indonesian Banking Efficiency: A Recovery Plan

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ABSTRACT

Banking efficiency is still a concern for many stakeholders in Indonesia, especially with the challenges of recovering after the huge impact of the pandemic COVID-19. This study estimates the value of banking technical efficiency using Stochastic Frontier Analysis before and after the peak of Pandemic COVID-19 and identifies key problems from the pandemic related to credit risk and portfolio switching. A set of solutions emerge mainly from the learning and growth perspective to improve employee competencies; from internal processes to improve organizational effectiveness; from the customer's perspective to digitalize banking processes and products; and finally from the financial perspective to focus on asset growth using a robust portfolio guideline. Hence, revising risk appetite statements for all significant products is also a key to effective and efficient business growth for recovery.

Keywords: banking efficiency, pandemic impact, recovery plan

1. INTRODUCTION

Efficiency is a critical component of every organization's survival, especially banking institutions. Effective banking is crucial from a macro perspective because of its role as an intermediary institution, which will help to promote price stability and have a good effect on many other sectors. The level of efficiency, on the other hand, describes the bank's capacity to control inputs and outputs from a micro viewpoint. Effective banks are typically in a position to provide customers with more competitive prices, allowing the bank's market share to increase.

Bauer, et al. (1998) stated that in recent years the calculation of the performance of financial institutions by researchers has focused on the efficient frontier. This is because this method uses programming or statistical techniques that can eliminate the effects of differences in input prices and other exogenous factors that can affect the calculation of financial performance. The optimal point is located on a curve called the "efficient frontier" or "production frontier". This point is considered the ideal condition for banking efficiency. However, not all banks can achieve optimal conditions or ideal conditions. Generally, banks can only "close" to the optimum point, for example, 90%, which means that the bank has reached 90% capacity of its potential efficiency. In the research of Berger and Humphrey (1997), it is known that at least most of the research in the banking industry uses frontier-based efficiency analysis, both parametric and non-parametric approaches.

With the disease as a whole and the associated preventative measures, the spread of Covid-19 is a global great shock. It was anticipated that the financial sector, particularly banks, would play a significant role in shock absorption in the immediate aftermath by providing crucial loans to the business sector and households.

This article tries to explore the estimation of the value of the technical efficiency of Indonesian banking during the 2016–2020 period using *Stochastic Frontier Analysis*, which covers before and during the pandemic and analyzes its development during the observation period. Based on this desk study, also identifies problems that arise from the pandemic that affected the development of banking efficiency and possible solutions so that banking efficiency can recover even better than before the pandemic.

2. MATERIALS AND METHOD

Berger and Humphrey (1991) have studied bank inefficiency with a parametric approach (Thick Frontier Analysis, TFA) concluding that inefficiency is more of excessive use of input factors that are non-financial resources such as human resources, technology, and spending on goods and services so that efficiency efforts should more be focused on controlling costs compared to increasing bank size (economies of scale) or product mix (economies of scope). Berger and Humphrey (1993) concluded that x-efficiency or managerial ability to manage costs has a greater magnitude, at least 20% of banking costs. Kwan and Eisenbeis (1995) used a simultaneous equation approach to see the relationship between 3 variables: risk, capitalization, and inefficiency with a sample of 254 banking parent companies worldwide between 1986-1991. In addition to proving that the three variables influence each other simultaneously, the study also shows that managerial quality is a significant factor for all

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three. Frei et al. (2000) examine what are the most important factors for bank efficiency, and also come to the same conclusion that managerial ability or x-efficiency is the dominant factor.

Chen (2001) uses a two-stage DEA approach to examine micro and macro efficiency factors in Taiwan, estimating independent variables that reflect the economic business cycle and economic policy conditions that affect bank performance. Chen concludes that macroeconomic factors and the banking industry have little effect on efficiency in large banks. Large banks are more independent of macroeconomic factors because they have more diversified portfolios.

Recent studies of Indonesian banking efficiency, among others, were carried out by Hadad et al. (2003) with a parametric approach, Hadad, et al. (2010) with a non-parametric approach (DEA), Ascarya et al. (2008) for a comparison of the efficiency of Islamic banking in Indonesia and Malaysia using parametric and non-parametric, Muljawan et al. (2014) and Apriyana (2015) for a study of banking efficiency at the ASEAN level.

Parametric Approach for Indonesian Banking Efficiency, Hadad, et al. (2003) use SFA and DFA The average value of banking efficiency in 2003 is 76% SFA and 67% DFA. Fewer mergers (only 1 in 6) make banks more efficient. Hartono (2009) use SFA to assess that the average bank efficiency is 62.6%. Hadad et al. (2010) used DEA and conclude that average bank efficiency is 62% – 67%; state-owned banks are 90% efficient, regional banks are the least efficient between 45% and 58%; listed banks perform better and the efficiency of Islamic banks lies between 54% and 74%.

Viverita and Ariff (2011) use DEA and SFA to conclude that Indonesian banks' efficiency is as twice as much as banks in developed countries because it has excessive use of inputs, which is the biggest challenge for bank managers. Agustina, D. et al (2019) finds that the average technical efficiency of Islamic rural banks in Indonesia from 2011-2016 achieves 86 percent; while there is the other one by 14 percent that can be optimized. Overall, the average efficiency of Indonesian Islamic rural banks increases during the research period. Additionally, this study also finds that big banks are more efficient than small banks.

Octrina et al (2020) find that the development of the banking industry in Indonesia could bring an impact on economic growth, especially in the face of the pandemic. This study aims to examine scientifically the efficiency score of regional development banks. Furthermore, it also aims to understand further what factors influence the efficiency performance of regional development banks in Indonesia using the SFA (Stochastic Frontier Analysis) approach. Riani and Ikhwan (2022) show that Covid-19 had an impact on decreasing the efficiency level of Indonesian Banks. In addition, the most important variable performance to be improved by banks during the Covid-19 pandemic is total financing.

Stochastic Frontier Analysis. The variables used in this study are modifications of the Yildirim and Philippatos (2007), multiproduct translog model, using 3 inputs (X) and 3 outputs (Y) with input prices (W) and Z in the form of equity which can be seen in Table 1. Variables X1 is operating costs defined as overhead costs (OHC) minus labor costs, this is intended to capture the effect of non-labor costs in OHC which can be referred to as bank office costs consisting of general and administrative costs, asset write-off costs earning, securities impairment costs, foreign exchange transaction costs, promotion costs, other operational costs. This is important considering that the efficiency improvement strategy will involve all overhead costs, both labor costs covered in X2 and operating costs captured in X1.

Table 1. Efficiency Variables Using SFA

C	Total Costs (interest expenses , operational and non-operational costs)
Y1	Loan
Y2	Treasury assets
Y3	3rd Party Funds
X1	Operational Costs
X2	Personel Costs
X3	Fixed Assets
W1	x1/Total Assetss, proxy for operational price
W2	x2/Total Assets, proxy for personel price
W3	x3/Total Assets, proxy for fixed costs price
Z	Equity
u_c	Inefficiency factors which deviation from the best operation
ε_c	Random error

Variable X3 is a fixed asset that represents technology investment and office network. The three variables are then matched with the price variable, which is proxying divided by all of them by total assets. So W1 is X1 divided by total assets, W2 is X2 divided by total assets, as well as W3 is X3 divided by total assets. Ideally, the price of labor or W2 is the cost of labor divided by the number of workers, but data on the number of employees of a bank can rarely be obtained collectively.

The measurement of cost efficiency is derived from the cost function where the variable cost depends on the input variable, the quantity of the output, the inefficiency factor, and random error. We return to the function of the equation below where inefficiency and random error can be separated from core costs (Berger and Mester, 1997), inefficiency u_ and error term _ are assumed to form a multiplicative cost function. So the

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general equation can be written in a natural logarithmic form as follows

$$lnC = f(y,w,z) + lnu \quad + ln\varepsilon$$

The cost efficiency of a bank, say bank i is defined as the estimated cost required to produce output if the most efficient bank in the example uses the same exogenous variable (w,y,z,v), then the result is divided by the actual cost of bank i. Mathematically it can be written in the form:

$$CostEFF_i = \frac{C_{min}}{C_i} = \frac{exp[f(w_i,y_i,z_i)]\,.\exp(lnu_{min})}{exp[f(w_i,y_i,z_i)]\,.\exp(lnu_i)} = \frac{u_{min}}{u_i}$$

The cost efficiency ranges in the interval [0,1] and is equal to one for the best performing bank.

The first step in this research is to estimate the cost structure using the Translog Multiproduct function. The translog function is different from the general production function, for example the Cobb-Douglas (CD) function. The CD function assumes that the firm experiences constant economies of scale and the elasticity value resulting from this function will always be equal to one. While the translog function does not require such strict assumptions. The form of the cost function used in this study is the following Yildirim and Philippatos (2007) model:

$$\ln(C/w_3 z) = \alpha_0 + \sum_{l=1}^{2}\alpha_l \ln(w_i/w_3) + \frac{1}{2}\sum_{l=1}^{2}\sum_{h=1}^{2}\omega_{lh}\ln(w_l/w_3)\ln(w_i/w_3) + \sum_{k=1}^{3}\beta_k \ln(y_k/z) + \frac{1}{2}\sum_{k=1}^{3}\sum_{j=1}^{3}\beta_{kj}\ln(y_k/z)\ln(y_j/z) + \sum_{k=1=1}^{3}\sum_{l=1}^{2}\delta_{lk}\ln(y_k/z)\ln(w_i/w_3) + \varphi_l \ln Z + \frac{1}{2}\varphi_2 (\ln Z)^2 + \sum_{k=1}^{3}\tau_k \ln(y_k/z)\ln Z + \sum_{l=1}^{2}\sigma \ln(w_l/w_3)\ln Z \quad + \ln \varepsilon_{ti} + \ln u_{it}$$

Legends:

C	Total Costs (interest expenses , operational and non-operational costs)
yi	Factor output -i
wi	Factor input price -i
z	Equity
u_{it}	Inefficiency factor bank-i year t beyond the best operation option
ε_{ti}	Random error -i at time-t

Stochastic Frontier Production Function is as follows:

$$lnC_{it} = \beta_0 + \beta_1 \ln(X1_{it}) + \beta_2 \ln(X2)_{it} + \beta_3 \ln(X3)_{it} + \beta_4 W1_{it} + \beta_5 W2_{it} + \beta_6 W3_{it} + v_{it} + u_{it}$$

Dimana,

C = Total Costs
X1 = Operational Costs
X2 = Personel Costs
X3 = Fixed Assets
W1 = Price X1 = X1 per Total Assets
W2 = Price X2 = X1 per Total Assets
W3 = Price X3 = X1 per Total Assets
u_{it} = Bank specific characteristic in term of inefficiency
v_{it} = Statistical disturbance term

Desk study. Furthermore, a desk review to collect data from pertinent prior studies and best practices related banking efficiency enhancement. Desk study is the collection of referral techniques to increase the efficiency of banking through the investigation and analysis of secondary data, such as academic efficiency studies and studies conducted by banking consultants. The collected studies are then categorized into four groups according to the BSC viewpoints of Financial, Customer, Internal Process, and Learning and Growth.

3. RESULTS AND DISCUSSION

The following Table 2 describes some of the statistical data that are summarized only for the years 2016-2020 and the data for the previous years are not shown. A descriptive description of the variables studied is presented in the following table.

Table 2. Descriptive Statistics of Banking Performances

	2016	2017	2018	2019	2020
Total Assets	6.729.799	7.822.144	8.865.233	9.684.258	9.625.049
Credit	4.377.195	5.331.377	5.952.317	6.571.563	6.029.394
3rd Party Funds	4.836.758	5.498.510	6.190.077	6.633.821	6.843.927
- Current Accs	1.124.235	1.241.061	1.303.796	1.447.349	1.427.703
- Savings	1.551.809	1.747.620	1.851.020	2.011.778	2.036.297
- Time Deposits	2.160.714	2.509.830	3.035.260	3.174.694	3.379.927
CAR (%)	17,43	18,13	19,57	21,39	22,69
ROA (%)	3,11	3,08	2,85	2,32	2,17
NIM (%)	5,49	4,89	4,23	5,39	5,47
Operation (%)	74,10	74,08	76,29	81,49	89,85
LDR (%)	90,50	96,96	96,16	99,06	88,10

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Figure 2 below provides an illustration of how the average development of Indonesian banking efficiency over the last 10 years.

Figure 2. The Mean Value of Indonesian Banking Efficiency in 2011-2020

From the Figure 2 we can see that the efficiency of Indonesian banking for nine years has fluctuated from the value of 0.71 to 0.73. In 2020, efficiency has decreased significantly. The impact of the pandemic shows that the Indonesian banking industry has indeed been severely affected, although not to the point of causing a crisis.

Referring to research conducted by Octrina et al. (2021), three banking problems were found during the COVID-19 outbreak, namely credit risk, liquidity risk, and loss of intermediary income. Wu (2012) constructed a strategy map with four perspectives to improve banking performance. People's competency, effective organization, robust delivery channels, and managing credit risks are the most important variables to be managed to improve banking performance. Managing credit risks is the single most significant variable in particular.

In the meanwhile, good product portfolio management will undoubtedly become the foundation for evaluating the profitability of each product and service, which has a significant impact on efficiency. Portfolio guidelines and risk appetite statements are important tools to grow assets while maintaining the optimum risk-return profile of a bank's business nowadays.

4. CONCLUSION

Using stochastic frontier analysis, this study calculates the value of banking technical efficiency before and after the height of pandemic COVID-19 and highlights major issues relating to credit risk and portfolio switching. As expected, the technical efficiency of Indonesian banks decrease in 2020 as it an estimate that the Pandemic Covid-19 affect the banking business significantly. Several solutions are primarily found from the learning and development perspective to enhance employee competencies, from internal processes to enhance organizational effectiveness, from the customer's perspective to digitize banking processes and products, and finally from the financial perspective to concentrate on asset growth using a strong portfolio guideline. Therefore, a fundamental to effective and efficient risk management is to update risk appetite statements for all bank's significant products.

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