

CHAPTER 3

RESEARCH METHODOLOGY

Hypothesis

A bull run is usually characterized with appreciation of share prices across the board. With appreciation of share prices, a bull run period can be characterized as a seller's market, with undervalued companies difficult to be found. Furthermore, the current owners of the target firms would be willing to sell their stakes only if lucrative prices were offered to them. The above mentioned leads us to Hypothesis 1 of this study.

H1: Acquired companies are relatively overvalued than non-acquired firms.

According to managerial economics of profit maximization theories, non-profitable or relatively low profitable companies will become targets for takeover. Agency theory has it that management is given the authority from the shareholders to operate the company and to maximize profits and returns to shareholders. Threats of takeover have been mentioned as one of the control mechanisms to ensure that the management will operate to the best interest of the shareholders instead of just serving the agent's benefits. If the returns to shareholders are low, the shareholders could use various strategies to protect their investment. One of these strategies is to sell their overvalued but poorly managed companies to others. Hypothesis 2 below reflects the above.

H2: Acquired companies are less profitable than non-acquired firms.

In addition to profitability, conventional wisdom has it that companies with low leverage are good takeover targets. Melicher and Rush in their joint publication in the 1974's Journal of Finance stipulated that acquiring firms would seek out the underlevered companies as merger or takeover targets. This is to increase the acquiring firms' borrowing capacity, lowering their gearing ratio and at the same time avoid from incurring huge debt's payment burden. Based on the above, Hypothesis 3 states that:

H3: Acquired firms have lower leverage than non-acquired firms.

Ajit Singh (1971) stipulated that even though not statistically significance, taken-over companies generally retained a higher portion of their incomes. Hypothesis 4 tests this statement.

H4 : Acquired firms retain a higher portion of their more earnings than non-acquired firms

Data

The data is a sample of companies listed in the Kuala Lumpur Stock Exchange that have been identified as takeover targets in the period from August 1990 to December 1993. This period corresponded to the bull market environment in the Kuala Lumpur Stock Exchange, with 1993 generally being labeled as the superbull period. Suspended public listed companies were excluded from the sampling as various measures such as market capitalization, stock prices and changes in principal activities were not available, making meaningful comparison impossible. Valuation and price-earnings ratios during announcement's month and three months preceding the announcement of acquisition were used in this study. The prices used in each of the acquired listed companies in this study were the average price for the month when the acquisition was announced ($t=0$), and the average prices for the past three months leading to the

announcement ($t=-1,-2,-3$). The average price is calculated as the average of the highest and lowest traded prices for the month in consideration. This approach is used with the intention of minimizing the speculative effects leading to the acquisitions of these companies. Price data were retrieved from the monthly Investor Digest published by the Kuala Lumpur Stock Exchange. The prices were adjusted for rights issues, bonus issues, share splits and new share issues. Latest balance sheet and profit and loss accounts before acquisitions were obtained from the Kuala Lumpur Stock Exchange Handbook for financial ratio calculations. Information on the acquired companies were obtained from the Kuala Lumpur Stock Exchange's Investor Digest, and counterchecked with writeups in the Kuala Lumpur Stock Exchange's Handbooks and Kuala Lumpur Stock Exchange's Daily Diary in the KLSE's Library.

The criteria used to select the non-acquired companies for use as control groups for the acquired firms are:

- (1) they must be listed and traded in the Kuala Lumpur Stock Exchange,
- (2) they must be listed in the same sectors as the acquired firms, and
- (3) they must have comparable market capitalizations at the time when the latest accounting statements were published before the acquisition.

The reason for selecting firms from similar sectors as controls is to avoid the effect of various economic and regulatory policies that might have adverse effects on one industry and fairly inert to others. In addition, companies used as control to the acquired firms were selected to have comparable market capitalization.

Financial Ratios

A total of 20 financial ratios were employed to analyze the characteristics of the acquired companies in this research. Out of these ratios, there are two groups of price

variables making up to eight ratios. These two groups of price variable are the valuation ratio and the price-earnings ratio. The other 12 financial ratios were selected to represent the profitability, liquidity, dividend policy and gearing of the companies. These financial ratios were selected to correspond closely to the ratios used in previous studies by other researchers. Listed below are some brief explanations on the financial ratios used in this research.

Price Ratios

Price ratios are ratios that take into consideration the stock prices traded in the Kuala Lumpur Stock Exchange. Two types of price ratio have been adopted in this study. These ratios are the valuation ratio and price-earnings ratio.

Valuation Ratio (VR). Valuation ratio has been used by various researchers such as Kuehn, Sighn, Newbould and Firth to analyze the characteristics of firms involved in mergers and acquisitions exercises. The valuation ratio measures the value of the firm in its numerator and value of the firm's net asset in the denominator. Net asset is defined as the gross assets minus liabilities plus preference shares. The basic formula for valuation ratio is:

$$VR = \frac{\text{Share Price}}{\text{Gross Assets - Liabilities + Preference Share}}$$

By definition, a valuation ratio less than unity denotes that the company being measured is undervalued. Similarly, a valuation ratio greater than one is said to be overvalued. Finally, a valuation ratio at unity means that the company is correctly valued. Valuation ratio as a factor to be considered in takeover theory, does suffer from serious setbacks when used in practice. One of the main problems with valuation ratio is that the denominator is purely accounting entries. Gross assets could be

undervalued if assets such as land and stocks have not been revalued at market rates. Another problem with valuation ratio occurs at its numerator. The result of the valuation ratio on the same company from two researchers could be different if the price measurements used were different. However, this ratio is included in this study because it has been widely used by many researchers in past studies.

Price-Earnings Ratio (PER). Price-earnings ratio basically measures the market price of a company's share over its earnings per share. The formula for this ratio is:

$$\text{PER} = \frac{\text{Share Price}}{\text{Earnings Per Share}}$$

A low PER generally means either the share price is undervalued by the market or that the market expects the company's growth rate to decline. Traditional managerial economics states that a company with low PER would become attractive target if the acquirer believes that the assets held by the company are valuable, or the acquirer is confident that the future growth of the company can be improved under new management. This assumption will be tested in this research through univariate statistical analysis. The PER of a company must also be compared to the PER of other companies, preferably with those in the same industry in order to determine if the PER ratio is at a relatively higher or lower level. In addition, PER also tends to be higher in a bullish stock market. PER, however, is among the most popular ratios used in research and in daily stock market analysis. PER is included in this research to provide the basis for comparison with past studies whenever required.

Liquidity Ratio (LR)

Liquidity ratios basically measure the ability of firms in meeting the short term cash payments when required. There are various financial ratios available in measuring a firm's liquidity. Examples of these ratios are current ratio and acid test ratio. Acid test ratio is employed here to analyze the short term solvency of the acquired companies and their respective controls. Acid test ratio is used instead of current ratio because it measures short term solvency more stringently than current ratio. Acid test ratio is formulated as:

$$LR = \frac{\text{Current Assets - Inventory}}{\text{Current Liabilities}}$$

Generally, a liquidity ratio greater than unity is desirable. However, a more meaningful method of analysis for this ratio is to compare to a company's liquidity ratio to another company's liquidity ratio from the same industry. The latter method is the one that will be used in this research.

Leverage Ratios

Closely related to liquidity ratios are the leverage ratios. Leverage ratios measure the long term debt financing and coverage of the company. The use of debt financing is a very important factor in analyzing the tradeoff between the returns and risk of a company. Gearing ratio, debt-to-equity ratio and proprietary ratio will be used to measure the extent of debt financing used in the study.

Gearing Ratio (GR). Gearing ratio measures the extent to which long term debt is being utilized in the company's capital structure. The gearing ratio is defined as:

$$GR = \frac{\text{Long-term Debt}}{\text{Long-Term Debt} + \text{Shareholders' Equity}}$$

Gearing ratio is an important factor in a takeover exercise. Generally, firms with low gearing will be attractive targets as they will lower the acquiring firms' gearing and increase their borrowing capacity. Another reason is that acquired firms with low gearing will normally means having very little fixed charge liabilities, a desirable factor in any acquisition program.

Debt-to-Equity Ratio (DE). Debt-to-equity ratio measures the riskiness of the capital structure of a firm. The higher the debt-to-equity ratio, the riskier it is the firm to creditors. The formula for debt-to-equity ratio is listed as:

$$DE = \frac{\text{Total Liabilities}}{\text{Shareholders' Equity}}$$

Debt-to-equity ratio is a more vigorous test for the financial risk of a firm as it measures not only the long-term debt structure, but the entire financing and operating liabilities of the company. Both long-term and short-term financing structures are included in this ratio.

Profitability Ratios

Profitability is an important factor in an acquisition exercise. Profitability is the best measurement for the efficiency of management in generating profits and earnings to the company and shareholders. A company with low profitability may be due to industry phenomenon or due to poor management. The latter is the one that this study is intrested to find out. Generally, companies with low profitability will make attractive targets in takeover exercises. Profitability ratios considered in this research are net

profit margin, return on capital employed, return on investment, and return on shareholders' fund.

Net Profit Margin (NPM). The net profit margin is the profit margin obtained after deducting all expenses, including interest expense, income taxes and nonoperating incomes. The net profit margin used in this research is as follow:

$$\text{NPM} = \frac{\text{Net Earnings}}{\text{Turnover}}$$

Return On Capital Employed (ROCE). Return on capital employed measures the efficiency of the management in generating earnings from the capital employed. Earnings are profit before interest and tax (PBIT) and capital employed are share capital, loans, bank overdraft, reserves and minority interest:

$$\text{ROCE} = \frac{\text{PBIT}}{\text{Capital Employed}}$$

Return On Investment (ROI). Return on investment measures the efficiency of the firm's management in managing investments and generating profits relative to its total assets. The return on investment in this research is formulated as:

$$\text{ROI} = \frac{\text{Profit After Interest And Tax}}{\text{Total Assets}}$$

Return On Shareholders' Fund (ROSF). Return on shareholders' fund measures the efficiency of the company's management in generating after tax earnings to common shareholders. It is hypothesized that the common shareholders will be more than willing to depart from the company if the returns generated is inferior than other companies. This will prompt the existing shareholders to part with the company and to

invest their money elsewhere. The existing shareholders could also elect to allow the company to be managed by new management team. This is to say that a low ROSF will be one of the factors that makes the company an attractive target for takeover, as the anticipated resistance from the shareholders would be much lower than that of profitable firms. ROSF in this paper is defined as:

$$\text{ROSF} = \frac{\text{Profit After Interest And Tax}}{\text{Total Shareholders Fund}}$$

Earnings Per Share (EPS). EPS is defined as earnings over number of shares outstanding. The formula for earnings per share is as follows:

$$\text{EPS} = \frac{\text{Earnings}}{\text{Number of Shares Outstanding}}$$

Acquirers will seek companies with high EPS if their intention is to gain access into high growth market. On the other hand, acquirer will look out for low EPS relative to others if they are scouting for poorly managed companies.

Activity Ratio

Activity ratio measures the effectiveness of management in generating sales from the various assets employed. The activity ratio used in this study is the total asset turnover ratio. A low total asset turnover ratio would indicate low utilization rate of assets in producing sales; this would normally result in low profitability to the company. The total asset turnover ratio (ATR) is calculated from the formula below.

$$\text{ATR} = \frac{\text{Turnover}}{\text{Total Assets}}$$

Dividend Policy

Dividend represents part of the returns expected by the shareholders, apart from the capital gains. Acquired firms have been found from past studies to have paid low and inconsistent dividend. If a firm has been continuously paying low dividend relative to its market price, it is hypothesized that the shareholders would sell their shares to capitalize on capital gains. The retention ratio is also an important measure of the dividend policy of the firm. Low dividend yield and low times covered indirectly indicate that the firm is not maximizing the shareholders' wealth. When this happens, the shareholders will reap the capital gain and pass the business to other operators that are better in maximizing wealth. Dividend yield and times covered are two financial ratios utilized in this research to track the dividend policy of the acquired firms relative to their controls.

Dividend Yield (DY). Dividend yield is formulated as dividend payout over the market price of the company's shares. Its formula is:

$$DY = \frac{\text{Dividend}}{\text{Market Price/Share}} \times 100\%$$

Times Covered (TC). Times covered measures the portion of the company's earnings that has been paid to shareholders as dividends. Mathematically, the times covered is formulated as follows:

$$TC = \frac{\text{Earning Per Share}}{\text{Net Dividend Per Share}}$$

Growth In Profitability

Growth in profitability would be another factor that may be important to an acquirer that is interested in taking over a listed firm. A low growth rate may reflect poorly managed company, which would also be reflected in low valuation ratio. Growth in profitability in this research is measured by comparing the latest earnings per share before takeover ($EPS_{t=0}$) to the earnings per share of the similar firm three years ago ($EPS_{t=-3}$). The formulation for earnings growth rate is:

$$EPG = \frac{EPS_{t=0} - EPS_{t=-3}}{EPS_{t=-3}}$$

Data Analysis

The ratios will be analyzed using univariate statistical analysis, factor analysis and discriminant analysis. SPSS will be used to assist in generating statistical outputs for analysis.

Univariate Statistical Analysis

Student t-test will be employed to test the difference in two ratio means between the acquired firms and their controls. Significance level will be set at 10% level. Separate variance estimate will be used if the two-tail F-value's Probability is less than 10%. Otherwise, the pooled variance estimate will be employed for data analysis.

Factor Analysis

One of the multivariate statistical techniques employed to analyze the multidimensional data is the factor analysis. Factor analysis is being used here in this research to investigate the underlying common patterns among the above-mentioned

variables that can best be summarized into smaller set of factors. Factor analysis will examine the interrelationships between the various ratios mentioned above, and to group those ratios that shared common underlying dimensions into smaller set of factors. From this, the common characteristics that describes acquired firms and their controls will be more identifiable. Varimax rotation will be utilized and an Eigenvalue of 1.0 and above will be adopted to determine the number of factors to be extracted. Factor loading of 0.5 and greater will be considered significant in pulling out variables to explain the factors extracted.

Discriminant Analysis

Hair, Anderson, Tatham and Black (1984) in their text on multivariate analysis suggested that factor analysis should be conducted before running multiple discriminant analysis. They stated that the variables selected for multiple discriminant analysis should be those that having the highest factor loadings in each respective factor. Accordingly, interpretation of data would be more meaningful with fewer dimension losses using Mahalanobis method instead of Fisher's procedure. Their three stages of analysis method for multiple discriminant analysis will be employed in this research.

Stepwise discriminant analysis is used in this research to supplement and summarize the results generated by factor analysis. Discriminant analysis is the appropriate multivariate statistical method to test the hypothesis that the group means of the acquired firms and the controls are equal. Using the stepwise process will allow us to identify the most dominant variables in the discriminant function. Mahalanobis D^2 statistics will be the statistical test used to test the significance of the discriminant functions in this research. The significance level chosen as the criteria for selecting the

dominant variable is $p < 0.10$. The relationship between the dependent variable (whether the firm is acquired or otherwise) with the sets of financial ratios as independent variables will be stated in a general discriminant equation. The significance of this equation can be evaluated using the canonical correlation. The discriminant analysis hence will provide us with an equation that will distinguish the companies which are targeted for acquisition from those that are not at risk of being acquired.