CAPIAL SRUCTURE AND THE FIRM CHARACTERISTICS: EVIDENCE FROM AN EMERGING MARKET

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ABSTRACT

We examine the determinants of capital structure of Malaysian companies utilizing data from 1984 to 1999. We classify data into four sub-periods that correspond to different stages of Malaysian capital market. Debt is decomposed into three categories: short-term, long-term and total debt. Both book value and market value debt ratios are calculated. The results of pooled OLS regressions show that profitability, size, growth, risk and tangibility variables have significant influence on all types of debt. These results are normally consistent with the results of fixed effect estimation with the exception that risk variable loses its significance. Unlike the evidence from the developed markets, investment opportunity (market-to-book value ratio) has no significant impact on debt policy in the emerging market of Malaysia. Our results are generally robust to time periods, but the significance of some variables changes over time. Profitability has a persistent and consistent negative relationship with all types of debt ratios in all periods and under all estimation methods. This confirms the capital structure prediction of the pecking order theory in an emerging capital market.

INTRODUCTION

The landmark studies of Modigliani and Miller (1958; 1963) about capital structure irrelevance and tax shield advantage paved way for the development of alternative theories and a series of empirical research on capital structure. The alternative theories include the trade-off theory, the pecking order theory and the agency theory. All these and many other theories have been subjected to extensive empirical testing in the context of developed countries, particularly USA (Harris and Reviv, 1991). A few studies report international comparison of capital structure determinants (Wald, 1999; Rajan and Zingales, 1995). The empirical literature has been to identify some stylized factors that relate to capital structure. There are a few studies that provide evidence from the emerging markets of South-east Asia (Pandey et. al., 2000; Annuar and Shamsher, 1993; Ariff, 1998). This study aims to investigate the determinants of capital structure in the emerging Malaysian market.

Empirical evidence in developed countries show that firm characteristics have different impact on different types of debt. For example, agency problem has different implications for long-term and short-term debt. Similarly, risk may be negatively correlated with long-term debt ratio but positively with short-term debt ratio. Further, the economic conditions may have an important influence on the firm's debt policy. Our study examines the influence of growth, investment opportunity, profitability, size, risk and tangibility on different types of debt ratios of Malaysian companies utilizing data from 1984 to 1999 to capture the impact of different economic conditions. We find that all these variables, except investment opportunity, have significant relation with debt ratios. Our results reveal that profitability with its negative relationship with debt ratios has the most dominant influence on debt policy of Malaysian firms.

The remaining sections of the study are organized as follows: Section 2 presents an overview of literature on capital structure. Section 3 describes data and research methodology. Section 4 reports results of the statistical analyses. Section 5 summarizes the main conclusions of the study.

LITERATURE REVIEW

Leverage can de defined in different ways. The definition of leverage depends on the objective of the analysis (Rajan and Zingales, 1995). For example, for agency-problem related studies of capital structure, leverage may be defined as debt-to-firm value ratio. Interest coverage ratio is more suitable in a study of leverage and financial distress. Other definitions of leverage include total liabilities-to-total assets, debt-to-total assets, debt-to-net assets, and debt-to-capitalization. Further, debt could be divided into its various components and numerator and denominator could be measured in book value and market value terms.

Debt-to-assets (or debt-to-capital) is the most often used measure of leverage in empirical studies. Since independent variables may have different effect on the types of debt, we use three measures of leverage: long-term debt to total assets, short-term debt to total assets and total debt to total assets ratios. Some previous research studies (Titman and Wessels, 1988; Pandey et. al., 2000; Chung, 1993) also use different measures of leverage. Each debt ratio is measured in book value and market value terms. Thus, we use six measures of debt ratio as dependent variable. In the market value debt ratio, the market value of debt is treated same as the book value and the current market capitalization of equity is used as the market value of equity.

The selection of independent variables is primarily guided by the results from previous empirical studies in the context of some developed and developing countries. Our focus in this study is to examine the influence of these variables on the debt policy of Malaysian firms rather to identify new variables. In a comparative cross-country study, Rajan and Zingles (1995) find the following four important variables: growth, tangibility, profitability and size. Many other studies (Titman and Wessels, 1988; Pandey et. al. 2000; Barclay and Smith, 1996; Castanias, 1983; Bradley, Janell and Kim, 1984) also show risk (earnings volatility) and investment opportunity (market-to-book value) as important determinants of debt policy. We use these six variables in this study as independent variables and discuss below the theoretical and empirical considerations underlying each one of them.

Growth: Firms whose sales grow rapidly often need to expand their fixed assets. Thus high growth firms have greater future need for funds and also retain more earnings. According to trade-off theory, the retained earnings of high growth firms

increase and they issue more debt to maintain the target debt ratio. Thus, positive relationship between debt ratio and growth is expected based on this argument. The same relationship is supported by pecking order theory too. According to this, growth causes firms to shift financing from new equity to debt, as they need more funds to reduce the agency problem. Baskin (1989) reports a significant positive relation between growth and leverage. On the other hand, Titman and Wessels (1988) find no relationship.

Investment opportunities: Investment opportunities represent a firm's intangible value that does not have collateral value. The intangible value is likely to be lost if financial distress takes place. The risk of under-valuation and resource diversion is quite high for firms with high intangible value (Myers, 1977). These arguments suggest a negative relationship between debt ratio and investment opportunities. But the agency problem may be lower for short-term debt than long-term debt (Myers, 1977; Barclay and Smith, 1996 & 1999; Michaeles et. al. 1999). Balance sheet does not capture the future investment opportunities rather share price reflects them. Therefore, market-to-book value ratio is used as a proxy for investment opportunities. Empirical evidence on the relationship between investment opportunities (reflected through market-to-book value ratio) and capital structure is not conclusive. Studies confirming a negative relation between investment opportunities and long-term debt or total debt ratios include Titman and Wessels (1988), Barclay et. al. (1995) Lasfer (1995), Rajan and Zingales (1995) Barclay and Smith (1996). However, Michaelas et. al. (1999) report a positive relation of investment opportunities with long-term and total debt ratio as well as with short-term debt ratio. Stohs and Mauer (1996) and Barclay and Smith (1996) find negative relationship between growth opportunities and all types of debt.

Profitability: According to the interest tax shield hypothesis, which is derived from Modigliani and Miller (1963), firms with high profits would employ high debt to gain tax benefits. On the contrary, the pecking order or asymmetric information hypothesis of Myers (1984) and Myers and Majluf (1984) postulates that companies prefer internal financing to debt to equity. Firms with higher profitability will employ higher retained earning and less debt. The interest tax shield hypothesis may also not work for those firms that have other avenues, like depreciation, to shield their taxes (DeAngelo and Masulis, 1980). Most empirical results confirm the pecking order

hypothesis (Kester, 1986; Titman and Wessels, 1988; Rajan and Zingales, 1995; Michaelas et. al., 1999).

*Risk***:** According to the trade-off theory, higher risk (earnings volatility) increases the probability of financial distress. Thus, it predicts a negative relationship between leverage and risk. However, it is shown that for a negative relationship between risk and leverage, bankruptcy costs should be quite large (Castanias, 1983; Bradley, Janell and Kim, 1984). Further, Thies and Klock (1992) argue that risk has negative relationship with long-term debt but positive relationship with short-term debt as high variability shifts financing from long-term debt to short-term debt and equity. Empirical results do not provide an unequivocal answer to the relationship between risk and capital structure. Bradley, Janell and Kim (1984) find an inverse relationship between earnings variability and leverage. But Titman and Wessels (1984), Auerbatch (1985) and Ferri and Jones (1979) find no association between earnings variability and leverage.

Size: Large firms are likely to be more diversified and less prone to bankruptcy (Rajan and Zingales, 1995). They are also expected to incur lower direct costs in issuing debt or equity. Thus, large firms are expected to employ higher amount of debt than small firms. It is also argued that smaller firms would have less long-term debt and more short-term debt because of shareholders-lenders conflict (Michaelas et. al., 1999; Titman and Wessels, 1988; Stohs and Mauer, 1996). The empirical evidence is mixed. A large number of studies find a significant positive relation between size and debt ratio (Lasfer, 1995; Rajan and Zingales, 1995; Barclay and Smith, 1996; Berger et. al., 1997). Kester (1986) and Remmers et. al. (1974) find no significant effect of size on capital structure. Some studies reveal a positive relation between size and debt maturities (Barclay and Smith, 1996; Stohs and Mauer, 1996; Michaelas et. al., 1999). It has also been shown that the relationship between size and capital structure is sensitive to the chosen method of estimation (van der Wijst and Thurik, 1993; Barclay et. al., 1995).

Tangibility: According to trade-off hypothesis, tangible assets act as collateral and provide security to lenders in the event of financial distress. Collaterality also protects lenders from moral hazard problem caused by the shareholders-lenders conflict (Jensen and Mekling, 1976). Thus, firms with higher tangible assets are expected to have high level of debt. According to the maturity principle, net fixed

assets shift financing from short-term-debt to long-term debt while inventory shifts financing from equity to short-term-debt and long-term debt (Thies and Klock, 1992). As regards the empirical evidence, some studies report a significant positive relationship between tangibility and total debt (Titman and Wessels, 1988; Rajan and Zingales, 1995). There are other studies that find a positive relationship between tangibility and long-term debt, but a negative relationship between tangibility and short-term debt (van der Wijst and Thurik, 1993; Chittenden et. al., 1996; Stohs and Mauer, 1996).

DATA AND METHODOLOGY

We use data of the KLSE Main Board companies. The selected time period from 1984 to 1999 is intended to capture the differences in economic conditions of the Malaysian economy. Companies that exist throughout the 16-year period with no missing data are included in the study. We exclude the financial and securities sector companies as their financial characteristics and use of leverage is substantially different from other companies. We also exclude companies with zero sales and negative 4-year average earnings. After eliminating outliers, the sample size is 106 companies for each period. We adjust data of those companies, which change their financial year. Such changes result in one year with missing data and the subsequent year data of more than 12 months. We first annualize the subsequent year data, and then substitute missing data by the mean value.

The entire period from 1984 to 1999 is divided into four sub-periods of four years each: 1984-87, 1988-91, 1992-95 and 1996-99. Given the capital market and general economic conditions in Malaysia, these four periods, respectively, correspond with downturn, upturn, stability and growth and downturn[1]. We calculate 4-year mean values of variables, except for growth and earnings volatility, to minimize the measurement error due to random fluctuations in variables. The dependent variable (debt ratio) is regressed to the lagged independent variables to avoid the problem of reverse causality.

[1] The average market returns were negative during 1984 and 1996-99 periods.

In this study, we assume that the differences in debt ratios could result from a firm's dynamics through different time periods. Therefore, we pool data for sub-periods and examine the influence of the firm characteristics on debt policy. With lagged independent variables, our pooled sample consists of 318 observations. We use pooled OLS regressions to understand the statistical relationship between debt ratios and independent variables. We also report results of cross-sectional regression that uses the mean values of variables of sub-periods. This approach ignores changes through time. Therefore, our third approach is to use of the fixed effects model. This approach examines the effect of independent variables on debt policy on the basis of variation through time. We also estimate OLS regressions for each period separately. The average debt ratio of period 1988-91 is regressed to the averages of independent variables for the previous period of 1984-87 and so on. Our results, with some differences, are generally robust to the estimation methods and the time periods. The regression equation is as follows:

$$D_{i,t} = \alpha_0 + \alpha_1 G_{i,t-1} + \alpha_3 IO_{i,t-1} + \alpha_5 P_{i,t-1} + \alpha_4 R_{i,t-1} + \alpha_2 S_{i,t-1} + \alpha_6 T_{i,t-1} + \varepsilon_{i,t}$$

Debt ratio (D) is our dependent variable. We use six measures of debt ratio – three book value and three market value ratios. Each component of debt -long-term, short-term and total debt- is divided by total assets (or capital).

Growth (G) is measured as one plus growth rate derived by regressing log of sales to time (four years). As implied by the trade-off and the pecking order theories, we hypothesize that growth is positively related to debt ratios.

Investment opportunities (IO) variable is approximated by market-to-book value ratio since market value of shares is expected to reflect future potential of investment opportunities. In accordance with the pecking order theory, we hypothesize that investment opportunities have negative association with long-term debt and positive association with short-term debt ratio.

Profitability (P) is defined as earnings before interest and taxes (EBIT) divided by total assets (or capital). As per the pecking order hypothesis, we hypothesize that profitability has a negative relation with debt ratios. The trade-off (or tax shield) theory would be validated if we find a positive relation between profitability and debt ratio.

Risk (R) is computed as coefficient of variation in EBIT over four years. In accordance with the trade-off theory, we hypothesize a positive association between risk (earnings volatility) and debt ratio.

Size (S) is measured as natural log of sales. Sales are preferred over assets since sales reflect current values. As suggested by the trade-off theory, we hypothesize that size has a positive association with debt ratios. Alternatively, in view of the empirical evidence, we could hypothesize that size has a positive association with long-term debt and a negative relation with short-term debt.

Tangibility (T) is defined as fixed assets divided by total assets. In accordance with the trade-off theory, we hypothesize a positive relationship between tangibility and long-term debt ratio. On the other hand, as per the matching principle, we should expect a positive relationship between tangibility and long-term debt ratio and a negative relationship between tangibility and short-term debt ratio.

RESULTS

Table 1 provides means of the book value and market value debt ratios for the period of 1988-99 and three sub-periods. On average, the KLSE companies employ low level of debt. For the entire 12-year period, the book value total debt ratio is about 15%. Mean long-term debt ratio is approximately half of the short-term debt ratio. The maximum values are 31%, 37% and 56%, respectively, for long-term, short-term and total debt ratios. The distribution of ratios is skewed towards lower end. The average market value debt ratios are lower than the book value debt ratios.

Debt ratios do not show substantial change during the periods of 1988-91 and 1992-95, corresponding with stability and growing phases of Malaysian capital market. During these two periods market value debt ratios are lower than the book value debt ratios. In the third period of 1996-99, both book and market value debt ratios increase. The market value debt ratios increase at a much higher rate than the book value debt ratios. During this period, the Malaysian economy suffered a downturn due to financial crisis that occurred in October 1997 and market prices of shares fell.

Table 1: Summary of Descriptive Statistics

	BLTD	BSTD	BTD	MLTD	MSTD	MTD
Entire Period: 1988-99						
Mean	0.055	0.090	0.145	0.045	0.073	0.118
Median	0.021	0.055	0.118	0.018	0.039	0.081
Maximum	0.310	0.370	0.561	0.308	0.446	0.570
Minimum	0.000	0.000	0.000	0.000	0.000	0.000
Std. Dev.	0.070	0.093	0.137	0.061	0.084	0.125
Skewness	1.320	0.871	0.606	1.708	1.298	1.072
Kurtosis	4.063	2.715	2.262	5.877	4.300	3.553
Period 1: 1988-91						
Mean	0.038	0.091	0.130	0.028	0.068	0.096
Median	0.015	0.059	0.099	0.011	0.038	0.065
Maximum	0.187	0.346	0.452	0.158	0.283	0.366
Minimum	0.000	0.000	0.000	0.000	0.000	0.000
Std. Dev.	0.050	0.096	0.128	0.038	0.076	0.100
Period 2: 1992-95						
Mean	0.053	0.081	0.134	0.034	0.051	0.085
Median	0.012	0.044	0.110	0.007	0.022	0.047
Maximum	0.266	0.319	0.425	0.172	0.266	0.388
Minimum	0.000	0.000	0.000	0.000	0.000	0.000
Std. Dev.	0.068	0.086	0.131	0.045	0.060	0.092
Period 3: 1996-99						
Mean	0.073	0.098	0.171	0.073	0.100	0.173
Median	0.048	0.067	0.146	0.052	0.064	0.147
Maximum	0.310	0.370	0.561	0.308	0.446	0.570
Minimum	0.000	0.000	0.000	0.000	0.000	0.000
Std. Dev.	0.082	0.096	0.149	0.082	0.103	0.157

Table 2 provides correlation matrix for the pooled sample of 318 observations. We observe that growth and profitability are positively related to the firm size, while investment opportunity has a negative relationship with size. This implies that larger firms tend to grow fast and have higher profitability, but they also have smaller investment opportunities relative to their market value. Growth and profitability have positive correlation with investment opportunity. Tangibility (FA/TA ratio) and risk variables have insignificant correlation with other explanatory variables.

Growth and size variables have positive correlations with all types of book and market value debt ratio. Profitability has negative correlation with all measures of debt ratio. This implies that firms employ more debt as their growth and size increase, but reduce debt as their profitability improves. Investment opportunities have significant negative correlation with total debt and short-term debt ratios and insignificant correlation with long-term debt ratios. Tangibility has similar association with debt ratios. The correlation of risk is positive with long-term debt ratio and negative with short-term debt ratio. But coefficients are insignificant. We do observe

high correlation between book and market short-term debt ratios, long-tem debt ratios and total debt ratios.

Table 2: Correlation Matrix – Pooled Sample

	BLTD	BSTD	BTD	MLTD	MSTD	MTD	GROWTH	INVSOP	PROFIT	RISK	SIZE	TANGI
B-LTD	1.000											
B-STD	0.417*	1.000										
B-TD	0.788*	0.888*	1.000									
M-LTD	0.929*	0.411*	0.748*	1.000								
M-STD	0.409*	0.913*	0.825*	0.484*	1.000							
M-TD	0.727*	0.810*	0.916*	0.812*	0.904*	1.000						
GROWTH	0.185*	0.156*	0.199*	0.217*	0.197*	0.238*	1.000					
INVSOP	-0.088	-0.128*	-0.131*	-0.071	-0.116*	-0.112*	0.170*	1.000				
PROFIT	-0.274*	-0.339*	-0.368*	-0.283*	-0.328*	-0.357*	-0.015	0.302*	1.000			
RISK	-0.036	0.111*	0.057	-0.033	0.055	0.021	0.017	0.062	-0.077	1.000		
SIZE	0.162*	0.208*	0.223*	0.201*	0.252*	0.266*	0.194*	-0.221*	0.179*	-0.019	1.000	
TANGI	-0.060	-0.268*	-0.212*	-0.108	-0.281*	-0.241*	-0.020	-0.099	-0.006	0.034	0.049	1.000

** 5% significance level*

Table 3 presents regressions results. We first discuss results of the pooled OLS regressions.

Growth: We find a significant positive relation between growth and all types of book and market value debt ratios. This finding supports both trade-off and pecking order theories. Malaysian firms have higher short-term than long-term debt ratios. Thus, it seems that they employ short-term debt to finance their growth.

Investment opportunities: The multivariate-pooled OLS regression results show that the coefficient of investment opportunity (market-to-book value ratio) variable is insignificant throughout. This contradicts the pecking order theory of Myers (1977, 1984) that suggests that companies with high market-to-book value would have lower long-term debt ratios because of the problem of under-investment. However, the correlation matrix shows that investment opportunity variable has inverse relation with book and market value short-term debt and long-term debt ratios. This simple correlation implies that firms with larger investment opportunities are perceived by lenders to have higher risk (bankruptcy costs). It may be noted from the correlation matrix that the market-to-book-value variable has a positive relation with profitability and negative relation with size. It is thus probable that the influence of investment opportunity is captured by size and profitability variables in the multiple regressions.

Table 3: Summary of Multiple Regressions Results

	B-TD			B-STD			B-LTD			M-TD			M-STD			M-LTD		
Variable	coeff.	t-stat.	sig.	coeff.	t-stat.	sig.	coeff.	t-stat.	sig.	coeff.	t-stat.	sig.	coeff.	t-stat.	sig.	coeff.	t-stat.	sig.
PANEL A: POOLED OLS MODEL																		
CONSTANT	-0.148	-2.54	0.01	-0.058	-1.37	0.17	-0.090	-2.55	0.01	-0.214	-3.64	0.00	-0.107	-2.57	0.01	-0.107	-3.07	0.00
GROWTH	0.178	3.08	0.00	0.084	1.97	0.05	0.095	2.64	0.01	0.194	3.07	0.00	0.100	2.31	0.02	0.094	2.45	0.01
IVSOP	0.001	0.28	0.78	0.000	-0.04	0.97	0.001	0.55	0.59	0.002	0.86	0.39	0.001	0.45	0.65	0.002	1.12	0.26
PROFIT	-1.049	-6.91	0.00	-0.644	-6.39	0.00	-0.406	-6.03	0.00	-0.978	-6.94	0.00	-0.591	-6.51	0.00	-0.387	-5.97	0.00
RISK	0.001	2.25	0.03	0.001	5.84	0.00	-0.001	-5.52	0.00	0.000	-0.17	0.87	0.001	2.69	0.01	-0.001	-5.34	0.00
SIZE	0.051	5.53	0.00	0.033	5.13	0.00	0.018	3.49	0.00	0.054	6.25	0.00	0.034	5.91	0.00	0.020	4.02	0.00
TANGI	-0.133	-4.82	0.00	-0.113	-6.72	0.00	-0.019	-1.13	0.26	-0.135	-5.45	0.00	-0.106	-6.77	0.00	-0.029	-1.97	0.05
R-sq.	0.293			0.287			0.149			0.335			0.314			0.192		
Adj. R-sq.	0.279			0.273			0.133			0.322			0.301			0.176		
F-stat.	21.442			20.880			9.092			26.149			23.779			12.289		
PANEL B: MEANS OF VARIABLES OLS MODEL																		
CONSTANT	-0.270	-1.68	0.10	-0.208	-1.87	0.06	-0.062	-0.97	0.34	-0.167	-1.45	0.15	-0.122	-1.47	0.14	-0.045	-1.00	0.32
GROWTH	0.330	1.94	0.06	0.255	2.08	0.04	0.075	1.13	0.26	0.216	1.72	0.09	0.155	1.64	0.10	0.061	1.24	0.22
IVSOP	0.001	0.25	0.80	0.001	0.31	0.76	0.000	0.13	0.89	-0.002	-0.75	0.46	-0.001	-0.55	0.58	-0.001	-0.88	0.38
PROFIT	-0.912	-3.93	0.00	-0.605	-3.60	0.00	-0.307	-3.94	0.00	-0.741	-4.24	0.00	-0.513	-3.97	0.00	-0.229	-4.04	0.00
RISK	0.052	2.64	0.01	0.038	3.02	0.00	0.014	1.42	0.16	0.043	2.47	0.02	0.030	2.72	0.01	0.013	1.64	0.11
SIZE	0.038	2.82	0.01	0.028	2.92	0.00	0.010	1.75	0.08	0.031	2.90	0.00	0.024	2.93	0.00	0.006	1.57	0.12
TANGI	-0.140	-3.40	0.00	-0.131	-4.65	0.00	-0.009	-0.46	0.65	-0.122	-3.85	0.00	-0.115	-5.06	0.00	-0.007	-0.47	0.64
R-sq.	0.328			0.329			0.162			0.369			0.370			0.180		
Adj. R-sq.	0.288			0.288			0.111			0.330			0.332			0.131		
F-stat.	8.067			8.090			3.184			9.630			9.710			3.628		
PANEL C: FIXED EFFECTS MODEL																		
GROWTH	0.215	3.13	0.00	0.107	2.20	0.03	0.108	2.86	0.00	0.233	3.29	0.00	0.124	2.62	0.01	0.108	2.85	0.00
IVSOP	-0.002	-0.57	0.57	-0.002	-0.99	0.32	0.000	-0.05	0.96	0.002	0.66	0.51	0.001	0.39	0.70	0.001	0.69	0.49
PROFIT	-0.736	-4.56	0.00	-0.430	-3.96	0.00	-0.305	-3.92	0.00	-0.712	-4.98	0.00	-0.411	-4.41	0.00	-0.301	-4.25	0.00
RISK	0.000	0.56	0.58	0.000	0.83	0.41	0.000	-0.51	0.61	0.000	1.71	0.09	0.000	2.98	0.00	0.000	-1.30	0.20
SIZE	0.034	2.96	0.00	0.017	2.07	0.04	0.017	2.47	0.01	0.057	5.29	0.00	0.031	4.11	0.00	0.026	4.14	0.00
TANGI	-0.094	-3.03	0.00	-0.072	-3.78	0.00	-0.023	-1.27	0.21	-0.108	-3.77	0.00	-0.074	-4.36	0.00	-0.034	-2.08	0.04
R-sq.	0.631			0.626			0.511			0.622			0.598			0.506		
Adj. R-sq.	0.432			0.424			0.247			0.419			0.382			0.239		
F-stat.	70.477			68.826			42.969			67.865			61.395			42.132		

Note:

(1) t-statistics are based on White heteroskedasticity-consistent standard errors and covariance

(2) F-statistics are significant at 0.01 level.

Profitability: Our results show that profitability has a significant inverse relation with all types of book and market value debt ratios. These results confirm findings of earlier studies and are consistent with pecking order theory (Myers, 1984) that postulates a negative relationship between profitability and debt ratio. The negative relationship between profitability and debt ratios contradict the tax shield hypothesis. Profitability seems to be the most dominant determinant of debt ratios of

Malaysian firms as it generally has high beta coefficients and t-statistics that are significant at 1% level of significance.

Risk: We find a negative relation of earnings volatility with book and market value long-term debt ratio, which is consistent with the trade-off theory. Our results also reveal a positive relation between risk and short-term debt ratios. This finding vindicates the view that high variability shifts financing from long-term debt to short-term debt and equity (Thies and Klock, 1992).

Size: We find that size is positively related to all types of book and market value debt ratios. All coefficients are significant at 0.01 level of significance. The positive correlation between size and debt ratios confirms the hypothesis that larger firms tend to be more diversified and less prone to bankruptcy and the direct cost of issuing debt or equity is smaller. This is consistent with the trade-off theory.

Tangibility: Our results indicate a significant negative relation of tangibility (FA/TA ratio) with book and market value short-term debt ratios. This confirms the maturity matching principle. The relation of tangibility with the market value long-term debt ratio is also significantly negative while with book value long-term ratio it is not statistically significant. These results contradict the trade-off theory that postulates a positive correlation between long-tem debt ratio and tangibility since fixed assets act as collateral in debt issues. The negative relation between tangibility and total debt ratio suggests that short-term debt is more than the collateralized long-term debt. Overall, our results are consistent with DeAngelo and Masulis (1980) who suggest an inverse correlation between tangibility and debt ratio. Yet another argument for the negative relationship is the traditional view that firms with higher operating leverage (high fixed assets) would employ lower financial leverage (both long- and short-term debt).

In Panels B and C of Table 3 we also present the results of means of variables OLS regressions and fixed effects model. These results show how much of the pooled OLS results can be attributed to debt ratio adjustment through time periods and how much to the differences in debt ratios among firms. The results of the means of variables OLS regressions are broadly similar to the results of the pooled OLS regressions, but adjusted R-squared values are generally higher. The results reveal that book and market value total debt and short-term debt ratios are explained better by the independent variables than the long-term debt ratios. Also, the explanatory

power of growth variable is lower. The adjusted R-squared values for short-term and total debt ratios are about 30% or more while for long-term ratios they are about 11-13%. The fixed effects model results in Panel C reveal that the explanatory power of regressions is considerably enhanced. The adjusted R-squared values are much higher than under pooled OLS and means of variables OLS models. The results of the fixed effects model reveal an important difference as compared to pooled and means of variables OLS regressions. The coefficient of risk variable becomes insignificant in the case of book value debt ratios as dependent variable. This implies that the relationship between debt ratios and risk is influenced when the firm effects are controlled. The relatively high adjusted R-squared values in OLS means of variables and fixed effects regressions indicate that independent variables significantly explain both the cross-sectional and time series variations in debt policy of Malaysian firms.

The results of the regression models as discussed above do establish that growth, profitability, risk and tangibility variables explain the cross-sectional and time-series variations in debt policy of Malaysian firms. The Malaysian economy has passed through different economic stages during last decade or so. When we run OLS regressions for each time period separately, we do observe some differences in the explanatory power of independent variables, but results are generally robust to different time periods. Table 4 provides regression results for each time period. Profitability is the most consistent variable in influencing debt policy and it has a significant inverse relation with all debt ratios in all periods. It may be noted that profitability, size, risk and tangibility variables also show consistent influence over short-term and total debt ratios in all periods. Size is positively related with all debt ratios in periods one and three and with short-term and long-term debt ratios in period 2. Tangibility variable has a significant negative relation with debt ratios except that its coefficient is insignificant for market value long-term debt ratio in period 2 and book and market value long-term debt ratios in period 3. Risk variable has a positive relation with short-term and total debt ratios in period 1, all ratios in period 2 and book value short-term debt ratio in period 3. Risk variable shows a negative relation with book and market value long-term debt ratios and market value total debt ratio in period 3. Growth variable has a significant positive relation with book and market value short-term and long-term debt ratios in period 1. Its coefficient is not significant

in periods 2 and 3. Investment opportunity as in the pooled regressions has no relationship with debt ratios.

Table 4: Regression Results for Each Period

	BTD			BSTD			BLTD			MTD			MSTD			MLTD		
Variable	Coeff.	t-stat.	Sig.	Coeff..	t-stat.	Sig.	Coeff.	t-stat.	sig.	Coeff..	t-stat.	Sig.	Coeff.	t-stat.	Sig.	Coeff.	t-stat.	Sig.
PANEL A: OLS MODEL - PERIOD 1: 1988-91																		
Constant	-0.270	-1.68	0.10	-0.208	-1.87	0.06	-0.062	-0.97	0.34	-0.167	-1.45	0.15	-0.122	-1.47	0.14	-0.045	-1.00	0.32
Growth	0.330	1.94	0.06	0.255	2.08	0.04	0.075	1.13	0.26	0.216	1.72	0.09	0.155	1.64	0.10	0.061	1.24	0.22
Invst. Opp.	0.001	0.25	0.80	0.001	0.31	0.76	0.000	0.13	0.89	-0.002	-0.75	0.46	-0.001	-0.55	0.58	-0.001	-0.88	0.38
Profitability	-0.912	-3.93	0.00	-0.605	-3.60	0.00	-0.307	-3.94	0.00	-0.741	-4.24	0.00	-0.513	-3.97	0.00	-0.229	-4.04	0.00
Risk	0.052	2.64	0.01	0.038	3.02	0.00	0.014	1.42	0.16	0.043	2.47	0.02	0.030	2.72	0.01	0.013	1.64	0.11
Size	0.038	2.82	0.01	0.028	2.92	0.00	0.010	1.75	0.08	0.031	2.90	0.00	0.024	2.93	0.00	0.006	1.57	0.12
Tangibility	-0.140	-3.40	0.00	-0.131	-4.65	0.00	-0.009	-0.46	0.65	-0.122	-3.85	0.00	-0.115	-5.06	0.00	-0.007	-0.47	0.64
R-sq.	0.328			0.329			0.162			0.369			0.370			0.180		
Adj. R-sq.	0.288			0.288			0.111			0.330			0.332			0.131		
F-statistic	8.067			8.090			3.184			9.630			9.710			3.628		
PANEL B: OLS MODEL - PERIOD 2: 1992-95																		
Constant	-0.020	-0.14	0.89	-0.010	-0.12	0.91	-0.010	-0.12	0.91	-0.024	-0.24	0.81	-0.017	-0.32	0.75	-0.007	-0.11	0.91
Growth	0.097	0.62	0.54	-0.009	-0.11	0.91	0.106	1.09	0.28	0.062	0.58	0.57	-0.002	-0.03	0.98	0.064	0.97	0.33
Invst. Opp.	-0.002	-0.32	0.75	0.003	1.04	0.30	-0.005	-1.64	0.10	-0.002	-0.68	0.50	0.001	0.46	0.65	-0.003	-1.52	0.13
Profitability	-0.930	-4.72	0.00	-0.583	-4.79	0.00	-0.346	-3.57	0.00	-0.694	-4.98	0.00	-0.435	-5.23	0.00	-0.259	-3.82	0.00
Risk	0.085	4.84	0.00	0.067	5.48	0.00	0.019	1.74	0.08	0.060	4.15	0.00	0.045	5.06	0.00	0.015	1.94	0.05
Size	0.033	2.12	0.04	0.034	3.42	0.00	-0.001	-0.17	0.87	0.026	2.49	0.01	0.025	3.87	0.00	0.001	0.16	0.87
Tangibility	-0.141	-3.26	0.00	-0.124	-4.89	0.00	-0.017	-0.61	0.54	-0.108	-3.67	0.00	-0.090	-5.10	0.00	-0.018	-1.00	0.32
R-sq.	0.344			0.415			0.147			0.389			0.458			0.182		
Adj. R-sq.	0.304			0.379			0.095			0.352			0.425			0.132		
F-statistic	8.647			11.689			2.846			10.508			13.942			3.669		
PANEL C: OLS MODEL - PERIOD 3: 1996-99																		
Constant	-0.280	-2.49	0.01	-0.146	-1.74	0.09	-0.134	-1.81	0.07	-0.153	-1.31	0.19	-0.078	-0.85	0.40	-0.075	-0.98	0.33
Growth	0.116	1.63	0.11	0.061	1.16	0.25	0.055	1.04	0.30	0.112	1.28	0.20	0.066	1.03	0.31	0.046	0.76	0.45
Invst. Opp.	0.007	1.17	0.24	0.003	0.80	0.43	0.004	1.17	0.24	0.002	0.31	0.76	0.000	-0.06	0.95	0.002	0.64	0.52
Profitability	-1.343	-6.18	0.00	-0.755	-5.14	0.00	-0.589	-4.31	0.00	-1.437	-5.94	0.00	-0.778	-4.64	0.00	-0.658	-4.70	0.00
Risk	0.000	1.36	0.18	0.001	8.50	0.00	-0.001	-6.10	0.00	-0.001	-2.91	0.00	0.000	1.16	0.25	-0.001	-6.16	0.00
Size	0.088	4.24	0.00	0.051	3.24	0.00	0.037	3.13	0.00	0.074	3.55	0.00	0.042	2.69	0.01	0.032	2.76	0.01
Tangibility	-0.117	-2.07	0.04	-0.100	-2.98	0.00	-0.017	-0.45	0.65	-0.150	-2.67	0.01	-0.108	-2.93	0.00	-0.042	-1.23	0.22
R-sq.	0.344			0.328			0.192			0.364			0.291			0.242		
Adj. R-sq.	0.304			0.287			0.143			0.326			0.248			0.196		
F-statistic	8.638			8.059			3.925			9.450			6.764			5.261		

Note:

(1) t-statistics are based on White heteroskedasticity-consistent standard errors and covariance

(2) Most F-statistics are significant at 0.01 level and some at 0.05 level.

CONCLUSION

Malaysian firms employ low debt ratios. The long-term (1988-1999) averages for long-term, short-term and total debt ratio are, respectively, 5%, 9% and 15%. Short-term debt ratio is twice of long-term debt ratio. The debt ratios are generally stable during the periods of 1988-91 and 1992-95. They show increase in the 1996-99 period. Malaysia suffered financial crisis in 1997 and went through economic slow

down during this period. Companies suffered losses and their market capitalization fell. This perhaps caused increase in debt ratios after 1996.

As regards the determinants of debt policy of Malaysian firms, the results of pooled OLS regressions show that growth and size variables have a significant positive relationship with all types of debt ratios and profitability has a significant negative relationship. Risk (earnings volatility) is negatively related with long-term debt ratios and positively with short-term debt ratios. We also find that tangibility (fixed-assets-to-total assets ratio) has a negative association with book value and market value short-term and market value long-term debt ratios. Its relationship with book value long-term debt is insignificant.

The results of means of variables OLS regressions are generally similar to the pooled OLS regression except that the explanatory power of growth variable weakens. The use of the fixed effects model improves estimation further. The only significant difference as compared to pooled OLS regressions is that risk variable becomes insignificant in the case of book value debt ratios as dependent variable. Our results are also generally robust to time periods. The results of OLS regressions for each period reveal that profitability, size, risk and tangibility have consistent influence over short-term and total debt ratios. There are some differences in results across time in the case of long-term ratio as dependent variable. Profitability is the most persistent variable that has a significant negative influence on all types of debt ratios in all periods. The explanatory power of independent variables is higher for short-term debt ratios than long-term debt ratios as revealed by adjusted R-squares values. Our results also uncover that market value debt ratios are explained better by independent variables than book value debt ratios.

Data availability is a major limitation in capital structure and other finance studies in emerging capital markets. For example, the R & D expenditure data is not available for companies in Malaysia. Similarly, no data on stock betas are available. Researchers have to spend a lot of time in data collection and processing because of the lack of validated databases in emerging markets like Malaysia. In future as more data becomes available, one could explore to identify additional variables that have influence on debt policy of companies in Malaysia. A study investigating the role of ownership structure and agency costs in debt policy of Malaysian firms could be undertaken.

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