“Productive efficiency of banks in ASEAN countries”

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Productive efficiency of banks in ASEAN countries

Abstract

This study examines the determinants of productive efficiency of banks operating in 8 member countries of the Association of Southeast Asian Nations (ASEAN). This study uses the economic theory approach to examine the existence of economies of scale on the ASEAN banking market, especially its impact on cost efficiency. The author applies a concept of average cost (AC) as a proxy for the productive efficiency. He finds that economies of scale exist on the banking market and economies of scale and scope should be considered in the industrial policy. Stronger capital position is also positive to banks' efficiency and means that stronger capitalized banks are more efficient. Bank that remunerates better tends to be more efficient as a result of economic capital effect.

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Introduction

The importance of banking industry in the economy has been recognized, as banking can promote economic growth (Minsky and Kaufman, 2008). Bank provides services for depositors and borrowers, as well as serving for payment system in the economy. The role of banking system in financing the economy requires banking system to operate efficiently so that the industry can provide service financing at a lower cost.

Efficiency refers to a measure of success in resource allocation. It is also viewed as a necessary condition for survival in the competitive market. That makes efficiency measure to be applied to compare the performance of the companies in their business. From this perspective, the efficiency or optimal results are achieved with the use of limited resources to achieve a desired level of output. Productive efficiency in economics is defined as the ability of bank to produce output at a lower cost. In other words, productive efficiency is a situation when a firm uses its resources without waste or efficiently. It is achieved when the average total cost (ATC) is at the lowest point. It is a process that a firm tries to find a combination of minimum output to produce maximum output.

In conjunction with industry organizations, the term efficiency is associated with the most productive way to utilize the resources that are scarce. In general, there are two types of efficiency, i.e., technical efficiency and economic efficiency. It is, therefore, natural that the efficiency of information should be included in sound measure or rating system. The results of the analysis conducted by two researchers were obtained using the data for the period 1994–2002. Very good validation results are related to the effective use of cost efficiency as an indicator for the detection of early warning information that banks would be problematic in the future. Competition usually encourages individual firms or economic agents in pursuit of efficiency, as it is necessary for survival. Increasing the efficiency of business improves the possibilities to survive and succeed, as well as optimal use of scarce resources.

Objective

In this paper, we aim to fill the gap in the banking literature by measuring the efficiency using microeconomic theory and a concept of cost. In contrast to applying cost efficiency using parametric or non-parametric measure, we only apply cost efficiency using accounting data from published sources. As our study compares banks from different jurisdiction, we translate all reports into US dollar. However, we use traditional efficiency approach, but simply total average cost ratio. This ratio is superior, as it can directly be used to test the economies of scale principle.

The objective of this paper is to investigate the determinant of bank productive efficiency using samples from the ASEAN banking market. The definition of the productive efficiency is accounting-based and follows the economic theory known as economies of scale. Within this framework, the definition of cost is an average total cost. This measure is simple in term of calculation technique and free from various methodological weaknesses, but very effective to test the validity of such a determinant as economic efficiency determinant. As the intention of the study to test the internal efficiency, we only employ internal factors such as total deposit, loan, capital position, bank size and price and cost structure.

1. Review of the theories and previous studies

The economic theory provides explanation on the sources of efficiency. We briefly discuss the theories of the firm that provide the links with the efficiency.

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Economics mainly discusses how efficiently limited resources are allocated to produce output with technological constraint. Neoclassical theory of firms assumes that firms are profit maximizing. Firms will maximize profits where marginal revenue (MR) is equal to marginal cost (MC). In the short run, firms are subject to diminishing returns.

As for the efficiency, the theory suggests that firms must be efficient to make a normal profit. However, empirical research suggests that not all firms operate on the efficient frontier and a number of firms do not produce at the point where long-run average costs are minimized, but still survive in the market. Thus, the traditional neoclassical theory fails to explain why inefficient firms survive in the competitive market.

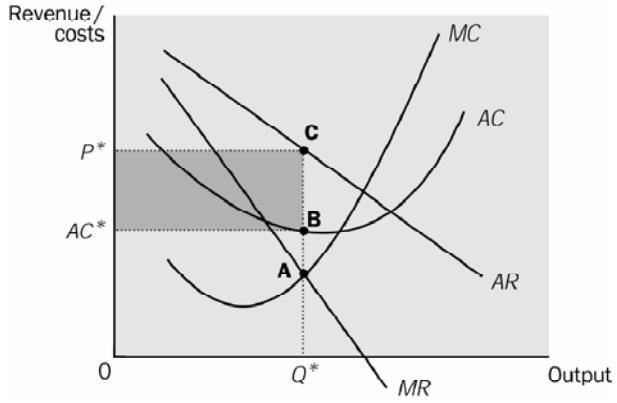

Fig. 1. Profit maximization under neoclassical economics

According to Foss and Klein (2011), the problem with the neoclassical theory of production and the firm has an emphasis on technology, rather than subjective valuation. In their discussion, although it is essential, there is no place for the entrepreneur or the investor in the theory of production process. In the neoclassical economics, everything is assumed in the black box with very little insight into the firm about structure of property rights, who owns what and how firms are organized, financed, governed, etc. There is a discussion on the role of authority, delegation, monitoring and evaluation. As a result, they added, modern contributions to the theory of the firm focus on solving given optimization problems and are, therefore, typically static and "closed". Modern theory of the firm, as a result of the submission, tends to avoid open-ended questions about where the problems come from or what is the origin of the firm.

In the production process, unnecessary expenses may occur that prevents the firm from achieving its potential efficiency. Leibenstein (1966) introduced the concept of X-efficiency and it is defined as the ratio of the minimum costs that could have been expanded to produce a given output bundle to the actual costs expanded. X-inefficiency is the difference between efficient behavior of firms assumed or implied by economic theory and their observed behavior in practice.

According to Kumbhakar and Lovell (2000), in order to be economically efficient, a firm must first be technically efficient. Profit maximization requires a firm to produce the maximum output given the level of inputs employed (i.e., be technically efficient), use the right mix of inputs in light of the relative price of each input (i.e., be input allocative efficient) and produce the right mix of outputs given the set of prices (i.e., be output allocative efficient).

The concept of economies of scale and economies of scope are the concepts in microeconomic theory that have very strong influence in today's business management and strategy (Besanko, Dranove, Shanley, and Schaefer, 2013). In the competitive market, economies of scale allow some firms to achieve a cost advantage over their rivals. This means economies of scale is a key determinant of market structure and entry. Both small and global business organizations are trying to take benefits by realizing the economies of scale.

Economies of scale refers to the situation in which output is higher compared to other firm when input factors are the same due to benefit in scale of operation. Specifically, economies of scale (or increasing returns to scale) exist if a proportionate increase in firm's output would lead to a less than proportionate increase in its input factors. Conversely, diseconomies of scale arises if a proportionate increase in a firm's output requires more input. Constant returns to scale occurs if a proportionate increase in a firm's output would lead to the same proportionate increase in input factors.

Economic theory states that average cost decreases in line with the output increase. Long-run cost curves are U-shaped due to economies of scale. An economy of scale means that higher production translates into lower average production costs (APC). The more firms choose to produce, the less cost production of units becomes. It is because fixed cost (FC) is divided by more output (Q). It makes average fixed cost (AFC) lower in line with bigger production. These types of cost definition are:

1. Fixed costs (FC): It is the costs that do not change with changes in output. An example of a fixed costs is the rent a bank has to pay for office space. The rent does not fluctuate each time a firm increases or decreases its output. The rent is an independent cost of production. The costs that do not depend on output are called fixed costs.
2. Variable cost (VC): It is cost that changes with the level of output. The variable cost fluctuates with the production levels. If output rises, then, the variable cost rises too. Conversely, if there is a decrease in output, the variable cost decreases too. Variable costs includes branch cost and

labor cost. The variable cost does not rise or fall in the same increments as output levels.
3. Total cost (TC): the sum of variable costs and fixed costs.
4. Marginal cost (MC): the rise in total cost due to one unit increment in output.
5. Average variable cost (AVC): It is calculated by dividing the total variable cost by quantity. The average variable cost curve is U-shaped and reflects this pattern.
6. Average total cost (ATC) is calculated by dividing total cost by quantity.

In the theory of the firm, a firm's ability to decrease its input in order to adjust costs is the concept of the long-run cost. In the short-run cost, it is difficult to reduce cost, as most resources become less sensitive to size of output. In banking, the average cost curve has a relatively flat U-shape. It means the cost advantage enjoyed by a medium sized is more scale efficient than a very large or very small bank.

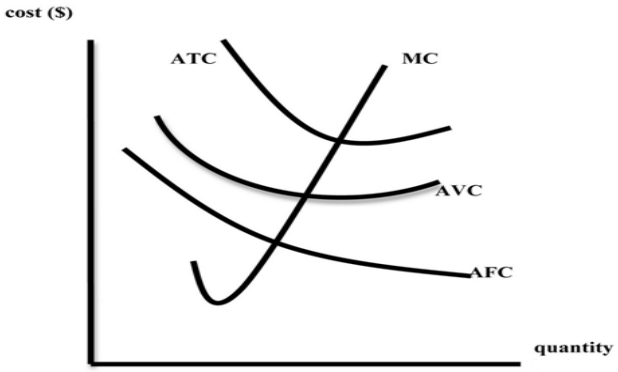

Fig. 2. The varieties of cost of production

In short, Pirayoff (2004) believes the long-run average total cost curve is U-shaped because of economies and diseconomies of scale. Short-run cost curves get their U-shape from diminishing marginal returns. Economies of scale can result from technology and specialization. Diseconomies of scale may occur because of coordination and communication problems that result from the firm's growth. There are two kinds of economies of scale. The first, product-specific economies of scale. Total economies of scale are the sum of output-specific economies of scale. The second, overall economic of scale refer to increases in all firm's output. Economies of scope exists if two or more products can be jointly produced with lower cost by a single firm than the total cost that is incurred in their independent production (Molyneux et al., 1996). In the banking industry, it is achievable through the joint production of bank services.

Berger and De Young (1997) produced a seminal paper on the bank efficiency related to problem loans. They employed Granger causality techniques to test four hypotheses regarding the relationships among loan quality, cost efficiency, and bank capital. The analysis suggests that the intertemporal relationships between loan quality and cost efficiency run in both directions. For the bad luck hypothesis, increases in nonperforming loans tend to be followed by decreases in measured cost efficiency. Skimping hypothesis states that higher efficiency is achieved by less spending in loan origination expenses and monitoring. It will bring disaster in the future. It means, banking efficiency is very important for financial development.

Efficient banking system can provide loan at a lower rate because the margin is very small. That is why banks operating in a country that have higher net interest margin (NIM) tend to be less cost effective. These conditions have a negative impact on financial deepening (loan to GDP ratio). Kasman et al. (2010) conclude that NIM bank in new member countries gets lower due to macroeconomic developments. Schweiger and Liebeg (2009) study the benefits of lower cost of financial intermediation to the economy. According to Kasman and Yaldirin (2006), capital adequacy ratio (CAR) serves both a common proxy for banks' creditworthiness and prudential behavior to take excessive risk. Claeys and Vennet (2008) concluded that capital adequacy standard is necessary for banking sector stability. The equity to total assets (ETA) ratio is viewed as a risk preference. Higher ETA ratio means that bank takes less risk preference (leveraging). Mongid and Muazaroh (2017) find mixed result on the impact of capital on efficiency.

Karim (2001), using sample from ASEAN banking, concludes that bigger size banks are more cost efficient. This paper is the foundation for merger. Mongid (2015) applied stochastic frontier analysis (SFA) and found that efficiency score for Brunei is 58%, Indonesia is 70%, Cambodia is 60%, Laos is 62%, Myanmar is 48%, Malaysia is 63%, Singapore is 80%, Thailand is 79%, Philippines is 67% and finally Vietnam is 69%. Mongid (2016), in contrast, is in opposition to merger. He found that size is negative to efficiency. The cost inefficiency is positively determined by inflation, loan loss provision, personnel expenses, capital adequacy and negatively by liquidity position. As market for liquidity is not well developed, most ASEAN banks hold more cash than needed. Further, Dong, Hamilton and Tippet (2014) found that there are moderate consistency between parametric and accounting methods in efficiency scores rankings. They also suggest that multiple methods for studying efficiency is strongly recommended, as this approach provides cross-check of the result.

Atanasoglou et al. (2006), using a sample from South European bank, report positive influence of banking asset on efficiency. Further, bank, operating at large size, is more efficient. In contrast, Akhavein, Berger and Humphrey (1997) found a contradictory result, as merger is not significant for improving cost efficiency. Fries and Taci (2005), for 15 transition countries, found that average sized bank is close to constant returns to scales or lowest ATC. Small banks do not enjoy economies of scale, as the sign is negative. It implies that merger among small banks contributes to greater cost efficiency in the banking system.

There are two possible results of bank capital position on productive efficiency (lower average cost). Bank's higher capital ratio means its higher creditworthiness. Higher creditworthiness means banks can borrow from the market at a lower price, as the probability to default is very low. On the other hand, higher capital ratio can bring positive moral hazard or too prudent behavior that make banks hold less risky asset to play safe. As a consequence of this choice, bank generates less income and profit. Empirical work by Mongid (2016) supports the positive impact of capital on efficiency.

On the human capital aspect, Fiordolisi, Ibanez and Molyneux (2011) study the effect of personnel expenses on business quality in the banking industry. It is regarded a pioneer study that links bank efficiency and quality of human resources. They apply human capital quality by using staff expenses to total assets. They find that personnel expenses to total assets positively increase the value added. They postulate that larger banks spend more to retain or hire qualified people to run the business banks in a way that improves quality operation.

Tahir et al. (2012) apply Tobit regression model to examine the determinants of cost inefficiency of banks operating in ASEAN market. The study applies the stochastic frontier analysis to calculate cost inefficiency. There is strong evidence that bank-specific variables and economic growth are important determinants of bank cost inefficiencies in ASEAN banking market. The study also reveals that Singapore is the most efficient banking market due to its size and global operation. Gardener, Molyneux and Nguyen Linh (2011) found that in the case of South East Asia Banking, country-level factors are important to national banking development and bank efficiency.

2. Methodology

2.1. Framework. Evaluating bank cost efficiency has always been an interesting area among academics, as it produces new insight on how banking operate in the dynamic condition. The concept of minimum average cost as an efficiency measure has been used in Tulu, Boelee, Taddesse, Peden and Aredo (2008) for studying livestock productivity. This paper is another effort using the same method for studying efficiency in the banking firm. The study exploits micro aspects that influence the productive efficiency of the banking firm. We are aware that banking firm is very specific in nature. Both macroeconomic and bank-specific factors appear to have a role to play, with real GDP growth and bank size being the most important determinants according to industrial economic theory. However, I focus on bank-specific data. This study is to find a link between bank-specific factors meaning that the finding can be useful for financial institution for further efficiency advancement. The framework basically replicates the work previously done by Louzis, Vouldis, Vasilios and Metaxas (2012) on Greek banking market with some major revision especially on external data and availability of the data. The framework is presented in Figure 1.

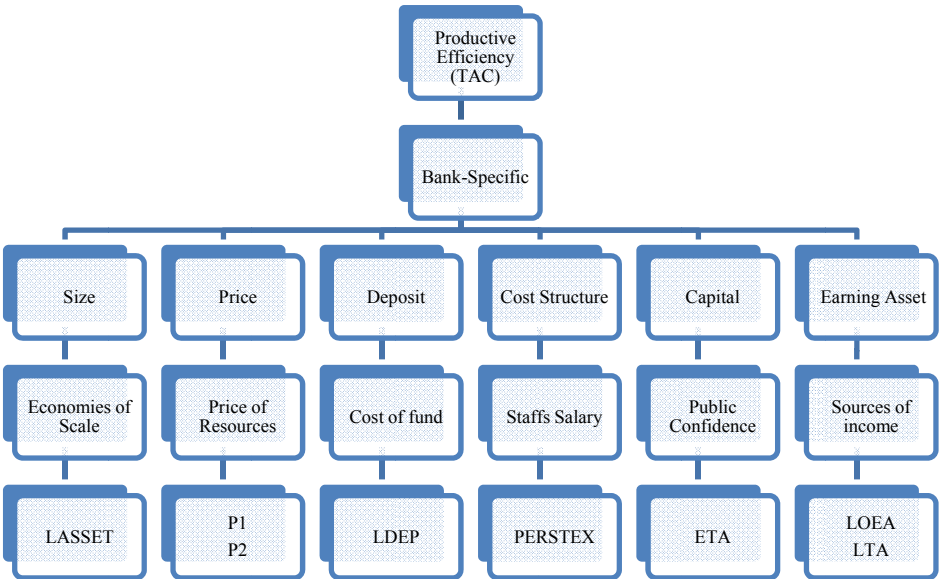

Fig. 3. Research framework

2.2. Model. The aim of the study is to test whether or not the operating cost of the banking firm follows economic theory principle. The definition of efficiency in this study is limited to productive cost efficiency. We define productive efficiency as the total cost or expenses divided by total assets. To examine the determinant of bank productive efficiency (total average cost, TAC) in ASEAN banking, we use simple linear regression model, which is a linear relationship between response variable, y, and the predictor variable, $x_i, i = 1,2...,n$. The model is:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_n x_n + \varepsilon_{it}\ , \quad (1)$$

where β_0, $\beta_{1.....}$ β_n are regression coefficients and ε is the error due to variability in the observed responses. In our study, the model can be formulated as follows:

$$TAC_{it} = \alpha + \beta_1 SIZE_{it} + \beta_2 LTA + \beta_3 ETA + \\ + \beta_4 PERSTEX_{it} + \beta_5 P1_{it} + \beta_6 P2_{it} + \beta_7 LOEA_{it} + \\ + \beta_8 LDEP_{it} + \varepsilon\ . \quad (2)$$

To assess the ability of the model to explain cost efficiency (TAC), we use linear regression testing techniques such as *t*-tests and *F*-test. It is the pooled regression model meaning we can not interpret it as a dynamic model. *F*-test is used to test the capability of the model to explain the variability of the TC. To assess the capacity of the individual variable, we use the *t*-test. We use pooled regression model, as the BP-test (Breuch-Pagan Test) shows that Chi-sq(7) = 4.23 and P-value =0.2335. It means pooled regression is appropriate.

2.3. Variables. In this paper, we employ variables derived from theoretical, as well as previous empirical studies. There are two types of variables. The first is asset related data (balance sheet) and the second is income and expenses related (profit and loss report). The data are derived from individual bank balance sheet and income statement. These data measure the individual bank characteristics. These variables and their definition are presented in Table 1.

Table 1. Variables and sources of data

Number	Variable	Observation	Sources of data	Measurement
1	TAC	Total cost to total asset	Bank level	Percentage
2	LASSET	Logarithm of total asset	Bank level	Nominal
3	LTA	Loan to total asset	Bank level	Nominal
4	ETA	Total equity to total asset	Bank level	Percentage
5	PERSTEX	Personnel expense to total expenses	Bank level	Percentage
6	P1	Interest rate expense / total deposit	Bank level	Percentage
7	P2	Price of other	Bank level	Percentage
8	LOEA	Logarithm of other earning asset	Bank level	Nominal
9	LDEP	Logarithm of total Deposit	Bank Level	Nominal

2.4. Hypotheses. In this study, we combine time series and cross-sectional data known as panel data. Panel data models combine a cross-section observations with a time series dimension. The cross-section nature of the panel explains the variability of the bank-specific factors and how these vary across banks in the samples. However, as our samples are not fully balanced, and panel test and BP (Breuch-Pagan-test) show that the pooled regression is appropriate, we decided to apply simple linear regression for simplicity.

The hypotheses to be tested are productive efficiency measured using TAC and related to bank-specific characteristics such as size (+/-), capital strength (-), personnel expense (+), price of inputs (+), total deposit (+) and productive asset ratio (+).

Table 2. Hypotheses relationship between productive efficiency (TAC) and predictors

No.	Hypothesis	Expected result
1	There is a significant and negative relationship between the size of bank's asset (LASSET) and total average cost (TAC)	Negative
2	There is a positive relationship between loan tot total asset (LTA) and total average cost (TAC)	Positive
3	There is a significant and negative relationship between capital asset (ETA) and total average cost (TAC)	Negative
4	There is a significant and negative relationship between Other Earning asset (LOEA) and cost to total average cost (TAC)	Positive
5	There is a significant relationship between ratio of personnel expenses to total expenses (PERSTEX) and total average cost (TAC)	Negative
6	There is a significant positive relationship between interest rate (P1) and total average cost (TAC)	Positive
7	There is a significant positive relationship between price of other (P2) and total average cost (TAC)	Positive
8	There is a significant relationship between total deposit (LDEP) and total average cost (TAC)	

3. Empirical results

3.1. Descriptive. This study uses 1356 observations from nine countries in ASEAN that include Indonesia, Malaysia, Singapore, Thailand, Philippines, Vietnam, Brunei, Laos and Cambodia. From 2003 to 2013, as we employ pooled regression technique, all observations are used in the study without considering whether the observation is completed for the range of years (unbalanced panel). We simplify this approach, as our study is to test the validity of cost theory under economics theory, which postulates the economies of scale.

The mean value for average total cost (ATC) is 6.2% meaning that for every 100 assets, bank spends 6.2 to operate or manage the operation. The standard deviation is 3%. The mean for loan to total asset (LTA) is 51% meaning that on average, loan is accounted for 50% of bank assets. The standard deviation is 19%. The mean for equity to total asset (ETA) is 14.5% with standard deviation 12%. We can conclude that bank finances 15% of its asset

using its own funds and 85% using debts. On average, the ratio of personnel expenses to total expense (PERSTEX) is 16% meaning that salary and other benefits less than 20%. Bank spends more on interest and other expenses that to its staff.

Table 3. Data description

Variable	Obs	Mean	Std. Dev.	Min	Max
ATC	1356	0.062	0.038	0.002	0.653
LASSET	1356	14.287	1.948	8.667	20.060
LTA	1356	0.514	0.190	0.004	0.996
ETA	1356	0.145	0.116	-0.377	0.943
PERSTEX	1356	0.160	0.065	0.003	0.392
LOEA	1356	13.025	2.082	4.615	19.697
LTDEP	1356	13.789	2.123	3.689	19.808
P1	1356	0.047	0.127	0.000	4.600
P2	1356	0.028	0.027	0.000	0.416

Price of the fund (P1) is used to measure the price of funds used by bank to finance its asset. On average it is 4.7% and the standard deviation is around 1.3%. Price of other (P2) includes personnel and other expenses such as maintenance cost, administrative cost. The means is 2.8% with standard deviation 2.7%. In general, we can conclude that other expenses are around 3% of total assets. The average of asset (LASSET) is 14.287 with standard deviation 1.948. For other earning asset (LOEA), the mean is 13.025 with standard deviation around 2.12. For total deposit, we find that the mean value is 13.789 with standard deviation 2.123. The value of assets, other earning assets and deposits are all in logarithm. One bank does not own other earning asset and the other does not own deposits due to a special reason.

Table 4. Correlation among variables

Variable	ATC	LAS-SET	LTA	ETA	PERS-TEX	P1	P2	LOEA	LDEP
AT	100%								
LASSET	-23%	100%							
LTA	8%	13%	100%						
ETA	-4%	-49%	-14%	100%					
PERSTEX	-3%	-5%	5%	31%	100%				
P1	55%	-8%	-2%	4%	-9%	100%			
P2	81%	-28%	2%	19%	36%	36%	100%		
LOEA	-21%	94%	-5%	-45%	-6%	-6%	-26%	100%	
LDEP	-22%	98%	16%	-58%	-6%	-10%	-29%	92%	100%

The correlations among variables are presented in Table 3. From the table, we can explain the correlatioin that between ATC and asset is negative and supports the validity of the economics theory. Under neoclassical framework, in line with the asset growth, bank enjoys both economies of scale and scope. More loans mean banks spend more money as loan management is expensive for monitoring and administering to guarantee best loan performance. Higher capital increases efficiency, as bank enjoys strong position in the market due to market discipline. Bank spends more on salary, and benefits tend to enjoy better efficiency. Price of fund interest rate (P1) and price of other (P2) are both positive and theoretically plausible, as price and cost must be positive. In line with loan, other earning asset (LOEA) is negative meaning that is more efficient as the cost to originate loans is more expensive than investing in securities. Size of deposit is negative meaning that bank with higher deposit enjoys economies of scale.

3.2. Determinant of productive efficiency. To investigate the determinant of bank cost productive efficiency (ATC), we use statistics Software Stata Version 10. Data are collected from the Bankscope database. Total 1356 bank samples are used in this study for the period 2003–2013. The study employs micro company data from bank level. The result shows that in general, we can conclude that the model can explain the productive efficiency of commercial banks in ASEAN market.

Please note that estimation of the pooled regression is carried out using Stata 10 assuming vce(robust) option to solve the heteroscedasticity. Pooled regression model is a combination of time series and cross section. We directly run the estimation using Ordinary Least Squares. Total 1356 samples are included in the model. The results show that all variables are simultaneously capable to explain the variability of the cost efficiency (ATC). The empirical Anova is s 856 for K=8, N=1347 and significant at 1%. Adjusted R-square is 84% implying that the model can explain 84% variability in the ATC. Model accuracy is very good, as it is only 1.5% indicating the reliability of the model. We can infer that the model is eligible for use as a cost efficiency model. Other indicators to assess the fits of model, such as Log likelihood ratio (LLR) is -2324, Akaike Information Criterion (AIC) is 4665, are significant confirming that the model is appropriate for further analysis.

Table 5. Regression result

Variable	Coefficient	Std. Err.	t-value	p-value
LASSET	-0.008	0.001	-6.520	0.000
LTA	0.021	0.003	8.160	0.000
ETA	-0.043	0.005	-8.180	0.000
PERSTEX	-0.154	0.008	-20.010	0.000
P1	0.070	0.004	18.920	0.000
P2	1.167	0.020	59.760	0.000
LOEA	0.004	0.001	5.400	0.000
LDEP	0.003	0.001	2.590	0.010
Constant	0.077	0.004	18.260	0.000

Our result shows that LASSET results in negative coefficient and is significant at 1%. The result confirms the validity of theory of economies of scale and scope. Higher asset size automatically reduces average cost of banking firm. There are many reasons to ex-

plain why size is important. The ability to exploit the position in the market is one reason that makes big bank enjoy cost benefit. In the deposit market bank, can set interest rate on deposits lower, as public assumed big is safer. Big bank also enjoys benefit of economies of scope. An economy of scope is joint cost benefits or cost sharing benefits. There are two types of economies of scale. The first is product specific economies of scale and the second is overall economies of scale. In the banking industry, overall economies of scale is stronger than specific one, as the nature of banking business is more on joint cost benefit. The use of advanced information technology in the banking operation generates more benefits for the other line of businesses. It is mostly related to production information and how to use it in the business strategy. Recent study by Stimpert and Laux (2011) supports the finding that size is important in banking.

Loan for business is very expensive to handle. The ratio loan to total asset (LTA) shows that it is positive indicating the more a bank invests in loan, the less efficient it will be. It is expected, as the cost for origination and maintenance is very expensive. In ASEAN market, generally banks focus its business on financial intermediaries that receive deposit and channel it as a loan. Loan is considered the most substantial source of income. However, we should note that considering loan originations reduces cost efficiency is a one side perspective. We do not yet consider from income side. From the model, we can any increase of the loan by one percentage conclude that will increase the cost by 2.1%.

Equity in the banking firm is a pivotal point that determines whether or not the bank is considerably strong. It is also important for cost efficiency. We find from the model that strong capital position will increase cost efficiency. The coefficient for equity to total asset (ETA) is -4.3% implying that any increase by one percentage point on ETA will reduce cost on average by 4.3%. It is understandable, as the bank that owns higher capital tends to have higher reputation in the market. Bank also owns more rooms to invest in facility that will increase efficiency, such as investment in information technology. The result is in accordance with expectation.

Banking firm in ASEAN marker are moving toward applying human resources management in human capital system. It is the stock of competencies, knowledge, habits, social and personality attributes that contribute to better and more efficient service. The consequence of this approach is higher attention to bank's staff. It means bank pays higher portion of salary cost ratio. We expect that this movement will improve cost efficiency. Our result shows that ratio of personnel expenses to total expenses (PERSTEX) is negative and it means that higher salary significantly ratio increases bank cost efficiency. The coefficient is 15.4% and significant at 1%. The finding confirms that staff is very important for bank when they are skillful and contribute to economic value of the bank. This result underlines the need for better compensation in the banking industry.

In the economic theory, price is positive and must be positive. Economic theory says the price for any specific good or service is the relationship between the forces of supply and demand. We use two prices in this study, where P1 is the price of interest and P2 is the price for other. In general, our result shows that both variables are consistent to the theory. For P1, the coefficient is 7% and significant at 1%. For other price (P2), the coefficient is 1.17 and significant at 1%. We can conclude that price of funds (interest) is less sensitive compared to price of other. The result provides support that personnel expenses and other operating expenses should be the priority for the bank as a target for achieving better efficiency.

Variable other earning asset to total asset (LOEA) is positive and significant at 1%. Interesting point on this variable is that the coefficient is smaller compared to LTA. It means LOEA is costly, but less costly compared to loan. Smaller coefficient (0.4%) means it is less sensitive. For deposit related variable (LDEP), the coefficient is 0.3% and significant. It is quite sensitive, as the value is not a ratio, but a logarithm of total customer's fund. One percent increase in LDEP will increase average cost by 0.3%. From quantitative perspective, in case of increase by 1%, average cost will increase by 0.3%. The result provides an insight that deposit market is very competitive that creates diseconomies of scale. Bank that relies on customer's deposit will not be competitive in the credit market, as its interest rate is relatively higher that of competitors. Other earning assets show similar behavior to deposits that contribute to cost inefficiency.

From the above result, we can confirm that economies of scale and scope are applicable in the banking business. It implies that merger should be priority in ASEAN banking market.

Conclusion

Current economic condition in ASEAN market given an opportunity for the banking firms operating here to expand their operation after substantial deregulation and law changes occurred in the region. Issue of cost efficiency is, then, becoming pivotal a point, because public expect the cost of banking operation to reduce and benefit for consumers. Our study uses economic theory approach to examine the existence of economies of scale in the ASEAN banking market, especially its impact on cost efficiency. We apply concept of average cost (TAC) as

a proxy for the productive cost efficiency. We find that economies of scale is existing in the ASEAN banking market indicating the validity of economies of scale and scope theory. This finding means economies of scale should be considered in the industrial policy. Stronger capital position is also positive to efficiency meaning that stronger capitalized banks are more efficient. Bank that remunerates better tends to be more efficient as a result economic capital effect. Efforts to increase the scale should be encouraged.

In contrast, originating loan for business is cost intensive business and reducing cost efficiency. Stronger reliance on deposit also increases inefficiency. Other productive asset also behaves similarly to loan. Interesting point is that all prices are positive indicating the validity of price theory. Under economics theory, price and cost relationship is always positive. Theoretically, this finding is superior, as both prices are positive. Efficiency model must produce a positive sign as there is a negative value in price. The implication of the study is that the banking firm should maximize the benefit of scale to generate production information. It is the only way to survive in the increasingly competitive banking business. It means policy maker should consider the merger and capital to improve the efficiency.

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