Measuring the Competitiveness of Islamic Banking in Indonesian Dual Banking System

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Abstract

Islamic banks in many countries have emerged as important component of financial system that contributes to the growth and development of the country's economy. They have proven to be a viable and competitive component of the overall financial system. In the dual banking system, Islamic banks have to be competitive to survive. One of the key to competitiveness is efficiency. This study will measure and compare the efficiency of Islamic and conventional banks in Indonesia using Data Envelopment Analysis (DEA) methodology. DEA is a non-parametric, deterministic methodology for determining the relative efficiency and managerial performance, based on the empirical data on chosen inputs and outputs of a number of decision making units. DEA allows us to compare the relative efficiency of banks by determining the efficient banks as benchmarks and by measuring the inefficiencies in input combinations (slack variables) in other banks relative to the benchmark. Intermediation approach will be applied. This study will identify the sources and level of inefficiency for each of the inputs and outputs of Islamic banks and conventional banks in Indonesia. The result shows that in overall, Islamic banking is relatively more efficient than conventional banking. This means that Islamic banks are competitive enough to compete with conventional banks. Islamic banking is technically more efficient, but less scale efficient than conventional banking. Internal inefficiency is the main source of disintermediation of conventional banking in Indonesia. Furthermore, accelerated expansion, organically and inorganically, is needed to improve scale and overall efficiencies of Islamic banking in Indonesia.

JEL Classification: C14, G21, G28
Keywords: *Banking, Islamic Banking, Efficiency, Data Envelopment Analysis*

1. Introduction

1.1 Background

Islamic banks have been in existence since early 1960s. The first Islamic bank established in 1963 as a pilot project in the form of rural savings bank in a small town of Egypt, Mit Ghamr. After that, Islamic banking movement came back to life in mid 1970s. The establishment of Islamic Development Bank in 1975 triggered the development of Islamic banks in many countries, such as Dubai Islamic Bank in Dubai (1975), Faisal Islamic Bank in Egypt and Sudan (1977), and Kuwait Finance House in Kuwait (1977). By the end of 2005, more than 300 institutions in over 65 jurisdictions are managing assets worth around US dollars 700 - 1000 billion in a Shariah compatible manner. A large part of the banking and Takaful concentration is in Bahrain Malaysia, and Sudan. A significant part of mutual funds concentrate in the Saudi Arabian and Malaysian markets in addition to the more advanced international capital markets.

In Indonesia, Islamic financial institutions started to emerge in early 1980s with the establishment of *Baitut Tamwil-Salman* in Bandung dan *Koperasi Ridho Gusti* in Jakarta. The first Islamic Bank in Indonesia, Bank Muamalat Indonesia, established in 1992. The development of Islamic bank has been accelerated since Bank Indonesia (the central bank of Indonesia) allowed conventional banks to open Islamic branch. This Islamic branch can offer Islamic banking products and services separated from its conventional parent with its own infrastructure, including staff and branches. By September 2007, Islamic banking system in Indonesia is represented by 3 Islamic banks and 24 Islamic branches, as well as 107 Islamic People's Credit Bank, with 679 offices and 1005 office channeling spread through out the country. They offer comprehensive and wide range of Islamic financial products and services and cater 1.7% of the banking market share. It is expected that the Islamic banking industry in Indonesia would reached 5% of the banking market share in 2008.

Despite these impressive achievements, Islamic banking in Indonesia has experiencing a slower growth in the past two years. There are many factors that could be attributed to this slower growth. One of these factors is the competitiveness of Islamic Banks within the banking system, since, in the dual banking system, they have to compete head to head with conventional banks. One important aspect of competitiveness is efficiency. Inefficiency would become a great disadvantage to face a fierce competition in the banking industry. To win the competition, Islamic banks should know the strengths and weaknesses of themselves as well as of their competitor. Know yourself and know your competitor is a halfway to success. Therefore, analysis of the efficiency of Islamic banks in comparison with conventional banks is very important to give a big picture of the strengths and weaknesses of Islamic banks and their competitors.

However, there are very limited study focusing on the efficiency of Islamic banks compare to the efficiency of conventional banks within a country or between countries, especially in Indonesia. Therefore, there should be a study that measures the efficiency of Islamic banks compare to that of conventional banks. These measures could be used as a guide for Islamic banks to improve their weaknesses to be able to compete head to

head with conventional banks and to achieve the intended goals to improve the market share. Moreover, the goal to strengthen Islamic banking structure could be achieved.

1.2 Objectives

The objective of this study is to compare the efficiency of Conventional and Islamic banks in Indonesia. This measurement will give the results of relative efficiency of individual bank compare to its peer group in every aspect considered.

1.3 Methodology

This study will apply Data Envelopment Analysis (DEA). DEA is a non parametric and non deterministic method to measure relative efficiency of production frontier, based on empirical data of multiple inputs and multiple outputs of decision making units. The non parametric nature of DEA makes it does not need assumption of the production function. DEA will generate production function based on data observed. Therefore, misspecification can be minimized. DEA can be applied to analyze different kind of inputs and outputs without initially assigning weight. Moreover, the efficiency produced is a relative efficiency based on observed data. Preference of decision maker can also be accommodate in the model.

2. Literature Review

Banking efficiency has been a very important issue in a transition economy. All countries in transition have been encounter at least with one banking crisis, and many with more than one crisis (Jemrić and Vujčić, 2002). Banking efficiency is also an important issue in a developing open economy, since most of them have also been faced a banking crisis in the past. Malaysia and Indonesia are no exception.

There are many studies about banking efficiency using parametric methods, but there are limited studies that measure banking efficiency using non-parametric method, particularly utilizing DEA application. Moreover, those studies mostly are applied to conventional banks. There is not much study that measures the efficiency of Islamic banks. Three of those studies that measure efficiency of Islamic banks using DEA application are conducted by Yudistira (2003), Ascarya and Yumanita (2006), Sufian (2006), and Ascarya and Yumanita (2007).

Yudistira measured the efficiency of 18 Islamic banks from various countries during 1997 – 2000 using intermediation approach. Ascarya and Yumanita (2006) measured the efficiency of Islamic banks in Indonesia during 2002 – 2004 using intermediation and production approaches. Sufian measured the efficiency of Islamic window banks in Malaysia during 2001 – 2004 using intermediation approach. Meanwhile, Ascarya and Yumanita (2007) compared the efficiency of Islamic banks in Malaysia and Indonesia using intermediation approach.

Other studies of banking efficiency using DEA are done by Jemrić and Vujčić (2002) and Hadad *et al.* (2003). Jemrić and Vujčić measured efficiency of banks in Croatia during 1995 – 2000 using production approach, while Hadad *et al.* measured efficiency of banks in Indonesia during 1995 – 2003 using asset approach.

The efficiency measurement, parametric or non-parametric, of financial institution like banks can be approached from their activities. There are three main approaches to explain the relationship between input and output of banks. Two approaches, namely, production (or operational) approach and intermediation approach, apply the classical microeconomic theory of the firm, while one approach, namely modern (or assets) approach applies modified classical theory of the firm by incorporating some specificities of banks' activities, namely risk management and information processing, as well as some form of agency problems, which are crucial for explaining the role of financial intermediaries (Freixas and Rochet, 1998).

The production approach describes banking activities as the production of services to depositors and borrowers using all available factors of production, such as labor and physical capital. The intermediation approach describes banking activities as intermediary in charge of transforming the money borrowed from depositors (surplus spending units) into the money lent to borrowers (deficit spending units). Meanwhile, the asset approach or the modern approach tries to improve the first two approaches by incorporating risk management, information processing, and agency problems into the classical theory of the firm. The summary of approaches applied by previous authors can be read in table 2.1.

Table 2.1 Summary of Approaches Applied

Author	Input	Output
Intermediation Approach		
Ascarya & Yumanita'07	Labor Costs; Fixed Assets; Total Deposits	Total Loans; Income
Sufian'06	Labor Costs[1]; Fixed Assets; Total Deposits	Total Loans; Income
Ascarya & Yumanita'06	Staff Costs; Fixed Assets; Total Deposits	Total Loans; Other Income; Liquid Assets
Yudhistira'03	Staff Costs; Fixed Assets; Total Deposits	Total Loans; Other Income; Liquid Assets
Jemrić & Vujčić'02	No. of Employees; Fixed Assets & Software; Total Deposits	Total Loans; Short-term Securities
Production Approach		
Ascarya & Yumanita'06	Interest Costs; Staff Costs; Operational Costs	Interest Income; Other Operational Income

Jemrić & Vujčić'02	Interest & Related Costs; Commissions for Services & Related Costs; Labor Related Adm. Costs; Capital Related Adm. Costs	Interest & Related Revenues; Non-interest Revenues
Asset Approach		
Hadad *et.al*'03.	Staff Costs to Total Assets; Interests Costs to Total Assets; Other Costs to Total Assets	Financing to Connected Party; Financing to Other Party; Financial Papers

From those studies it can be concluded that asset approach is an advanced approach that views bank not only has a classical function of intermediary, but also has other various new functions. Therefore, asset approach is not suitable to be applied to Islamic banking which focuses on extending financing to the real sector. Production approach can be applied for Islamic banking, since this approach views Islamic bank as a general business unit.

However, it becomes too general, so that the very essence of Islamic banking is not represented. Meanwhile, intermediation approach can be applied for Islamic banking since this approach views Islamic banking as an intermediary institution. However, the input and output variables should be selected carefully to really reflect the true essence of Islamic banking. Input and output variables selected by Sufian (2006) and Ascarya and Yumanita (2007) are the closest to the characteristics of Islamic banking. Some refined modifications might be needed to make the approach more representative.

3. Methodology

The methodology of Data Envelopment Analysis or DEA will be used in this study. This DEA application is derived from the theory of efficiency. Therefore, this chapter will first discuss the theory of efficiency, the measurement of efficiency, the connection of DEA to efficiency theory, and then discuss the details of DEA. Moreover, bank's efficiency can be measured from its functions. Three approaches to measure the efficiency of bank's functions are intermediation approach, production approach, and modern or asset approach.

3.1 The Theory of Efficiency

The concept of efficiency rooted from the microeconomic concept, namely, consumer theory and producer theory. Consumer theory tries to maximize utility or satisfaction from individual point of views, while producer theory tries to maximize profit or minimize costs from producer point of views. In the producer theory, there is a production frontier line that describes the relationship between inputs and outputs of production process. This production frontier line represents the maximum output

from the use of each input. It also represents the technology used by a business unit or industry. A business unit that operates on the production frontiers is technically efficient. Figure 3.2 shows the production frontier line.

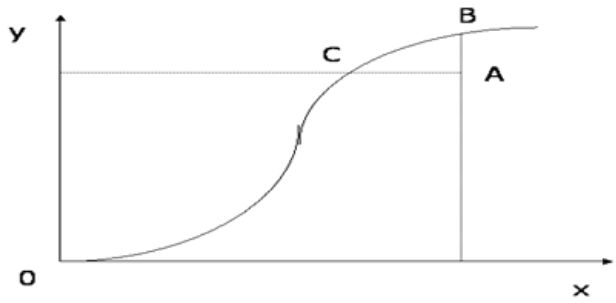

Figure 3.2 Production Frontier Line

Considered from economic theory, there are two different types of efficiency, namely technical efficiency and economic efficiency. Economic efficiency has macro economic point of view, while technical efficiency has micro economic point of view. The measurement of technical efficiency limited to technical and operational relationship in a conversion process of input to output. Whereas, in economic efficiency price can not be considered as given, since price can be influenced by macro policy (Sarjana, 1999).

According to Farell (1957), efficiency comprises of two components, namely: a) Technical efficiency describes the ability of a business unit to maximize output given certain amount of input; and b) Allocative efficiency describes the ability of a business unit to utilize inputs in optimal proportion based on their price. When the two types of efficiency combined, it will produce economic efficiency. A company is considered to be economically efficient if it can minimize the production costs to produce certain output within common technology level and market price level.

Kumbhaker and Lovell (2000) argue that technical efficiency is only one of many components economic efficiency as a whole. Nevertheless, in order to achieve economic efficiency a company should produce maximum output with certain amount of input (technical efficiency) and produce output with the right combination within certain price level (allocative efficiency).

3.2 The Measurement of Efficiency

In the past few years, performance measurement of financial institution has increasingly focused on frontier efficiency or X-efficiency (rather than scale efficiency), which measures deviation in performance of a financial institution from the best practices or costs-efficient frontier that depicts the lowest production costs for a given level of output. X-efficiency stems from technical efficiency, which gauges the degree of friction and waste in the production processes, and allocative efficiency, which measures the levels of various inputs.

Frontier efficiency is superior for most regulatory and other purposes to the standard financial ratios from accounting statements, such as, return on asset (ROA) or cost/revenue ratio, that are commonly employed by regulators, managers of financial institutions, or industrial consultants to assess financial performance. This is because frontier efficiency measures use programming or statistical techniques that removes the effects of differences in input prices and other exogenous market factors affecting the standard performance ratios in order to obtain better estimates of the underlying performance of the managers (Bauer, *et al.*, 1998).

Frontier efficiency has been used extensively in regulatory analysis to measure the effects of merger and acquisition, capital regulations, deregulation of deposit rates, removal of geographic restrictions on branching and holding company acquisitions, etc., on financial institution performance. Furthermore, Bauer *et al.* (1998) argue that the main advantage of frontier efficiency over other indicators of performance is that it is an objectively determined quantitative measure that removes the effects of market prices and other exogenous factors that influence observed performance.

Tools to measure efficiency could be parametric and non-parametric. Parametric approach to measuring efficiency uses stochastic econometric and tries to eliminate the impact of disturbance to inefficiency. There are three parametric econometric approaches, namely: 1) Stochastic frontier approach (SFA); 2) Thick frontier approach (TFA); and 3) Distribution-free approach (DFA). These approaches differ in the assumptions they make regarding the shape of the efficient frontier, the treatment of random error, and the distributions assumed for inefficiencies and random error. The parametric methods have disadvantages relative to the non-parametric methods of having to impose more structure on the shape of the frontier by specifying a functional form for it. However, an advantage of the parametric methods is that they allow for random error, so these methods are less likely to misidentify measurement error, transitory differences in cost, or specification error for inefficiency (Bauer, *et al.*, 1998).

Meanwhile, non-parametric linear programming approach to measuring efficiency uses non-stochastic approach and tends to combine disturbance into inefficiency. This is built based on discovery and observation from the population and evaluates efficiency relative to other units observed. One of the non-parametric approaches, known as data envelopment analysis (DEA), is a mathematical programming technique that measures the efficiency of a decision making unit (DMU) relative to other similar DMUs with the simple restrictions that all DMUs lie on or below the efficiency frontier (Seiford and Thrall, 1990). The performance of a DMU is very relative to other DMUs, especially those that cause inefficiency. This approach can also determine how a DMU can improve its performance to become efficient.

DEA was first introduced by Charnes, Cooper, and Rhodes in 1978. Since then its utilization and development have grown rapidly including many banking-related applications. The main advantage of DEA is that, unlike regression analysis, it does not require an a priori assumption about the analytical form of the production function so imposes very little structure on the shape of the efficient frontier. Instead, it constructs the

best practice production function solely on the basis of observed data, and therefore the possibility of misspecification of the production technology is zero. On the other hand, the main disadvantage of DEA is that the frontier is sensitive to extreme observations and measurement error (the basic assumption is that random errors do not exist and that all deviations from the frontier indicate inefficiency). Moreover, there exists a potential problem of "self identifier" and "near-self-identifier".

2.3 Data Envelopment Analysis

Data envelopment analysis or DEA is a methodology for analyzing the relative efficiency and managerial performance of productive or decision making units (DMUs), having the same multiple inputs and multiple outputs. DEA allows us to compare the relative efficiency of (Islamic or conventional) banks by determining the efficient banks as benchmarks and by measuring the inefficiencies in input combinations (slack variables) in other banks relative to the benchmark (Jemrić and Vujčić, 2002). Data envelopment analysis first introduced by Charnes, Cooper, and Rhodes in 1978 and 1979. Subsequently, DEA approach has become increasingly popular in operational researches and management science. DEA provides an alternative approach to regression analysis. While regression analysis relies on central tendencies, DEA is based on extremal observations. While the regression approach assumes that a single estimated regression equation applies to each observation vector, DEA analysis each vector separately, producing individual efficiency measures relative to the entire set under evaluation (Jemrić and Vujčić, 2002).

DEA is a non-parametric, deterministic methodology for determining the relative efficient production frontier, based on the empirical data on chosen inputs and outputs of a number of DMUs. From the set of available data, DEA identifies reference points (relatively efficient DMUs) that define the efficient frontier (as the best practice production technology) and evaluate the inefficiencies of other, interior points (relatively inefficient DMUs) that are below the efficient frontier (Jemrić and Vujčić, 2002). Besides producing efficiency value for each DMU, DEA also determines DMUs that are used as reference for other inefficient DMUs.

$$Efficiencyof\ DMU_o = \frac{\sum_{k=1}^{p} \mu_k y_{ko}}{\sum_{i=1}^{m} v_i x_{io}}$$

DMU = decision making unit
n : number of DMU evaluated
m : different inputs
p : different outputs
x_{ij} : number of input i consumed by DMU_j
y_{kj} : number of output k produced by DMU_j

There are two DEA models that are most frequently used, namely, the CCR model (Charnes, Cooper, and Rhodes, 1978) and the BCC model (Banker, Charnes, and

Cooper, 1984). The main difference between these two models is the treatment of return to scale. The CCR assumes that each DMU operates with constant return to scale, while the BCC assumes that each DMU can operate with variable return to scale.

CCR model was developed by Charnes, Cooper, and Rhodes in 1978. This model assumes that the ratio of additional input and output is equal (constant return to scale). It means that an additional input of x times will produce additional output of x times. Another assumption is that every DMU operates on an optimal scale. Therefore the efficiency of DMU can be measured as a maximum of a ratio weighted outputs to weighted inputs. Meanwhile, BCC model was developed by Banker, Charnes, and Rhodes in 1984. It is an improved model of previous CCR model.

This model assumes that every DMU has not (or not yet) operated on optimal scale. This model assumes that the ratio of additional input and output is not equal (variable return to scale). It means that an additional input of x times will not produce additional output of exactly x times, but it can be less or greater than x times.

Generally, the efficiency score of CCR model for each DMU will not exceed the efficiency score of BCC model. This is because BCC model analysis each DMU "locally" (i.e. compared to the subset of DMUs that operate in the same region of return to scale) rather than "globally (Jemrić and Vujčić, 2002). Furthermore, a business or DMU, like bank, has similar characteristics one to another. However, each bank usually varies in size and production level. This indicates that size matters in relative efficiency measurement. CCR model represents (the multiplication of) pure technical and scale efficiencies, while BCC model represents technical efficiency only. Therefore, the relative scale efficiency is a ratio of CCR model and BCC model.

$$S_k = q_{k,CCR}/q_{k,BCC}$$

If the value of S = 1 means that the DMU operates in the best relative scale efficiency, or in optimal size. If the value of S is less than 1 means that there still exists scale inefficiency of the DMU. Therefore, the value of (1-S) represents the level of inefficiency of the DMU. Consequently, when a DMU is efficient under BCC model, but inefficient under CCR model, this means that the DMU has scale inefficiency. This is because the DMU is technically efficient, so that the inefficiency that exists comes from the scale.

OE = TE x SE --> SE = OE/TE

OE: overall efficiency measured by CCR Model

TE: technical efficiency measured by BCC Model

4. Data Analysis

4.1 Data Description

The data needed for this empirical analysis comes from financial statements of conventional and Islamic banks in Indonesia in the period of 2003 – 2005. The type

and number of banks in the analysis can be read on table 5.1. Conventional banks included in the analysis are those that have assets less than US$.1 billion, domestic and foreign owned, to be comparable to the size of Islamic banks. Meanwhile, Islamic banks included in this analysis are similar to those used in the previous analysis, i.e., full fledged Islamic bank and conventional bank that have Islamic branch or Islamic business unit (domestic and regional development banks).

Table 5.1 Data of Conventional and Islamic Banks

	2003	2004	2005
Conventional Bank			
Domestic	62	57	31
Foreign	20	17	12
Regional Development	20	23	20
Islamic Bank			
Domestic Full Fledged	2	3	3
Domestic Full Branch (included)	7	10	16
Domestic Full Branch (no data)	1	5	3

3.2 Results and Analysis

The efficiency of Conventional and Islamic banks in Indonesia is measured in several ways by applying DEA method. To make a comparable measurement, conventional and Islamic Banks are pooled together to form a common frontier. First, all banks are measured for each year from 2003 to 2005. Second, all banks for all years are pooled to measure overall efficiency. Table 5.2 reports the sample statistics of the various efficiency scores of Conventional and Islamic banks for the years 2003 (Panel A), 2004 (Panel B), and 2005 (Panel C).

Table 5.2 Summary Statistics of Measurement

Efficiency Measures	Mean	Minimum	Maximum	Std Dev
Panel A. 2003				
Overall Efficiency	0.726	0.159	1.000	0.208
Pure Technical Efficiency	0.769	0.169	1.000	0.212
Scale Efficiency	0.949	0.430	1.000	0.098
Islamic Bank				
Overall Efficiency	0.751	0.363	1.000	0.211
Technical Efficiency	0.835	0.378	1.000	0.226
Scale Efficiency	0.907	0.686	1.000	0.114
Conventional Bank				

Overall Efficiency	0.724	0.159	1.000	0.209
Technical Efficiency	0.763	0.169	1.000	0.210
Scale Efficiency	0.953	0.430	1.000	0.096
Panel B. 2004				
Overall Efficiency	0.628	0.172	1.000	0.190
Pure Technical Efficiency	0.677	0.208	1.000	0.196
Scale Efficiency	0.931	0.382	1.000	0.119
Islamic Bank				
Overall Efficiency	0.672	0.172	0.891	0.190
Technical Efficiency	0.779	0.450	1.000	0.150
Scale Efficiency	0.851	0.382	0.996	0.184
Conventional Bank				
Overall Efficiency	0.622	0.204	1.000	0.190
Technical Efficiency	0.664	0.208	1.000	0.198
Scale Efficiency	0.942	0.514	1.000	0.105
Panel C. 2005				
Overall Efficiency	0.717	0.303	1.000	0.201
Technical Efficiency	0.766	0.308	1.000	0.203
Scale Efficiency	0.940	0.466	1.000	0.113
Islamic Bank				
Overall Efficiency	0.811	0.303	1.000	0.222
Technical Efficiency	0.886	0.406	1.000	0.191
Scale Efficiency	0.909	0.624	1.000	0.132
Conventional Bank				
Overall Efficiency	0.688	0.307	1.000	0.187
Technical Efficiency	0.730	0.308	1.000	0.193
Scale Efficiency	0.950	0.466	1.000	0.106

The results suggest that overall efficiency of conventional banks has declined in 2004, but has exhibited improvement in 2005 due to the improvement in technical efficiency and reach the mean of only 68.8% (Panel C). The decomposition of overall efficiency into its pure technical and scale efficiency components suggest that technical inefficiency dominates scale inefficiency of conventional banks for all years. Technical efficiency has been declining in 2004, but has been improved to 73.0% in 2005 (Panel C), while scale efficiency has always been high and stood at 95.0% in 2005 (Panel C). This implies that during the period of study, conventional banks have been operating at scale efficient, but technically inefficient (see figure 5.1).

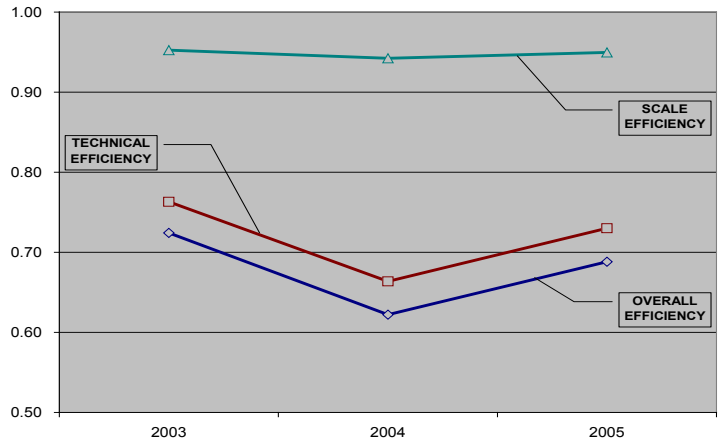

Figure 5.1 Efficiency of Conventional Bank in Indonesia

Meanwhile, the overall efficiency of Islamic banks has declined in 2004, but has improved significantly in 2005 to reach the highest mean of 81.0% in 2005 (Panel C), due to the decline and improvement in both technical and scale efficiencies.

The decomposition of overall efficiency into its pure technical and scale efficiency components suggest that both technical and scale inefficiencies have declined in 2004, but have improved in 2005 to reach 89.0% and 91.0%, respectively. This shows that during aggressive expansion from 2003 to 2004 all efficiency deteriorated, while during more moderate expansion in 2005 all efficiency improved significantly (see Figure 5.2).

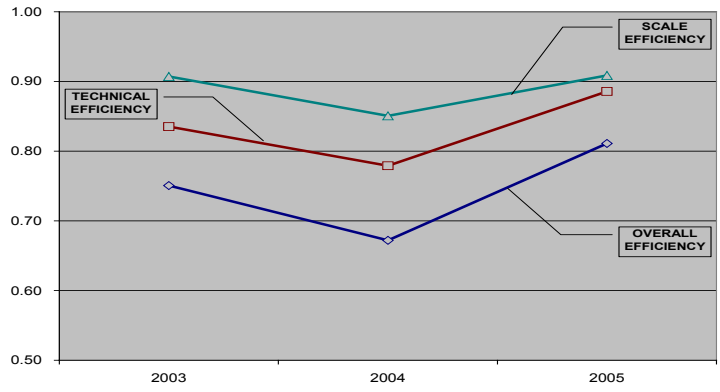

Figure 5.2 Efficiency of Islamic Bank in Indonesia

Table 5.3 Return to Scale

	2003		2004		2005	
	Bank	**% Share**	**Bank**	**% Share**	**Bank**	**% Share**
Panel 1. All						
CRS	24	21.6	9	8.2	17	20.7
DRS	44	39.6	74	67.3	40	48.8
IRS	43	38.7	27	24.5	25	30.5
TOTAL	111	100.0	110	100.0	82	100.0
Panel 2. Islamic Bank						
CRS	3	33.3	1	7.7	9	47.4
DRS	5	56.6	10	76.9	9	47.4
IRS	1	11.1	2	15.4	1	5.3
TOTAL	9	100.0	13	100.0	19	100.0
Panel 3. Conventional Bank						
CRS	21	20.6	8	8.2	8	12.7
DRS	39	38.2	64	66.0	31	49.2
IRS	42	41.2	25	25.8	24	38.1
TOTAL	102	100.0	97	100.0	63	100.0
Total Bank	111		110		82	
Islamic Bank	9		13		19	
Conventional Bank	102		97		63	

Conventional banks in Indonesia have very low percentage of less than 14% that operated efficiently (CRS) in 2005. The number of conventional banks in Indonesia operating at efficient scale has decreased since 2004, and only 8 out of 63 conventional banks have operated efficiently in 2005. Almost 40% conventional banks have operated at the wrong scale (IRS). Conventional banks experiencing economies of scale (IRS) have also decreased since 2004, and recorded 24 out of 63 in 2005. Meanwhile, about 50% conventional banks have operated inefficiently (DRS) in 2005. Conventional banks experiencing diseconomies of scale (DRS) have increased in 2004, but have decreased to 31 out of 63 banks in 2005 (see figure 5.3).

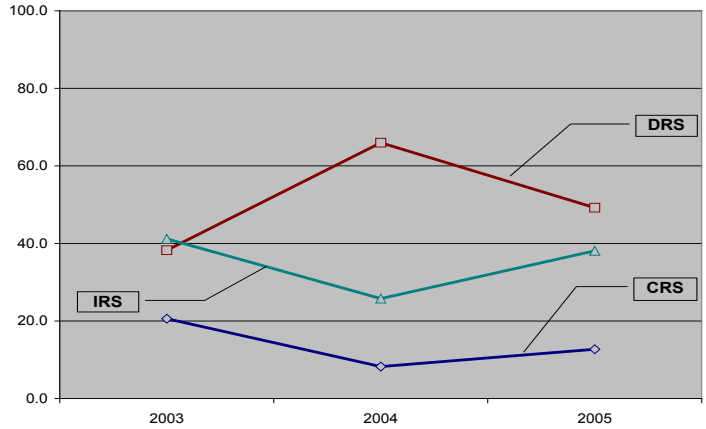

Figure 5.3 Return to Scale of Conventional Bank in Indonesia

Meanwhile, Islamic banks in Indonesia operating at efficient scale (CRS) have been increased significantly in 2005, after a decrease in 2004. Nine out of 19 Islamic banks have operated efficiently in 2005. Islamic banks experiencing diseconomies of scale (DRS) have been increased and reach 9 out of 19 Islamic banks in 2005, while Islamic banks experiencing economies of scale (IRS) have always been low at only one bank in 2005 (see figure 5.4). Overall, from table 5.4, it can be concluded that half of Indonesian Islamic banks have been operating at scale efficient, while the other half have been operating at diseconomies of scale.

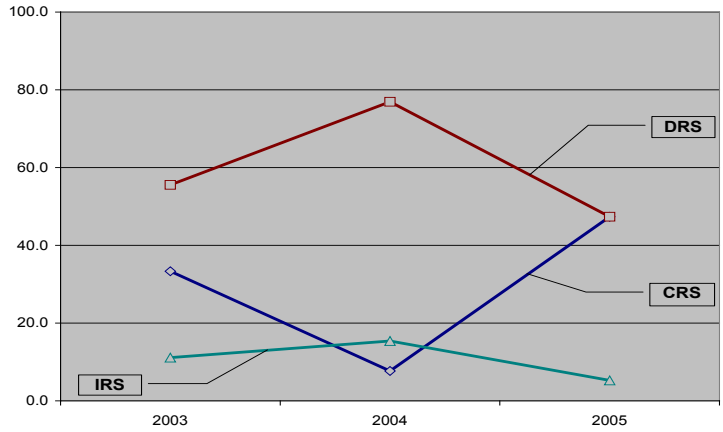

Figure 5.4 Return to Scale of Islamic Bank in Indonesia

Other than generating efficient frontier, one salient feature of DEA is that it can generate set of references for inefficient DMUs (conventional and Islamic banks) to benchmark to. Table 5.4 shows conventional and Islamic banks that are referenced by other inefficient banks in 2005. Six out of 63 conventional banks and 6 out of 19 Islamic banks become reference banks for other inefficient banks to make improvements. Within the best five, there are one conventional bank and four Islamic banks on efficient frontiers that set as benchmarks for other inefficient banks to make improvements. Conventional banks have been benchmarked 145 times, while Islamic banks have been benchmarked 132 times. Bank UFJ Indonesia has been the most referred conventional bank, while Bank DKI, Bank Muamalat Indonesia, and Bank IFI have been the most referred Islamic banks.

Table 5.4 Reference Set

No	Bank	Count	No	Bank	Count
1	*Conventional Bank*	85	7	Full-fledged Islamic Bank	19
2	Regional Islamic Bank	28	8	*Conventional Bank*	15
3	Full-fledged Islamic Bank	27	9	*Conventional Bank*	10
4	Full-branch Islamic Bank	27	10	*Conventional Bank*	9
5	Full-branch Islamic Bank	23	11	Full-branch Islamic Bank	8
6	*Conventional Bank*	20	12	*Conventional Bank*	6

Another useful feature of DEA is that it can identify the source of inefficiency for each DMUs. In general, the source of inefficiency for Indonesian conventional banks in 2005 can be read in Figure 5.5. The most efficient element of Indonesian conventional banking is other income, while the most inefficient element is labor costs. From 31.2% inefficiency occurred in 2005, 37.08% can be attributed to labor costs or personnel expenses. This means that Indonesian conventional banks should give priority to improve their efficiency in human resources.

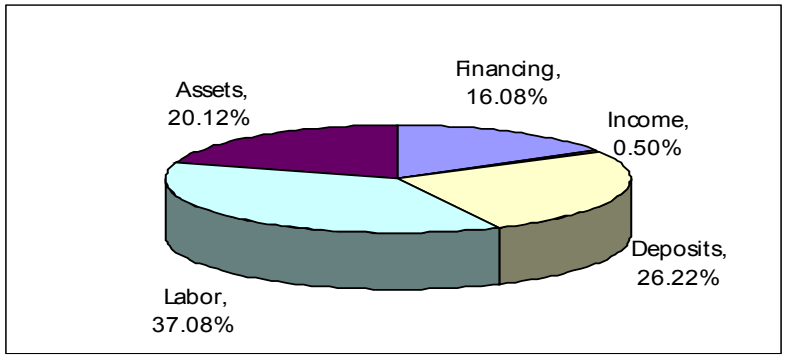

Figure 5.5 Potential Improvements of Conventional Banks

Moreover, other elements of input (deposits and assets) and output (financing) can also be improved further in less priority than labor. Financing or loan extended can still

be improved to improve disintermediation problem, since current loan to deposit ratio (LDR) has only reached around 60%. This picture has proved that disintermediation problem was not because of high interest rate, but because of internal problem of inefficiency of conventional banks.

Meanwhile, the source of inefficiency for Indonesian Islamic banks in 2005 can be read in Figure 5.6. Differ from conventional banks' case, the most efficient element of Indonesian Islamic banking is financing, while the most inefficient element is also labor costs. From 19.0% inefficiency occurred in 2005, 29.56% can be attributed to personnel expenses, since the supply of qualified human resource is very limited compare to the growing demand of this emerging industry. Therefore, Indonesian Islamic banks should give more attention to human resource to improve their efficiency. Moreover, other elements of input can also be improved further in less priority than human resource.

Financing is the most efficient element of Islamic banks, since the figure of financing to deposit ratio (FDR) has always been high above 100%. This also could imply that there was a problem in fund mobilization activities that were not fast enough to support the pace of financing activities. This is a classic problem of a dual financial/ banking system with floating customer as majority. When the interest rate moves up, floating customers will move their deposits (mostly corporate) from Islamic banking to conventional banking searching for higher return.

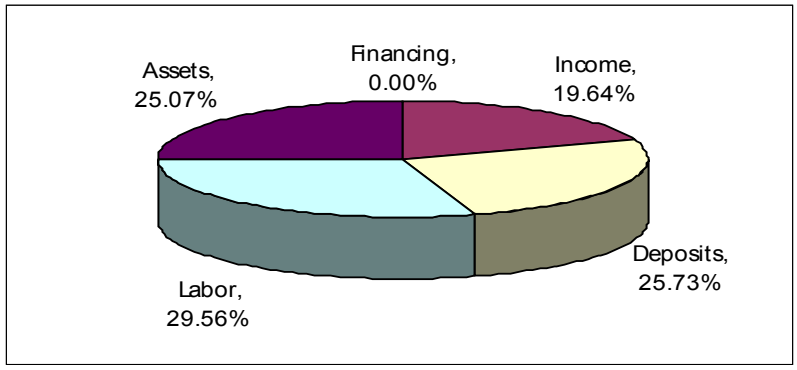

Figure 5.6 Potential Improvements Islamic

In sum, Islamic banks are relatively more overall and technical efficient, but relatively less scale efficient than conventional banks. Again, this can be attributed, among others, to efficient financing activities where FDR has always been high above 100 percent, reflecting high contribution of Indonesian Islamic banking to the real sector. However, since Islamic banking in Indonesia is still young in age, scale efficiency is still lower than more mature conventional banking. Further expansion, organically and inorganically, is still needed to improve its overall and scale efficiency.

5. Conclusions and Recommendations

5.1 Conclusions

From the comparison of conventional and Islamic banks in Indonesia, it can be summarized several important points, as follows:

1. Islamic banks are relatively more overall and technical efficient, but relatively less scale efficient than conventional banks. These mean that Islamic banks are competitive enough to compete with conventional banks.
2. Half of conventional banks operated inefficiently. The source of inefficiency and disintermediation was not because of high interest rate, but because of internal problem of inefficiency of conventional banks.
3. Labor was a common problem of conventional and Islamic banks in Indonesia, which should be given top priority for improvement.
4. Islamic banks need further expansion, organically and inorganically, to improve its scale and overall efficiency.

4.2 Recommendations

1. Islamic banks in Indonesia are still young and small, so that expansion should be the number one priority to reach economies of scale and critical mass in the shortest time possible.
2. Other than organic expansion that naturally slow, to accelerate expansion Islamic banks in Indonesia (i.e. the government) should also have the political will, commitment, and courage to expand inorganically by converting one state owned conventional bank into Islamic bank, preferably the one that have large networks in rural areas throughout Indonesia.
3. Human resource has always been a problem in Indonesian Islamic banking. The improvement of the human resources could be done with two strategies, namely, short term and long term. In the short term, education and training should be conducted for every level of management. In the long term, special fields of study in Islamic economic and finance should be opened in graduate and undergraduate levels, as well as inserting Islamic economic and finance curriculum in high school.
4. The improvement of the human resources from the regulator side could be done by requiring banks to spend minimum budget for human resources development. Moreover, the government or regulator could give incentives by financing participation in human resources development. The regulator could also provide free training for Islamic bank officers.

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