

EVALUATION OF BANK MERGER IN INDONESIA: Lessons from Parametric Cost Function

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Abstraksi

Merger dan akuisisi telah menjadi pilihan utama dalam pelaksanaan konsolidasi perbankan yang direkomendasikan dalam rangka penguatan industri perbankan di Indonesia. Proses merger dan konsolidasi ini membutuhkan biaya besar dan mengandung resiko, dua factor yang menyebabkan penurunan tingkat efisiensi bank yang telah melakukan merger.

Penelitian ini menunjukkan bahwa proses merger menurunkan efisiensi bank, meski berdampak positif terhadap stabilitas dari efisiensi bank tersebut. Ini menunjukkan manajemen bank yang lebih baik setelah merger dan peningkatan economies of scale. Sebelum merger, bank harus meningkatkan efisiensi terlebih dahulu, misalnya dengan meningkatkan produktivitas tenaga kerja dan peningkatan utilisasi teknologi. Paper ini menunjukkan, jika skor DFA 0,7, bank dapat meraih keuntungan economies of scale, economies of scope dan technical progress yang dapat meningkatkan efisiensi.

Beberapa rekomendasi yang diusulkan, pertama, Bank Indonesia seharusnya mengarahkan manajemen perbankan dalam hal pengalokasian biaya operasional secara optimal. Kedua, harus ada upaya untuk mengembalikan tingkat efisiensi bank pada level efisiensi semula. Ketiga, Bank Indonesia, harus mengarahkan perbankan untuk mengabsorpsi teknologi sejauh mungkin. Keempat, efisiensi internal merupakan aspek penting yang harus diraih sebelum proses merger dilakukan.

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Keywords : X-efficiency, Merger, Seemingly Unrelated Regression, Cost function, Economies of scale, Bank.

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I. INTRODUCTION

A mechanism, which could be used to figure out the effectiveness of bank merger activities, is profoundly needed by the government in order to evaluate the results of this merger policy. According to Kane (2000), there are three problems that regulator must solve in evaluating merger. First, regulator has to settle on the objective of the merger. Eight reasons on why merger are to be implemented are adopted by Kane (2000) from Dermine (1999). They are (1) cost-based economies of scale, (2) brand-based-economies of scale, (3) revenue-based economies of scale, (4) safety-net based economies of scale, (5) revenue-based economies of scope, (6) X-efficiency, (7) market power, and (8) marginal agency cost, which is the widening of size in order to strengthen the managerial entrenchment and increase the executives' salaries. The second problem is that regulator has to estimate whether every combination of the reasons above could improve social welfare. Social cost caused by the increasing of political influence and monopoly power shall be managed as small as possible. Third, the authority must figure out on what and how intervention should be done in order to reduce the unexpected effects.

This paper is examining economic-based thinking of bank merger. It is explaining the methodology and empirical findings derived from the estimation of cost function, which is comparing banking before and after merger in Indonesia. This writing is also giving some recommendations in order to create a better implementation of bank merger in Indonesia, so that banks can reach their objectives.

Organization of this paper is as follows: part one is the introduction, part two is the explanation about the economic-based thinking of merger, part three is the explanation about the estimation of parametric cost function, which is the benchmark in getting efficiency measurement. Part four it the determination of X-efficiency and part five is the evaluation of merger in Indonesia, based on the result of cost function estimation and the efficiency calculation derived from cost function. Part six is the conclusion and policy recommendation. The last part is recommendation about future research that shall be done in order to reevaluate the merger activities in Indonesia.

II. ECONOMIC-BASED REASONS OF MERGER

In principle, the decision to merger or to acquire a firm should be motivated by the desire to increase the wealth of shareholders of acquiring firm. According to Dermine (1999), merger and acquisitions in banking are raising policy issues for three major reasons. The first is concentration, market power and too large interest margins which hurt the real economy.

Secondly, there is a concern that large banks will devote less attention to lending to small & medium size firms. The third, threat of systemic stability, under the premise that the default of large bank would be costly (or that a costly bail out would be necessary), it would appear that small countries are facing a comparative disadvantage. In Dermine (1999) there are 11 economic reasons that 8 among are stated in Kane (2000), which are explained above. Economics reasons of bank merger are:

- (1) Cost-based economies of scale: cost efficiency is achieved by lowering average cost per unit of output through expanding a single line of business.
- (2) Brand-based economies of scale: large size will allow obtaining brand recognition at a lower cost. This is a special type of cost-based economies of scale, related to marketing costs per unit of product sold.
- (3) Revenue-based economies of scale: Size and a large capital base will allow underwriting large loans or securities issues, having a positive impact on the demand for underwriting services.
- (4) Safety net-based economies of scale: as a bank becomes very large, it is more likely to be qualified as 'too big too fail' by the public authorities. This would provide a competitive advantage in terms of both a lower funding cost for a given level of capital and risk, and larger positions accepted by counterparties.
- (5) Cost-based economies of scope: cost efficiencies achieved by offering a broad range of products or services to a customer base.
- (6) Sales (revenue)-based economies of scope: the hope of cross-selling (selling product other than banking product, such as insurance) new products to an existing customer base.
- (7) Financial diversification-based economies of scope: standard portfolio theory shows that a portfolio of imperfectly correlated risk will reduce the overall volatility of profit. Financial diversification can be obtained through the offering of a range of products, to servicing different customers groups, or through spreading credit risk across industries or regions.
- (8) X-efficiency: X-efficiency refers to the fact that given a current volume of output, a firm is not operating with maximum cost efficiency, i.e. it has too high cost structure. This source of efficiency is often cited as the prime motivation for domestic merger, as two banks merging can more easily coordinate the reduction of the size of too large branch network.
- (9) Market Power: horizontal merger which reduces the number of firms operating into one market may lead to less competition and higher margins.

- (10) Defense-based economies of scale: Achieving size (capital clout) that acts as a defensive measure against takeover.
- (11) The “quite life” or hubris hypotheses: the argument is that higher profit driven by economies of scale or market power can be captured by management in the forms of higher salaries, perks or reduction of risk (the “quite life”) hypothesis.

Meanwhile, Walter (2004) emphasizes five reasons of why the financial institution merge. The first reason is market extension. The classic motivation for merger & acquisition transactions in the financial services sector is market extension. A firm wants to expand geographically into markets in which it has traditionally been absent or weak. Or it wants to broaden its product range because it sees attractive opportunities that may be complementary to what it is already doing. Or it wants to broaden client coverage, for similar reasons. The second is economies of scale. If economies of scale prevail, increased size will help create shareholder value and systemic financial efficiency. If diseconomies prevail, both will be destroyed. The third reason is cost economies of scope. Cost economies of scope suggest that the joint production of two or more products or services is accomplished more cheaply than producing them separately. Bank can create cost savings through the sharing of transactions systems and other overheads, information and monitoring cost, and the like. The fourth reason is operating efficiencies. The reasons involve differences in production functions, efficiency, and effectiveness in the use of labor and capital; sourcing and application of available technology; as well as acquisitions of inputs, organizational design, compensation, and incentive system – that is, in just plain better management-what economists call X-efficiencies. Finally, the last reason is revenue economies of scope. On the revenue side, economies of scope attributable to cross-selling arise when the overall cost to the buyer of multiple financial services from a single supplier is less than the cost of purchasing them from separate suppliers. These expenses include the cost of the service plus information, search, monitoring, contracting, and other transaction cost. Revenue-diseconomies of scope could arise, for example, through agency cost that may develop when the multiproduct financial firm acts against the interests of the cent in the sale of one service in order to facilitate the sale of another, or as a result of internal information transfers considered inimical to the client’s interest. Commercial banks may also benefit from economies of scope by underwriting and selling insurance.

III. ESTIMATION OF PARAMETRIC COST FUNCTION

Measurement the efficiency that is derived from cost function estimation is more comprehensive. By estimating the cost function, behavior of the banks in allocating their cost can be analyzed based on properties and assumptions of cost function. Besides, cost

function does not only give efficiency measurement of the bank. In general, from cost function it can be derived other measurements that indicate efficiency of the bank, such as economies of scale, economies of scope, and technical progress.

Indonesian government has issued many regulations that are relevant to the efficiency of banking especially after crisis. One of the regulations is the forming of merged banks. Thus, making an efficiency measurement is getting more important to the Indonesian banking.

This paper is providing tools to evaluate whether bank merger policy has reached its objectives. It is done by estimating the cost function as a frontier or a benchmark in calculating efficiency of a bank in Indonesia.

Theoretically, the cost function can be derived from behavior of the bank that minimizes its cost:

$$\begin{aligned} \text{Minimize } C &= \mathbf{w}\mathbf{x} \\ \text{Subject to } f(\mathbf{x}) &= y \end{aligned} \tag{V.1}$$

Where: C = Cost

\mathbf{w} = input price vector

\mathbf{x} = input quantity vector

y = output quality

Total cost function of banking industry can be written as this following:

$$C(\mathbf{w}, y) = \mathbf{w} \mathbf{x}(\mathbf{w}, y) \tag{V.2}$$

The function above is the minimum cost to produce y unit of output or the lowest cost to produce an output.

Properties of cost function (Varian, 1992) are as follows:

1. Non-decreasing in \mathbf{w} . If $\mathbf{w}' \geq \mathbf{w}$, then $c(\mathbf{w}', y) \geq c(\mathbf{w}, y)$
2. Homogeneous of degree 1 in \mathbf{w} . $c(t\mathbf{w}, y) = tc(\mathbf{w}, y)$ for $t > 0$
3. Concave in w. $c(t\mathbf{w} + (1-t)\mathbf{w}', y) \geq tc(\mathbf{w}, y) + (1-t)c(\mathbf{w}', y)$, for $0 \leq t \leq 1$.
4. Continuous in w. $c(\mathbf{w}, y)$ is a continuous function of w, for $\mathbf{w} \geq 0$.

Cost function used in this paper is Fourier Flexible (FF) function that was first developed by Gallant (1981, 1982). This function can reduce bias created by Translog form, because Translog function embedded in FF as a special case. FF form represents a semi non-parametric approach that estimates function by using data in order to come up with inter-variable relation when the real form is unknown.

Fourier Flexible with two trigonometric terms that will be estimated has a form as follow:

$$\begin{aligned}
 \ln TC = & \alpha_0 + \sum_{i=1}^2 \alpha_i \ln Q_i + \sum_{i=1}^3 \beta_i \ln P_i + t_1 T \\
 & + \frac{1}{2} \left[\sum_{i=1}^2 \sum_{j=1}^2 \delta_{ij} \ln Q_i \ln Q_j + \sum_{i=1}^3 \sum_{j=1}^3 \gamma_{ij} \ln P_i \ln P_j + t_{11} T^2 \right] \\
 & + \sum_{i=1}^3 \sum_{j=1}^2 \rho_{ij} \ln P_i \ln Q_j + \sum_{i=1}^3 \psi_{it} \ln P_i T + \sum_{j=1}^2 \theta_{jt} \ln Q_j T + \sum_{i=1}^7 \text{stat}_i \\
 & + \sum_{i=1}^2 [a_i \cos(z_i) + b_i \sin(z_i)] + \sum_{i=1}^2 \sum_{j=1}^2 [a_{ij} \cos(z_i + z_j) + b_{ij} \sin(z_i + z_j)] + \varepsilon
 \end{aligned} \tag{V.3}$$

Those properties of cost function can be fulfilled if cost function is restricted by using input share equations, which is a first derive of cost function on each input values. General form of input share equation is as follow:

$$S_n = \frac{\partial \ln TC}{\partial \ln P_n} = \beta_n + \sum_k \gamma_{nk} \ln P_n + \sum_m \rho_{nm} \ln q_n \tag{V.4}$$

Where:

S_n = input cost share gained by dividing the n quantity input with total cost

Cost function equation is simultaneously estimated by using SUR (Seemingly Unrelated Regression) method and similar coefficients are restricted, so that they have same values.

This paper is using asset approach (intermediate approach) in defining input and output that will be used, based on definition that banks are intermediaries whose task is converting deposits into credits, so that the deposits are used as input, not as output. This writing will be using three types of input and two types of output. Inputs used in this writing are labor, deposit, clearing and fund, and physical capital. While outputs used are credits to the banks and credits to other bodies. For estimating the model above, data used is the quarterly financial report, which was published in mass media from June 1994 to June 2003.

IV. ESTIMATION OF X-EFFICIENCY

On this paper there are two types of approach used in estimating efficiency of a bank. The first approach is called Stochastic Frontier Approach (SFA) and the second one is Distribution

Free Approach (DFA). Basic models of these two approaches assume that total cost spent by a bank is different from the optimal cost because of random noise v_i and inefficiency component u_i . Total cost of the i bank can be written as follow:

$$\ln TC_n = f(\ln Q_i, \ln P_i) + \varepsilon_n \tag{V.5}$$

Where:

TC_i = total cost of bank n

Q_i = output quantity

P_i = input price

e_i = error component which is consist of two parts in form of:

$$\varepsilon_i = u_i + v_i \tag{V.6}$$

v_i = uncontrollable random factor

u_i = controllable error factor (inefficiency)

Especially for SFA approach, assumptions used by equation (IV.6) above are:

(i) $v_i \sim \text{idd } N(0, \sigma^2_v)$

(ii) $u_i \sim \text{idd } N^+(0, \sigma^2_u)$

(iii) v_i and u_i are independently distributed to each other and also to independent variables

SFA inefficiency is gained by using equation that was stated in Aigner, Lovell and Schimdt (1977); Jondrow, Lovell, Materov and Schimdt (1982); which is as follow:

$$E(u_i | \varepsilon) = \left[\frac{\sigma \lambda}{1 + \lambda^2} \right] \left[\frac{\phi\left(\frac{\varepsilon_i \lambda}{\sigma}\right)}{\Phi\left(\frac{\varepsilon_i \lambda}{\sigma}\right)} + \frac{\varepsilon_i \lambda}{\sigma} \right] \tag{V.7}$$

Cost efficiency of a bank, let say b bank, is defined as the cost estimation needed to produce output of b bank; if the most efficient bank in sample were use the same exogenous variable (p,q) as b bank, and then the result is divided to actual cost of b bank. Mathematically, it can be written as:

$$\begin{aligned} \text{Eff Biaya } b &= \frac{\hat{C}_{\min}}{\hat{C}_b} \\ &= \frac{\exp[\hat{f}(p^b, q^b)] \times \exp[\ln \hat{u}_c^{\min}]}{\exp[\hat{f}(p^b, q^b)] \times \exp[\ln \hat{u}_c^b]} = \frac{\hat{u}^{\min}}{\hat{u}_c^b} \end{aligned} \tag{V.8}$$

Critic of stochastic frontier approach is that the assumption of distribution is too restricted. In order to avoid it, distribution free approach, which is a relative measure by comparing the efficiency of a bank to another, is used. Efficiency of an institution on sample is derived from reference of efficiency belonged to the most efficient institution there is in sample.

V. ECONOMIES OF SCALE, ECONOMIES OF SCOPE, AND TECHNICAL PROGRESS

After having estimation of cost function, could be derived economies of scale, economies of scope, and technical progress. Economies of scale is gained by calculating the first derivation of cost function to output:

$$SE = \frac{1}{\left(\frac{\partial c(w, y)}{\partial y} \right)} \quad (V.9)$$

SE > 1, shows increasing return to scale or economies of scale

SE = 1, shows constant return to scale

SE < 1, shows decreasing return to scale or diseconomies of scale

Economies of scope is calculating cost that can be saved by producing some outputs in one bank, which is relatively lower than producing each output in some banks separately. Economies of scope is calculated by comparing the evaluation of specialized production cost to cost of production that are done all together:

$$scope = \frac{[c(q_1, 0, \dots, 0; r) + c(0, q_2, \dots, 0; r) + \dots + c(0, \dots, 0, q_m; r) - c(q_1, q_2, \dots, q_m; r)]}{c(q_1, q_2, \dots, q_m; r)} \quad (V.10)$$

Economies of scope are reached if the production cost of some outputs all together in one bank were cheaper than the production cost of the same outputs in some separate banks. If scope > 0, positive economies of scope is reached; but if scope < 0, diseconomies of scope is reached. Economies of scope show whether bank still has to expand their outputs or not.

By adding time trend (T) variable as one of the variables affected the cost function, the technical changes occurred in a bank can be figured out. Time trend variable can be used to seize those changes. Technical progress makes possible a bank to produce a certain output level with total cost that gets lower and lower and with fixed input value. The effect of technical changes can be calculated by using partial derivation of cost function to time trend (T). In mathematics equation, it is written as follow:

$$TP = \frac{\partial C(w, y, T)}{\partial T} \tag{V.11}$$

Technical progress occurred if TP in equation IV.11 are smaller than zero, which signals that total cost spent by the bank will be declined as the time goes by.

VI. EVALUATION OF MERGER IN INDONESIA BASED ON COST FUNCTION

VI.1 Merger Impact on Efficiency

Efficiency scores of Bank Mandiri and its formation banks and efficiency score of Bank Danamon before and after merger reached at the lowest level in the beginning of merger period. After that, however, the efficiency scores increased sharp and stable, although their levels were lower than their efficiency scores before merger. Merger process that demands a high cost at the beginning of the period becomes a cause of the declining of efficiency score post merger. Although merger process declines efficiency level of a bank, it makes the efficiency of the bank more stable. For instances, at the following are Figure V.1 and Figure V.2 that are showing efficiency scores of Bank Dagang Negara, Bank Mandiri, and Bank Danamon before and after merger.

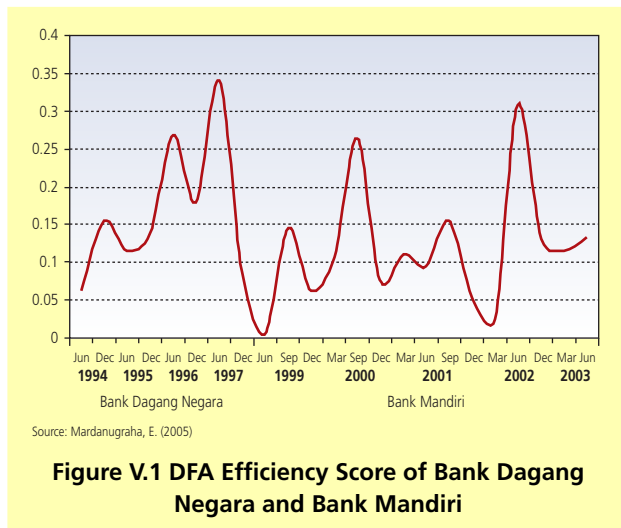
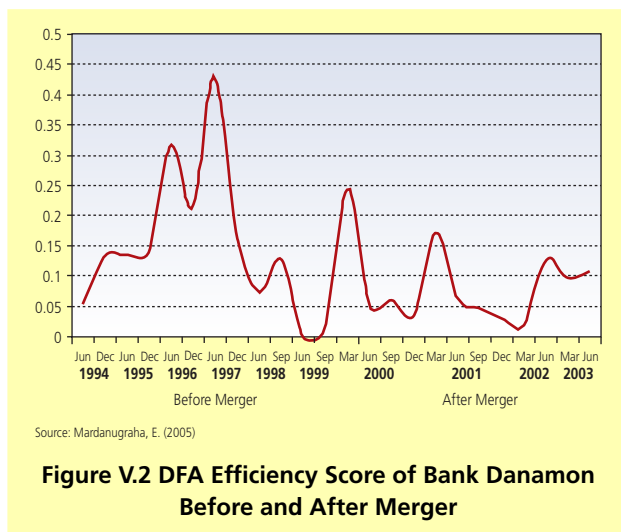


Figure V.1 DFA Efficiency Score of Bank Dagang Negara and Bank Mandiri

Figure V.1 shows that the efficiency of Bank Dagang Negara (deviation standard = 0.093) is more fluctuated comparing to the efficiency of Bank Mandiri (deviation standard = 0.118). However, the level of Bank Dagang Negara in average (mean = 0.168) is higher than the level of Bank Mandiri (mean = 0.118).



As happened in Bank Mandiri, deviation standard of efficiency score of Bank Danamon before and after merger are 0.121 and 0.047, respectively. While the averages of its efficiency score before and after merger are 0.157 and 0.073, respectively. Deviation standard and the average of efficiency score that are lower after merger show that merger process has created a lower though more stable efficiency.

VI.2 Cost Structure of Merged Bank

Optimal input structure is obtained by estimating input share equation, which uses two input variables namely human resources cost and physical capital that is above the cost frontier. Both of them show negative percentages. This fact proves that all merged bank, as showed above, are banks that use their input excessively. The idea of merging these banks is good; it is, however, hasn't reached the merger objective, which is reducing the input utilization. It is showed by the excessive use of input in Bank Mandiri. In order to operate at the cost frontier, Bank Mandiri still has to reduce its interest cost as much as 50 percent and its physical capital cost as much as 7 percent. Meanwhile, Bank Danamon has to reduce its human resources cost as much as 62 percent, its interest cost as much as 72 percent, and its physical capital cost as much as 60 percent. Thus, from the explanation above it is cleared why efficiency of the bank is declined after merger.

VI.3 Economies of Scale and Merger

Merged bank still have potency to increase its efficiency by enhancing the economies of scale. The aim of the bank merger is reached as the economies of scale increased. Both Bank

Mandiri and Bank Danamon have showed that tendency. They were the results of diversification effect mentioned by Huges, et.al (2000).² We can see it from the sharp decline of loan to asset ratio after merger. This declining shows that there was a shifting of loan to bonds and other assets done by Bank Mandiri and Bank Danamon after merger. At the following is Table V.1 that shows loan to asset ratio and economies of scale of banks that formed Bank Mandiri and Bank Danamon, either before and after merger.

B a n k	Loan to Asset Ratio	Economies of Scale
Dagang Negara	72.60%	1.670
Bumi Daya	78.59%	1.666
Exim	53.96%	1.579
Bapindo	91.81%	1.588
Mandiri	24.40%	1.747
Danamon before Merger	69.65%	1.616
Danamon after Merger	20.54%	1.759

Source: Mardanugraha, E. (2005)

VII. WHAT KIND OF MERGER CAN INCREASE EFFICIENCY?

In order to answer this question, this writing is going to test the influences of economies of scale, economies of scope, and technical progress on efficiency by using analysis of regression. The equation of regression that will be used to test those influences is at the following:

$$\text{Eff} = \alpha_0 + \alpha_1 \text{SE} + \alpha_2 \text{Scope} + \alpha_3 \text{TP} + \varepsilon \quad (\text{V.12})$$

Where:

Eff = DFA efficiency score

SE = economies of scale

Scope = economies of scope

TP = technical progress indicator

Scores of α_1 and α_2 are supposed to be positive, while the score of α_3 is negative, if relation between efficiency of the bank and economies of scale, economies of scope, and technical progress is in line with the theory and hypothesis given.

STATA output used for estimating the previous parameter is as follow:

Output result on Table IV.2 shows unmatched result with the hypothesis. This gives us a

² Hughes, Joseph P; Mester, Loreta, J dan Moon, Choon-Geol. "Are Scale Economies in Banking Elusive or Illusive? Evidence Obtained by Incorporating Capital Structure and Risk-Taking into Models of Bank Production" Federal Reserves Bank of Philadelphia Working Paper No. 00-4, August 2000.

Table V.2 STATA Output Estimation of Equation of Regression (IV.12)

Source	SS	df	MS			
Model	95.9361924	3	31.9787308	Number of obs	=	4117
Residual	69.7674403	4114	.016958542	F (3, 4114)	=	1885.70
				Prob > F	=	0.0000
				R-squared	=	0.5790
				Adj R-squared	=	0.5787
Total	165.703633	4117	.040248636	Root MSE	=	.13022

dfa	Coef.	Std. Err.	t	F> t	[95% Conf. Interval]
se	-.0033748	.0086471	-0.390	0.696	-.0203278 .0135783
scope	-.051069	.0114405	-4.464	0.000	-.0734985 -.0286394
tp	1.820485	.1466569	12.413	0.000	1.532958 2.108012

view that economies of scale, economies of scope, and technical progress of Indonesian banking do not support the efficiency. The still low average of efficiency of Indonesian banking is the reason on why efforts to enhance economies of scale, economies of scope, and technical progress have not impacted on the increasing of efficiency. It can be tested by doing re-estimation of equation of regression (V.12), especially for DFA efficiency score that is above 0.7. STATA output for this equation of regression is as follow:

**Table V.3 STATA Output Estimation of Equation of Regression (12)
Special for DFA Rate above 0,7**

Source	SS	df	MS			
Model	38.3771632	3	12.7923877	Number of obs	=	46
Residual	.960155759	43	.022329204	F (3, 43)	=	572.90
				Prob > F	=	0.0000
				R-squared	=	0.9756
				Adj R-squared	=	0.9739
Total	39.337319	46	.855159108	Root MSE	=	.14943

dfa	Coef.	Std. Err.	t	F> t	[95% Conf. Interval]
se	.57806	.1485082	3.892	0.000	.2785648 .8775553
scope	.6046515	.3149703	1.920	0.062	-.0305467 1.23985
tp	-.8101671	2.244246	-0.361	0.720	-5.336121 3.715786

Table V.3 shows that coefficients of economies of scale, economies of scope, and indicator of technical progress give signs that are consistent with the hypothesis. Economies of scale and economies of scope influence the efficiency of banking significantly, while the influence of technical progress is not significant. The assessment of equation of regression (V.12) by observing at DFA score above 0.7 also gives a better result. It can be seen from scores of R^2 (0.9756) that is higher than the assessment using comprehensive observation (0.5790).

According to result above, it can be said that Indonesian banking still has a too low efficiency, so that any efforts, which are enhancing economies of scale, economies of scope, and technical progress, cannot help to increase the efficiency. Bank management should be able to establish efficiency by reducing the use of input quantitatively –either input in form of human resources, fund, or fixed assets- to create certain level of output. The reducing of human right factor can be obtained by increasing productivity of labor. Meanwhile, government should also prompt banks to reduce its input, for example by maintaining a low rate of interest of deposit, so that banks do not suffer the burden of high rate of interest. This reducing input must be able to increase the banking efficiency up to certain score. In this paper, it is shown at the efficiency score at 0.7.

After reaching an adequate efficiency level, a new bank can enhance its economies of scale, economies of scope, and technical progress in order to operate more efficient. Efforts to enhance economies of scale, economies of scope, and technology progress do not produce any efficiency for the bank if it is not preceded by reducing input utilization of the bank.

Therefore, the question of how merger can increase efficiency has been answered. Bank merger can increase the efficiency if the company had done internal improvement before merger, such as allocating input optimally and pressing cost as low as possible. Moreover, those efforts can be done for instance by increasing productivity of labor and then is continued by merger to reach a higher level of efficiency. Banks, even those with adequate capital and assets, should not rush to implement merger. It would be better if those banks increase their internal efficiency up to certain level and then merge. Small banks merger is done only to strengthen the capital. Therefore, internal efficiency should be endeavored either before or after merger.

Merger cannot also be implemented to any banks. If it is done so, the new bank will stay longer at the low position of efficiency level. Bank merger should carefully pay attention to the characteristic of to-be-merged banks. Banks with bad performance and efficiency should not be merged into one. While bank with good performance and efficiency should become the leader if it is to be merged with bank that has a less good performance and efficiency.

VIII. CONCLUSION AND RECOMMENDATION

The measurement of efficiency of a bank through assumption of cost function explained in this paper provides us an alternative to measure bank performance and to evaluate either resources of efficiency or resources of inefficiency based on input utilization structure. Some policy recommendations based on efficiency analysis using the assumption of cost function that can be proposed are as follow: First, government should make efforts to arrange good management of the banks, so that they are able to operate by utilizing costs optimally. Second, Indonesian banking should at first increase their internal efficiency before attempting any external efforts. Among these internal attempts are allocating inputs optimally and pressing costs that are to be spent as small as possible. It can be done, for example, by increasing productivity of labor. The decreasing of efficiency of merged banks that has been mentioned in this paper shows that it is necessary for them to make some attempts to accelerate their efficiency recoveries, in order to return them back to their previous level. The stability shown after merger gives us a view that merger has been successfully created banks with stronger foundation. The increasing efficiency of a merged bank to a higher level can be accelerated, for example, by shortening the merger consolidation period. Acceleration of this period can be achieved only if there were a good merger preparation and a clearly planned future business after merger. Merger, in any kind of form, either it is absorbed into a specific bank or it is merged to one new bank, must have the ability to create value added to its merger members. A good merger process shall encourage bank to reach economies of scale and economies of scope. Furthermore, in order to speed up internal consolidation, credit restructurization that must be settled should be given special attention. Operational consolidation will determine the productivity of the labor of the bank. The longer consolidation is reached, the longer inefficiency exists in the bank. Merger that shows decreasing efficiency is also showing ineffectiveness in implementing economic principles, such as the decreasing economies of scale that has been shown in this paper. Efficiency of merged bank can be aggravated if a high-efficient bank were merged with a low-efficient bank. Therefore, merger should be executed among banks with high compatibilities in order to make the synergy of merger process possible. Merger that is executed without well-prepared plan will position the merged bank in low level longer. In merger, it is also crucial to be aware of the characteristic of banks to be merged. Banks which both have bad performance and efficiency should not be merged at the first place. Meanwhile bank with good performance and efficiency should become the leader if it is merged with a bank that has less good performance and efficiency. Merger among bad performance banks make the period of consolidation process longer. Therefore, drastic steps should be taken to shorten the period. At last, the recovery of banking industry in Indonesia can be achieved by many ways. Merger is

only one of the ways. Eventually, increasing efficiency of the bank through austerity program and internal management improvement are more important to be put on the top of priority.

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APPENDIX V.A

DEFINITION OF VARIABLE USED FOR COST FUNCTION	
Symbol	Definition
TC	Total cost = cost of human resources + cost of interest + accumulation of depreciation
Input Variables:	
P1 (Price of labor)	Cost of human resources is divided by labor's amount
P2 (Price of funds)	Cost of interest is divided by total funds. Total funds = deposit + clearing + saving
P3 (Price of Physical Capital)	Accumulation of depreciation and other costs ³ are divided by fixed assets
Output Variables:	
Q1	Credit given by bank and its associates
Q2	Credit given by other bodies
Input Share Variables:	
S1	Cost of human resources is divided by total cost
S2	Cost of interest is divided by total cost
S3	Accumulation of depreciation and other costs are divided by total cost
Dummy Variables:	
Stat1	= 1 if bank is a Bank Persero
Stat2	= 1 if bank is Bank SND ⁴
Stat3	= 1 if bank is Bank SNND ⁵
Stat5	= 1 if bank is Mixed Bank
Stat6	= 1 if bank is BPD ⁶
Stat7	= 1 if bank is Closed Bank
Stat8	= 1 if bank is Bank Merger

3 Other costs include rent, maintaining and repairing, goods and service, and so forth.

4 SND = Swasta Nasional Devisa (Foreign Exchange National Private)

5 SNND = Swasta Nasional Non Devisa (Non-Foreign Exchange National Private)

6 BPD = Bank Pembangunan Daerah (Region Development Bank)