Chapter 4

Research Methodology

4.1 Introduction

This research focuses on the performance of the domestic banks by accessing the significance of merger-related gains in terms of cost and profit efficiency.

4.2 Methodology

In order to study the effect of merger, this analysis will compare the pre merger and post merger performance of banks using accounting data to determine whether consolidation leads to changes in reported costs, revenue or profit figures for bank mergers over a three year pre and post merger period.

The data used in this analysis was obtained from secondary sources. The data on financial performance of domestic banks were gathered from published annual audited financial reports by each bank, which is available from the Knowledge Management Centre (KMC) of Bank Negara Malaysia, Kuala Lumpur, Institute Bank-Bank Malaysia (IBBM), Kuala Lumpur, one of the big three audit firms in Malaysia and the respective banks' web-sites.

In this study, the focus of research is the acquiring and acquired domestic banks, which eventually became the ten anchor banks in Malaysia. The year of the merger is excluded from the analysis because it includes a one-time merger cost incurred during that year. Hence, it is biased and inconsistent to compare results for the merger year with the other years. We define the year of the merger as t-year for each of the ten anchor banks. Hence,

the accounting data that had been collected for the mergers samples for a period three-years before merger year, t is defined as t - 3, t - 2 and t - 1, whereas t + 1, t + 2 and t + 3 represents three years following the merger year, t.

4.3 Operating Performance

In our study, we analyse the operating performance, which permits us to focus specifically on profit, cost and efficiency. To this end, we evaluate changes in accounting profit and cost ratios. Financial performance is measured through the following three ratios; return on assets, return on equity, and the cost efficiency ratio. We use the following definitions for this study:

4.3.1 Return On Assets-ROA

The return on assets (ROA) is an indicator of profitability and a good overall indicator of a banking organisation's performance. ROA is a comparison of net income over total assets. Investors and potential investors use this ratio to evaluate how well a company's leadership and how much profit a company generated for each RM1 in assets. The formulation of ROA measures a company's earnings in relation to all of the resources it had at its disposal, which is the shareholders' capital plus short and long-term borrowed funds. Thus, it is the most stringent and excessive test of return to shareholders. If a company has no debt, the return on assets and return on equity figures will be the same.

4.3.1.1 Formula for Return On Assets

The formula for Return On Assets is:

Return On Assets (ROA) = net income as percentage of total assets

$$ROA = \frac{\text{Net Income}}{\text{Total Assets}}$$

The lower the profit per dollar of assets, the more asset-intensive a business is. The higher the profit per dollar of assets, the less asset-intensive a business is. All things being equal, the more asset-intensive a business, the more money must be reinvested into it to continue generating earnings. If a company has a ROA of 20%, it means that the company earned $0.20 for each $1 in assets. As a general rule, anything below 5% is very asset-heavy for instance, manufacturing, anything above 20% is asset-light, for instance financial servicing industry. As this is a study in banking sector, increasing ROA in the period of post-merger could be contributed by the successful merger practice. However, according to Rhoades, 1998, ROA is biased upward for some banks due to profits generated from off-balance sheet operations.

4.3.2 Return On Equity – ROE

One of the most important profitability metrics is return on equity (ROE). ROE reveals how much profit a company earns in comparison to the total amount of shareholder equity or shareholders fund, found on the balance sheet. The shareholder equity is equal to total assets minus total liabilities. It is what the shareholders "own". Shareholder equity is a creation of accounting that represents the assets created by the retained earnings of the business and the paid-in capital of the owners, or we can say that shareholders' equity comprises ordinary share capital and reserves. ROE is used as an alternative measure of profitability and reflects the return to owners' investment.

A business that has a high return on equity is more likely to be one that is capable of generating cash internally. For the most part, the higher a company's return on equity compared to its industry, the better. If you owned a business that had a net worth

[shareholder's equity] of $100 million dollars and it made $5 million in profit, it would be earning 5% on your equity [$5 / $100 = .05, or 5%]. The higher you can get the "return" on your equity, in this case 5%, the better.

4.3.2.1 Formula for Return On Equity

The formula for Return On Equity is:

Return On Equity (ROE) = net income as a percentage of common shareholder's equity

$$ROE = \frac{Net\ Income}{Common\ Shareholder's\ Equity}$$

Stockholder and potential investors are particularly interested in the analysis of the firm's ROA and ROE as they would derive revenue in the form of dividend (Gibson and Frishkoff (1986)). To the management, ROA and ROE signify important performance indicators. Both ROA and ROE have a positive relationship, however, when a bank has higher debt-equity ration, the lower is its ROA given the same ROE. Profit efficiency is based on the economic goal of profit maximisation, which requires the same amount of managerial attention to raise a managerial dollar of revenues as to reduce a managerial dollar of cost. Thus, profit efficiency, measured by using ROA and ROE, may be better used to show efficiency gains, if any, and associated with bank mergers.

4.3.3 Cost Efficiency Ratio-CER

Cost Efficiency Ratio (CER) is a measure of cost control, hence it is important to know whether bank mergers result in cost savings. Cost efficiency measures how well the

observed bank manages its cost relative to pre merger. The standard definition of the CER is non-interest costs divided by total assets. Although the ratio is dependent on figures for cost and assets, its use tends to focus on cost, specifically overhead cost. Non-interest costs or overhead costs are perceived as that part of a bank's cost which are most controllable, and most responsive to management action. A reduction in cost for a fixed level of revenue, should lead to increased profit, and thus increased return on equity the measures of greatest interest to investors in bank shares. Focusing on bank's non-interest cost means that fluctuation in the general level of interest rates do not cause volatility in the ratio that would arise if interest cost were included.

4.3.3.1 Formula for Cost Efficiency Ratio

The formula for Cost Efficiency Ratio is:

Cost Efficiency Ratio (CER) = non-interest expenses divided by total assets

$$CER = \frac{\text{Non-interest expenses}}{\text{Total Assets}}$$

4.4 Pre Merger Performance Measurement

To measure pre merger performance, accounting data for the acquiring and acquired banks are combined, and we calculated the average ROA, ROE and CER to find the pro forma performance for the ten anchor banks, for instance:-

$$(ROA_a + ROA_b)/2 = ROA_{ab}$$

$$(ROE_a + ROE_b)/2 = ROE_{ab}$$

$$(CER_a + CER_b)/2 = CER_{ab}$$

whereby:

ROA_a = Return on Assets for bank **a**

ROA_b = Return on Assets for bank **b**

ROA_{ab} = Return on Assets for bank **ab**

ROE_a = Return on Equity for bank **a**

ROE_b = Return on Equity for bank **b**

ROE_{ab} = Return on Equity for bank **ab**

CER_a = Cost Efficiency Ratio for bank **a**

CER_b = Cost Efficiency Ratio for bank **b**

CER_{ab} = Cost Efficiency Ratio for bank **ab**

4.5 Post Merger Performance Measurement

As our main objective is to measure the impact of bank mergers on the performance of the combined banks, we compare the average ROA_{ab}, ROE_{ab} and CER_{ab} of the ten anchor banks for the three years preceding the merger with the three years following the merger, excluding the merger year itself, because it is affected by one-time merger costs incurred during that year. The post merger combined banks' ROA, ROE and CER, are as below:

$$ROA^{(1)......(10)} = \text{Return On Assets for anchor bank number } 1.....10$$

$$ROE^{(1)......(10)} = \text{Return On Equity for anchor bank number } 1.....10$$

$$CER^{(1)......(10)} = \text{Cost Of Efficiency Ratio for anchor bank number } 1.....10$$

4.6 Industry Average Performance Measurement

In order to assess the effectiveness of the government assisted merger and acquisition plan in the domestic banking sector, this paper also calculates the average of the ten anchor banks' ROA, ROE and CER for the period of three years before and three years after the merger to evaluate the domestic banking industry as a whole. As a reminder, for the pre merger, all the three financial analysis are equivalent to the average of the financial ratios for the acquiring and acquired banks in the respective merged group. For instance, industry average financial ratios for the pre merger period;

$$[ROA_{ab}^{(1)} + ROA_{ab}^{(2)} + ROA_{ab}^{(3)} + ...ROA_{ab}^{(10)}]/10 = ROA \text{ domestic bank industry}$$

whereby:

$ROA_{ab}^{(1)}$ = Return On Assets for anchor bank number 1 for period of pre merger

$ROA_{ab}^{(2)}$ = Return On Assets for anchor bank number 2 for period of pre merger;

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and so on for the 10 anchor banks.

$$[ROE_{ab}^{(1)} + ROE_{ab}^{(2)} + ROE_{ab}^{(3)} + ...ROE_{ab}^{(10)}]/10 = ROE \text{ domestic bank industry}$$

whereby:

$ROE_{ab}^{(1)}$ = Return On Equity for anchor bank number 1 for period of pre merger

$ROE_{ab}^{(2)}$ = Return On Equity for anchor bank number 2 for period of pre merger;

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and so on for the 10 anchor banks.

$$[CER_{ab}^{(1)} + CER_{ab}^{(2)} + CER_{ab}^{(3)} + \ldots\ldots CER_{ab}^{(10)}]/10 = CER_{\text{domestic bank industry}}$$

whereby:

$CER_{ab}^{(1)}$ = Cost Efficiency Ratio for anchor bank number 1 for period of pre merger

$CER_{ab}^{(2)}$ = Cost Efficiency Ratio for anchor bank number 2 for period of pre merger;

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and so on for the 10 anchor banks.

For the post-merger period, the industry average financial ratios are simply averaging all the ten banks ROA, ROE and CER, as shown below;

$$[ROA^{(1)} + ROA^{(2)} + ROA^{(3)} + \ldots \ldots ROA^{(10)}]/10 = ROA_{\text{domestic bank industry}}$$

$$[ROE^{(1)} + ROE^{(2)} + ROE^{(3)} + \ldots \ldots ROE^{(10)}]/10 = ROE_{\text{domestic bank industry}}$$

$$[CER^{(1)} + CER^{(2)} + CER^{(3)} + \ldots \ldots CER^{(10)}]/10 = CER_{\text{domestic bank industry}}$$

4.7 Strength and Limitation of Methodology

The strength of this profits and costs efficiency approach is that accounting performance can be directly measured and the data used is easily obtained and well understood. The approach is also fairly straightforward. Data from both pre merger and post merger data were used in the analysis and evaluated for evidence of a change in the performance around the merger activities. Proponents of this methodology argue that accounting data measure actual performance conditions, not investor expectations and are therefore likely to be somewhat more reliable than equity returns.

However, studies of accounting data have several drawbacks. Although accounting data are designed to measure actual performance, they may be inaccurate in an economic sense. Data are based on historical figures. Hence, all the accounting measures merely reflect the past rather than present financial performance expectations (Montgomery & Wilson, 1986) nor do they reflect changes in the firm's risk profile. In fact they often neglect current market values or present financial performance. Capron's recent survey-based work claims: "…traditionally available financial data are too gross to permit differentiation between the types of fine-grained value-creating mechanisms…" (Capron, 1999 page 993). In addition, measured changes between the pre merger and post merger period may not be solely due to the merger. Other events may have occurred during the period that is being investigated which may more accurately account for the observable performance changes. Failing to account for such extraneous events may lead to improper conclusions regarding merger-related changes. The use of these financial ratios does not

consider the input price and output mix. Also, this method does not assign weightage to each of the ten banks. As some banks are larger than the others, weightage should be appropriated in terms of assets size for each bank. For example, as Malayan Banking Berhad is the largest domestic bank in terms of assets, it should be given a higher weightage as compared to the other smaller banks. Also, financial rations ignore the current market value of the bank and do not reflect economic value-maximisation.

4.8 Conclusion

This type of study that compares the operating performance of financial institutions for the period of pre merger and post merger is recognised as dynamic analysis and it is more comprehensive than static analysis.[3]

The next chapter analyses the results by employing the methodology discussed in this chapter.

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[3] Static analysis is defined as studies that relate to the potential consequences of mergers to certain characteristics of financial institutions that are associated with the mergers, such as institution's size, and it does not use data on mergers.