THE INFLUENCE OF INDUSTRY, SIZE AND EARNINGS ON CAPITAL STRUCTURE OF MALAYSIAN LISTED COMPANIES

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ABSTRACT

This paper examines the nature of capital structure of 109 listed Malaysian firms for the period from 1986 to 1995. Three ratios (debt to equity, common equity to total assets and total debt to total assets) are used to measure financial leverage. The results are consistent with the pecking order theory for only five industries out of ten. The results show significant difference in terms of industry class but very little in relation to effect of size for Malaysian companies under study. The inter-industry tests reveal that the industrial groups do not necessarily have homogeneous leverage policies and that they are significantly different in the case of debt to equity ratio and total debt to total assets ratio. To test the relationship between earnings volatility and capital structure, ordinary least square regression is used. The results show significant relationship between earnings volatility and capital structure. The results reinforced the earlier research in this area in the Malaysian context that leverage is negatively related to earnings.

1. INTRODUCTION

The problem of optimal capital structure of the firm received great attention when Modigliani and Miller published their article "The Cost of Capital, Corporation Finance, and Theory of Investment" in 1958. The question being asked was whether a firm's total valuation and its cost of capital could be affected by changing its financing mix. According to MM, the cost of capital to a firm is independent of its capital structure. This finding is contrary to traditional thinking of a U-shaped relationship between leverage and the cost of capital.

However, one of the most perplexing issues facing financial managers is the relationship between capital structure and the value of the firm. Brealey and Myers (1996) referred to capital structure as a mix of debt, equity or hybrid securities issued by the firm. How much debt financing as opposed to equity financing should a firm use? It is extremely difficult for financial managers to actually quantify the costs and benefits of debt financing to their firms and neither is it easy to pin-point the capital structure that truly maximizes a firm's value. It is generally believed that such a structure exists for every firm, but it changes substantially over time with the growth pattern of the firm and with the change in the environment characterized by changes in capital markets and regulatory framework. It is also believed that there is some benefit associated with debt financing and further, that such firms probably try to maintain a borrowing reserve.

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The Malaysian economy had been the fastest growing economy in the Far East Region for the last 15 years. Therefore, the purpose of this paper is to investigate the relationship between debt and equity level. This paper also investigates the differences across industries in debt policy and equity levels for a sample of companies, which are classified on industry basis, earnings volatility and size. The empirical tests carried out in this paper are an extension of capital structure theories namely, traditional theory and pecking order theory.

This paper is organized into five sections. Section one is the introduction while section two discusses previous studies in the literature. The third section describes the methodology employed and sample data for this study. The fourth section presents empirical findings for three leverage ratios and the last section concludes the results of the study.

2. LITERATURE REVIEW

Since capital structure policy is believed to influence a firm's cost of capital, and as a consequence, its value many studies have sought to ascertain the determinants of capital structure. The issue of capital structure choice was brought to center stage when Modigliani and Miller published their paper (1958). Modigliani's and Miller's model which argued, under certain assumptions, that the average cost of capital to any firm is completely independent of its capital structure and that firms maximize their market value by maximizing their use of debt financing, has been debated extensively in finance literature. Their model and its theoretical extension inspired several time-series and cross-sectional studies.

According to Schwartz (1964: 189), "An optimum financial structure maximizes the long-run market value of the firm's common stock. This is not the same as asserting that the optimum capital structure maximizes profit or earnings per share. For both the earnings per share and the rate at which the market capitalizes these earnings must be considered."

The traditional theory of finance describes the optimal capital structure as the proportions of debt and equity securities that maximize the value of a firm's common stock in the market place while simultaneously minimizing the cost of capital (Hampton, 1982; Schall and Haley, 1991; Brigham and Gapenski, 1994).

Pandey (1981) illustrated the effect of capital structure change on the cost of capital. His empirical findings indicated that leverage could lower the average cost of capital. In a survey conducted by Scott and Johnson (1982), the opinions of the participating financial executives revealed that prudent use of debt can lower the overall cost of capital. According to Scott and Johnson, there is a functional relationship between a firm's cost of capital and the amount of debt it utilises in its financial structure.

According to Schall and Haley (1983: 339-341) a financial manager can determine the optimal capital structure range, by referring to the following information: (1) drop in a firm's stock price on the announcement of a new financing program, (2) payment of high interest rates for its debt issues, and (3) a lowering of rating on the firm's bond by bond rating agencies. This information, according to Schall and Haley, is a sign that a firm has moved outside of its optimal range.

According to Eckbo and Masulis, (1995:1046), "Theories of optimal capital structure generally imply a non-negative market reaction to capital structure changes. These theories emphasize various debt and equity issuance trade-off such as between the corporate tax advantage of debt and the cost of financial distress (Kraus & Litzenberger, 1973; Brennan & Schwarts, 1978), the personal tax disadvantage of debt and the impact of excess corporate tax deductions on the corporate tax advantage of debt (Miller, 1977; DeAngelo & Masulis, 1980), agency costs of debt and equity (Jensen & Meckling, 1976; Myers, 1977), and the effect of debt on the firm's competitive product market strategy (Nakamura & Nakamura, 1982)."

Nasir and Mohamad (1993) studied Malaysian limited firms for the period from 1975 to 1989. They used one-way ANOVA and regression analysis. They noted that the capital structure of firms differs significantly within and between industries. Mooi, Susan Tho Lai (1993) also studied Malaysian companies listed on the Kuala Lumpur Stock Exchange for a five-year period (1986 to 1990). In her study, she analyzed capital structure relationship with broad industry groups, various industries over time and firm size. She used one-way variance analysis in her study and found significant difference between capital structure and industries. However, there is no significant difference between capital structure and firm size.

Kester and Isa (1994) undertook a survey on capital structure policies of companies listed on the Kuala Lumpur Stock Exchange. They found that company executives prefer a financing hierarchy rather than sticking to a target capital structure.

Rajan and Zingales (1995:1457) are of the view that profitability for small firms may serve as a proxy for both the amounts of internally generated funds and the quality of investment opportunities, which have opposing effects on the demand for external funds (debt).

3. DATA AND METHODOLOGY

Data

A sample of ten industries as classified by the PACAP Databases (food & beverage, electrical, transport equipment, wood manufacturing, chemicals, building materials, metal manufacturing, property development, engineering and plantation) are included for this study. All companies are listed on the Kuala Lumpur Stock Exchange. However, financial institutions, investment companies and insurance companies have been excluded from this study because their leverage is strongly influenced explicitly/implicitly by the different deposit schemes available for investors. The distribution of companies in these ten industries is shown in table 1 below:

Table 1: Distribution of Sample by Industry Type

Name of the Industry	# of companies
Food & beverage	12
Electrical	5
Transport equipment	6
Wood manufacturing	6
Chemicals	6
Building material	9
Metal manufacturing	6
Property development	20
Engineering	6
Plantations	21

The data is taken from the Annual Companies Handbook, a publication of Kuala Lumpur Stock Exchange. Only firms in the non-financial operations were selected for the study. Since the industrial structure in Malaysia is not broad based, therefore, almost all the industrial groups constituting at least five firms or more are included in this study. The data covers a 10-year period from 1986 to 1995.

Statistical Test

Financial leverage is measured by various ratios – debt to equity (total debt divided by total equity) or total debt to total assets (total debt divided by total assets) and common equity to total assets (common equity divided by total assets). Book values or market values are used in the computation of these ratios. With the exception of two studies (Bowen et al., 1982 and Boquist & Moore 1984 who have used two leverage ratios) all prior studies in this area have used only one of the three leverage ratios (debt to equity, total debt to total assets and the total equity to total assets). The three ratios differ considerably in emphasis, and therefore, need to be analyzed successively, in order to find their association with industry and size. Therefore, all the three ratios (debt equity, total debt to total assets and common equity) at book value are measured in this study. The statistical tests used are similar to those employed in earlier studies. Both parametric (the conventional analysis of variance tests) and Kruskal-Wallis (a non-parametric counterpart of the former) tests are performed on the three leverage ratios. Underlying the use of the parametric analysis of variance tests are the two major assumptions that the distribution of the sampled population is normal, and the variances of the population are the same.

Along-with the parametric tests, non-parametric tests have been applied to enhance the acceptability of the results and reinforce the conclusion drawn through parametric tests.

In addition to the two tests noted above, ordinary least squares regression is applied to test the relationship between earnings volatility and capital structure. In order to ascertain the validity of the ordinary least squares (OLS) results, the usual techniques are used to investigate whether the four assumptions i.e. normality, linearity, independence and homoscedasticity are fulfilled.

4. EMPIRICAL FINDINGS

4.1 Industry Class and Capital Structure

For the first ratio (debt equity ratio) the summary results of both the parametric and non- parametric tests performed on the sample are shown in Annex 1 and 2. Annex 1 contains the mean debt to equity ratio by industry, their related standard deviation in parentheses, the F-ratios and the critical F-ratio required for significance at the 5% level. As is evidenced by the results, except in the case of 1990, 1991 and 1993, the computed F-ratio for each year, is significant. The debt equity ratio for the years 1986 to 1989 are found to be significant at 1% and for the years 1992, 1994 and 1995 significant at 5% level of significance. The high level of significance in the seven years could be attributed to the highly geared capital structure of the five industries i.e. metal manufacturing, engineering, food and beverage, property development and electrical. In the case of other three years (1990, 1991 and 1993), the hypothesis of no significant difference could not be rejected at the 5% level.

The Kruskal-Wallis test is performed on the same set of debt to equity ratios in order to test the null hypothesis that the data does not support the significant variation among the industry groups with respect to the aforesaid determinant of capital structure. Annex 2 displays the debt equity ratio ranks, the computed H-ratios and critical chi-square ratios at 1% and 5% level of significance.

As shown in Annex 2, our sample data is by and large consistent with null hypothesis and reinforce the results obtained in the parametric test, with some variation. However, it is noted that the results for 1992, 1994 & 1995 declined in the level of significance from 5% to 1%. On the other hand, in all the years, null hypothesis could be rejected at the 1% level of significance. The emergence .of significance in the non-parametric test of the ratios in the case of three years (i.e. 1990, 1991 and 1993) is understandable in view of the similarity of their ranking patterns with the years in their respective neighborhood (1989 and 1992). The degree of freedom in the non-parametric tests are K-1 (number of industries minus one).

Both parametric and non- parametric tests are also performed on the second leverage measure (the total debt to total assets) to test the null hypothesis that industry groups do not differ with respect to this measure of financial leverage. The descriptive statistics for the two tests are shown in Annex 3 and 4. Annex 3 shows the mean debt ratios by industry, their corresponding standard deviations in parentheses, the computed F-ratio, the critical F-ratio at 1% and 5% level of significance. As is apparent from Annex 3 the hypothesis of no-significance difference is rejected at the 1% level of significance in the years 1986 to 1994 and at 5% level in the year 1995.

The results of the Kruskal-Wallis one way analysis of variance tests performed on the second leverage measure noted above, rejected the null hypothesis of significant difference at 1% level in all the ten years investigated. The degree of freedom in the non-parametric tests is the same K-1 (number of industries minus one).

The third leverage (common equity ratio) measures the results of the two tests. Their corresponding descriptive statistics are shown in Annex 5 and 6. The two tables are presented in exactly the same manner as Annex 1 & 2 respectively. The hypothesis that industry groups do not show evidence of significant differences with respect to common equity ratios could not be rejected at 5% level of significance of F-ratio for two years i.e. 1993 and 1994. From 1986 to 1992 and for 1995 the null hypothesis is rejected at 1% level of significance. It is however interesting to note that the results obtained in the parametric tests are not reinforced by the non-parametric tests. Further, the null hypothesis is rejected at 1% level of significance for eight years in the parametric tests while the null hypothesis is rejected for ten years in the non-parametric tests. Annex 5 shows that the plantation industry is highly supported by common equity unlike companies in property development, metal manufacturing and engineering industries which are the least supported by common equity. These results are consistent with the previous study of Naidu (1986).

The Kruskal-Wallis tests performed on the three leverage ratios need some additional comments. The mean leverage ratio ranks are presented as information items through Annex 2, 4 and 6. In the Kruskal-Wallis test each of the observations is replaced by a rank. This means that all the groups samples combined are ranked in a single series. The smallest observation is assigned rank 1 and so on. The mean leverage ratio rank is the sample arithmetic mean of the ranks associated with the groups of companies constituting any industry. In this way the relative leverage levels among industry class in a given year can be compared. For example, in 1986 the lowest ranks attributed to plantations with respect to debt equity ratios (Annex 2) indicate a lower level of leverage and high level of common equity ratio. The highest ranks attributed to metal manufacturing and engineering indicate a high level of relative ranking of each industry with respect to overall debt equity level and this can be further examined in any given year in Annex 4 and 6.

As is apparent from the preceding discussion, the results of analysis of variance tests are supportive of the rejection of null hypothesis in a greater number of years in the case of debt equity ratio (seven out of ten) and in eight out of ten in the common equity ratios, and for the whole period in the case of total debt to total assets ratio.

Summarizing the discussion it can be suggested that parametric analysis of variance tests and the non-parametric tests reinforce the belief that industry classification has a significant effect on capital structure decisions.

Analysis of Variance for the Mean Leverage Ratio Differences within the Industries

Within each of the individual industries, mean leverage ratio differences are tested in terms of debt to equity ratio, total debt to total assets ratio and common equity to total assets ratio. The data showed that those Malaysian firms, which have high leverage level, produced very low amount of earnings. The tests are done by analysis of variance.

Mean debt to equity ratio. In terms of mean annual debt to equity ratio, significant differences are found within eight of the industries. Within two industries, the Electrical and Fabricated Metals industries, no two groups are significantly different at the 0.05 level. (See Table 2)

Mean total debt to total assets ratio. In terms of mean annual total debt to total assets ratio, significant differences are found within eight of the industries. Within the Electrical and Fabricated Metals industries, no two groups are significantly different at the 0.05 level. (See Table 3)

Mean common equity to total assets ratio. In terms of mean annual common equity to total assets ratio, significant differences are found within five of the industries. Within the Electrical, Chemicals, Fabricated Metals, Property Development/Construction and Engineering industries, no two groups are significantly different at the 0.05 level. (See Table 4)

Table 2: Summary Table of the Results of Mean Debt to Equity Ratio Differences Within the Industries

Industry (1)	Number of Companies (2)	Actual Number of Sig. Differences (3)	Possible Number of Differences (4)	Percentage Difference (3 & 4)
Food & Beverage	12	14	66	21.21
Electrical	5	0	10	0
Transport Equipment	6	4	15	26.67
Wood-Based	6	4	15	26.67
Chemicals	6	7	15	46.67
Building Material	9	7	36	19.44
Fabricated Metals	6	0	15	0
Property Dev./Construct.	20	10	190	5.26
Engineering	6	1	15	6.67
Plantations	21	13	210	6.19

Table 3: Summary Table of the Results of Mean Total Debt to Total Assets Ratio Differences Within the Industries

Industry (1)	Number of Companies (2)	Actual Number of Sig. Differences (3)	Possible Number of Differences (4)	Percentage Difference (3 & 4)
Food & Beverage	12	19	66	28.79
Electrical	5	0	10	0
Transport Equipment	6	4	15	26.67
Wood-Based	6	7	15	46.67
Chemicals	6	8	15	53.33
Building Material	9	13	36	36.11
Fabricated Metals	6	0	15	0
Property Dev./Construct.	20	4	190	2.10
Engineering	6	7	15	46.67
Plantations	21	34	210	16.19

Table 4: Summary Table of the Results of Mean Common Equity to Total Assets Ratio Differences Within the Industries

Industry (1)	Number of Companies (2)	Actual Number of Sig. Differences (3)	Possible Number of Differences (4)	Percentage Difference (3 & 4)
Food & Beverage	12	17	66	25.76
Electrical	5	0	10	0
Transport Equipment	6	11	15	73.33
Wood-Based	6	5	15	33.33
Chemicals	6	0	15	0
Building Material	9	6	36	16.67
Fabricated Metals	6	0	15	0
Property Dev./Construct.	20	0	190	0
Engineering	6	0	15	0
Plantations	21	27	210	12.86

4.2 Company Size and Capital Structure

Another question investigated here is whether company size has any impact on financing decision in Malaysia. One potential reason as to why there could be a size effect, was pointed out by Remmers et al. (1974) who noted that single product, small firms are likely to be more risky than multi-product, larger firms. In view of this, a size variable has been used as a proxy for business risk in empirical studies of capital structure decisions. Potentially, leverage ratios may differ across industries simply because some industries are composed of larger firms while others consist of smaller firms.

The parametric and non-parametric analysis of variance tests are run on each leverage ratio (debt equity ratio, total debt to total assets ratio and common equity ratio) based on the size of the firm. Sample firms are divided into five size groupings (without regard to industry class) according to their ranking by total assets size. The groups arrived at in the manner are described in Annex 7.

As can be seen from the table there is an equal division of range across the ten years investigated and a sufficiently reasonable sample of firms in each of the five groups studied. The results of the tests are reported in Annex 8 to Annex 10. Only the results of the parametric tests are reported, as the results of the non-parametric are almost similar. Annex 8 to Annex 10 show the means of the leverage ratios (debt equity ratio, total debt to total assets ratio and common equity ratio respectively) based on the five assets size categories, their respective standard deviations, the computed F-ratios, the critical F-ratios, H-ratio and critical Chi-square at 5% level of significance. The ratios are investigated for a period of ten years i.e. 1986 to 1995.

The null hypothesis of significant differences in the five groups based on assets size with respect to two leverage ratios (debt to equity and total debt to total assets) could not be rejected at the 5% level of significance except in the case of total debt to total assets ratio in the year 1992 which is found to be significant.

The results for the common equity ratios are different from the other two leverage ratios. The null hypothesis is rejected at 5% level of significance for the year 1989, 1992, 1993 and 1995.

The results of the Kruskal-Wallis one way analysis of variance tests are performed on the three leverage ratios. The results of the non-parametric test are similar to the results of the parametric tests. The Kruskal-Wallis test rejects the null hypothesis of significant difference at 5% level in 1992 for debt equity ratio and 1991 for total debt to total assets ratio which is not the case in parametric testing. Further, the parametric test rejects the null hypothesis at 5% significance level for 1993 in the case of common equity to total assets ratio while the non-parametric test does not. Our results thus provide only slight support for the existence of size effect in leverage policies as measured by the debt to equity ratio as well as common equity to total assets ratio. However, no size effect could be detected for the total debt to total assets leverage ratio.

4.3 Earnings Volatility

A firm's profitability is included as an independent variable in the paper under the belief that leverage ratios are influenced by a firm's ability to raise finance from internally generated funds. The greater the past profitability of the firm, the greater the amount of earnings to be retained, and hence the lower will be the debt ratios. A sample test of this hypothesis using data of the Malaysian listed firms in the sample is conducted. The volatility of earnings is estimated by the difference of current year's net earnings minus last year's net earnings divided by last year's net earnings for the 10-year time period. The results of total debt to asset ratio and debt equity ratio on volatility of earnings for the period from 1986 to 1995 are presented in table 5.

Table 5: Regression of Debt/Asset and Debt/Equity Ratios on Volatility of Earnings from 1986-95 (N=109)

Independent Variable	Intercept	Slope	R-Square	F-value
Debt/Asset Ratio	0.4839	0.2598	0.5790	31.397
	(14.6302)	(5.5417)		
Total Debt/ Equity Ratio	1.4274	0.8747	0.2662	21.705
	(9.6958)	(3.3949)		
t-statistics are in parentheses				

Volatility of earnings is calculated on the basis of current year's net earnings minus last year's net earnings divided by last year's earnings.

When total debt to total assets ratio is regressed on volatility of earnings, the t-statistic 5.5417 with a coefficient of 0.2598 shows a wrong sign of positive relationship. The R-Square has a value of 0.5790, indicating that approximately 57.90 percent of the variability in the dependent variable (net earnings) is explained by the explanatory variable (debt to total assets). The t-statistic 3.3949 with a coefficient of 0.8747 on net earnings also shows a wrong sign of positive relationship with total debt to total equity ratio. R-Square has a value of 0.2662, indicating that approximately 26.62 percent of the variability in the dependent variable (net earnings) is explained by the explanatory variable (total debt to total equity ratio). Hence our results indicate a clear positive relationship between earnings volatility and leverage. This is consistent with the explanation of pecking order hypothesis where highly profitable firms use their internally generated funds, hence having less need for external funding.

Empirical evidence in this area has been consistent with Myer's (1984) "pecking order hypothesis." Gale (1972) and Baker (1973) observed that when leverage is included in a regression of profitability, it assumes a significant negative coefficient. Hurdle (1974), Carleton and Silberman (1977), Nakamura and Nakamura (1982) and Titman (1984) reported that profitability exerts a significant negative influence in regression of debt ratios. Titman and Wessels (1988:2) found a negative relation between past profitability and current debt level scaled by the market value of equity. According to them this supports the proposition that "profitable firms have relatively less debt relative to the market value of their equity."

5. CONCLUSION

This paper examines leverage ratios of the ten different industries over the period 1986-95. The results are consistent with the pecking order theory where most of the time firms relied on internally generated funds and less on debt. The exception was for firms in the food and beverage, electrical, metal manufacturing, property development and engineering industries. Both the parametric and non-parametric analysis of variance tests showed significant industry effects with respect to the three leverage ratios tested. That industry classification has significant effect on capital structure decisions was supported by the intra-industry results.

Our study provides mixed results on the size effect on leverage. Both the parametric and non-parametric tests performed on the leverage ratios as a function of total assets size categories did not reveal any significant differences, except in the case of debt equity ratio across the five size categories. Company size effect was significant with respect to the debt to total assets ratio in one year, but with respect to common equity to total asset ratio, the company size effect was significant in four of the ten years. The results are more indicative rather than supportive of the size effects on capital structure decision in Malaysia.

Our results also indicate a clear positive relationship between earnings volatility and leverage. Since earnings volatility is measured as growth in earnings, the results are consistent with the pecking order hypothesis where highly profitable firms use their internally generated funds, hence needing less external funding.

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Annex 1

Mean Debt to Equity Ratios by Industry (N = 97)

Industry	Year										10 Years
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	mean
FOOD & BEVERAGES	91.3	83.9	104	137	146	167	143	133	144	105	125.4
N=12	(66.5)	(53.7)	(73.5)	(101)	(136)	(200)	(158)	(144)	(146)	(86.9)	
ELECTRICALS	80.8	104	159	193	114	125	80.7	105	137	143	124.2
N=5	(51)	(48.3)	(143)	(252)	(136)	(84.2)	(39.2)	(61.3)	(119)	(117)	
TRANSPORT EQUIPMENT	58.1	59.5	72.6	79.2	74.8	89.6	92.1	82.3	91.8	85.1	78:51
N=6	(34.3)	(45.4)	(55.7)	(40)	(19.7)	(34.6)	(49.3)	(41.4)	(47.7)	(45.5)	
WOOD MANUFACTURING	64.3	68.1	81.4	118	53	58.5	60.8	120	166	167	95.71
N=6	(70)	(86.3)	(105)	(153)	(40.5)	(41.3)	(37.4)	(121)	(183)	(183)	
CHEMICALS	64.1	75.1	80.6	85.4	64.8	108	75	109	93.6	90	84.56
N=6	(46.2)	(66.8)	(74.6)	(94.8)	(30)	(105)	(27.2)	(64.5)	(46.7)	(56)	
BUILDING MATERIAL	84.1	78.2	72.73	72	65.2	45.6	47.2	87.3	86.6	93.1	73.2
N=9	(97.1)	(92.9)	(99)	(84.3)	(68)	(35.8)	(37.8)	(102)	(104)	(116)	
METALS MANUFACTURING	249	359	421	349	218	86	57.2	38.3	35.9	30.9	184.4
N=6	(198)	(345)	(383)	(249)	(154)	(53.1)	(34.2)	(26)	(21.7)	(14)	
PROPERTY DEVELOPMENT	85.1	95.5	129	147	124	100	75.1	80	89.8	83	100.9
N=20	(75.8)	(94.2)	(170)	(192)	(194)	(126)	(36.7)	(36.2)	(46.7)	(43.3)	
ENGINEERING	114	120	130	127	172	99.8	86.5	150	90	98.4	118.8
N=6	(75.1)	(69.5)	(97.8)	(91.5)	(222)	(68.6)	(605)	(142)	(48)	(60.3)	
PLANTATIONS	34.7	27.6	31.5	43.4	37	28.1	36.4	48	36.8	45.5	36.9
N=21	(47.1)	(30)	(31.4)	(54.1)	(40)	(33.8)	(47.4)	(77.3)	(38.4)	(38.1)	
ONE-WAY ANOVA											
F-RATIO	4.01	5.231	4.436	2.954	1.818	1.951	2.359	1.532	2.343	2.112	
PROBABILITY	.0031	.0000	.0001	.0041	.0761	.0551	.0196	.1493	.0204	.0368	

The figures in parenthesis under the mean debt equity ratio for each industry group indicate the standard diviation for that year. Figures for means and standard deviations are in percentages.

Critical F-Ratio at 1% = 2.62 and 5% = 1.98

Annex 2

Mean Debt to Equity Ratio Ranks by Industry and The Results of The Kruskal-Wallis One Way Anova (N = 97)

Industry	Year									
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
FOOD & BEVERAGES N=12	58.92	57.08	58.67	60.83	64.33	68.25	69.17	61	62	57.58
ELECTRICALS N=5	56.8	69	69.2	61	51	66.4	58.6	63.2	61.6	64.4
TRANSPORT EQUIPMENT N=6	49.33	46.67	49.5	53.5	55.67	62.33	62.33	55.5	59.5	57.5
WOOD MANUFACTURING N=6	42.5	42.5	43.83	50.33	40.5	45	47	55.5	59.83	62.33
CHEMICALS N=6	47.17	50.67	48.33	46.17	49.17	58.67	56.17	65	60	56.83
BUILDING MATERIAL N=9	50.33	47.89	41.67	39.89	41	53.33	37.44	43.56	44.11	43.44
METALS MANUFACTURING N=6	80.67	75.83	81	81.33	79.83	56.5	44	29.5	28.33	22.5
PROPERTY DEVELOPMENT N=20	52.13	53.42	52.58	51.5	52.65	54.79	55.3	55.3	57.95	55.6
ENGINEERING N=6	63.25	65.75	60.75	58.33	60.33	59	59.17	66.17	57.33	60.83
PLANTATIONS N=21	27.1	25.48	27.43	28.14	28.14	21.76	27.38	27.48	26.43	32.24
INTER-INDUSTRY KRUSKAL-WALLIS H-STATISTIC	24.34	26.65	26.27	24.47	25.24	34.14	24.39	24.77	25.76	20.25
PROBABILITY	0.004	0.002	0.002	0.004	0.003	0.000	0.004	0.003	0.002	0.016

Critical Chi-square Ratio at 1% = 21.67 and 5% = 16.92

Annex 3

Mean Total Debt to Total Asset Ratios by Industry (N = 97)

Industry	Year										10 Years
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	mean
FOOD & BEVERAGES	42.6	41.6	45.2	50.4	50.5	51.8	50.7	47.5	49.4	44.7	47.44
N=12	(16.6)	(15.4)	(18.1)	(19.9)	(19.7)	(19.6)	(18.2)	(18.6)	(19.3)	(18.7)	
ELECTRICALS	40.9	48.9	54.1	51.3	40.3	47.8	40.8	44.1	47.3	48.4	46.39
N=5	(16.9)	(10.8)	(17.2)	(22.6)	(27.6)	(17.6)	(13.9)	(16.8)	(22)	(21.5)	
TRANSPORT EQUIPMENT	34.1	33.1	37.3	42.2	42.2	45.7	45.4	43.1	45.1	43.7	41.19
N=6	(15.1)	(17.9)	(18.1)	(10.7)	(6.3)	(10.3)	(11.9)	(11)	(13)	(10.8)	
WOOD MANUFACTURING	31.3	30.8	33.9	41	31.2	33.8	34.1	44	47.5	49	37.66
N=6	(23)	(24)	(24.5)	(24.7)	(15.8)	(14.6)	(14.7)	(23)	(29)	(27.7)	
CHEMICALS	35.5	36.5	33.9	41	31.2	33.8	34.1	44	47.5	49	37.66
N=6	(15.9)	(20.2)	(21.2)	(20)	(9.2)	(16.7)	(8.9)	(12.9)	(12.5)	(15.5)	
BUILDING MATERIAL	37	34.9	31.9	33.6	33	28.1	28.6	38.4	37	36.4	33.89
N=9	(20.6)	(21.1)	(21.8)	(20.6)	(18.6)	(15)	(15.5)	(30)	(26.4)	(24.1)	
METALS MANUFACTURING	62.4	65	71.5	72.5	63.1	42.1	33.8	225.7	25	22.8	48.39
N=6	(20.1)	(29.1)	(24.7)	(20.8)	(13.9)	(17.6)	(14.6)	(12.7)	(10.5)	(8.2)	
PROPERTY DEVELOPMENT	38	39.2	41.5	43.6	41.2	42.8	40.4	42.1	44	42.3	41.51
N=20	(21.5)	(22.5)	(25)	(25.2)	(22.1)	(18.1)	(13)	(12.1)	(14.6)	(13.7)	
ENGINEERING	46.5	48.7	48.1	48.3	47.7	42.8	40.4	51.5	44.3	46	46.38
N=6	(24)	(23)	(24.7)	(24.1)	(27.1)	(25)	(22.7)	(22.7)	(15)	(14.4)	
PLANTATIONS	20.4	18.5	20.6	23.8	22	18.3	20.4	22.8	22.2	27.4	21.64
N=21	(17)	(14.3)	(15)	(19)	(18.2)	(14.8)	(19.5)	(21.1)	(16.6)	(16)	
ONE-WAY ANOVA											
F-RATIO	3.283	4.032	4.154	3.586	3.69	4.981	4.037	2.977	3.486	2.462	
PROBABILITY	.0021	.0002	.0002	.0008	.0006	.0000	.0002	.0039	.0010	.0150	

The figures in parenthesis under the mean total debt to total assets ratio for each industry group indicate the standard diviation for that year. Figures for means and standard deviations are in percentages.

Critical F-Ratio at 1% == 2.62 and 5% = 1.98

Annex 4

Mean Total Debt to Total Asssets Ratios Ranks by Industry and The Results of The Kruskal-Wallis One Way Anova (N = 97)

Industry	Year									
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
FOOD & BEVERAGES N=12	58.92	57.08	58.67	60.83	64.33	68.25	69.17	61	62	57.58
ELECTRICALS N=5	56.8	69	69.2	60.8	51	64.4	56.2	59.4	59.2	62
TRANSPORT EQUIPMENT N=6	49.33	46.67	49.5	53.5	55.67	62.33	62.5	56.33	60	57.67
WOOD MANUFACTURING N=6	42.5	42.5	43.83	50.33	40.5	45.17	45.83	54.33	58.83	62.5
CHEMICALS N=6	47.17	50.67	48.33	46.17	49	58.67	56.17	64.83	60.33	57.33
BUILDING MATERIAL N=9	50.33	47.89	41.67	39.89	41.11	35.33	37.89	44.44	44.67	43.44
METALS MANUFACTURING N=6	80.67	75.83	81	81.33	79.83	56.83	44.17	29.67	28.5	22.5
PROPERTY DEVELOPMENT N=20	52.13	53.42	52.58	51.4	52.65	54.89	55.55	55.7	58.2	55.75
ENGINEERING N=6	63.25	65.75	60.75	58.33	60.33	59.33	59.33	66.17	57.5	61
PLANTATIONS N=21	27.1	25.48	27.43	28.14	28.14	21.76	27.62	27.52	26.43	32.24
INTER-INDUSTRY										
KRUSKAL-WALLIS H-STATISTIC	24.34	26.65	26.27	24.67	25.22	33.98	24.03	24.17	25.46	20.08
PROBABILITY	0.004	0.002	0.002	0.003	0.003	0.000	0.004	0.004	0.003	0.017

Critical Chi-square Ratio at 1% = 21.67 and 5% = 16.92

Annex 5

Mean Common Equity to Total Assets Ratios by Industry (N = 97)

Industry	Year									
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
FOOD & BEVERAGES	29.5	29.1	27.8	24.6	24.5	23.9	21.6	13.6	8.9	29.4
N=12	(12.7)	(13)	(13.4)	(14.4)	(13.1)	(14.1)	(25)	(65.8)	(80.2)	(17.9)
ELECTRICALS	30.6	24.1	19.9	18.6	26.9	31.1	26.5	35.4	34.9	38.8
N=5	(14.5)	(15.5)	(24)	(28.6)	(30.2)	(29.1)	(17.7)	(24.4)	(28.8)	(28.5)
TRANSPORT EQUIPMENT	31.6	33.1	33.2	32.8	31	30.2	32.4	35.3	36.9	40.1
N=6	(19.2)	(19.8)	(18)	(14.7)	(16.2)	(16.2)	(16.4)	(14.7)	(15.9)	(17)
WOOD MANUFACTURING	19.9	18	16.6	11.1	19.2	21.8	24.2	16.7	9.7	11
N=6	(23.2)	(14.6)	(11.2)	(9.5)	(11.3)	(10)	(13.2)	(15.5)	(14.2)	(21.3)
CHEMICALS	34.3	32.6	30.8	24.5	8.5	14	23.3	17.1	27.1	25.8
N=6	(6.2)	(7.8)	(9.8)	(24.6)	(53)	(44)	(27.8)	(20.1)	(17.3)	(17)
BUILDING MATERIAL	27	26	27.9	27.9	29.5	34.8	34.8	25.8	27.9	32.7
N=9	(18.2)	(20.7)	(22)	(21.4)	(24.7)	(27.9)	(29.4)	(45.8)	(45.3)	(34.1)
METALS MANUFACTURING	3.8	2.2	3.3	1.2	10.8	23.2	32.7	39.6	43.5	46.9
N=6	(24.9)	(31.9)	(36.5)	(33.6)	(22.8)	(20.3)	(19.1)	(19.8)	(18.5)	(18.2)
PROPERTY DEVELOPMENT	17.1	13.5	12.6	11	13.1	12.1	13.4	12.9	19.9	23.2
N=20	(26)	(28)	(28.8)	(30.5)	(29.2)	(24.7)	(22.1)	(25.5)	(16.6)	(18.6)
ENGINEERING	14.2	11.7	9.2	7.3	10.2	16.7	17.4	14.8	19.9	21.7
N=6	(22.6)	(23.6)	(28.8)	(30.5)	(29.2)	(24.7)	(22.1)	(25.5)	(16.6)	(18.6)
PLANTATIONS	44.5	44.3	42.7	43.9	44.5	45.7	45.7	43	46.9	48
N=21	(18.7)	(20.3)	(23.3)	(25.9)	(23)	(22.1)	(22.9)	(29.3)	(23)	(20.8)
INTER-INDUSTRY										
KRUSKAL-WALLIS										
H-STATISTIC	3.696	3.773	3.471	3.022	2.582	2.652	2.456	1.346	1.487	2.984
PROBABILITY	.0006	.0005	.0011	.0025	.0110	.0093	.0126	.2263	.1657	.0039

The figures in parenthesis under the mean common equity to total debt ratio for each industry group indicate the standard diviation for that year. Figures for means and standard deviations are in percentages.

Critical F-Ratio at 1% == 2.62 and 5% = 1.98

Annex 6

Mean Common Equity to Total Debt Ratios Ranks by Industry and The Results of The Kruskal-Wallis One Way Anova (N = 97)

Industry	Year									
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
FOOD & BEVERAGES N=12	52.08	51.79	51.92	48.58	46.5	43.92	44.33	48.33	45.92	45
ELECTRICALS N=5	52.2	45.2	43.4	44.2	50	42.4	31.8	40.8	39	38.8
TRANSPORT EQUIPMENT N=6	54	57.5	59.33	58.33	53.83	51	53.33	57.83	56.17	58.67
WOOD MANUFACTURING N=6	37.5	38.33	38.17	32.17	39	38.5	36.83	29.67	21.67	23.17
CHEMICALS N=6	58.83	57	56.67	52.33	45.5	45.17	47.5	35.33	44.17	38.5
BUILDING MATERIAL N=9	46.56	47	51.89	53.22	54.67	58.44	60.69	57.56	56.89	55.44
METALS MANUFACTURING N=6	25	29.17	28.5	27.83	34	46.17	57.67	65	68.5	68.33
PROPERTY DEVELOPMENT N=20	35.78	35.1	36.53	37.17	36.33	32.55	31.67	32.47	33.63	36.25
ENGINEERING N=6	30.75	30.75	32.25	31.25	31.08	35.42	37.08	32.42	35.25	35.5
PLANTATIONS N=21	71.24	71.62	70.95	72.14	71.71	70.24	70.76	70.48	69.9	69.05
INTER-INDUSTRY KRUSKAL-WALLIS										
H-STATISTIC	26.61	26.09	24.33	26.75	23.36	23	26.86	29.24	29.57	26.94
PROBABILITY	0.002	0.943	0.892	0.011	0.092	0.275	0.022	0.072	0.403	0.042

Critical Chi-square Ratio at 1% = 21.67 and 5% = 16.92

Annex 7

Distribution of Companies by Total Assets Size (N = 109)

Range	Group	Number of Companies each Year									
		1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
RM3m ... RM69.99m	1	33	32	26	24	22	15	14	11	10	7
RM70m ... RM149.99m	2	33	35	37	25	20	22	20	23	14	14
RM150m ... RM249.99m	3	13	10	17	27	23	16	14	10	9	8
RM250m ... RM499.99m	4	21	25	18	18	26	33	38	32	37	33
RM500m ... and above	5	9	7	11	15	18	22	23	33	39	47

Annex 8

Mean Debt to Equity Ratios by Industry (N = 109)

Size	Year										10 Years
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	mean
GROUP 1	61.3 (61.4)	69 (65.7)	83.6 (104)	106 (163)	103 (193)	99.2 (154)	42.2 (40.7)	49.9 (66)	112.3 (168)	55.5 (53)	78.22
GROUP 2	98.4 (90.9)	92.9 (101)	134 (184)	179 (186)	81.5 (51.4)	86 (65)	88.5 (61.5)	118 (124)	96.3 (102)	125.9 (144)	110.1
GROUP 3	67.3 (62.7)	90.7 (150)	146 (242)	122 (147)	93.7 (76.9)	62.8 (38.7)	61 (48.6)	55.3 (40)	91.1 (60.1)	70.4 (28.5)	86.03
GROUP 4	111 (130)	131 (187)	131 (182)	108 (166)	108 (140)	70.2 (48.5)	85.6 (96)	75.5 (49.2)	72.1 (45.9)	74.4 (52.5)	96.68
GROUP 5	110 (68.7)	84 (48)	95 (56)	130 (109)	130 (120)	146 (160)	100 (88.9)	109 (99.1)	104.6 (95.5)	104.6 (100)	111.3
INTER-INDUSTRY											
ONE-WAY ANOVA											
F-RATIO	1.571	0.93	0.537	0.831	0.367	2.23	1.482	2.207	0.806	1.482	
PROBABILITY	0.188	0.449	0.709	0.509	0.832	0.071	0.213	0.073	0.524	0.213	
KRUSKAL-WALLIS											
H-STATISTIC	8.077	2.751	2.806	6.766	6.48	9.29	9.97	9.25	3.18	3.39	
PROBABILITY	0.088	0.6	0.591	0.149	0.17	0.054	0.041	0.055	0.529	0.495	

The figures in parenthesis under the mean debt equity ratio for each group indicate the standard diviation for that year. Figures for means and standard deviations are in percentages.

Critical F-Ratio at 1% = 3.51 and 5% = 2.46
Critical Chi-square Ratio at 1% = 13.28 and 5% = 9.49

Annex 9

Mean Total Debt to Total Assets Ratios by Size (N = 109)

Size	Year										10 Years
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	mean
GROUP 1	30.5	33.2	34.3	33.6	32.5	34.4	24.9	27.9	34.9	30.5	31.67
	(21.5)	(21.2)	(23)	(24.8)	(24.8)	(27.5)	(19)	(27.1)	(31.6)	(18.5)	
GROUP 2	41.3	38.7	42.1	51.7	40.3	39.6	41.4	43.8	39.4	42.9	42.12
	(20.7)	(22.6)	(26)	(24.6)	(17.5)	(21)	(19.1)	(21.6)	(22.6)	(25)	
GROUP 3	35.9	34.3	42.5	42.7	41.4	35.3	32.3	31.4	42.2	39.6	37.76
	(15.8)	(20.4)	(24)	(23.5)	(20.4)	(15)	(20.4)	(18.3)	(20.7)	(11.8)	
GROUP 4	40.4	42.14	40.6	38.8	40.2	36.6	39.5	38.7	37.8	37.9	39.26
	(24.0)	(24.8)	(25.5)	(20.9)	(20.1)	(15.7)	(16.8)	(16.1)	(15.8)	(17)	
GROUP 5	48.2	42.3	44.9	47.3	47.8	50	43.6	44	43.3	43	45.44
	(15.3)	(15.3)	(15.3)	(22.3)	(20.6)	(19.8)	(17.8)	(18.7)	(18.9)	(18.7)	
INTER-INDUSTRY											
ONE-WAY ANOVA											
F-RATIO	1.967	0.727	0.598	1.723	1.723	1.371	2.148	2.924	0.569	1.008	
PROBABILITY	0.105	0.576	0.665	0.151	0.249	0.08	0.025	0.083	0.685	0.407	
KRUSKAL-WALLIS											
H-STATISTIC	8.077	2.751	2.806	6.766	6.48	9.49	9.85	8.5	2.88	3.26	
PROBABILITY	0.088	0.6	0.591	0.144	0.17	0.05	0.043	0.075	0.579	0.515	

The figures in parenthesis under the mean debt equity ratio for each group indicate the standard diviation for that year. Figures for means and standard deviations are in percentages.

Critical F-Ratio at 1% = 3.51 and 5% = 2.46
Critical Chi-square Ratio at 1% = 13.28 and 5% = 9.49

Annex 10

Mean Common Equity to Total Assets Ratios by Size (N = 109)

Size	Year										10 Years
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	mean
GROUP 1	27.4	24.5	25.6	28.2	22.5	28	40.8	31.4	8.7	51.6	28.87
	(27.5)	(27.4)	(30.2)	(29.2)	(39.8)	(38.4)	(23.7)	(46.9)	(100)	(12.5)	
GROUP 2	23.9	23.9	19.7	5.8	12.8	19	12.5	5.2	23.6	15.3	16.17
	(17.8)	(20.5)	(22.8)	(22.6)	(18.9)	(24)	(27.6)	(53.4)	(25.3)	(32.3)	
GROUP 3	26.5	27	24.1	24.2	27.92	20.6	24.5	27	28.3	33.3	26.34
	(20.9)	(26.1)	(23.5)	(25.2)	(23)	(25.4)	(21.7)	(21.5)	(19.5)	(13.9)	
GROUP 4	28.2	25	23.4	25.6	23	31	24.4	32	31.7	31	27.53
	(20.9)	(22.9)	(28.8)	(28.6)	(26.1)	(20.2)	(25.4)	(18.3)	(20.4)	(23.2)	
GROUP 5	19.4	21.2	26.4	29.4	28.6	24.1	31.62	26.6	27.5	31.5	26.63
	(16.6)	(20.4)	(15.9)	(19.7)	(16.9)	(19.7)	(16.2)	(19.7)	(19.3)	(20.8)	
INTER-INDUSTRY											
ONE-WAY ANOVA											
F-RATIO	0.354	0.069	0.284	3.303	1.188	0.984	3.415	2.579	0.86	3.189	
PROBABILITY	0.841	0.991	0.888	0.014	0.321	0.42	0.012	0.042	0.49	0.016	
KRUSKAL-WALLIS											
H-STATISTIC	1.39	0.468	1.116	12.99	7.92	5.13	11.46	8.58	4.02	9.89	
PROBABILITY	0.846	0.943	0.892	0.011	0.09	0.275	0.022	0.072	0.703	0.042	

The figures in parenthesis under the mean debt equity ratio for each group indicate the standard diviation for that year. Figures for means and standard deviations are in percentages.

Critical F-Ratio at 1% = 3.51 and 5% = 2.46
Critical Chi-square Ratio at 1% = 13.28 and 5% = 9.49