# The Role Of Post-Crisis Bank Mergers In Enhancing Efficiency Gains And Benefits To The Public In The Context Of A Developing Economy: Evidence From Malaysia

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**EXTENDED ABSTRACT**

Malaysia's response to the Asian Financial Crisis involved an industry-wide bank consolidation program within which the Malaysian banking sector underwent a comprehensive merger exercise. In this study the relative pre- and post-merger pure technical efficiency and scale efficiency scores of Malaysian domestic banks for a period from 1996 to 2002 are measured and compared. The non-parametric Data Envelopment Analysis (DEA) approach is applied to detect any efficiency gains resulting from bank mergers. Changes in banks' market share of deposits are subsequently probed to examine the extent to which post-merger efficiency gains were transmitted to benefit the public in the form of more favorable deposit pricing and improved service quality. The evidence shows that acquiring banks were more technically efficient but less scale efficient than target banks at the time of merger. Nevertheless, the acquiring banks did not always maintain their pre-merger efficiency levels. Inefficiencies grew during the first post-merger year but the results were inconclusive during the subsequent post-merger years. There is little evidence to support the notion that post-merger efficiency gains are quickly passed on to the public.

## 1. INTRODUCTION

The two principal objectives of this paper are (1) to investigate evidence of post-merger economic efficiency gains from the recent bank merger wave in Malaysia and (2) to examine the extent to which any gains are passed on to the public.

Operating efficiencies are measured using relative efficiency scores obtained from a Data Envelopment Analysis (DEA) approach and are decomposed into (1) pure technical efficiency (PTE) and (2) scale efficiency (SE) measures. Post-merger bank performance can be assessed by comparing pre and post-merger relative efficiency scores adjusted to exclude the effects of other changes in banks' operational structure. The degree to which post-merger bank efficiency gains are passed on to benefit the public are proxied by measuring the percentage changes in deposit market shares post merger.

The key motivation is to investigate the impact of Malaysian bank consolidation.. This involved assisting indigenous banks to achieve critical mass aimed at enabling them to (1) make material investments in technology to enhance their distribution networks and to facilitate product/service innovations, (2) reap scale and scope economies, (3) reduce costs and excess capacity as well as to (4) upgrade their risk management systems to enhance value creation (BNM Annual Report, 2001). These reforms were implemented following the country's recovery from the 1997-1998 financial crisis. There is a lack of evidence about the performance of banks operating in developing economies undergoing rapid bank consolidation and financial deregulation. There is a lack of conclusive evidence that bank mergers provide operating benefits that are both quantitative and qualitatively sound/proven (Avkiran, 1999b). In Malaysia, banks were forced to merge into stronger capitalized banking groups by the Malaysian central bank, Bank Negara Malaysia (BNM). The industry-wide consolidation was successfully concluded by 2001 and the BNM has since reported a greater embracement of technology, the introduction of better product innovations, production of marked improvements in operating efficiency and the adoption of better risk management systems (Aziz, 2004), (Bowers et al, 2001).

## 2. THE MALAYSIAN BANK CONSOLIDATION EXPERIENCE

The Malaysian finance sector consolidation can be traced back to the 1997-1998 East Asian financial crisis that left many Malaysian banking institutions with high levels of non-performing loans (NPL) (BNM Annual Report, 1999). The BNM resorted to capital injection and removal of problem loans from banks' books to special-purpose government vehicles to stem bank failures. It realized that a longer-term solution lay in the consolidation of the banks. Initially, only 2 severely weakened banking groups were merged towards the end of 1998 to stem systemic risks to the financial system. The financial sector gradually removed barriers to entry for foreign entities under the ASEAN Framework Agreement on Services and the GAT on Trade and Services (BNM Annual Report, 1999). The foreign banks stood ready to capture significant market shares as domestic banks were engrossed in managing loan losses. Despite facing numerous regulatory restrictions, foreign banks have generally been able to respond to opportunities faster (Aziz, 2002). In 1999, the BNM extended the bank consolidation program to include the entire domestic financial sector. Banking institutions were given the liberty to form their own merger groups and to elect their own leader to lead the merger process. Approval was granted for the formation of 10 banking groups, each with a minimum shareholders' equity of RM 2 billion and an asset base of RM 25 billion (BNM Annual Report, 1999). Over a period of only two years, BNM forced the merger of 58 financial institutions comprising commercial banks, merchant banks and finance companies into 10 domestic anchor bank groups with 13 foreign banks.

As a result, extensive rationalization of common functions and operations was carried out (Aziz, 2002). Credit growth rose strongly largely due to demand side factors owing to strong credit demand in response to the low interest rate environment (BNM Annual Report, 2000). Significant amounts of distressed assets were removed from balance sheets in addition to Tier 1 capital injections conducted by the central bank.

However, the consolidated banks were not as profitable as previously and most Malaysian banks were still overstaffed (Bowers et al, 2003). Continued protection from foreign banks' competition also led to a somewhat lackluster performance. Foreign banks still managed to control 30% of the total assets of commercial banks (BNM Annual Report, 1999). Foreign banks have also been able to operate Islamic banking with increasing efficiency.

## 3. CONCEPTUAL FRAMEWORK

### 3.1. Measuring Bank Efficiency

The operating efficiency of banks can be measured in terms of x-efficiency which is defined as the sum

of technical efficiency and allocative efficiency (Goddard et al, 2001; Avkiran, 1999b). Technical efficiency refers to the effective implementation of the production plan, that is, the managerial ability to maximize revenue and minimize costs whilst allocative efficiency is defined as the effective choice of inputs given their prices (Avkiran, 1999a).

### 3.2 The Non-Parametric Data Envelopment Analysis (DEA) Approach

This study adopts the DEA approach which is a non-parametric methodology that constructs a piece-wise frontier formed by linear combination of the best practice observations in the sample and hence, it does not impose any form specification on the production function. Nevertheless, DEA assumes the data to be free of random errors (Mester, 1996). The frontier is formed in such a way that no observation point lies beyond the frontier, creating an envelopment of all data points. DEA generates relative technical efficiency scores by comparing a particular DMU to a virtual technically efficient DMU (or its target) that has the same input-output configuration. The efficiency scores generated follow the technical efficiency ratio. Some of the more influential DEA applications in banking include Berg et al (1992), Elysiani and Mehdian (1995), Grifell-Tatje and Lovell (1996), Bhattacharya et al (1997) and Avkiran (1999a, 1999b). There is disagreement about the preferred method to measure relative x-efficiency given difficulties in distinguishing variations in x-efficiency from random errors (Avkiran, 1999b). There are 3 parametric approaches to measuring efficiency: (stochastic frontier approach (SFA), distribution free approach (DFA) and thick frontier approach (TFA)), and 2 non-parametric approaches (data envelopment analysis (DEA) and free disposal hull (FDH)) that can be employed to compute relative efficiency scores. Each differ from one another in terms of structure of the benchmark production function, whether random error is accounted for and the distribution of inefficiencies to isolate inefficiency from random error.

### 2.3 A Graphical Illustration of DEA

Figure 1 illustrates a production possibility frontier for producing two outputs- $y_1$ and $y_2$- using input x in the most efficient manner possible. Since B lies below the efficiency frontier, the DMU is inefficient relative to A and C. However, it is erroneous to derive B's efficiency score relative to A and C because B is somehow different and unique to A and C. Instead, A and C are the *peers* of B because both A and C define the relevant portion of the frontier (AC) to produce efficient production for B. B's efficiency would be determined by comparing it to a virtual DMU V or its *target* that is made up by different proportions of A and C. The percentage of C and A in V is AV/AC and CV/AC respectively. The BV distance represents the amount by which outputs could be increased without requiring extra inputs- technical inefficiency. The figure also highlights that to compute the relative efficiency scores of A and C, the ratios OA/OV and OC/OV will be equal to 1. Thus, inefficient units like B would have efficiency scores of less than 1 but more than 0 while fully efficient units would score the value of 1.

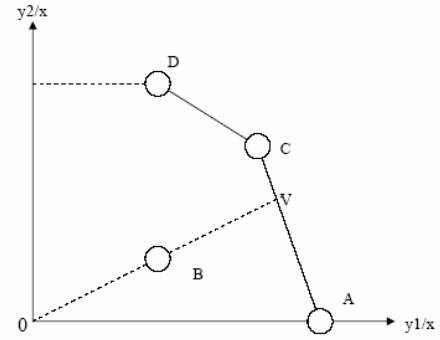


Figure 1: A Two-Output, One-Input Output Orientated DEA Model.

Figure I is an example of an output-orientated efficiency measure that defines efficiency in terms of maximization of the output vector with a given vector of inputs. Incontrast, input orientated efficiency looks at how much a vector of inputs can be minimized to produce a given vector of outputs. In many DEA studies, researchers have applied input orientated models because in many DMUs, input quantities seem to be the primary variables (Coelli, 1996). This is less applicable to the banking industry since banks have limited control over their inputs. Avkiran (1999a) suggests in these conditions the application of the output orientated model.

### 2.4: Common Bank Production Models and Input-Output Specifications

The definition and measurement of the specific bank inputs and outputs depends on the specific approach adopted to model the production function of the bank. There are four principal bank modeling approaches: production, intermediation, value added, and user cost.

## 4. ROLE OF MERGERS IN ENHANCING OPERATING EFFICIENCIES

Bank mergers can increase value by reducing costs or increasing revenues. Cost reduction may be greater when merging banks have geographic overlap because banks often claim that overlap elimination can result in cost savings amounting to around 30% of the target's non-interest expenses

(Houston, James and Ryngaert, 2001). Revenue enhancements may result from cross-selling of bank services and the improved ability to raise fee revenues and lower interest rates on deposits (Houston, James and Ryngaert, 2001). Mergers can also increase efficiency when larger merged entities reaches required critical mass to gain access to cost-saving technologies or spread fixed costs over a larger production base. The studies of US banking generally show very little cost X efficiency improvement on average from bank mergers in the 1980s (Berger and Humphrey, 1992; Rhoades, 1993; DeYoung, 1997 Rhoades,1998[1] and Berger, 1998[2]). Berger et al (1999) provide a summary.

## 5. EVIDENCE OF PUBLIC BENEFITS FROM MERGERS

There is no certainty that post-merger efficiency gains will be passed on to the consumers via lower prices and improved services/product quality. Increased market share could lead to above competitive prices[3]. Outcomes rest on the eventual magnitude of efficiency effects relative to those of market power.

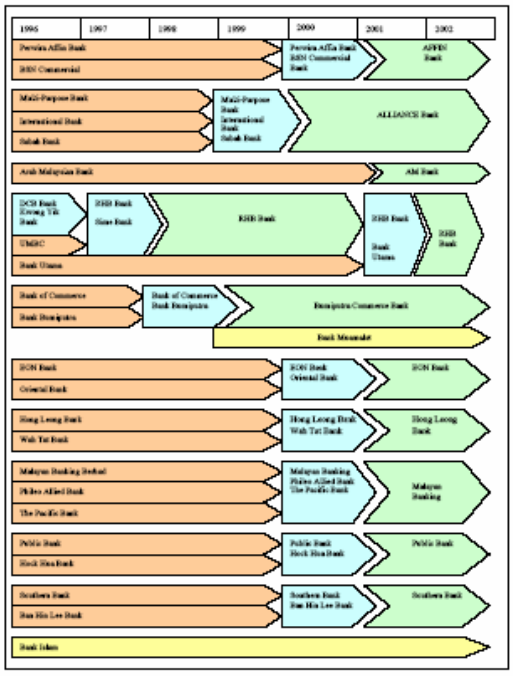
## 6. RESEARCH DESIGN

The sample population comprises 10 domestic Malaysian conventional banks, 11 Malaysian Islamic banking units (IBS) that are being benchmarked against 13 Malaysian foreign banks, 3 of which are Singaporean banks. The study covers a time period between 1996 and 2002 to capture the rapid changes within the Malaysian banking industry following the onset of the Asian financial crisis and subsequent banking consolidation. This saw the systematic merger of 54 pre-crisis Malaysian domestic banks into 10 domestic post-crisis anchor banking groups. The mergers are detailed in Table 1. The 10 post-merger Malaysian banks are benchmarked against foreign banks operating in Malaysia.

The data are obtained from the individual commercial bank's audited annual reports as well as from other publicly available published information from stock exchanges and libraries.

This paper applies an output orientated DEA model. The relatively regulated Malaysian and Singaporean banking industries afford bank managers little control over input variables such as deposit rates, and thus the output-orientated DEA specification appears appropriate. A DEA model can be run on either constant returns to scale (CRS) or variable returns to scale (VRS) specifications. CRS means that a rise in inputs results in a proportionate rise in outputs and otherwise for VRS (Avkiran, 1999a). Note that under VRS, a DMU may exhibit increasing returns to scale (IRS) or decreasing to scale (DRS). Given a VRS efficient production function or frontier, a DMU initially operate with IRS until CRS is reached at the most productive scale size MPSS and thereafter would show signs of DRS. The VRS specification effectively decomposes x-efficiency into (1) pure technical efficiency and (2) scale efficiency. Scale efficiency can be intuitively translated into the ability of a DMU to operate at the MPSS.

Table 1: Bank Mergers and Acquisition in Malaysia between 1996 and 2002




CRS assumes a negligible relationship between operation scale or size and efficiency (Avkiran, 1999a). This assumption can be safely made if the majority of DMUs have almost similar or identical scales and that CRS and VRS scores converge. Nevertheless, the banks within the study sample are of varied operating scales and this warrants the use of a VRS output-orientated DEA model.

This study follows the intermediation approach which includes off balance sheet activities (OBS) and is comparable with prior applications of DEA to banking. In order to better discriminate x-efficient DMUs from x-inefficient ones within the DEA framework, sample sizes need to be substantially

[1] As cited in Berger, Demsetz and Strahan (1999).
[2] As cited in Berger, Demsetz and Strahan (1999).
[3] Many bank products are price inelastic especially in retail banking sector and localized markets where customers may agree to pay more if there is little option in shifting to a new bank or that there is a general maneuver made by all banking groups in unison.

larger than the product of the number of inputs and outputs (Avkiran, 1999b). Under the intermediation approach, we use 4 inputs (staff numbers, deposits, interest expense and non-interest expense) and 3 outputs (net loans, interest income and non-interest income) (Avkiran, 1999a, 1999b). We specify interest expense and non-interest expense as inputs, and interest income and non-interest income as outputs in the output orientated intermediation model leaving out staff numbers, deposits and net loans. This has to be done given the small sample size. Interest expense serves as the proxy for deposits, non-interest expense for expenses incurred in conducting the financial intermediation process, interest income for loans and non-interest income for fees revenues generated from the non-traditional and OBS activities.

Table 2: Intermediation Model Input-Output Specification

| | **Banking Variables** |
|---|---|
| **Inputs** | Interest Expense |
| | Non-Interest Expense |
| **Outputs** | Interest Income |
| | Non-Interest Income |

The input-output specification of this study is outlined in Table 2.

The relative DEA TE, PTE and SE scores of both the acquiring and the target banks were monitored for (1) one year prior to the merger, (2) during the merger year and (3) during the subsequent post-merger years until 2002. We use market share of the deposits of banks as a proxy for whether post-merger productivity gains have been passed on to the public.

## 7. EMPIRICAL FINDINGS

Tables 3 to Table 5 summarize the DEA TE, PTE and SE scores for participating DCB banks involving 9 mergers. In 9 merger cases, changes in market share of deposits rose during the first post-merger year. However, only 2 cases reported increase in TE while the remaining 8 cases reported TE declines. Out of these 2 cases, only Case 2 sees a positive correlation between increase in both market share of deposits and TE. During the second post-merger year however, 3 cases (Case 3, 5 and 7) reported such a relationship. Proceeding towards the third post-merger year that only involves observations for Case 2 and Case 3, both cases reported declines

Table 3: Relative Efficiency Scores (TE) for 1 pre-merger year and 3 post-merger years

| | Technical Efficiency | | Pre-merger Yr | Merger Yr | Post Merger Yr1 | Post Merger Yr 2 | Post Merger Yr 3 |
|---|---|---|---|---|---|---|---|
| Case 1 | Acquiring Bank | AFFIN | 0.631 | 0.876 | 0.380 | 0.484 | n.a |
| | Target Bank(s) | BSNC | 0.602 | n.a | n.a | n.a | n.a |
| Case 2 | Acquiring Bank | ALLIANCE | 0.755 | 0.982 | 0.612 | 0.500 | n.a |
| | Target Bank(s) | IBM | 0.633 | n.a | n.a | n.a | n.a |
| | | SABAHB | 0.634 | n.a | n.a | n.a | n.a |
| Case 3 | Acquiring Bank | BCB | 0.795 | 0.384 | 0.662 | 0.794 | 0.477 |
| | Target Bank(s) | BBMB | 0.608 | n.a | n.a | n.a | n.a |
| Case 4 | Acquiring Bank | EONBANK | 0.608 | 0.923 | 0.486 | 0.442 | n.a |
| | Target Bank(s) | ORIENTALB | 0.648 | n.a | n.a | n.a | n.a |
| Case 5 | Acquiring Bank | HONG LEONG | 0.722 | 0.938 | 0.642 | 0.607 | n.a |
| | Target Bank(s) | WTBB | 0.601 | n.a | n.a | n.a | n.a |
| Case 6 | Acquiring Bank | MAYBANK | 0.336 | 0.732 | 0.912 | 0.566 | 0.602 |
| | Target Bank(s) | PABB | 0.339 | 0.525 | 0.849 | n.a | n.a |
| | | TPBB | 0.305 | n.a | n.a | n.a | n.a |
| Case 7 | Acquiring Bank | PUBLIC | 0.672 | 0.833 | 0.494 | 0.599 | n.a |
| | Target Bank(s) | HHB | 0.656 | n.a | n.a | n.a | n.a |
| Case 8 | Acquiring Bank | RHB | 0.539 | 0.571 | n.a | n.a | n.a |
| | Target Bank(s) | BUB | 0.582 | n.a | n.a | n.a | n.a |
| Case 9 | Acquiring Bank | SOUTHERN | 0.728 | 0.910 | 0.570 | 0.593 | n.a |
| | Target Bank(s) | BHL | 0.688 | n.a | n.a | n.a | n.a |

Table 4: Relative PTE Scores for 1 pre-merger year and 3 post-merger years

| | Pure Technical Efficiency | | Pre-merger Yr | Merger Yr | Post Merger Yr1 | Post Merger Yr 2 | Post Merger Yr 3 |
|---|---|---|---|---|---|---|---|
| Case 1 | Acquiring Bank | AFFIN | 0.805 | 0.908 | 0.571 | 0.721 | n.a |
| | Target Bank(s) | BSNC | 0.678 | n.a | n.a | n.a | n.a |
| Case 2 | Acquiring Bank | ALLIANCE | 0.908 | 1.000 | 0.874 | 0.769 | n.a |
| | Target Bank(s) | IBM | 0.670 | n.a | n.a | n.a | n.a |
| | | SABAHB | 0.705 | n.a | n.a | n.a | n.a |
| Case 3 | Acquiring Bank | BCB | 0.931 | 0.864 | 0.908 | 0.814 | 0.803 |
| | Target Bank(s) | BBMB | 0.712 | n.a | n.a | n.a | n.a |
| Case 4 | Acquiring Bank | EONBANK | 0.705 | 0.946 | 0.703 | 0.682 | n.a |
| | Target Bank(s) | ORIENTALB | 0.683 | n.a | n.a | n.a | n.a |
| Case 5 | Acquiring Bank | HONG LEONG | 0.831 | 0.979 | 0.878 | 0.759 | n.a |
| | Target Bank(s) | WTBB | 0.615 | n.a | n.a | n.a | n.a |
| Case 6 | Acquiring Bank | MAYBANK | 1.000 | 0.978 | 1.000 | 1.000 | 1.000 |
| | Target Bank(s) | PABB | 0.782 | 0.572 | 0.905 | n.a | n.a |
| | | TPBB | 0.810 | n.a | n.a | n.a | n.a |
| Case 7 | Acquiring Bank | PUBLIC | 0.813 | 0.894 | 0.786 | 0.772 | n.a |
| | Target Bank(s) | HHB | 0.882 | n.a | n.a | n.a | n.a |
| Case 8 | Acquiring Bank | RHB | 0.889 | 0.829 | n.a | n.a | n.a |
| | Target Bank(s) | BUB | 0.741 | n.a | n.a | n.a | n.a |
| Case 9 | Acquiring Bank | SOUTHERN | 0.926 | 0.930 | 0.731 | 0.767 | n.a |
| | Target Bank(s) | BHL | 0.848 | n.a | n.a | n.a | n.a |

Table 5: Relative SE Scores for 1 pre-merger year and 3 post-merger years

| | Scale Efficiency SE | | Pre-merger Yr | Merger Yr | Post Merger Yr1 | Post Merger Yr 2 | Post Merger Yr 3 |
|---|---|---|---|---|---|---|---|
| Case 1 | Acquiring Bank | AFFIN | 0.784 | 0.964 | 0.666 | 0.671 | n.a |
| | Target Bank(s) | BSNC | 0.887 | n.a | n.a | n.a | n.a |
| Case 2 | Acquiring Bank | ALLIANCE | 0.831 | 0.982 | 0.701 | 0.651 | n.a |
| | Target Bank(s) | IBM | 0.946 | n.a | n.a | n.a | n.a |
| | | SABAHB | 0.899 | n.a | n.a | n.a | n.a |
| Case 3 | Acquiring Bank | BCB | 0.846 | 0.900 | 0.562 | 0.690 | n.a |
| | Target Bank(s) | BBMB | 0.854 | n.a | n.a | n.a | n.a |
| Case 4 | Acquiring Bank | EONBANK | 0.988 | 0.690 | 0.648 | n.a | n.a |
| | Target Bank(s) | ORIENTALB | 0.948 | n.a | n.a | n.a | n.a |
| Case 5 | Acquiring Bank | HONG LEONG | 0.868 | 0.958 | 0.731 | 0.799 | n.a |
| | Target Bank(s) | WTBB | 0.977 | n.a | n.a | n.a | n.a |
| Case 6 | Acquiring Bank | MAYBANK | 0.336 | 0.749 | 0.912 | 0.566 | 0.602 |
| | Target Bank(s) | PABB | 0.433 | 0.917 | 0.938 | n.a | n.a |
| | | TPBB | 0.377 | n.a | n.a | n.a | n.a |
| Case 7 | Acquiring Bank | PUBLIC | 0.827 | 0.932 | 0.629 | 0.776 | n.a |
| | Target Bank(s) | HHB | 0.744 | n.a | n.a | n.a | n.a |
| Case 8 | Acquiring Bank | RHB | 0.607 | 0.689 | n.a | n.a | n.a |
| | Target Bank(s) | BUB | 0.785 | n.a | n.a | n.a | n.a |
| Case 9 | Acquiring Bank | SOUTHERN | 0.785 | 0.978 | 0.779 | 0.772 | n.a |
| | Target Bank(s) | BHL | 0.812 | n.a | n.a | n.a | n.a |

in both market share of deposits and TE. Evidence on whether post-merger efficiency gains are passed on to the public is inconclusive.

Observation of the efficiency scores within the "pre-merger year" column shows that in 8 out of the 9 cases in Table 3, the acquiring banks were more efficient in terms of TE than the target banks one year prior to their respective mergers. Furthermore Table 4 shows that in all 9 cases, the acquiring banks had higher PTE levels than the target banks during the pre-merger period. However results from Table 5 show that only 2 of the 9 cases where the acquiring

banks had higher SE than the acquiring banks. In all the remaining 7 cases, the acquiring banks had lower SE scores than the target banks.

According to Table 3, in 9 out of 10 cases, bank mergers led to an increase of TE during the merger year but it then fell during the first post-merger period. The only exception is Case 4 where TE fell during and after the merger. In Cases 1, 3, 7 and 9, TE eventually improved during the second post-merger year. In Cases 2, 5 and 6, TE continued to deteriorate. In Case 6, TE eventually improved marginally. Thus, for a majority of banks, mergers initially boost TE during the merger year but subsequently led to growing inefficiency in the years after the merger.

In Table 4, we see that for 8 out of 9 cases, PTE improved during the merger year, but declined during the first post-merger year, only to increase again in the second post-merger year. The exceptional case is Case 5 where multiple mergers at different time frames led to an apparent decrease in TE during the merger year but improvement beginning in the first post-merger year and eventually full efficiency during the first, second and the third post-merger year. In terms of SE, Table 5 shows that in all cases SE rose during the merger year. Nevertheless in Cases 1, 3, 5 and 7, SE subsequently worsened during the first-post merger year but improved in the second year. For Cases 2 and 9, SE declined during the first and second post-merger years. For Case 4, SE worsened in the first post-merger year. There was however some delay to the usual initial fall in efficiency and subsequent SE improvement due to the presence of multiple bank mergers that seem to have confounded the efficiency results.

Table 6 shows that in 8 out of the 9 merger cases, changes in market share of deposits rose during the first post-merger year. At the same time however, only 2 cases reported increase in TE whilst the remaining 8 cases reported TE declines. Of these 2 cases, only Case 2 sees a positive correlation between increases in both market share of deposits and TE. During the second post-merger year however, 3 cases (Case 3, 5 and 7) reported such a relationship. Proceeding towards the third post-merger year with observations for Case 2 and Case 3, both cases reported declines in both market share of deposits and TE instead of increase in market share.

## 8. DISCUSSION OF RESULTS

We find acquiring banks are more efficient than target banks and most of this efficiency advantage is attributable to better managerial competence (PTE). In contrast, acquiring banks are less scale efficient than target banks.

Table 6: Change in Relative Efficiency Scores (TE) and Market Share of Deposits in the 3 years following merger.

| | DCB | Period | Market Share of Deposits | Change in Market Share of Deposits | Change in TE for Merged Banks |
|---|---|---|---|---|---|
| Case 1 | AFFIN | During year of merger | 2.05% | | |
| | | During Post-Merger Year 1 | 2.50% | 22.02% | -36.53% |
| | | During Post-Merger Year 2 | 2.43% | -3.14% | 29.74% |
| | | During Post-Merger Year 3 | Nil | Nil | Nil |
| Case 2 | ALLIANCE | During year of merger | 1.04% | | |
| | | During Post-Merger Year 1 | 1.92% | 83.83% | 23.76% |
| | | During Post-Merger Year 2 | 1.97% | 2.64% | -5.60% |
| | | During Post-Merger Year 3 | 1.93% | -2.26% | -3.18% |
| Case 3 | BCB | During year of merger | 2.62% | | |
| | | During Post-Merger Year 1 | 7.10% | 171.22% | -27.50% |
| | | During Post-Merger Year 2 | 7.37% | 3.76% | 13.79% |
| | | During Post-Merger Year 3 | 7.06% | -4.17% | -11.64% |
| Case 4 | EONBANK | During year of merger | 0.82% | | |
| | | During Post-Merger Year 1 | 1.67% | 102.68% | -21.69% |
| | | During Post-Merger Year 2 | 1.65% | -0.77% | 4.19% |
| | | During Post-Merger Year 3 | Nil | Nil | Nil |
| Case 5 | HONG LEONG | During year of merger | 2.42% | | |
| | | During Post-Merger Year 1 | 2.86% | 18.13% | -3.60% |
| | | During Post-Merger Year 2 | 3.03% | 5.88% | 3.52% |
| | | During Post-Merger Year 3 | Nil | Nil | Nil |
| Case 6 | MAYBANK | During year of merger | 10.29% | | |
| | | During Post-Merger Year 1 | 12.94% | 25.71% | -11.34% |
| | | During Post-Merger Year 2 | 12.93% | -0.08% | 9.51% |
| | | During Post-Merger Year 3 | Nil | Nil | Nil |
| Case 7 | PUBLIC | During year of merger | 4.08% | | |
| | | During Post-Merger Year 1 | 4.97% | 21.94% | -13.62% |
| | | During Post-Merger Year 2 | 5.53% | 11.18% | 18.15% |
| | | During Post-Merger Year 3 | Nil | Nil | Nil |
| Case 8 | RHB | During year of merger | 5.64% | | |
| | | During Post-Merger Year 1 | 5.42% | -3.90% | 10.33% |
| | | During Post-Merger Year 2 | Nil | Nil | Nil |
| | | During Post-Merger Year 3 | Nil | Nil | Nil |
| Case 9 | SOUTHERN | During year of merger | 1.92% | | |
| | | During Post-Merger Year 1 | 1.97% | 2.64% | -6.03% |
| | | During Post-Merger Year 2 | 1.93% | -2.26% | -1.61% |
| | | During Post-Merger Year 3 | Nil | Nil | Nil |

Banks that are consistently under performing are likely to become take over targets if potential acquiring banks can identify synergies that can lead to increased savings and efficiencies. Although banks generally grew more efficient during the merger year, almost all banks experienced PTE and SE efficiency declines during the first post-merger year, but in 3 bank merger cases, there had been a sharp decline in SE. Sudden enlargement of operating sizes could often result in problems and difficulties in consolidating branches, computer operations and transaction processing during the first few post-merger years (Berger et al, 1999). Furthermore, banks are likely to experience PTE decline as banks were swamped by managerial difficulties in monitoring larger organizations, conflicts in corporate culture and system integration problem. However as Figures 4 and 5 suggest, growing scale inefficiencies were more prevalent amongst banks and dominated declines in PTE.

The results show inconsistent evidence about increased efficiency levels during the extended post-merger periods. The results were consistent with a majority of studies of bank mergers in the US, Europe and Australia that found very modest or no efficiency gains resulting from bank mergers (Berger and Humphrey, 1992; Rhoades, 1993; DeYoung, 1997 ;Peristiani, 1997 and Avkiran, 1999b).

Contrary to the potential for increased scale economies identified by Berger and Mester (1997), Berger and Humphrey (1997), Allen and Rai (1996), this study found no concrete measures of scale efficiency gains.

It is very likely that banks need time to address coordination difficulties Berger, Saunders, Scalise and Udell (1998), Calomiris and Karceski (2000), Rhoades (1998) and Houston, James and Ryngaert (2001) suggest it takes time for banks to realize post-merger gains in efficiency.

There is inconclusive evidence about the extent to which any benefits of post-merger bank efficiency gains are passed on to the public.

## 9. CONCLUSIONS

We find clear evidence that the less efficient banks become takeover targets. There is some evidence of increases in efficiency immediately post-merger but these are not sustained. There is no evidence of transmission of post merger gains to the public. Our conclusions are limited by the fact that we have used a short post-merger time frame and it may take a considerable period to consolidate efficiency gains post-merger.

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