

## CHAPTER 3 : RESEARCH METHODOLOGY

### 3.1 Research Hypotheses

With reference to theoretical background presented in section 1.2; the differentiation, conformity and strategic balance propositions are derived based on elaborations in section 2.1, 2.2, 2.3 respectively:-

Differentiation proposition : Less strategic similarity increase performance.

Conformity proposition : Greater strategic similarity increases performance.

Strategic balance proposition : Moderate amounts of strategic similarity increase performance.

The following hypotheses are used to test the above propositions: -

Hypothesis 1 (Differentiation) : There is a positive relationship between strategic deviation and performance.

Hypothesis 2 (Conformity) : There is a negative relationship between strategic deviation and performance.

Hypothesis 3 (Strategic balance) : There is a curvilinear, inverted U-shape relationship between strategic deviation and performance.

### **3.2 Selections of Measures**

The selections of the measures for performance (dependent variable), strategic deviation (independent strategic variable) and dependent and independent control variables were based on the Deephouse's (1999) empirical study on the theory of strategic balance.

#### Dependent Variable

The measure for performance of commercial bank was based on the return on asset (ROA), which is the ratio of profit before tax to assets reported at year-end. Relative ROA was used as performance measure (Reger, Duhaime, Stimpert, 1992) in the statistical test, which indicates how well a bank is performed relative to its competitors. Relative ROA is the different between commercial bank's ROA and the average ROA of all commercial banks in a given year.

#### Independent Strategic Variable

The measure for strategic deviation as independent strategic variable was based on the specific strategies used in allocation of bank resources. Each specific strategy is defined as individual strategic variable. This study examined the following ten strategic variables measured as a proportion of bank total assets: -

1. Cash and short term funds
2. Deposits and placement with financial institutions
3. Dealing and investment in securities
4. Others assets
5. Manufacturing loan
6. Construction loan
7. Real estate loan
8. Finance, insurance and business services loan

9. Consumption credit

10. Other loan

The degree of similarity of each strategic variable was measured using standard deviation. For a given year, each strategic variable for each bank was compared to sample average and expressed as standard deviation. The absolute values of standard deviations of each strategic variable were totaled for each bank to form strategic deviation because strategy is holistic concept involving interrelated components and aggregation increase model parsimony (Deephouse, 1999).

The standard deviation of each bank  $(i)$  in a given year  $(t)$  was derived from the following equation: -

$$\text{Strategic deviation}_{(i,t)} = \sum_{a=1 \text{ to } n} \{ \text{ABS} [ (P_{ait} - \text{Aver}(P_{at})) / \text{SD}(P_{at}) ] \}$$

Where;  $P_{ait}$  = Proportion of the assets in specific strategic variable $_{(a)}$  for bank $_{(i)}$  in given year $_{(t)}$ .

$\text{Aver}(P_{at})$  = Mean of strategic variable $_{(a)}$  in given year $_{(t)}$ .

$\text{SD}(P_{at})$  = standard deviation of strategic variable $_{(a)}$  in given year $_{(t)}$ .

## Independent Control Variables

Three independent control variables were included in statistical analysis using hierarchical multiple regression to account for the influences of other elements on ROA. The independent control variables included were market share of deposit, operational efficiency and market growth of deposit.

### 1. Market Share of Deposits

Many past researches have illustrated that organization size has direct relationship with performance (Berger, 1995; Chen and Hambrick, 1995; Smirlock, 1985) . Bigger organizations normally act as market leader, they are able to exert market power, exercise leadership in many business strategies. Thus, they gain first mover's advantage to performance better than other competing organizations. According to micro economy theory, size effect also associates strong with benefit of economies of scale whereby bigger size of organizations are able to reduce the unit cost to gain higher profit margin.

For this study, commercial banks' market share based on deposit as control variable was used to account for relative size effect, which is expected to have a positive relationship with ROA.

### 2. Cost Efficiency

Although the assumption of perfect competitive market theory is applied to commercial banks in general, some banks are relatively more cost efficient than others (Berger, 1995), irrespective of the size effect. This cost efficiency is strongly related to banks' management skill in normal business operation.

For this study, the cost efficiency as control variable was measured by the ratio of total interest and non-interest expense to total average bank's assets. The cost efficient is expected to have positive relationship with ROA.

### 3. Market Growth of Deposit

Changes in the overall market resources condition over time may affect the degree of market competition and hence the organization's performance. It is assumed that supply of resources is relatively more than demand of resources, thus drive down the resource cost and improve the performance.

For this study, market growth of deposit as control variable was measured by the ratio of current total market deposits to previous total market deposits. This control variable is expected to have positive relationship with performance.

### Dependent Control Variables

Lagged effect of previous performance in the form of relative ROA was included as dependent control variable. It is assumed that the effects of changes of the previous performance are distributed over multiple time periods. This control variable is expected to have positive relationship with performance.

### **3.3 Sampling Design and Data Collection**

This study was conducted by testing the hypotheses in a population of local commercial banks competing in Malaysia (as single market) from 1995 to 2000. A sampling frame as shown in Appendix 1 was developed to provide a summary list population element for each year as direct sampling guide.

The secondary internal data for dependent variable, independent strategic variables and dependent control variable was collected from the data published in annual report of each commercial bank. The report format of all commercial banks is standardized by BNM, thus the strategic deviation computed using the data published directly reflect the relative distinct strategic position of each bank without any modification or adjustment. The main sources of these data are BNM library, KLSE library and each commercial bank headquarter.

The rest secondary external data was collected from BNM's periodic publications.

The unit of analysis is the bank-year. Data in 1995 was served to provide the first dependent control variable (lagged variable) for 1996. Strategic variables were constructed using data published from 1996 onwards because the components of the loan extended by bank were incorporated in annual report only since 1996.

### 3.4 Data Analysis Techniques

The SPSS computer software was used for the statistical analysis in this study.

The scatter diagram was plotted for distribution of relative ROA and strategic deviation as part of data screening and cleaning processes. The preliminary regression analysis was carried out to examine the linear and curvilinear relationship between strategic deviation and ROA. The existence stronger curvilinear relationship than linear relationship would provide support to strategic balance theory proposition.

The data was analyzed using hierarchical multiple regression method. In the study of curvilinear relationship, second order of independent strategic variable is the highest order considered in the models. Three models shown below were used in the hierarchical multiple regression analysis to examine the relationship between dependent variable, strategic independent variable and control variables: -

$$\text{Model 1 : } RROA_{(i,t)} = Bo + (B3 * MS_{(i,t)}) + (B4 * EFF_{(i,t)}) \\ + (B5 * MG_{(t)}) + (B6 * RLAG_{(i,t)}) + e_{(i,t)}$$

$$\text{Model 2 : } RROA_{(i,t)} = Bo + (B1 * SD_{(i,t)}) + (B3 * MS_{(i,t)}) + (B4 * EFF_{(i,t)}) \\ + (B5 * MG_{(t)}) + (B6 * RLAG_{(i,t)}) + e_{(i,t)}$$

$$\text{Model 3 : } RROA_{(i,t)} = Bo + (B1 * SD_{(i,t)}) + (B2 * SD_{(i,t)}^2) \\ + (B3 * MS_{(i,t)}) + (B4 * EFF_{(i,t)}) + (B5 * MG_{(t)}) \\ + (B6 * RLAG_{(i,t)}) + e_{(i,t)}$$

where;	$RROA_{(i,t)}$	→	Relative ROA for bank <sub>(i)</sub> and year <sub>(t)</sub>
	$SD_{(i,t)}$	→	Strategic deviation for bank <sub>(i)</sub> and year <sub>(t)</sub>
	$MS_{(i,t)}$	→	Market share for bank <sub>(i)</sub> and year <sub>(t)</sub>
	$EFF_{(i,t)}$	→	Cost efficiency for bank <sub>(i)</sub> and year <sub>(t)</sub>
	$MG_{(t)}$	→	Market growth for year <sub>(t)</sub>
	$RLAG_{(i,t)}$	→	Lagged relative ROA for bank <sub>(i)</sub> and year <sub>(t-1)</sub>
	$e_{(i,t)}$	→	residual error for bank <sub>(i)</sub> and year <sub>(t)</sub>

Model 1 was used to test the control variables.

Model 2 was generated by adding first order of strategic deviation into model 1. Model 2 was used to test the hypothesis 1 against hypothesis 2.

Model 3 was generated by adding second order of strategic deviation into model 2. Model 3 was used to test the hypothesis 3.

The disturbing phenomena of first order of autocorrelation, heteroscedasticity and multicollinearity need to be examined because of the presence of lagged dependent variable and time series data. However, there was a high interaction among these disturbing phenomena, so treatment for each phenomena may not be appropriate and may generate other disturbing effects. Treatments will be applied only if it is appropriate and originality of data set can be restored.

Durbin-Watson statistic was used to identify the existence of first order of autocorrelation. For certain level of significance, Durbin-Watson statistic (D) must greater than 'd<sub>u</sub>' so that null hypothesis of no autocorrelation cannot be rejected. An iterative approach (Wesolowsky, 1976) will be used (if appropriate) to reduce its disadvantage in obtaining the coefficients of models, iterative process stops when D is greater than d<sub>u</sub>. The following is the tabulation for d<sub>u</sub> at 0.01 level of significance (Intriligator, 1978) which was used for this study: -



Data sets	Model 1 (4 variables)	Model 2 (5 variables)	Model 3 (6 variables)
80	1.60	1.62	1.62
85	1.60	1.63	1.63
90	1.61	1.64	1.64

The distributions of residual errors vs independent variables were used to identify the existence of heteroscedasticity. Weighted least square regression will be used (if appropriate) to restore homoscedasticity.

Condition index computed by SPSS was used to identify the degree of degrading effect of multicollinearity on regression estimates for further evaluation. Weak degrading effect is associated with condition indexes around 5 or 10 whereas moderate to strong degrading effect is associated with condition indexes of 30 to 100 (Belsley, Kuh, Welsch; 1980).

The fitness of the each model was examined. The sign of each variable coefficient in each model was examined and tested statistically.

The improved fitness of model 1 over model 2 reflects that strategy is related to the competitive environment and institutional environment, and there is existence of relationship between strategy and performance.

If the fitness of model 3 improve over model 2, and the term of coefficient B2 (in model 3) is negative and statistically significant, then it can be concluded in this study that hypothesis 3 have greater credence over hypothesis 2, which will provide strong empirical support to strategic balance theory.