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THE EFFICIENCY ANALYSIS OF INDONESIAN FINANCIAL INSTITUTIONS

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Abstract

This paper investigates the efficiency level of Indonesian commercial banks by using Data Envelope Analysis (DEA). In this paper, we use three inputs and two outputs variables for assessing efficiency and examine the impact of ownership structure such as private, government, foreign, and public. Results revealed that government-owned banks have performed more efficiently than private one; and there is no significant difference of efficiency level between foreign-owned and domestic banks. Total fixed assets is the only significant input factor that affects banks' efficiency.

Keywords: Data Envelopment Analysis, Indonesia Banks, Ownership Structure

1. Introduction

As the third most populated country in Asia after China and India, Indonesia is a country in which its economy has been stable and which has maintained a positive economic growth over the last five years even during the 2008 financial crisis period. Having more than 230 million of population widely spread out over 17,000 islands and multiple cultures makes Indonesia's economy pretty unique compared to its neighborhood countries. Yet, the political issue and government intervention still play an important role in the country's economic stability.

One of the reasons why Indonesia is less affected by the global economic issues is because Indonesia's financial sector is not fully integrated yet. Despite the economic boom of the Indonesian economy in the past couple of years, which has drawn foreign investors' attention of aggressive investing, the financial industry is the one that plays an important role in supporting and providing funds to countries and companies having interest in investing in Indonesia. Indonesia's banking industry has shown positive and numerous significant changes since late 1990s. These changes, which include mergers and acquisitions, led to reformation of the banking industry.

In the academic field, there are numerous studies conducted on measuring how efficient banks operate in several different countries such as Lin *et al.* (2009) observed bank's operating performance in Taiwan and Sufian and Habibullah (2010) measured the efficiency of Thailand banking sectors. Nevertheless, there are very few papers talking about the banking industry in Indonesia.

Indonesia has more than a hundred banks operating and officially registered. But, very few research papers study banking industry efficiency in Indonesia. Therefore, the first objective of our research is to examine how efficient the banks are across the country over time. Since the financial sector stability during the global financial crisis has been heralded as proof of the correct financial reforms in the sector, this research focuses on this period of time as well.

Besides knowing the efficiency level, this research also tries to understand possible factors that may cause the difference of the level of efficiency among banks.

Banking industry in Indonesia is dominated by commercial banks and commercial banks can be classified into government-owned vs. private-owned and domestic banks vs. foreign banks. Hence, ownership structure may affect the efficiency of banks (Rao and Lakew, 2012; Altunbas *et al.* 2001; Gaganis and Pasiouras, 2009).

Other research mentioned that ownership structure is deemed to be related to a bank's efficiency. Manlagñit (2011) pointed out that a bank's size can affect its cost efficiency; while Dacanay (2007) found efficiency to be inversely related to asset size. In emerging markets, since banking is a strictly regulated industry, most of the time, the size of government-owned banks is bigger than that of the private-owned banks. Therefore, the second objective is to test whether private-owned and government-owned would be a reason causing the difference of efficiency (Jemric and Vujicic, 2002; Staub *et al.* 2010).

On the other hand, efficiency is expected to be higher for foreign-owned banks because foreign-owned banks not only need to follow the local laws but also that of the international standards. However, local-owned banks only need to follow the local laws. Karas *et al.* (2009) found foreign-owned banks with international standards as their corporate governance are expected to operate and perform more efficiently. With a higher standard of regulations, we want to find out, as third objective, whether or not foreign-owned banks perform better than domestic owned banks in Indonesia. We have done this research partially as a result of the ideas coming out of the Financial Crisis of 2008. There is a greater regulatory scrutiny over the inherent risks of banks. Of great concern is whether or not banks have become "too big to fail?" If banking is of too large of a size, does it become a systemic risk? We have done this research to examine in a desire to prove whether or not such thinking is valid, and give empirical evidence base on banking environments that have done relatively well during the financial crisis. In addition, we have done this paper in a response to the recent movement of Asia Pacific regional banks to expand outwards (for example ANZ, DBS, OCBC), and to show an example of what models of banking are most successful and most efficient in a still developing Asia Pacific country like Indonesia.

2. Data and Methodology

The quarterly observations of 21 commercial banks in Indonesia from the second quarter of 2010 to the third quarter of 2013 are the dataset used in this research. Therefore, the total of observation in this research is 21 (banks) x 14 (quarterly reports) = 294 observations.

There are two variables used in this research which is input and output variables. The input variables include: (1) total fixed assets, (2) total deposit, and (3) total capital, whereas the output variables are: (1) total loans, and (2) net equity investment, as a parameter of efficiency measurement. In addition, several factors such as asset level, and ownership structure are also included in the efficiency measurement in DEA regression.

3. Empirical Analysis

The researcher proceeded in calculating the Pearson's correlation of the input and output variable (Table 1) to further determine and confirm the degree to which our DEA input and DEA output variables are related. Results implied a substantial degree of relation.

Table 1. Pearson Correlation of DEA Input and Output Variables

INPUT OUTPUT	Total Fixed Assets	Total Deposits	Total Capital
Total Loans	0.906**	0.978**	0.980**
Net Equity Investment	0.607**	0.590**	0.619**

Note: ** Correlation is significant at the 0.01 level (2-tailed).

Second, DEA efficiency scores (Table 2) have been shown. Maximum scores remained at par; while minimum scores have somehow showed banks are doing relatively stable year after year.

Table 2. Descriptive Statistic of DEA Efficiency Score

Year	Average	St. Dev	Maximum	Minimum
2010	0.8163	0.1734	1.0000	0.4150
2011	0.8216	0.1661	1.0000	0.2810
2012	0.8197	0.1846	1.0000	0.2900
2013	0.8276	0.1923	1.0000	0.2120

In Indonesia, besides ordinary commercial banks operations, government-owned banks can do underwriting. Hence, government-owned banks are more powerful than any other banks. In addition, government-owned banks are widely spread out across the country while private-owned banks mainly operate in major areas. This is one of the reasons why government-owned banks may have higher level of efficiency than private-owned banks.

Based on this comparison, we have noticed a significant difference on the production efficiency level between private-owned and government-owned banks in Indonesia (Table 3). From their mean scores, the government-owned banks posed to be better than private-owned banks. Dug deeper, we found 12 out of 21 government-owned banks scoring above 95%; while, only 3 private-owned banks stood on this level and the rest are in a much lower position. This explains that the banking industry in Indonesia still has to improve its liberalization.

Table 3. DEA Score Comparison: Private-Owned and Government-Owned Banks

Bank Type	Mean	Std. Deviation	t-value	Sig.
Private-Owned	0.80979	0.188548	2.97	0.004***
Government-Owned	0.86968	0.121850		

Note: *** indicate significance at $p<0.01$.

Besides comparing government-owned and private-owned banks, we are wondering whether with different regulation requirements banks would show different efficiency level. Chortareas *et al.* (2012) found that strengthening capital restrictions and official supervisory powers can improve the efficient operations of banks. Foreign-owned banks in Indonesia not only need to follow the Indonesian regulations but the home countries as well. From Table 4, it is shown that there is no significant different between foreign-owned and domestic-owned banks even though foreign-owned banks have higher DEA efficiency scores than that of domestic-owned banks. The main reason why foreign-owned banks and domestic-owned banks are on the same level of efficiency is because both of the banks are operationally engaging in the same competitive market in Indonesia. Furthermore, as part of the banking regulation of Indonesia, a foreign bank can also take a significant ownership in another local bank, in addition to having its own presence in Indonesia. Therefore, the foreign bank can impose its own knowledge, and management structure, internal control practice and risk management practice on a local bank. It is theorized that it is this mixed ownership structure that is found in several local banks has closed the efficiency gap in Indonesia between local and multinational banks.

Table 4. DEA Score Comparison: Foreign-Owned and Domestic-Owned Banks

Bank Type	Mean	Std. Deviation	t-value	Sig.
Foreign-Owned	0.83718	0.148975	0.967	0.334
Domestic-Owned	0.81481	0.189844		

Combining DEA with Tobit regression can help integrate the analysis of efficiency. From Table 5, it is shown that a bank's total asset is significantly and positively correlated with efficiency. Hence, as total fixed assets increase, efficiency scores increase as well. This finding

confirms with the other factors, government-owned and private owned. That is, government-owned banks in Indonesia do not only operate like an ordinary commercial bank, but are also authorized to do underwriting; thus making them larger and more powerful than any other banks. Therefore, the efficiency score is positively correlated with the government-owned banks and negatively correlated with the private-owned banks.

Table 5. Tobit Regression Model Result

Variables	Coefficients
Private-Owned	-0.130*** (0.027)
Government-Owned	0.298*** (0.030)
Total Fixed Assets	0.137*** (0.015)

Note: *** indicate significance at p<0.01. Standard errors are given in parenthesis.

4. Conclusion

This paper presents a two-stage DEA approach coupled with Tobit regression analysis in examining the efficiency level of two kinds of banking categories. First, government-owned banks are found to be more efficient than private-owned banks. The reason may be because government-owned banks are widely spread across the country and private-owned banks do not have enough resource to do so. On top of this, government-owned banks can operate like investment banks and do underwriting. Therefore, government-owned bank can provide more vertical integration services and tend to show more economic of scale. However, this can also be a sign showing that Indonesia can improve its internationalization of the financial industry.

Second, this research also finds that there is no much difference of efficiency between foreign-owned and domestic-owned banks in Indonesia. Foreign-owned banks need to follow not only the Indonesian regulations but also the home country's regulations. Chortareas *et al.* (2012) found that strengthening capital restrictions and official supervisory powers can improve the efficient operations of banks. That is, ideally, foreign-owned banks should show more efficiency than domestic-owned banks. The research result does not support the argument. It would be interesting and perhaps an item for future study to separate local banks that have significant foreign ownership. As part of the banking regulation of Indonesia, a foreign bank can also take a significant ownership in another local bank, in addition to having its own presence in Indonesia. Therefore, the foreign bank can impose its own knowledge, and management structure, internal control practice and risk management practice on a local bank. It is theorized that it is this mixed ownership structure that is found in several local banks has closed the efficiency gap in Indonesia between local and multinational banks.

Lastly, confirming by Tobit regression, this research shows that when a bank has more total fixed assets, the efficiency score would be higher. This coincides with the result that a government-owned bank is more efficient than a private-owned banks.

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