

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

#### **3.1 Research Design**

The study focuses on the construction sector of companies listed on the Bursa Malaysia Main Board. As of December 2004, there are 43 companies listed on this sector of the Main Board. In order to qualify for the parametric test, 35 companies are selected as sample for analysis based on the following criteria:

1. The company is a member of Bursa Malaysia and listed on the Main Board construction sector. The financial statements and annual reports provide information on company background and financial data for analysis. The same information can also be obtained from internet or Bloomberg system.
2. Complete annual revenue, net profit, shareholder's equity and long term debt ratio of the companies for the period 1999 to 2003 are available in order to avoid having missing values, which may affect the analysis.
3. The shares of the company were frequently traded in the market. This criterion is to reduce the thin trading effect. When shares are thinly traded, the prices of the share do not reflect the market value of the shares. Consequently, the estimation of share returns and other financial data may be biased.

A regression of the dependent variables; company performance represented by Return on Equity (ROE), on the independent variables which consists of capital structure represented by long term debt ratio and firm size by revenue is performed on the 35 construction companies listed on the Bursa Malaysia Main Board over a period of 5 years. Then, the variables are examined to find out if there is any significant relationship between them.

A regression model is conducted to observe how capital structure decisions affect the firms' profit performance. There are two types of variables measured in this study; the dependent and independent variables.

a. *Dependent Variables*

A firm's ability to generate profit is regarded as a major indicator of its performance. Thus, profitability ratios have been used as dependent variables for the regression analysis. The indicator for performance used in the study is Return on Equity (ROE).

ROE measures the return earned on the ordinary stockholders's investment in the firm. The ROE can be separated into three individual components:

- *Asset efficiency* – the extent to which management can generate sales from a given asset base. Asset efficiency is measured by the asset-turnover ratio: sales divided by assets
- *Expense control* – the extent to which management can obtain income after taxes from a given sales base. Expense control is measured by the after-tax profit margin; net income divided by sales
- *Debt utilization* – the extent to which management relies on debt financing to support a given level of assets. Debt utilization is measured by the following ratio: total assets divided by total equity.

The ROE is determined by the following equation:

$$\text{ROE} = \frac{\text{Annual Net Profit}}{\text{Common Equity}}$$

b. *Independent Variables*

This study adopts capital structure decision and firm size as the independent variables. Capital structure is measured by the *long term debt ratio (ratio of long term debt to equity)*. The higher this ratio, the greater the relative amount of debt (or financial leverage) in the firm's capital structure. The level of debt (financial leverage) that is acceptable for one industry or line of business can be highly risky in another, because different industries and lines of business have different operating characteristics. With that in mind, this study has focused only on the construction industry; as a form of control on the independent variables that will affect the company performance.

As in the study conducted by Masulis (1983), Hamada (1972) and Bhandari (1988), the capital structure of this study is measured by the long term debt ratio. Debt includes all long-term debt stated at book value as at the financial year-end of the company. The ordinary shareholder's equity includes all share capital, share premium, reserves, etc. The long term debt ratio is given by:

$$\text{Long Term Debt Ratio} = \frac{\text{Long term debts}}{\text{Ordinary Shareholder's Equity}}$$

In this study, the effect of firm size on company performance is also being evaluated. Since long term debt ratio has been included as one of the independent variables, revenue is chosen as an approximation of firm size instead of paid-up capital or common shareholder's equity. This is to avoid multicollinearity, the high correlation among the independent variables. The purpose of including firm size in the study is as a control variable; to determine the extent of firm size effect on the study of relationship between capital structure decisions and company performance.

### **3.2 Data Collection**

All the data used in this study is secondary data; obtained from the following sources:

1. The end of year financial results of the construction companies
2. The Bursa Malaysia website ([www.bursamalaysia.com](http://www.bursamalaysia.com))
3. The Bank Negara Malaysia website ([www.bnm.gov.my](http://www.bnm.gov.my))

The sample period of 5 years was chosen in order to obtain a reasonable period. Such duration is chosen as to evaluate the performance of the construction companies, few years after the financial crisis of 1997. Data during the financial crisis might be biased and not accurate as this study is not focusing on the crisis. It may be influenced by the macroeconomic factors instead of the capital structure decision that is being studied.

By the year 1999, the companies were expected to be more independent from the financial crisis. The data of 2003 is regarded as the most recent data available. The study will include 35 construction companies listed on Bursa Malaysia Main Board and annual data of revenue, net profit, long term debt and shareholders equity are used and these data are available to the public at yearly intervals.

### **3.3 Regression Model**

The statistical tool used in this study is the simple cross sectional regression and independent samples t test. The objective of simple cross sectional regression is to evaluate the extent to which variation in the dependent variable is associated with the variation in the independent variable specified in the regression equation. The main objective of this research is to determine whether there is an effect of long term debt ratio on company performance measured using ROE.

Data was analyzed using the regression package of Statistical Package for Social Sciences (SPSS) Version 11.0 for Windows. First, all the data for the companies in the industry for a five year period from 1999 to 2003 were plotted. Then regress the ROE on

the long term debt ratio and revenue. This is done by taking into consideration that the industry they are in is being controlled; by only taking the construction industry for analysis. Also, the firm size is included in the analysis for control reasons. This was employed to measure the significance of association between variables and to determine the extent of influence of the independent variables on the dependent variables.

The second part of the analysis zooms into a few categories, by firm size and level of long term debt ratio. Firstly, all the data is listed in an ascending order based on annual revenue, as a proxy for firm size. The data is then divided into two parts with the lower half representing the small firm size companies and the other half the large firm size companies. For the small firm size companies, it is then listed based on ascending order of long term debt ratio. The data is further divided into two parts with the lower ratio companies representing small firm size and low long term debt ratio while the higher ratio companies are the small firm size and high long term debt ratio. Similarly, large firm size and low long term debt ratio companies and large firm size and high long term debt ratio companies are being determined. Appendix E lists all the companies under each category. Similarly, ROE is then regressed on long term debt ratio and revenue for each category of the companies and the result is presented in Appendix F to I.

The following simple cross sectional regression model is used to test whether there is a relationship between long term debt ratio and company performance measured by ROE for the construction sector in Malaysia:

$$P = \alpha + \beta_1 CS + \beta_2 FS + \varepsilon$$

where,

- P = Performance of company measured by ROE
- CS = Capital structure decision measured by long term debt ratio
- FS = Firm size measured by revenue
- $\beta_1, \beta_2$  = Coefficient of independent variables with the dependent variables
- $\alpha$  = Constant
- $\varepsilon$  = Error term

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The type of industry is hold constant as a controlled independent variables. For this study, only the construction companies listed on the Bursa Malaysia Main Board are being analyzed.

Based on findings of previous research, it is expected that a significant relationship exist between long term debt ratio and company performance.

### **3.4 Hypothesis**

The t-distribution, like the standardized normal distribution, is a symmetrical, bell-shaped distribution with a mean of zero and a standard deviation of 1. It is used to test a hypothesis concerning the population mean with a sample size that is not large enough ( $n \leq 40$ ) and the population standard deviation is unknown, to be approximated by the normal distribution. In this research, the t test and Pearson Correlation is performed to test the significance of the relationship between capital structure and company performance.

The major focus of this paper is to investigate the effect of capital structure decision on company performance in the construction industry in Malaysia. Then it looks into the relationship between firm size and company performance of the aforesaid industry. The next focus then is to zoom into each category of small firm size with low long term debt ratio, small firm size with high long term debt ratio, large firm size with low long term debt ratio and finally large firm size with high long term debt ratio.

Two hypothesis have been developed for the study:

**Hypothesis 1:** From the previous studies done on Malaysian companies, Izwan (2001) investigates companies from 7 different sectors and found that there is a negative relationship between leverage and company performance. Chandran's (2003) study on Industrial product companies and Foo (2002) on Trading/Services and Plantation sector

have similar results. However, Suresh' (2002) study on Finance and Consumer product sector shows a mixed result. Thus for this study, it is predicted that capital structure decisions has a negative and significant effect on construction companies' performance in Malaysia, based on the previous related findings. As the long term debt ratio increases, it is expected that the company performance will decline mainly due to the higher interest rates and increase in the bankruptcy cost.

The null and alternative hypothesis to test the significance of  $\beta_1$  are as follow:

$H_{01}$  : *There is no relationship between capital structure and construction companies' performance in Malaysia,  $\beta_1 = 0$*

$H_1$  : *The capital structure decision should have a negative and significant effect on construction companies' performance in Malaysia, ,  $\beta_1 =$  negative and significant*

**Hypothesis 2:** Leong's (2003) studies on 70 stocks from several sectors concluded that firm size is not significant in explaining the company's performance. However, Liew's (2004) study has a somewhat contradict results. For this study, it is predicted that firm size should not have any effect on the construction companies' performance in Malaysia. Liew (2004) argues that firm size should be positively related to leverage ratio because larger firms are more diversified, have easier access to the capital market and borrow at more favorable interest rates. Furthermore, it is argued that larger firms may have lower agency costs associated with the asset substitution and the under investment problem. This research is on the construction companies in Malaysia and the period of investigation is from 1999 to 2003, a period where the economy is considered on a downturn. There were many large firms that are badly hit during this period. Stronger firms have large amount of equity and retained earnings instead of opting for loans. Therefore, financial institutions were very careful in releasing loans to large companies. In some cases, the interest rates were even higher due to the higher risk. In addition, the interest rates during this period is relatively low.

Therefore, the argument of larger firms borrowing at more favorable interest rates is somewhat weak in this study. Furthermore, agency costs might not be low in the large construction firms in Malaysia. There are many large construction firms with no single individual being the majority shareholder e.g. Malaysian Resources Corporation Bhd (MRCB) and IJM Bhd

The null and alternative hypothesis to test the significance of  $\beta_2$  are as follow:

$H_{02}$  : *The firm size should have a significant effect on construction companies' performance in Malaysia,  $\beta_2 \neq 0$  and significant*

$H_2$  : *There is no relationship between firm size and construction companies' performance in Malaysia,  $\beta_2 = 0$*

If  $\beta_1$  is positive and significant, we can say that the company performance is positively correlated with long term debt ratio or the capital structure of the company. Vice versa, if  $\beta_1$  is negative and significant, we can say that the company performance is negatively correlated with long term debt ratio or the capital structure of the company.

The F-test is also performed in the analysis. It is a procedure for comparing one sample variance to another sample variance. The F-test determines whether there is more variability in the scores of one sample than in the scores of another sample. The key question is whether the two sample variances are different from each other or are from the same population.