

CHAPTER IV

Results

The main objectives of this study are investigating the effect of credit rating on firm's capital structure and the usefulness of probability of default as a determinant of the firms' capital structure in G7 nations. This section will be start with the descriptive statistics of the paper's sample. Then, continue with the analysis of credit rating effect on firms' capital structure. Credit rating effect will be divided into 2 main parts, the broad rating test and the micro rating test. Next part will be the analysis on the effect of probability of default on capital structure and last part will be the result of testing credit rating and probability of default with the capital structure theory which is Pecking order, Trade off and Market timing theory.

4.1 Descriptive statistics

The samples are the firms in G7 nations provided by Reuters. Then, select only the prime stock market of each country and choose the firms that rated by S&P domestic Issuer Credit Rating as the sample. After excludes the firm that missing, the samples then includes the firms from Toronto stock exchange 127 firms, Frankfurt stock exchange 58 firms, Euronext Paris 83 firms, Milan stock exchange 34 firms, Tokyo stock exchange 273 firms, London Stock exchange 91 firms, and S&P 500 index 405 firms. Total firms are 1,071 firms; 10 years time series data cover the period of 1997 to 2006 which contains rating are 6,991 firm-years. Then, the accounting data and the variables that are missing value are cut and net observations are 6,070 firm years.

Table 1 shows the number of firms' rating in G7 nations during the period of 1997 to 2006 classified by rate is shown in the above part of table 1. The vast majority

of firm ratings are rated investment grade (i.e. rating of BBB- or higher). Most of the firms are rated in A and BBB broad rating. The firm that rated CCC+ and below are combined and reported in one line, the total observation of this level is 21 observations. The number of firms' rating classified by rate sign is shown in the lower part of table 1. The firms that have rate sign are 3,692 out of 6,070 observations while the firms that have no rate sign are 2,378 out of 6,070 observations.

Mean, maximum, and minimum of leverage, profit, and size are presented in table 2 by rating. This table provides the information about the characteristic of the firms. The higher the firms' rating, the lower the level of debt firms use, i.e. AAA rating firms have its average debt level at 31.7%, while B rating firms have its average debt level at 77.6%. Next is the profit of firm in each rating, the table show that the higher the firms' rating, the higher the firms' profit, i.e. AAA rating firms have its average profit at 10.1%, while B rating firms have its average profit at -3.2%. Last one is the firm's size of each rating, the higher the rating, the bigger the firm size, i.e. AAA rating firms have its average size at 17.8, while B rating firms have its average size at 14.4.

4.2 Credit rating impact on capital structure decision:

4.2.1 The broad rating test

The result of broad rating test is presented in table 3; column 1 presents the result of equation 1 with accept the null hypothesis, in other word, it is insignificant in using the rating sign to explain the debt issuing. The firms are indifferent to being near a credit rating change for capital structure decision. In other word, firms tend not to care much about their credit rating which is consistent with the result from Kisgen (2006) presented in table 5. This table runs regression on yearly basis, from 1986 to

2001 which is the sample period of Kisgen's paper. From year 1986 to 1995, there is significant effect of plus or minus sign on financing decision, but from year 1996 forward, there are only two year (1998 and 2001) that are significant and only at 10% level. Second column presents the result of equation 2. It examines whether firms are more sensitive to being near an upgrade versus downgrade. The result consist with the first column, insignificant both plus and minus dummy variables. In third column, the controlled variables are omitted and the result still consists with the first 2 columns which are insignificant. The control variables are significant at 10% level for profitability and size, respectively, while leverage control variable is not significant.

The result of plus or minus test show, rating sign can not be used to explain the debt issuing of firm. In other word, the sign of the credit rating seem to be useless in explaining the capital structure decision of firm in G7 nations. This could mean that the belief on rating agencies or rating itself is decrease. The good rating company may fail the investor like in the case of Enron.

4.2.2 The micro rating test

To test deeply in the change in credit rating, the credit score is used in this place. Coefficient for equation 4 are as follow $\beta_1 = 0.356586$, $\beta_2 = 4.497481$, and $\beta_3 = -0.016107$ which is significant at 1%, 1%, and 5% level, respectively.

Credit score is calculated for each firm year and rank the firm in particular rating into 3 levels high, middle, and low. The result of regression 5 to 7 is presented in table 4. Column 1 presents the result of regression 5; high or low dummy variable is insignificant. Column 2 presents the dummy variable high and low separately which is consist with the first column, insignificant. Column 3 presents the univariate of high or low dummy variable which is also insignificant. The controlled variables are significant at 10% level for profit and size, respectively.

The result in table 4 confirms the result in table 3 that since the sign of rating can not be used as the determinant of debt issuing, the deeply change in each rating also can not be used as debt issuing determinant. Both result consist with the result of Kisgen (2006) itself. Table 5 in Kisgen (2006); show the result of broad rating test yearly from 1986 to 2001. From 1986 to 1996, the result show some significant at 1% and 5% confidence level, while during the period of 1997 to 2001 the significant of plus or minus dummy variable have low (10% confidence level) or not significant which this period is overlap with the sample in this paper for first 5 years. This can be concluded that when time passes the explanatory power of rating on debt issuing is decrease. This is consisting with the recent news and research. There are evidences of the decreasing in the confident of credit rating. The critics on the efficiency of rating agencies are increasing after the case of Enron and especially in the recently sub-prime credit crisis. Dieter Kerwer (2005) and article by Nagraj Gummala, Rory Watson, and Sarah Johnson⁴ are the evidences of the criticizing on the rating agencies' efficiency. They critics on the accuracy of rate giving and suggests that the improvement is needed for the rating agencies. These points to the decrease on the confidence on credit rating and rating agencies and support the result in this paper that credit rating can not be used as the determinant of debt issuing.

4.3 Probability of default Impact on capital structure decision

The probability of default is calculated and run in regression 8 and 9. The result is presented in table 5. In column 1, coefficient of probability of default is negatively significant at 5% confidence level indicate that firm with high probability

⁴ <http://ezinearticles.com/?Credit-Rating-Agencies---Need-For-Reform&id=788696>

of default will issue 24% less debt relative to equity. Controlled variables profitability is negatively significant at 5% confidence level, while leverage and size are not significant. Without controlled variables, probability of default is still negatively significant at 5% confidence level. It also indicate that firm with high probability of default will issue 24% less debt relative to equity. The probability of default is more significant than credit rating both in broad rating level and in micro rating level. The negative relationship between probability of default and debt issuing can be explained that the high probability of default firm can realize its level of debt use in financing. The higher the debt level lead to the higher probability of default. Then as too much debt can be lead to the reduction of debt, high level of probability of default can be lead to the reduction of debt also.

4.4 Incorporating with the capital structure theories

This section incorporates the credit rating and probability of default into the context of capital structure theories, Pecking order, Trade-off, and Market Timing theory; this is presented in table 6. This table is the result of equation 10. The table has 7 columns. First 3 columns represent the capital structure theories, Pecking order, Trade off, and Market timing, respectively. Next 3 columns represent the credit rating dummy plus or minus, credit rating dummy high or low, and probability of default, respectively. Last column is putting all variable together which will test whether how strong each variable can explain the dependent variable.

Column 1, DEF or deficit represents the pecking order is insignificant while controlled variable leverage is insignificant but controlled variable profit and size is positively and negatively significant at 1% confidence level, respectively. This can be implied that most of the firms are not issue the securities up to the order. The controlled variable profit and size also point that there is no order for securities

issuance. Positive sign of profit tell that the firms that have high profit are the firms that have high leverage. These firms can reduce their cost of capital and boost their income through debt financing. Negative sign of size tell that the bigger the firms are the lower the firms borrow. These firms are more likely to issue equity to finance their new project. Second column represent the trade off theory, the result is positively significant at 1% confidence level. This shows that most of the firms have its target leverage level, whether it is unintentionally. Most of the firms try to keep its leverage level at the same not too low and not too high in order to benefit for the tax shield and not risk facing the distress situation. Third column represent the market timing theory which is not significant. The result is consist with Hovakimian (2003) whose find that the effects of market-to-book ratios on capital structure do not last long significantly reflect past equity market timing. If market timing theory exists there must be negative relationship between market to book ratio and change in long term debt to asset, when market to book ratio increase, equity will be issued more and decreasing of debt level will be occurred. The result shows positive relationship which is when the market price increase, firms tend to increase its debt which against the market timing theory. In this place it is not significant which can not be explained anything. The positive relationship can also be implied for the existing of trade off theory, when the market price increase D/E ratio will decrease. These decreasing followed by the issuing of debt which rebalance the D/E back to its optimal level. The evidence of firms move back to its target leverage is from Flannery and Rangan (2006). They find that firms return relatively quickly to their target leverage ratios when they are shocked away from their target.

Column 4 is the plus or minus dummy variable, it shows insignificant result. This is consistent with the previous test (y variable is net debt issuing). It confirms

that the confidence on credit rating and rating agencies is decrease. Column 5 also shows insignificant which is representative of high or low dummy variable. This is also consistent with the previous test. The result confirms the decreasing in the confidence of credit rating. Column 6 is using probability of default as dependent variables and it shows negatively significant at 1% confidence level. This shows that probability of default can be used to determine the change in long term debt. The result is consistent with the previous part. It confirms that firms care about it probability of default, in other word, firm concern on their debt level, if it is too much it can lead firm tot the financial distress situation.

Column 7 is putting all variables together and find out the explanatory power of each variable to the change in long term debt. The result confirm that trade off theory is exist and the probability of default can be use to determine the debt issuing together with trade off theory. Trade off variable is positively significant at 1% confidence level and probability of default is negatively significant at 5% confidence level. Controlled variables are significant at 1% confidence level. The existing of trade off theory point that most of the firms want to balance it benefit and cost of debt financing in the same level which can also be explained by the significant explanatory power of probability of default that firm concern not to use too much debt in order to keep the firm away from financial distress situation.