COMPARATIVE ANALYSIS OF INDONESIAN BANKING EFFICIENCY BY BANKS CATEGORY

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ABSTRACT

This study aims to compare the Indonesian banking efficiency among the six bank category: state-private, merger-nonmerger, and domestic-foreign. It used a quantitative approach and historical data, where the data used is both time series (2000–2012), and cross sectional (for some commercial banks that meet the requirements of the sample). Conceptually, it will rely upon the concept of efficiency proposed by Farrell (1957). Meanwhile, banking efficiency measurement techniques used is the DEA with intermediation approach. In the application of DEA, it uses both CRS models (CCR) and VRS (BCC). While in its construction, it uses input- oriented approach. In comparing those banks, we aplly the Wilcoxon-Mann-Whitney Test. Based on the sample of 17 commercial banks, we find that, generally, Indonesian foreign banks are more efficient than domestic. This fact also illustrates that the private banks are more efficient than state, and merger banks are more efficient than non-merger.

Keywords: efficiency, banking, data envelopment analysis (DEA), post Asian monetary crisis

INTRODUCTION

The level of bank efficiency describes the ability of the bank concerned in managing its input and output. In the perfect competition, the less efficient banks can be eliminated from the market because those are not able to compete with their competitors, both in terms of pricing and product quality and service. Such banks will have difficulty in retaining customers, and also to attract new customers to expand its customer-base. Difficulties that will be faced by those banks may be even tougher when associated with the development of an increasingly competitive financial market in which banking institutions are not only facing the competitors in the banking industry but also from other industries as consequences of AEC implementation on banking, business, and economy. It is clear that the efficiency affects performance, health and survival of a banking institution. This study aims to compare the indonesian banking efficiency by category, namely: state-private, merger-nonmerger, and domestic-foreign banks.

FRAMEWORK AND EMPIRICAL STUDIES

The concept of efficiency can be traced in the micro-economic theory, both in the theory of consumption and production theory. In the theory of consumption, the concept was known as maximize utility or satisfaction. While in production theory, the concept was known as maximize profits or minimize costs (Case and Fair, 2011). According to Farell (1957), efficiency comprises of two components, namely: technical efficiency and allocative efficiency. This concept measures the ratio of the input level to the output level. Technical efficiency can be breakdown into Pure Technical Efficiency (PTE) and Scale Efficiency (SE). The PTE measure is obtained by estimating the efficient frontier under the assumption of variable returns to scale (VRS). It is a measure of technical efficiency without scale efficiency and purely reflects managerial performance in organizing the inputs into the production process. Thus, the PTE measure has been used as an index to capture managerial performance. The measure of SE demonstrates the ability of the management to choose the optimum size of resources, i.e. to decide on the firm's size or in other words, to choose the scale of production that will attain the expected production level. Inappropriate size of a firm (too large or too small) may sometimes be a cause of technical inefficiency (Kaur and Kumar, 2010). This measurement related to the scale of firm is usually described by a size of its assets.

Non-parametric approaches measure efficiency using non-stochastic approach that tends to combine disturbance into inefficiency. The most important method of this approach is known as Data Envelopment Analysis (DEA). DEA is a mathematical programming approach to build efficient frontier and measure the relative efficiency of each decision making unit (DMU) are investigated for the efficient frontier constructed. DEA measures the efficiency of a decision making unit (DMU) relative to other similar DMUs with the simple restrictions that all DMUs lay on or below the efficiency frontier. DEA can also determine how a DMU can improve its performance to become efficient (Ascarya et al, 2008). Further, a DEA model can be constructed either to minimize inputs or to maximize outputs. An input orientation aims at reducing the input amounts as much as possible while keeping at least the

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present output levels, while an output orientation aims at maximizing output levels without increasing use of inputs (Sufian, 2007; Ali and Afzal, 2011).

Efficiency concept is often applied in banking. Miskhin (2007) said that banks are financial institutions that accept money deposits and make loan. In other words, the scope of certain banking activities are as intermediary institution that turns money borrowed from depositors (surplus spending unit) into money lent to borrowers (deficit spending units) (Ascarya and Yumanita, 2008; Sufian, 2007; and Yudhistira 2004). In fact, banking firms have heterogeneous characteristics of ownership. In that context, Leibenstein (1966) considers that there is a relationship explicitly agent and principal, as a source of inefficiency. These relationships often result in imperfect contract, giving rise to excessive costs due to information asymmetry. In this case the managers act in accordance with their own interests, rather than adhere to the interests of the principal. Based on these arguments, it is interesting to analyze the influence of characteristics of ownership on the efficiency. Therefore, comparing the effect of bank ownership on efficiency comparisons can be divided into two comparisons, namely between state and private-owned banks; and between domestic and foreign-owned banks. Several studies comparing the efficiency between state and private banks suggested that the findings are not conclusive.

Figueira et al (2006), investigated whether privately-owned banks outperform state- owned banks. Based on a range of performance ratios as well as parametric and non-parametric estimations, the results showed that in Africa, on average, privately-owned banks do not appear to outperform state-owned banks. Then, Abidin (2007) evaluated the performance efficiency of
93 commercial banks in Indonesia in the period 2002 to 2005 using Data Envelopment Analyis (DEA). The findings showed that state banks showed more efficient than other banks. Also, Muthmainnah (2012) examined whether the effect of state and private bank ownership on X- efficiency by using 62 samples banks, during the period of 2001-2005 in Indonesia. A non- parametric method of Data Envelopment Analysis (DEA) has been used to arrive at the efficiency scores. She found that state banks are more efficient in allocative and overall efficiency than private banks.

But the study of Altunbas et al (2001) found the opposite conclusion. They used variety of approaches to model cost and profit inefficiencies as well as technical change for different ownership types in the German banking market. Little evidence is found to suggest that privately owned banks are more efficient than their mutual and public-sector counterparts. While all three bank ownership types benefit from widespread economies of scale, inefficiency measures indicate that public and mutual banks have slight cost and profit advantages over their private sector competitors.

Relationship between banking efficiency and ownership may exist due to spillover effects from the superior performance of foreign-owned banks compared with domestic-owned banks, which are always considered to be lagging behind in terms of managerial skills, technologies, and network. Those performances such as the introduction of new, more diverse products, greater use of up-to date technologies, and know-how spillovers (e.g., as people learn new skills from foreign banks, they migrate over time to domestic banks) (Claessens and Horen,
2012). Thus, foreign-owned banks are often considered to be more efficient than domestic- owned banks.

Such a view is supported by a number of empirical studies. Grigorian and Manole (2006), for instance, suggested that foreign ownership with controlling power and enterprise restructuring enhance commercial bank efficiency. Meanwhile, Nikiel and Opiela (2002) found that foreign banks servicing foreign and business customers are more cost-efficient and less profit-efficient than other banks in Poland. In addition, Barry et al (2010) found that efficiency scores are higher for banks which are held by minority private shareholders and banks that are foreign-owned.

However, empirically foreign banks are not always more efficient than domestic-owned banks. Anayiotos et al (2010) proved that foreign-owned banks in emerging Europe seem to be less efficient than their mother banks, suggesting that although they may bring some efficiency benefits to their host country, they are highly affected by the local business and operational environment. In addition, Sufian (2007) provided evidence that the domestic Islamic banks were more efficient compared to the foreign Islamic banks albeit marginally.

Next, comparison can also be conducted on between nonmerger and merger banks. Merger is often motivated by a desire to increase economic efficiency, and some mergers result in significant efficiency gains. Economic of scale may result from any merger but are most common in horizontal merger. A horizontal merger may enable the consolidated firm to reduce its production or marketing costs (Waldman and Jensen, 1988; Martin, 1988). Moreover,according to Berger (1998), profit efficiency is enhanced by merger because the combined firms generally achieve greater diversification of their risk exposures through a better mix of geographic areas, industries, loan types, and maturity structures. In turn, improved diversification might allow the combined banking organization to undertake a portfolio shift from security investments into consumer and business loans—activities with higher expected values. Hence, profit efficiency

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would be greater with consolidation because capital is put to better use and because greater geographic diversification tends to reduce risk.

Berger's postulate is supported by several empirical studies. Worthington (2001), for instance, suggested that merger appears to have improved both pure technical efficiency and scale efficiency in the credit union industry. In addition, Punt and Rooij (1999) found that merger banks in recent years appear to have been successful because, on average, X-efficiency and profitability have improved after the consolidation. Al-Sharkas (2004) indicated that merger seems to have improved cost and profit efficiency of the banks involved in the 1990s.

However, some other empirical studies actually reject these postulates. Rooij (1997) accented that empirical studies on cost effects of merger banks show that on average merged banks do not improve their cost efficiency relative to non merged banks. Liang (2011) reported that the costs for the acquiring banks rise during the merger and costs of the banks after the bank mergers rise significantly. Also, Singh (2009) found that while the mergers don't seem to impact the cost and profit efficiency in an adverse manner and whatever loss that happened initially was recovered quickly.

METHODOLOGY AND DATA

Based on the intermediation approach, this study specifies two inputs and two outputs. The inputs are fixed assets and total deposits. While, the outputs are total loans and liquid assets (Suzuki and Sastrosuwito, 2011, Bos and Kool, 2006; Hollo and Nagy, 2006; Weill, 2003; Berger and Humphrey, 1997; Berger and Mester, 1997). Input oriented measures mean that when a certain amount of input can be reduced proportionally to produce the same level of output. DEA model for a DMU is in a linear fractional program, with the inputs and outputs of DMUs as decision variables. Here is the general form of the CCR DEA Models with input oriented approach that will be applied in this study (Cooper et al, 2004; Ramanathan, 2003).

$$Minz' = \sum_{i=1}^{I} U_{im}' X_{im}$$

Subject to

$$\sum_{j=1}^{J} V_{jm}' Y_{jm} = 1$$

$$\sum_{j=1}^{J} V_{jm}' Y_{jn} - \sum_{i=1}^{I} U_{im}' X_{in} \leq 0; n = 1,2,K,N$$

$$V_{jm}', U_{im}' \geq \epsilon;\ i = 1,2,K,I;\ j = 1,2,K,J$$

While the general form of VRS DEA Models with input oriented approach that will be applied in this study are as follows.

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$$Minz' = \sum_{i=1}^{I} U_{im}^{'} X_{im}$$

Subject to

$$\sum_{j=1}^{J} V_{jm}^{'} Y_{jm} = 1$$

$$\sum_{j=1}^{J} V_{jm}^{'} Y_{jn} - \sum_{i=1}^{I} U_{im}^{'} X_{in} \leq 0; n = 1,2,K,N$$

$$\sum_{n=1}^{N} \lambda_n = 1$$

$$V_{jm}^{'}, U_{im}^{'} \geq \epsilon;\ i = 1,2,K,I;\ j = 1,2,K,J$$

Where

z' is the efficiency of the mth DMU,

$U_{im}^{'}$ is the weight of that input,

X_{im} is ith input of the mth DMU,

$V_{jm}^{'}$ is the weight of that output,

Y_{jm} is jth output of the mth DMU, and

Y_{jn} and X_{in} are jth output and ith input, respectively, of the nth DMU, n= 1, 2, …, N.

$\sum_{n=1}^{N} \lambda_n = 1$ is the convexity constraint

ϵ is a non-Archimedean number.

Note that here n includes m.

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After getting the value of the efficiency of each bank, we compare the Indonesian banking efficiency among the six categories: state-private, merger-nonmerger, and domestic-foreign. For the purpose, we used the two populations of independent data statistical test, when at least ordinal measurement has been achieved for the variables being studied, data in the form of non- parametric or not normally distributed, namely the Wilcoxon-Mann-Whitney Test (Siegel and Castellan, 1988). The Procedure of Testing is shown in Figure 1.

Figure 1. The Wilcoxon-Mann-Whitney Test Procedure

DISCUSSION ON EMPIRICAL RESULTS

Table 1 provides the summary of Wilcoxon-Mann-Whitney Test to test the difference of efficiency scores between Indonesian state and private banks. The hypothesis that we propose to examine the differences are:

H01. There is no a significant difference of average of banking efficiency between Indonesian state and private banks.

Ha1. There is a significant difference of average of banking efficiency between Indonesian state and private banks.

Table 1.
Summary of Wilcoxon-Mann-Whitney Test of Indonesian State and Private Banks

Efficiency	Category	N	Mean Rank	Z-Statistic	Significance (α=0.05)	Remark
PTE	State	39	162.17	-4.514	.000	Reject H01/Accept Ha1
	Private	195	108.57			
	Total	234				

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SE	State	39	46.92	-7.132	.000	Reject H01/Accept Ha1
	Private	195	131.62			
	Total	234				
OTE	State	39	102.64	-1.502	.133	Accept H01/Reject Ha1
	Private	195	120.47			
	Total	234				

Source: Results from SPSS Software version 18.

From the result in Table 1, it appears that for the Pure Technical Efficiency (PTE), and Scale Efficiency (SE), the hypothesis is rejected, which means that there are significant differences in the average efficiency of the two types of efficiency between state and private banks. Furthermore, from the bigger mean rank, it appears that state is more efficient than the private banks in Pure Technical Efficiency (PTE). In contrast, for the Scale Efficiency (SE), private is more efficient than state banks. Meanwhile, for Overall Technical Efficiency (OTE), a hypothesis of no significant difference of averages of banking efficiency between Indonesian state and private banks is accepted. This means, there is no difference in the average Overall Technical Efficiency (OTE) between both.

Studies that compare the efficiency between state banks and private banks in Indonesia are thrusting ambiguous results. On the one hand, some studies have found that state banks are more efficient than private banks (Muthmainnah, 2012; Suzuki and Sastrosuwito, 2011; Abidin and Cabanda, 2007; Abidin, 2007). But on the other hand, many studies have concluded otherwise (Chunhachinda and Li, 2010; Hartono, 2009; Reynaud and Rokhim, 2005; Harada and Ito, 2005; Hadad et al, 2003). Therefore indeed, studies on the effect of ownership structure towards the banking efficiency especially in developing countries and Asia are still inconclusive and need further attention especially when dealing with state- and private -owned banks.

However, in the case of Indonesia, excellence in Pure Technical Efficiency (PTE) indicates that the Indonesian state banks have a high index to capture managerial performance compared to private. Managerial performance excellence of the Indonesian state banks is achieved by combining precisely the effect of management, teaming, and leadership skills on banking productivity. The success in combining those would raise the capability of managers to utilize banks' given resources (Sufian and Habibullah, 2012). The high Pure Technical Efficiency (PTE) also demonstrated the superiority of managerial efficiency of the state banking in saving the use of fixed assets and total deposits. The superiority is determined by the effectiveness of the bank's internal micro policy. That is possible because they have a very large and wide network, and close to the decision makers so that these banks perform better (Abidin,
2007). Meanwhile, the problems in developing countries such as Indonesia is that generally the domestic private banks also lack the loan officers are well trained, lack of risk assessment systems, and other management expertise to evaluate and respond appropriately risk. This problem makes it increasingly intensified by the high credit growth in the sectors of business or high-risk projects, they fail to select and monitor the credit properly (Mian, 2002).

Meanwhile, as well as the findings of several studies, private banks are more efficient than state banks in Indonesia in terms Scale Efficiency (SE). The excellence in the Scale Efficiency (SE) demonstrates the ability of the management of private banks to choose the optimum size of resources, i.e. to decide on the firm's size or refers to exploiting scale economies by operating at a point where the production frontier exhibits CRS (Sufian and Habibullah, 2012). This capability is confirmed by Mian (2002) that domestic private banks are more aggressive in placing their funds and higher interest rates because of the absence of collateral sources of funding. The aggressiveness makes private banks to eliminate financial barriers, including by conducting Mergers and acquisitions (M&A) that could reach the better Scale Efficiency (SE) than state banks.

On the other hand, the main problem of the Indonesian state banks in the context of Scale Efficiency (SE) is relatively high NPLs due to the lack of adequate legal infrastructure in the resolution of problem loans. As a result, in the banking industry business competition, the bank is not in a same level of playing field as the private banks, especially in the handling of problem loans. Finally, the excellence of efficiency of private banks compared to state banks in Indonesia in this study may be biased. Because, in the group of private banks, also included foreign banks operating in each country. However, the facts indicate a significant effort of a group of private domestic banks to become more efficient post-crisis (Hadad et al, 2003). The phenomenon cannot be separated from the privatization policy in the country as part of bank restructuring.

Next, Table 2 provides the summary of Wilcoxon-Mann-Whitney Test to test the difference of efficiency scores between Indonesian non-merger and merger banks. The hypothesis that we propose to examine the differences

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are:

H02. There is no a significant difference of average of banking efficiency between Indonesian non-merger and merger banks.

Ha2. There is a significant difference of average of banking efficiency between Indonesian non- merger and merger banks.

Table 2
Summary of Wilcoxon-Mann-Whitney Test of
Indonesian Non-Merger and Merger Banks

Efficiency	Category	N	Mean Rank	Z-Statistic	Significance (α=0.05)	Remark
PTE	Non-merger	92	116.76	-.135	.892	Accept H02/Reject Ha2
	Merger	142	117.98			
	Total	234				
SE	Non-merger	92	99.10	-3.346	.001	Reject H02/Accept Ha2
	Merger	142	129.42			
	Total	234				
OTE	Non-merger	92	96.91	-3.745	.000	Reject H02/Accept Ha2
	Merger	142	130.84			
	Total	234				

Source: Results from SPSS Software version 18.

From the result in Table 2, it appears that for Pure Technical Efficiency (PTE), a hypothesis of no significant difference of averages of Indonesian banking efficiency between non-merger and merger is accepted. This means, there is no difference in the Pure Technical Efficiency (PTE) between Indonesian non-merger and merger banks. In contrast, for the Scale Efficiency (SE), and Overall Technical Efficiency (OTE), the hypothesis is rejected, which means that there are significant differences in the average efficiency of the two types of efficiency between non-merger and merger banks. This finding supports the findings of Liang (2011), Singh (2009), and Rooij (1997). Furthermore, from the bigger mean rank, it appears that merger banks are more efficient than the non-merger in two types of efficiency. Those findings are in accordance with the study of Al-Sharkas (2004); and Punt and Rooij (1999).

The above findings prove the existence of the great benefits of the merger policy, both individually and industry. In a number of countries, merger takes place in order to create synergy, reduce costs and increase the competitive edge of the merger institutions (Watanagase,
2001). Furthermore, merger and acquisitions can increase economies of scale and scope economies, improve the efficiency, making the merged bank have a greater market power or increase the size of the management. As a consequence, the merger of banks affects the cost and profit efficiency, as well as interest from deposits and loans. Merger has the potential to deliver benefits to the wider community if cost efficiency and profit due to the merger, increased (Hadad et al, 2003).

Merger and acquisition is an option to banks in Indonesia to act more efficiently after the economic crisis that hit Indonesia in 1997. The merger could create a bank with better management took over the management of the bank which is not good for performance improvement. The merger will also reduce operating costs and offer benefits to society as a whole in the form of freedom in choosing resources used (Hadad et al, 2003).

Furthermore, Table 3 provides the summary of Wilcoxon-Mann-Whitney Test to test the difference of efficiency scores between Indonesian domestic and foreign banks. The hypothesis that we propose to examine the differences are:

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H03. There is no a significant difference of average of banking efficiency between Indonesian domestic and foreign banks.

Ha3. There is a significant difference of average of banking efficiency between Indonesian domestic and foreign banks.

Table 3
Summary of Wilcoxon-Mann-Whitney Test of
Indonesian Domestic and Foreign Banks

Efficiency	Category	N	Mean Rank	Z-Statistic	Significance (α=0.05)	Remark
PTE	Domestic	156	106.32	-3.573	.000	Reject H03/Accept Ha3
	Foreign	78	139.86			
	Total	234				
SE	Domestic	156	88.39	-9.301	.000	Reject H03/Accept Ha3
	Foreign	78	175.71			
	Total	234	79.48			
OTE	Domestic	156	79.48	-12.150	.000	Reject H03/Accept Ha3
	Foreign	78	193.54			
	Total	234				

Source: Results from SPSS Software version 18.

From the result in Table 3, it appears that for Pure Technical Efficiency (PTE), Scale Efficiency (SE), and Overall Technical Efficiency (OTE), a hypothesis of no significant difference of averages of Indonesian banking efficiency between domestic and foreign is rejected. This means, there is difference in three types of efficiency between Indonesian domestic and foreign banks. Furthermore, from the bigger mean rank, it appears that foreign are more efficient than the domestic banks in three types of efficiency. The findings reinforce the conclusions of some previous studies, such as Barry et al (2010); Grigorian and Manole (2006); and Nikiel and Opiela (2002). The conclusion also confirmed some of the findings of previous studies in the Indonesian case (Fathony, 2012; Abidin 2007; Reynaud and Rokhim, 2005; Herberholz, et al, 2004, 2001).

From various studies and literature revealed several reasons why foreign are more efficient than domestic banks. Foreign banks are considered to have: less connected lending; improved quality and availability of financial services; greater competition which in turn reduces the costs of banking products; new skill and technology; faster and cheaper access to international capital markets and liquid funds (via parent banks); additional oversight by foreign supervisors, which may make them sounder; and meeting entry conditions to international "clubs" (notably the OECD) (Abdullah and Santoso, 2001). In addition, Foreign ownership everywhere in developing countries tends to be superior given the fact that they make the least effort to extend the branch network beyond the metropolitan areas, they are entitled with better technologies, and they deal with healthy customers as well as multinational companies (Suzuki and Sastrosuwito, 2011). Foreign banks are also well run and beneficiate from know-how and from high skilled and experienced personnel, leading thus to more efficient work (Reynaud and Rokhim, 2005).

In Indonesia, the advantages of foreign banks, among others; has a network of international management and corporate governance practices and higher skill able to introduce new products, new strategies and risk management techniques that yield better efficiency performance compared to domestic banks (Fathony, 2012). This advantage is also supported by the high credit growth of foreign banks since the beginning of 2004.

CONCLUSION

In general, Indonesian foreign banks are more efficient than domestic. This fact also illustrates that in general the private are more efficient than state banks, and merger are more efficient than non-merger banks. The advantages of foreign banks because they were well-

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capitalized banks and more focused on the quality of bank management and risk aversion. They also excel in new skills and technology. While the advantages of private banks because they more receive adequate control measures resulting in a high incentive to create efficiencies. In addition, the lack of political pressure could reduce the demand to employ a larger staff with consideration of nepotism, so as not obtained good quality workers.

Indonesian domestic banks should take advantage of the presence of foreign banks in the country. They have to catch up to foreign banks in terms of technology, best-practice standards, and IT development (i.e. internet banking, e-money), to improve their efficiency. Indonesian banking should apply the knowledge, capability of management, managerial incentives, good corporate governance, and efficient cost management in its operations, in order to be saving for transforming fixed assets and total deposits into total loans and liquid assets. Banking in Indonesia should strengthen its capital structure, in order to carry out its operations in economics of scale. For that, they can be merged to improve its efficiency to be able to compete with the big and foreign banks. The merger will lead to market power will increase and have high competitiveness with other banks which resulted in lower operating costs and increase efficiency levels. Advantages of the merger in the long term are expected to be realized.

The main limitation of this study is not included labor costs and other income as the inputs and outputs of the banks studied. This is caused by the limited data available. In fact, if those items could be included, so this study will be more details to cover aspects of efficiency derived from cost and operating income. In the future, more in-depth discussion needs to be done by experts and practitioners in the field of banking to define the input and output of the bank and to formulate a better model. In addition, the availability of better data is also very important. Future studies should also conduct a survey technique, to examine the behavior of banks in Indonesia, which are useful in formulating the model and comparison with the empirical results obtained.

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