

Mergers Improve Efficiency of Malaysian Commercial Banks

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Abstract

The merger of the Malaysian domestic banks was enforced by the government in the year 1999 after years of persuasion with little success. This study endeavors to measure the impact of the involuntary merger on the efficiency gains. Merger and acquisition of domestic banks improved the banks' performance, profitability and value creation as indicated by Bank Negara Malaysia in 1999. The central bank of Malaysia (Bank Negara Malaysia) reassures banks to merge with other banking institution in order to bring about the economies of scale and to provide a higher level of efficiency. Subsequent to the mergers, there were only nine commercial banks left to form a completely new corporation. The secondary data was derived from the nine domestic banks from the year 2005 to 2009 were accumulated and analyzed using the DEA method. Mergers had unique advantages in terms of industry efficiency.

Keywords: mergers and acquisition, banks, performance, efficiency

1. Introduction

Merger could be divided into two categories, one of which is inter-industry mergers and the other the intra-industry mergers. According to Morrison and Floyd (2000), they observed that the motive of the inter-industry mergers may be risk diversification. Alternatively, the intra-industry mergers were usually driven by the desire to attain the level and scope in economies and managerial X-efficiencies (Gilson & Roe, 1993).

Acquisition could either be friendly or hostile. Previously, the companies cooperated in the negotiations. Currently however, the takeover target is unwilling to be bought or the target's board had no knowledge of the acquisition, takeover, buyout or merger. The purposes of merger and acquisition were to improve the company's performance and in moving global. According to Seth et al. (2000), Buckley and Ghauri (2002), Shimizu (2004), they mentioned that over the past few years mergers had become a strategic choice for companies' performance. A common and important reaction to globalization and the changing market environment which includes merger and acquisition of companies (Weber, 1996; Ashkenas et al., 1998). Business consolidations were indeed a common practice to achieve economies of scale and higher productivity.

2. Background of Study

According to Ravenscraft and Scherer (1989), indicated that two to thirds of merger did not create value for shareholders in the medium term and the performance of target companies, on average after an acquisition. Some banks decline merger and acquisition as they had anticipated failure after acquisition as corroborated by Erez-Rein et al. (2004) and Carleton (1997) who indicated that failure rate of mergers and acquisition ranged from fifty five to seventy percent. Although merger and acquisition form an important corporate landscape as they were vulnerable to failure. Research evidence suggested that less than 50% of merger and acquisition achieved success as initially anticipated was presented by Cartwright and Cooper (1996). According to Holbeche (1998), he said mentioned that one important asset, the personnel were not considered when negotiating merger and acquisition at the expense of financial aspects and thus they had been identified as an important factor in merger failure.

The reason why few companies failed after merger was because there was a mismatch of culture. According to the following studies conducted by Fralix and Bolster (1997), Cartwright and Cooper (1993), Daniel and Metcalf (2001), and Evans and Mendenhall (2004) agreed and suggested that incompatible cultures was the main

causes of merger and acquisition failure. Furthermore, studies on the impact of cultural differences on merger and acquisition performance had yielded mixed results and did not provide framework for managing cultural integration (see, Weber et al., 1996; Stahl et al., 2004; Brock, 2005). For example, Bank Bumiputra Commerce merges with Southern Bank. Southern Bank is a Malaysia's ninth-largest banking group, were pursued by CIMB; it is part of the Bumiputra-Commerce Group and Malaysia's second largest bank.

In addition, compared to earlier papers, this study is to examine the efficiency of bank performance after bank merger. As Sufian (2004), who examined the efficiency effect of bank mergers and acquisition in a developing economy during 1998–2003 period respectively. In addition, the previous researcher (Krishnasamy et al., 2004) he had examined the productivity of Malaysian banks had changed during the years from 2000–2001 period. According to Berger and Humphrey (1997) they noted that a linear programming based benchmarking technique, it called Data Envelopment Analysis (DEA) can be used to measure the bank performance and productivity according to Ho and Zhu, (2004) they agree that the DEA models which appeared in the literature review these issues of profitability and effectiveness.

3. Problem Statement

According to a KPMG study, it was noted that "83% of all Mergers and Acquisitions (M&A) failed to create any benefits for the shareholders and over half actually destroyed its value". Interviews of over with over 100 senior executives involved in these deals over a two-year period indicated that the majority of the failure was due to people and the cultural differences. In addition, globalization had led to a highly competitive business environment. Mergers and acquisitions served as a key weapon through which organization often tried to counter the blows of globalization. This research examined the performance effects of bank mergers and found no evidence of merger-related performance improvements as measured by return on asset (ROA) (Ramaswamy, 1997; Houston et al., 2001; DeLong, 2003; Zollo & Singh, 2004), return on equity (ROE) (Altunbas & Marques, 2004; Akhavein et al., 1997) or operating income profitability (Lindner & Crane, 1993).

4. Research Objective

The objective of this study is to:

- To identify the efficiency of bank performance after bank merger using DEA analysis.
- To analyze the ROE and ROA of the bank.
- To evaluate the bank performance in term of profitability efficiency and effectiveness.

5. Literature Review

The Malaysian Central bank (Bank Negara Malaysia) had supported banks to merge. In order to achieve the economies of scale and higher level efficiency, only a few mergers took place among the commercial banks. In addition, the government had procured stronger measures to promote merging of the banking institution due to the Asian financial crisis which happened during the years from 1997 to year 1998. Consequently, only nine commercial banks existed.

Table 1. Malaysian bank mergers and acquisition

Anchor Banks	Bank Acquired
Malayan Bank	The Pacific Bank Phileo Allied Bank
RHB Bank	Bank Utama (Malaysia) Berhad
Public Bank	Hock Hua Bank
Arab Malaysian Bank	N.A
Hong Leong Bank	Wah Tat Bank
BANK 1	BSN Commercial Bank
EON Bank	Oriental Bank
Alliance Bank	Merger of 7 financial institutions: Multi-Purpose Bank Bhd, International Bank Malaysia Bhd, Bolton Finance Bhd, Bumiputra Merchant Bankers Bhd, Sabah Bank Bhd, Sabah Finance Bhd and Amanah Merchant Bank Berhad.
Bumiputra-Commerce Bank	Southern Bank

Source: Bank Negara Malaysia.

It is widely known that the subprime crisis of year 2007 and 2008 had affected most of the countries in the Asian

Region. Basically, the crisis had affected the private and public sector such as the housing industry, banking sector and investment activities. There was a slowdown in economic growth, especially in Indonesia, Thailand, Malaysia and etc. According to the Star newspaper (23th June, 2009), it was noted that Malaysia's real GDP was expected to fall by 4.4% in year 2009 before recovering by 2.2% in year 2010. The subprime crisis hit the banking sector very much. As a result, the government encouraged financial institutions to merge with other banks to strengthen their wealth.

Nowadays, Malaysian banks move rapidly towards mergers. It should be noted that regardless of the progress achieved. Without the comprehensive plan for mergers of the commercial banks, it was possible that the non-performing loans could threaten the forthcoming permanence of the banks in the future. For example, the smaller financial institutions had faced many problems due to their inefficiencies and they tended to offer higher interest rates for the competition of deposits. They were also inclined to price their loans far above to pay higher deposit rates to get high-risk borrowers. Consequently, the respectful borrowers went to superior and stringer institutions with lower lending rates (The Star, 1999).

According to a study by Abreu and Mendes (2002), they noted that the ratio of credit (credits and equity to assets) affected the return on asset (ROA) positively and also the market share of a bank and ratio of equity to total asset affected the return on equity (ROE). In addition, profitability ratios were negatively affected by inflation and unemployment rates.

6. Theoretical Framework

The dependent variables (Output) were Return on equity (ROE) and Return on asset (ROA); and the Independent variables (Input) were Share capital, Interest expense, Deposit and Fixed asset.

6.1 Dependent Variables

6.1.1 Return on Equity

ROE estimated the net benefit that the stockholders had obtained from investing the required capital as indicated by Rose and Hudgins (2006). As this study examines the efficiency of bank performance after bank merger, the items taken from the income statement was the allowance of loss on loan and the interest expense of the bank. These two items affected the return on equity of the bank. After the banks had merged, the net income of the bank might increase or decrease due to the combination of two corporations had different financial system. Based on Pecking Order Theory as mentioned by Myer, 1984, it was noted that a firm was liable to financial investments through its retained earnings first, and later can raise external financing when it was essential.

According to Kaya (2002), he noted that the ratio of equity to asset will affect the ROA positively while affecting the ROE negatively. Furthermore, both of ROA and ROE will be affected while the ratios of credits and liquid assets to total assets. Other than that, the independent variables had also affected the ROE which was the share capital and interest expense. Therefore, any changes in share capital and interest expenses had affected the Return on Equity.

6.1.2 Return on Asset

Return on asset can be defined as the sum of profit earned on each dollar invested in assets and in addition it can be measured by the management efficiency at using its assets. To calculate the ROA is shown below:

$$\text{Return on Asset (ROA)} = \frac{\text{Net profit after taxes}}{\text{Total assets}}$$

The Return on Assets (ROA) indicates the earnings generated from invested capital. For public companies, ROA can have varied substantially, depending on the industry. In addition, according to Sinkey Jr. (1992) they said that ROA was a comprehensive measure of overall bank performance from an accounting perspective. It had indicated how capable the management of the bank had been converting the bank's assets into Net Earnings. Deposit could be defined as an asset of the bank; therefore the increment or reduction of the deposit may have affected the total asset of the bank. Furthermore, the changes of the total asset might affect the ROA of the bank. Another item which might affect the ROA is fixed asset, for example: the fixed asset might change when a bank mergers.

6.2 Independent Variables

6.2.1 Share Capital

In general, share capital is funds raised by issuing shares in return for cash or other consideration. For example, every time when a business sells new shares to the public in exchange for cash lead to the amount of share

capital of a bank to increase. Share capital can be divided into Common and Preferred shares. The change of share capital is when a company issues the new share to new shareholder. After a corporation had merged, the share capital may increase. Therefore, the changes of share capital may affect the ROE of the company. Exchange ratios reflects these characteristics and are a major concern of the shareholders on both sides since it can result in wealth redistribution which may increase the potential strength or growth of earning per share. According to Francis and Schipper (1999), accounting earnings are still an important indicator of valuation and more empirical evidence suggests that the returned-earnings relationship had declined over decades.

6.2.2 Interest Expenses

Interest expense correlates to the cost of borrowing money. It is the price that a lender charges a borrower for the use of the lender's money. Interest expense is related to the capital structure of a company. Interest expense is usually tax-deductible and it is an item that the bank needs to pay to its shareholder. Bank mergers can increase the value by reducing costs or increasing revenues. According to Houston, James and Ryngaert (2001), they had noted that cost reduction might be greater when the merging bank had geographic overlap because banks often claimed that the overlap elimination could result in cost saving around 30% of the target's non-interest expenses.

Benjamin Esty, Bhanu Narasimhan and Peter Tufanos' study (1996), examined how interest rates and interest-rate exposures affected the level of acquisition activity, the identities of targets and acquirers, and the pricing of acquisitions in the banking industry. Using a sample of 477 large mergers from 1980 to 1994, they also find that the level of acquisition activity is more negatively correlated with interest rates and more positively correlated with yield curve spreads to banks than non-banks. Finally, they found the evidence that merger pricing was a function of the interest-rate environment, with acquirers paying higher prices and earning lower returns when rates were lower (and when more deals were announced.)

6.2.3 Deposit

In general, a deposit is a specific sum of money taken and held on account, by a bank as a service provided for its clients. In this case, deposit defined as an asset of the bank. As a result, it may also have an effect on return on asset (ROA) of bank after bank merger. On the other hand, the bank accepts deposits and uses them to make loans and investments. Based on the study of Heffenan (1996), he said that under the intermediary approach, bank were viewed as a financial intermediary transferring funds between surplus saving units and deficit spending unit.

6.2.4 Fixed Asset

According to Wikipedia, it is noted that fixed asset is known as non-current asset or as property and equipment. Fixed asset is a term used in accounting for asset and property which cannot convert into cash easily. When two financial institutions merge, the fixed asset will also increase. Therefore, it affects the return on asset (ROA) of the bank due to increment of total asset. As a result, mergers may reduce cost if they enable banks to close redundant branches or consolidate back-office functions. Furthermore, merger may also to make banks more productive if they increase the range of products that banks can profitability offer. Another advantage of bank merger which is increasing the diversification may reduce banks' total costs by reducing desired capital asset ratios.

7. Research Methodology

In this study, all the information collected was secondary data. The sample includes nine commercial banks operating in Malaysia as at beginning of the year 2005 to year 2009. As mentioned earlier, the objective of this research is to identify the efficiency of bank performance after bank merger. Therefore, the financial ratios which were return on equity (ROE) and return on asset (ROA) was used to measure the profitability of each of bank to achieve the significance performance. The use of the financial ratios was used to measure the profitability of the bank and the Data Envelopment Analysis (DEAP) method was used to investigate the efficiency of bank performance after bank merger. Data Envelopment Analysis is also known as a non-parametric approach that investigates any efficiency gains both in pre and post-merger periods. The data was collected from the sources of Bank Negara Malaysia Annual Report and Annual reports of the commercial banks. The ratios measuring the bank profitability performance used in this study are as follows.

$$(i) ROA = \frac{\text{Net income} + \text{Interest Expense}}{\text{Total Asset}}$$

@ = Net profit margin x Total Asset Turnover;

$$(ii) ROE = \frac{\text{Net Income}}{\text{Shareholder's Equity}}$$

@ = ROA x Equity multiplier.

The return on asset (ROA) indicates the returns of a company generating on the firm's investment or asset. It also measures the managements' efficiency at using assets. The higher ratio of ROA is better compared to lower ratio. Next, is the Return on Equity (ROE), it indicated that a company's profitability by revealing how much profit a company generates with the money shareholders have invested. ROE is also to measure of the management's efficiency at using stockholders' funds. The higher the ratio of ROE indicates that the managements' efficiency was better compared to lower ratio. The reason for comparing the ROE and ROA of the bank is to measure the profitability of bank after bank merger. Since financing was made from deposits rather than capital, ROA is a better choice over ROE.

Secondary data was be used in this study. Most of the data was collected from the financial reports and etc. According to Sufian and Fazlan (2004), they noted that Data Envelopment Analysis (DEA) is non-parametric frontier approach and it can analyze the technical and scale efficiency of domestic incorporated Malaysian commercial banks during the merger year, pre-and post-merger periods. Therefore, Data Envelopment Analysis (DEA) is applied in this study measured the efficiency of the bank performance after bank merger. Furthermore, Allen and V. Boobal-Batchelor (1999) had indicated that Data Envelopment Analysis approach may detect efficiency gains resulting from bank mergers. Changes in banks' market share of deposits were subsequently probed to investigate the level to which post-merger efficiency gains were transmitted to advantage the public in the form of more positive deposit pricing and improved service quality.

This research is an exploratory study of efficiency of bank performance after bank merger. According to Altunbas and Marques (2008) examined 207 domestic M&As that took place in the EU banking sector between 1992 to 2001. Banks merged during Asian economic crisis because regulators believed that merging could restore banks with a healthier than a bank failure (Shih, 2003). The merger in Malaysia is exclusive as all the domestic banks were forced to merge by the government in year 1999 after years of association with little success.

To overcome the problem of the inherent dependency of data envelopment analysis efficiency scores in the regression analysis, a bootstrapping technique was applied. In general, the results suggested that the enforcement of the bank merger policy had resulted in an improvement of bank efficiency levels.

8. Model

There are three principals' option which is available in the computer program in relation to the DEA models such as, standard Constant Returns to Scale model and Variable Returns to Scale model. The second option considers the addition of these models to account for cost and efficiencies. Lastly, it had the application which uses to calculate indices of total factor productivity change; technological change; technical efficiency change and scale efficiency change.

8.1 Data Envelopment Analysis (DEA)

Data Envelopment Analysis (DEA) is the non-parametric mathematical programming approach to frontier estimation. The piecewise-linear convex hull approach to frontier estimation which was proposed by Farrell (1957) had been considered by only a handful of researchers in the last two decades.

8.2 The Constant Returns to Scale Model (CRS)

The purpose of data envelopment analysis is to construct a non-parametric envelopment frontier over the data points such that all observed points lie on or below the production frontier. According to Charnes, Cooper and Rhodes (1978), they suggested that a model had an input orientation and assumed constant return to scale (CRS). Constant return to scale (CRS) was the first model to be widely applied in several studies. The best way to introduce the Data Envelopment Analysis (DEA) was via the ratio form. For each decision making unit (DMU), there had to obtain a measure of the ratio of all outputs over all inputs, such as $U'Y_i/V'X_i$.

$$\text{MAX}_{u,v} (U'Y_i / V'X_i),$$

$$\text{St } U'Y_i / V'X_i \leq 1, j= 1, 2 \dots N,$$

$$U, V \geq 0.$$

K = Input of data;

M = Output;

N = Firm/ Decision making unit (DMU);

X_i, Y_i = Decision making unit (DMU);

$U = Mx1 =$ Output weights;

$V = Kx1 =$ Input weight;

$KxN =$ Input matrix, X , $MxN=$ Output matrix, and Y represented the data of all N decision making unit (DMU).

8.3 Variable Return to Scale Model (VRS)

Assuming that all decision making unit (DMU) were operating at an optimal scale, the constant return to scale (CRS) was the only suitable assumption. In a study by Banker, Charnes and Cooper (1984), they had suggested that an extension of the constant return to scale data envelopment analysis model to account for variable return to scale (VRS) situation. The use of the constant return to scale (CRS) specification was used when not all decision making unit operated at the optimal scale, it had resulted in a survey of technical efficiency which was confused by scale efficiencies (SE). The use of the VRS specification had permitted the calculation of technical efficiency (TE) devoid of these Scale Efficiency effects.

The CRS linear programming problem could be easily modified to account for VRS by adding the convexity constraint: $N1'\lambda=1$ to (12) to provide:

Min $\lambda \theta$,

St $-y + Y\lambda \geq 0$,

$\theta x - X\lambda \geq 0$,

$N1'\lambda = 1$,

$\lambda \geq 0$.

8.4 Decision Making Unit (DMU)

Decision making unit (DMU) in a DEA study consumed varying amounts of the same inputs to produce varying amounts of the same outputs. The input and output value were required to be non-negative; and at least one input and one output value of every DMU is required to be non-zero. If there was one output and one input, the efficiency score of a DMU would simply be the ratio of its output. In the occurrence of multiple inputs and outputs, DEA score is the ratio of a DMU's 'virtual' output to its 'virtual' input. These virtual input and output are determined for each DMU by the weighted sum of its inputs and outputs.

9. Result and Findings

In this paper, the efficiency estimates were computed using the multi-stage DEA. The efficiency level was computed from year 2005 to year 2009. In the figure (below), the technical efficiency estimates were presented, along with the disintegration into pure technical and scale efficiency estimates. As a result, Malaysian banks have achieved a praiseworthy mean technical efficiency level of 82% in year 2005, Figure 1. Resti (1997), had one similar studies on Italian banks and found that the mean efficiencies of about 70% under both the DEA and econometric models. In another studies performed by Pastor et al. (1997), noted that efficiency score of 80% in his study of banks in the U.S. In year 2006 (see figures), Malaysian Banks had inefficiency with the mean technical efficiency of 40.2% in year 2006, Figure 1. The reasons for average inefficiency is because of six banks had inefficiency as the technical efficiency level less than 50%. In addition, according to Lang and Welzel (1996), they found that the average scores of 54% and 61% for German banks. Figure shows Mean, Maximum, Minimum, Standard Deviation and number of efficient DMU of CRS model, VRS model and Scale Efficiency. Note: Number of efficiency DMU (Decision making unit)—those bank which had achieved 100% efficiency. Figure 1,2 and 3 on TE: Technical Efficiency, PTE: Pure Technical Efficiency and SE—Scale Efficiency

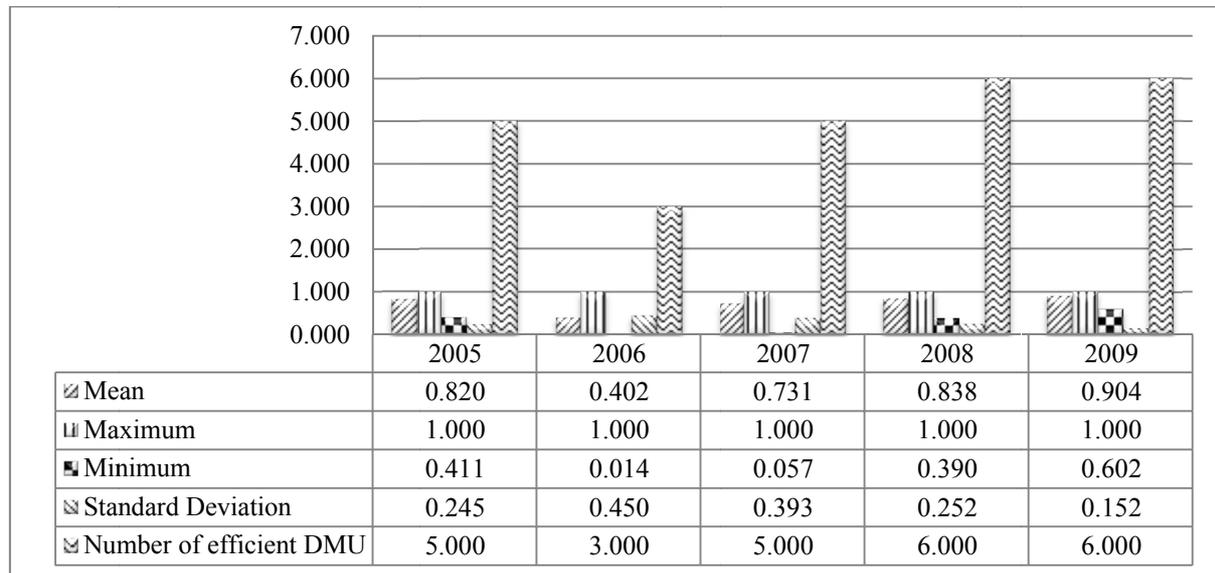


Figure 1. TE-technical efficiency

On the other hand, Malaysian banks had achieved a commendable mean technical efficiency level of 73.1% in year 2007 (see figure on TE–Technical Efficiency). Next, Malaysian banks have performed well which assemble the mean technical efficiency level from 73.1% to 90.4% in the following year. Along the five years period, an average of five banks had achieved 100% technical efficiency.

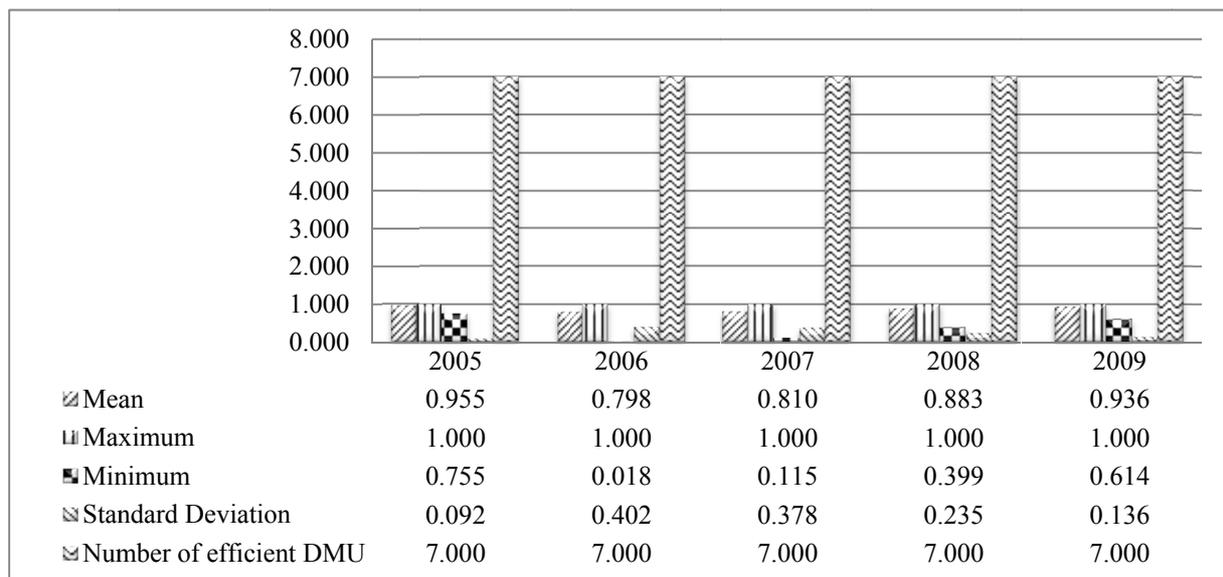


Figure 2. PTE-pure technical efficiency

Pure Technical Efficiency (PTE) Figure 2 is interpreted as the optimal use of resources. Pure technical efficiency could be also defined as managerial inefficiency as it devoid of scale effects by Avkiran (1999), Together the distribution of pure technical efficiency scores for the nine banks is presented in the figures below. The Malaysian commercial banks had achieved the mean pure technical efficiency level of 95.5%, 79.8%, 81%, 88.3% and 93.6% in year 2005 to year 2009. Obviously, the result shows that the nine local commercial banks had performed well in their financial performance as the pure technical efficiency scores had nearly 100% throughout the five years.

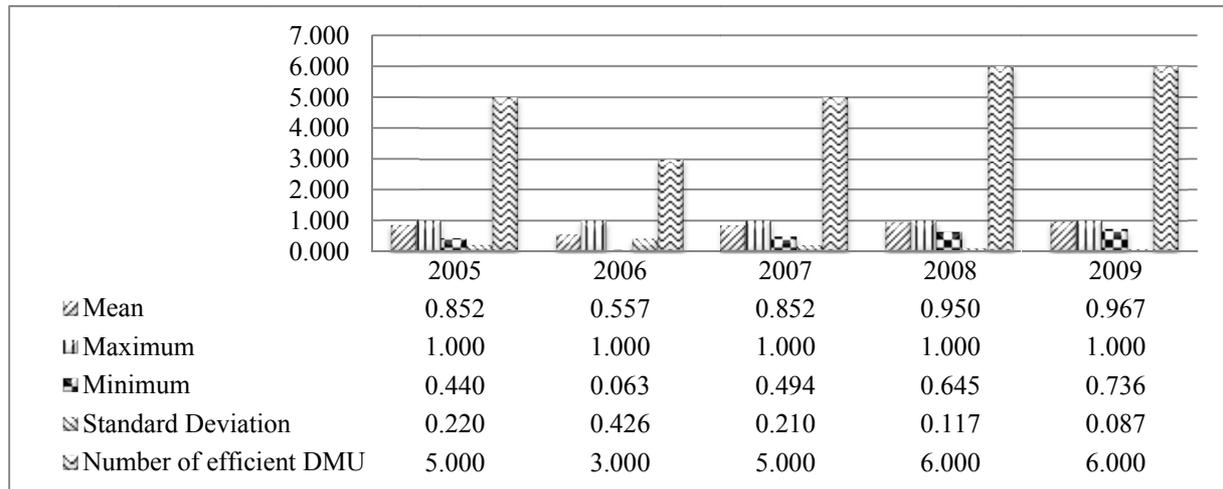


Figure 3. SE-scale efficiency

The comparison of scale efficiency level score each year as shown in Figure 3 (SE–Scale Efficiency) is indicated in the figures below. As a result, the scale efficiency level of 55.7% in year 2006 was slightly lower than other years due to only three banks had operated at 100% scale efficiency in that year. Meanwhile, seven banks had pure technical efficiency in year 2005 to year 2009. As a conclusion, overall Malaysian banks had achieved the three models of DEA which is technical efficiency, pure technical efficiency and scale efficiency throughout the five years period.

Figure 4, 5, & 6: Summary of Mean Efficiency levels of Malaysian Bank in year 2005 to year 2009.

Key: TE–Technical Efficiency from CRS DEA,

PTE–Pure Technical Efficiency from VRS DEA,

SE–Scale Efficiency = (CRS/VRS).

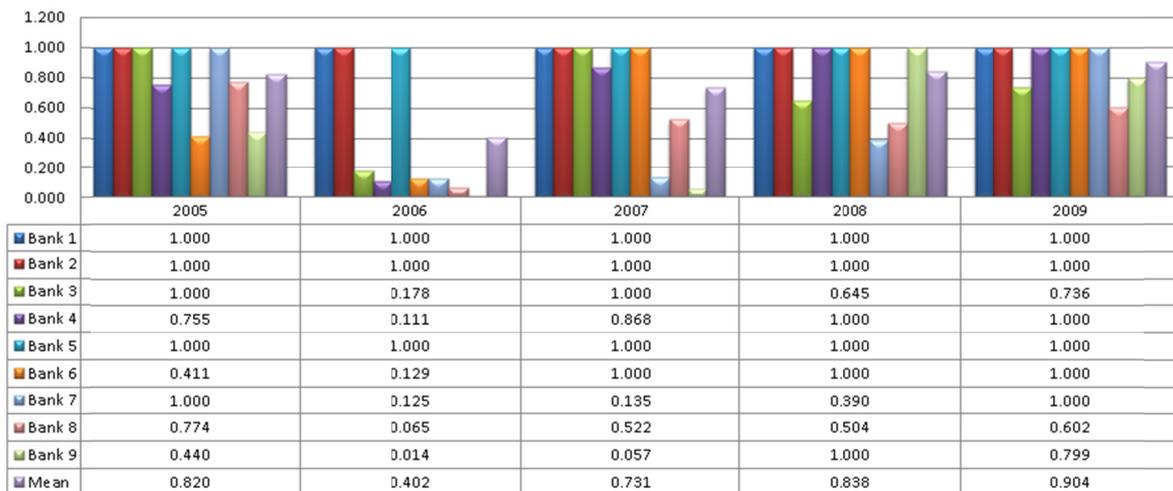


Figure 4. TE-technical efficiency

From the Figure 1, 2 & 3, as shown below indicates that BANK 1, had achieved a commendable mean technical efficiency, pure technical efficiency and scale efficiency level of 100% during year 2005 to year 2009. According to Sufian, Fazlan (2004) found that BANK 1 had lower scale efficiency during the merger year (2000). In this paper, it is apparent that BANK 1 was fully efficient in year 2005 to year 2009. Another two banks had also fully efficiency in each model which is BANK 2 and BANK 5. In addition, both of them have achieved technical efficiency level of 100%, pure technical efficiency level of 100% and scale efficiency of 100% in year 2005 to year 2009.

Next, the Figure 4 (TE–technical efficiency) shows that BANK 3 had achieved fully efficiency in year 2005 and year 2007. BANK 3 was inefficient as the technical efficiency level of 17.8% and scale efficiency level of 17.8%. Both of the level was less than 50%. Furthermore, BANK 3 had also achieved technical efficiency level of 64.5% in year 2008 and 73.6% in year 2009. As a result, BANK 3 can be considered as well performance throughout the five years except year 2006.

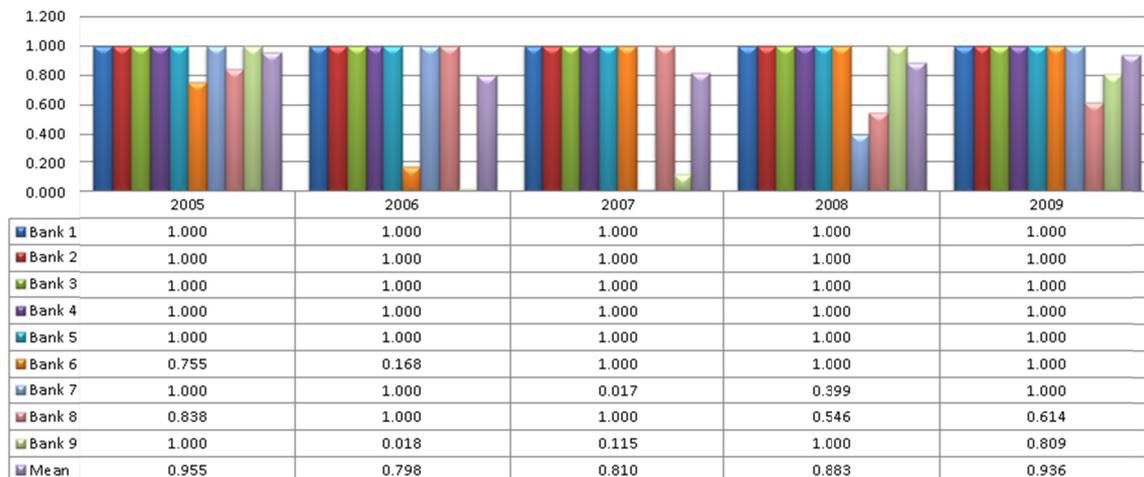


Figure 5. PTE-pure technical efficiency

From Figure 4 (TE) Technical efficiency, it shows that BANK 4 was fully efficient in the years 2008 and year 2009. However, BANK 4 was inefficient in technical efficiency and scale efficiency as it scored only 11.1% in year 2006. But, BANK 4 had achieved 100% of pure technical efficiency level in year 2006. Subsequently, BANK 4 had achieved the commendable technical efficiency level of 75.5% and 86.8% in year 2005 and year 2007. In addition, it had also achieved 100% of pure technical efficiency in year 2005 and year 2007.

Moreover, BANK 6 had achieved fully efficiency in year 2007 to year 2009 as showed in the figures. For early stage (Figure 4) year 2005, BANK 6 had technical inefficiency with a score only of 41.1%. Hence, it had achieved pure technical efficiency and scale efficiency of 75.5% and 54.4%. In addition, BANK 6 had failed to achieve the technical efficiency and pure technical efficiency in year 2006. It had achieved scale efficiency level of 100% in year 2006.

Furthermore, figures show that BANK 7 had achieved full efficiency in years 2005 and 2009. BANK 7 was inefficiency in technical efficiency and scale efficiency level as 12.5% in year 2006, but it had achieved 100% in pure technical efficiency in year 2006. Moreover, BANK 7 had inefficiency due to its technical efficiency level as 13.5% and 39% (Figure 4); while 1.7% and 39.9% of Pure Technical Efficiency (PTE) Figure 5 in year 2007 and year 2008. On top of that, it had achieved scale efficiency level of 78.3% and 98% in year 2007 and year 2008.

On the other hand, BANK 8 was not performing well in year 2006 as show in the figure. It only scored 6.5% in technical efficiency and scale efficiency Figure 4. In the following year, the technical efficiency, pure technical efficiency and scale efficiency of BANK 8 had efficient as the result scored over 50%.

Last but not least, BANK 9 was fully efficient in year 2008. For the year 2005, BANK 9 had achieved 100% pure technical efficiency but failed to achieve technical efficiency and scale efficiency as score 44%. In year 2006, BANK 9 showed inefficiency due to only 1.4% in technical efficiency and 1.8% in pure technical efficiency. However, it had achieved technical efficiency level as 77.3%. In year 2007, BANK 9 shows inefficiency in technical efficiency, pure technical efficiency and scale efficiency due to the scores less than 50%. Fortunately, BANK 9 had met the technical efficiency as 79.9%, pure technical efficiency as 80.9% (Figure 5) and scale efficiency as 98.7% in year 2009 in Figure 6.

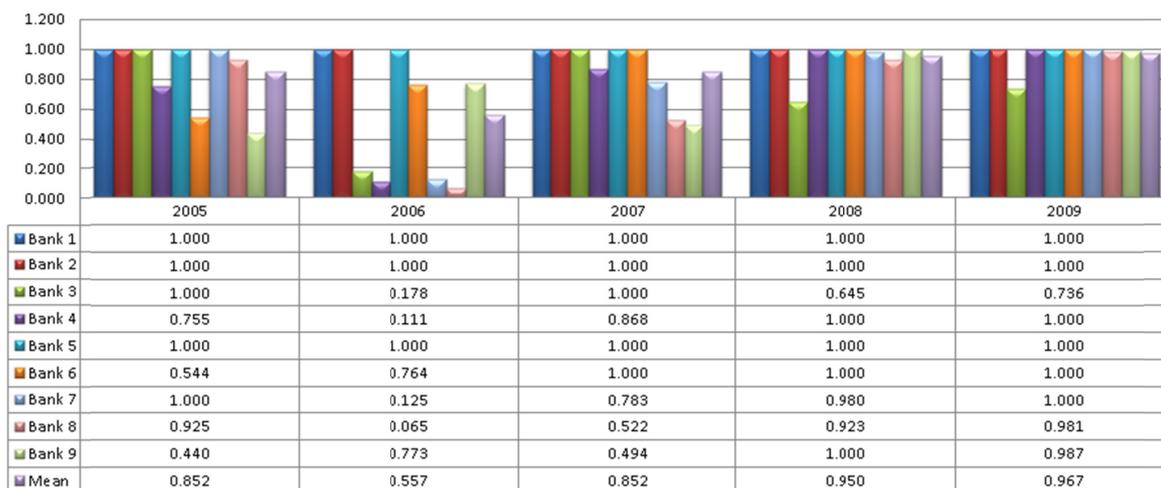


Figure 6. SE-scale efficiency

10. Conclusion

The DEA was used to analyze as it was a non-parametric frontier approach to investigate the effects of merger to the efficiency of Malaysian banks during the period of 2005–2009. Data Envelopment Analysis (DEA) methodology had enabled us to distinguish between technical, pure technical and scale efficiency. Upon running several tests of each local commercial bank and each year, the results suggested that the mean technical efficiency was 82% in year 2005, decreasing to 40.2% in year 2006. Then it had increased from 40.2% to 90.4% in year 2006 to year 2009. Based on the figures it shows that five or six banks have achieved the fully technical efficiency in years 2007 to year 2009.

Furthermore, the results showed that mean pure technical efficiency was 95.5% in year 2005, and then it had decreased to 79.8% in year 2006. In addition, the mean of pure technical efficiency had increased from 81% to 93.6% in year 2007 to year 2009. Based on the figure, it showed that seven banks had fully pure technical efficiency in this five year period.

Moreover, the study indicated that almost six banks had technical inefficiency and scale inefficiency in year 2006. A possible cause was that, as the US subprime mortgage crisis happened in mid-2006, banks were disinclined to assume higher risks. Furthermore, the study also highlighted that most of the largest banks were efficient such as BANK 7, BANK 8, BANK 9, BANK 4 and BANK 6. However, the results suggested that the merger would be better proving greater positive impact to the small and medium sized banks such as BANK 1, BANK 2 and BANK 5. According to the earlier researches by Berger et al. (1993), Chu and Lim (1998), they found that the large banks showed higher efficiency levels compared to the small and medium sized banks. In dissimilarity, Sufian F. (2004) found that larger banks were still suffering from scale inefficiency after the third year of merger.

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