

DEBT STRUCTURE FOR MALAYSIAN CONSTRUCTION COMPANIES: EVIDENCE FROM PANEL DATA ANALYSIS

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ABSTRACT

The main objective of this paper is to examine whether firm's size, growth opportunity, and firm's reputation affect the debt level (leverage) of the construction companies in Malaysia. The study uses the data from ten selected Malaysia's construction companies for the period from 2001 until 2008. Using the panel data technique, the estimation results show that size of construction companies has a strong significant positive relationship to the firm's leverage. The finding is consistent with the previous findings that firm's size adds huge information in explaining the level of debt. The results also suggest that company's leverage is positively affected by firm's reputation. On the other hand, growth opportunity has inverse relationship with leverage, indicating that high leverage would retard the growth of firms.

Keywords: Leverage, Construction companies, Growth opportunity, Size, Malaysia

JEL Classification : G32; C35

1. INTRODUCTION

The study on capital structure has a long history. It has started more than forty years ago following the famous seminar work of Modigliani and Miller (M&M) (1958). M&M in their findings suggest that, in a perfect financial market, where there is no taxes and transaction costs, a firm's value will depend solely on its level of returns and risk of its future cash flows. What it means is that a firm is not too concerned whether to use internal fund or different forms of external fund in financing their investment because a firm's value is unrelated by its choice of financing. Since then the studies in this area have interested many researchers in different economic settings. Harris and Raviv (1991) for example, survey the theoretical literature that explain the capital structures in developed economies and prove that, in general, the assumptions underlying M&M proposition are not fulfilled. In other related study due to Padron, et al (2005), who declare that combination of internal and external financial resources in company liability has generated much controversy over the years. It seems that prolonged debate on the relevancy of the topic will far from conclusive. As such continued interest on the topic among academicians justifies further study of a company's financial decisions that determine debt level.

In general, any companies regardless of the size typically employ both debt and equity financing. In the world with uncertainties, creditors normally are unwilling to provide financing without protection provided by equity financing. Therefore, financial leverage is the amount of debt financing that pays a fixed return in a company's capital structure.

There are reasons why companies favour the use of debt instead of equity, among them are tax deductibility. However other factor, such as cost of bankruptcy has put the limit of tax advantage. Along these lines, it can be suggested that both agency and signal theories offer considerable help in understanding a company's use of debt. Specifically, the use of debt may reduce managerial discretion and mitigate conflicts of interest between management and the contributors of funds to the company. Moreover, as a consequence of separating ownership and management, shareholders have less information about the company than do managers. In this way, leverage becomes a signal to the former of the private information in the hands of the latter, since the directors' desire to avoid the problems of bankruptcy convert debt into a believable signal.

The first and foremost purpose of this study is to determine the factors that critically explain the level of debt of selected Malaysian construction companies listed on Main Board of Bursa Malaysia during the period from 2001 to 2008. The study on Malaysian companies will shed light on a small economy of an open emerging market and with a representation of small scale local firms.

The paper is organised as follows. Section 2 explains the economy and the performance of construction sectors in Malaysia. Section 3 gives a brief survey of the literature. Section 4 discusses the data and methodology. Section 5 reports the empirical results. Section 6 is the conclusion.

2. PERFORMANCE OF CONSTRUCTION SECTORS IN MALAYSIA (2001 – 2008)

The construction industry has assumed an important role in generating wealth and improving the quality of life for Malaysians through the translation of government's socio-economic policies into social and economic infrastructures. The construction industry, for example, provides job opportunities to about 800,000 workers particularly to the semi and unskilled workers. Moreover, the industry creates a multiplier effect to other sectors such as manufacturing, financial services, and as well as other professional services.

The estimation of the construction output has shown a positive growth from 2003 to 2008. The Construction Industry Development Board (CIDB) Malaysia forecast that the construction sector in Malaysia and the output shows positive growth in the future. The annual output value for the sector towards Malaysian GDP was at the average of RM14 billion per year since 2001. This figure has maintained the stable GDP contribution by the construction sector throughout the recent years. Almost RM69.0 billion worth of projects are completed by year 2008.

The 2008 Annual Report released by Bank Negara has shown that all sectors registering positive growth in 2008 including construction. Positive growth in the construction sector's output and productivity are due to the ongoing Ninth Malaysia Plan infrastructure projects and continued development of both residential and non-residential sub-sectors. The implementation of the Development Economic Regions such as Iskandar, Northern Corridor, and East Coast Corridors are also expected to contribute positively to the sector's growth over the coming years. Overall, the construction sector is expected to achieve productivity growth of 3.1% in 2008 and expected to be even higher in 2009. Moreover, the Tenth Malaysian Plan which has just launched will further stimulate greater demand for construction-related building materials and professional services.

In current prices, the construction sector contributed about RM19.6 billion to the country's GDP in 2008. Although this represents a mere 2.7% share of the pie, the sector still prevail as one of the important component of the Malaysian economy nevertheless due to its many inter-linked relationships with various sectors, particularly construction-related manufacturing industries.

A closer examination reveals that the residential and non-residential segment continued to grow with firm demand – driven by attractive financing packages and rising disposable income – for landed properties, while a favourable business environment helped push the demand for offices and retail spaces.

3. LITERATURE REVIEW

It is common belief that the value of the company has positive relation with the size of its debt. Variations in the company's level of debt will affect its market value since any changes in its capital structure will transmits information about the future expectations of the company to the potential investors and other market participants. For example, an announcement of reduction of the number of common stocks in exchange for a debt offering might has a positive effect on the market or might be negative when the reverse happens.

Many studies including Rajan and Zingales (1995), have found out that leverage is positively correlated with company size. Specifically, they find that larger firms in Germany tend to have less debt compare to small one. On the other hand, debt also has its own agency cost. Myers (1977) argues that high-growth firms may hold

more real options for future investment than low-growth firms. If high-growth firms need extra equity financing to exercise such options in the future, a firm with outstanding debt may forgo this opportunity because such an investment effectively transfers wealth from stockholders to debt holders. So firms with high-growth opportunity may not issue debt in the first place and leverage is expected to be negatively related with growth opportunities.

Alonso et al.,(1999 use reputation measured by the age of a company and they find that reputation has a positive relationship with debt. This is because companies with better reputations are more mature and are well positioned in the market. Furthermore, Mayers (1997) points out that the companies that are more concerned about having a reputation for being honest are those that expect to remain in the market for a long time. For them, honesty is the best policy.

Padron, et al (2005) use many variables such as size, generated resources, level of warrants, debt cost, growth opportunities, and reputation in explaining the level of debt. They use sample comprises of non-financial firms listed in the Spanish Stock Exchange over the period from 1990 – 1999. The selected sample constitutes a balanced panel of 65 companies, with a total of 4550 observations. The result obtained using within-groups estimation and generalized least squares, suggest that the behaviour of the sample throughout the study period is consistent with the fixed effects approach, in which the specific characteristic of each firm remain constant throughout time.

Huang & Song (2005) study the determinants of capital structure in Chinese-listed companies and examine whether firms in the largest developing and transition economy of the world entertain any unique features. They employ a new database containing the market and accounting data from 1994 to 2003 for more than 1200 Chinese-listed companies to document their capital structure characteristics. They discover that leverage in Chinese firms increase with firm size and fixed assets, and decreases with profitability, non-debt tax shields, growth opportunity, managerial shareholdings and correlates with industries. They also find that state ownership or institutional ownership has no significant impact on capital structure.

Delcours (2006) study investigates whether capital structure determinants in emerging Central and Eastern Europe (CEE) countries support traditional capital structure theory in the western economies. The empirical findings confirm that financial leverage of companies in emerging markets is positively related to firm size, asset structure, non-debt tax shield, and corporate tax rate, and negatively related to earnings volatility except for short-term leverage. The empirical evidence supports the importance of these variables across countries. It appears that capital-structure in developed countries is similar with the transitional economies.

4. Data and Methodology

Data

Data are obtained from the balance sheets of each firm over the period from 2001 to 2008 via *Datastreams*, an international database company. There are altogether 43 construction firms listed on Main Board of Bursa Malaysia. The companies for which all necessary information could not be obtained are excluded. Finally, the sample constitutes a balanced panel of 10 companies, with a total of 80 mean observations are used.

Table 1: List of Companies

NO.	COMPANIES NAME	COUNTER CODE
1.	Ekovest Berhad	8877
2.	Gamuda Berhad	5398
3.	General Corporation Berhad	3166
4.	Ireka Corporation Berhad	8834
5.	Merge Energy Berhad	5006
6.	MTD Capital Berhad	9032
7.	Pintaras Jaya Berhad	9598
8.	PLB Engineering Berhad	7055
9.	Ranhill Berhad	5030
10.	SBC Corporation Berhad	5207

The different variables that allow this study to test the stated hypothesis are size of firm, growth opportunities, and the firm's reputation. The dependent variable use in the regression model is the leverage and is defined as follows:

$$\text{LEV} = \frac{\text{Total Debt}}{\text{Total Equity}} \quad (1)$$

For the size of firm, it is defined as the natural logarithm of total assets.

$$\text{Size of Firm} = \text{Loge} (\text{Total Asset}) \quad (2)$$

For growth opportunities, it is measured as the ratio of the market value of common stock over total liabilities.

$$\text{Growth Opportunities} = \frac{\text{Market Value of Common Stock}}{\text{Total Liabilities}} \quad (3)$$

For reputation of firm, it is measured as the natural logarithm of numbers of years since incorporation.

$$\text{Reputation} = \text{Loge} (\text{Numbers of years since Incorporation}) \quad (4)$$

The Model

The main focus on this section is the panel data model derived from Padron, *et. al* (2005). The equation to estimate the factors affecting leverage of construction firms in Malaysia is as follows:-

$$\text{LEV}_{it} = \alpha + \beta_1 \text{SIZE}_{it} + \beta_2 \text{GOP}_{it} + \beta_3 \text{REP}_{it} + \varepsilon_{it} \quad (1)$$

$$i = 1, 2, 3, \dots, 10$$

$$t = 1, 2, 3, \dots, 8$$

where $i \dots 1, 2, 3, \dots, 10$ stands for the i th firms unit and $t \dots 1, 2, 3, \dots, 8$ for the t th time period. The determinants factors of the leverage ratio are the firm size (SIZE), growth opportunities (GOP), and reputation (REP). The ε_{it} is the error term follows the classical assumptions of $\sim N(0, \sigma^2)$.

There are several possibilities when estimating the panel data regression models. First, it is assumed that the intercept and slope coefficients are constant across time and space; and error term captures differences over time and individuals. Secondly, the slope coefficients are constant but the intercept varies over individual firms. Thirdly, the slope coefficients are constant but the intercept varies over individuals and times. Fourth, all coefficients (the intercept as well as slope coefficients) vary over individuals and finally it is assumed that all the intercept together with all slope coefficients vary over time and individuals.¹

The study also takes into account the importance of each construction firm by including the differential intercept dummies, which can be re-write as follows:

$$\text{LEV}_{it} = \delta_0 + \delta_1 D_{1i} + \delta_2 D_{2i} + \delta_3 D_{3i} + \delta_4 D_{4i} + \delta_5 D_{5i} + \delta_6 D_{6i} + \delta_7 D_{7i} + \delta_8 D_{8i} + \delta_9 D_{9i} + \delta_{10} D_{10i} + \beta_1 \text{SIZE}_{it} + \beta_2 \text{GOP}_{it} + \beta_3 \text{REP}_{it} + U_{it} \quad (2)$$

where D_{1i} , D_{2i} , D_{3i} , D_{4i} , D_{5i} , D_{6i} , D_{7i} , D_{8i} , D_{9i} and D_{10i} are the intercept dummies for each cross-sectional units (the firms). Since the dummies are used to estimate the fixed effects, in this paper, the equation (2) is also

¹ See Gujarati's "Basic Econometrics" pp. 640 - 650

known as the least-squares dummy variable (LSDV) model. The estimation results for the models, by using the Generalized Least Square (GLS) method are presented in the next section.

The fixed effects or LSDV modelling is easy to apply. However, it can be tedious in terms of degrees of freedom if the data contains several cross-sectional units. While the dummy variables do in fact represent a lack of knowledge about the model, this ignorance can be expressed and detected through the disturbance term u_{it} .

5. EMPIRICAL RESULTS

This section will discuss the empirical results for the selected models that have been specified in the earlier sections. As define earlier, the models select consist of a series of 80 observations, and referred as balance panel data. The empirical test on the model will consider the combination of time-series and cross-section analysis.

The discussion will be divided into two sub-sections. In the first section, we will generally overlook into the descriptive analysis of the variables. The main target is to understand the behaviour of the variables itself, by looking at the distribution of mean, median, maximum, minimum, standard deviation, skewness, kurtosis and the Jarque-Bera test value of each variable. The next subsection will be focusing on the estimation results of three different approaches to the model, namely the ordinary least square regression (OLS) and the generalized least square (GLS) models regression with fixed- and random-effect models. By analyzing these results, the optimum and the best results that fit the model can be determined.

Descriptive Analysis

The mean, median, maximum, standard deviation, skewness, kurtosis and Jarque-Bera value can determine the statistical behaviour of the variables. The descriptive statistics of the variables of the model are summarized in the table 2 below.

Table 2 : Descriptive Statistics

	LEV	SIZE	GOP	REP
Mean	1.597951	2.737847	1.531125	1.181467
Median	0.748615	2.665599	1.160132	1.176091
Maximum	7.418076	4.075451	6.389958	1.612784
Minimum	0.156496	1.565607	0.047975	0.602060
Std. Dev.	1.765725	0.587684	1.483763	0.284372
Skewness	1.655621	0.398595	1.317257	-0.181111
Kurtosis	4.803258	2.666658	3.912008	2.069494
No. Of Observations	80	80	80	80

The figures in second row show that the mean value for leverage (LEV) is 1.598 and the standard deviation is 1.766. The relatively bigger figure of standard deviation indicates that the data dispersion in the series is quite large. This finding suggests that almost all the construction firms included in the sample were having large dispersion level of leverage across time series. While the kurtosis value of 4.803, shows that the distributions are relatively peaked compared to normal (leptokurtic). The sample distributions of leverage also appear to be positively skewed, showing that most of the selected construction firms had a high level of leverage across times. The outcome were supported by the large figure of JB test (Jarque-Bera probability test), where the null hypothesis (that the data are normally distributed) can be rejected.

For firm size (SIZE), the mean value and standard deviation are 2.738 and 0.588, respectively. These figures mean that the data dispersion is small throughout the series. The kurtosis value of 2.667 shows that the distributions were somehow flat compared to normal (platykurtic), and it was also positively skewed. These two statistic values give an outcome to the Jarque-Bera statistic value of 2.489. Next, for the firm's growth opportunity (GOP), the mean point is 1.531 with its standard deviation of 1.484 points. The large data dispersion has lead to the rejection of H_0 that the data on growth opportunity of all firms in this study were normally distributed. The firms' growth opportunity ratio is rather small throughout the distribution where the skewness is right-tailed or positively skewed. The 'leptokurtic' (peaked) shaped of the data distribution also shows that some firms has high rate of growth opportunity. Finally, for firm's reputation (REP) the mean value is 1.181 with the standard deviation of 0.284.

Comparing these two figures, we can suggest that reputation of firms were still not normally distributed, but with a small range of data dispersion over the series. Unlike other variables, firms' reputations are negatively skewed. This shows that the data distributions are left-tailed, meaning that most firms have high reputation over the series. The distribution also 'platykurtic' shaped, or flat-shaped distribution, indicates that most firms have almost-the-same value of reputation.

Estimations

In this section, the estimation results of the pool regression using OLS (assuming the intercepts and coefficients are constant) and the GLS with fixed- and random effects (firm-effect) are reported in Table 3.

Table 3 : Estimation results for OLS and GLS method

	Pooled Regression	Fixed-Effects	Random-Effects
SIZE	0.2890 (0.3589)	1.8320 (0.0010)***	1.4659 (0.0015)***
GOP	-0.6821 (0.0000)***	-0.3264 (0.1112)	-0.4594 (0.0072)*
REP	-0.0080 (0.9902)	1.4824 (0.2713)	0.6761 (0.5059)
R-squared	0.3681	0.7781	0.2729
Adjusted R-squared	0.3432	0.7384	0.2442

Note: The * denotes the significance of coefficient at 10% level of significance. ** denotes the significance of coefficient at 5% level of significance. *** denotes the significance of coefficient at 1% level of significance. Figures in parentheses indicate the p-value of parameter estimation.

Looking at the pooled regression using OLS estimation results, it shows that GOP (growth opportunity) has shown significant negative correlation with leverage. We can safely conclude that construction firms rely more on its market value in the form share price appreciation (equity financing) over debt financing for its future expansion. In other less leverage is used as firm expand. Meanwhile, for GLS estimation results, table 3 shows significant positive relationship between size and leverage for both fixed effect and random effect models. The results suggest that as size of the construction increase, the needs for financing in the form of debt is also arises, similar to the findings of Padron, et al (2005). It shows that as firms expanded their operation the need for fund in the form of debt arises. This is logical since larger corporations usually require more up to date facilities to cater for the market needs.

The firm's reputation measure by number of years in the market place does not have any effect on the leverage. This finding is contrast with those of Alonso et al, (1999) and Mayers (1997), who find that reputations plays a significant role in obtaining financing in the form of debt. They argue that firms which concerned about having a reputation for being honest are those that expect to remain in the market for a long time.

6. CONCLUSIONS

This study examines the determining factors of the leverage of a construction companies listed on the Main Board of Bursa Malaysia from year 2001 to 2008. Specifically, we use the methodologies of both pooled and panel data techniques to test whether firm whether firm's size, growth opportunity, and firm's reputation affect the debt level (leverage) of the construction companies in Malaysia. The results from the OLS estimations of pooled method show that growth opportunity negatively related to the leverage. On the other hand, the results obtained using within-groups estimation from the generalized least squares of the panel model show that the behavior of the sample throughout the study period is consistent with the fixed effects approach, in which the specific characteristics of each firm remain constant throughout time. Therefore, it is possible to confirm that a larger size of the corporations allow a greater level of debt.

Theoretically, there are other factors that firms generally considered, when deciding capital structure decision. Factors such as sales stability, assets structure, operating leverage, growth rate, profitability, taxes should be explored and looked upon for future study.

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