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Firms' Specific Determinants of Capital Structure: An Analysis into Construction Firms in Malaysia and Singapore

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ABSTRACT

The study aims to examine the firm-specific factors such as firm size, profitability and asset tangibility in the capital structure decisions (leverage) on a sample of twenty construction firms in Malaysia and Singapore from 2009 to 2018, with 200 observations. The sample firms are chosen based on convenience sampling technique and the availability of the data. Prior studies documented inconclusive findings on the determinants of capital structure and different industries tend to reveal different patterns of relationship. In addition, the empirical evidence on comparative analysis between construction firms in Malaysia and Singapore is lacking. Hence, the objective of this study is to extend the prior work by investigating the impact of the determinants on capital structure on the construction firms in Malaysia and Singapore. The study uses panel data analysis to test the effectivity of trade-off, pecking order and agency cost theories of capital structure. The empirical findings reveal positive and significant association between firm size and capital structure for Singapore firms. Meanwhile, profitability and asset tangibility correlate negatively with capital structure. As for Malaysian firms, the three determinants exhibit insignificant association with the capital structure. The study only examines 10 construction firms in Malaysia and 10 construction firms in Singapore, therefore, the small sample size becomes the limitation of the study. Nevertheless, the findings of this study may contribute to the body of knowledge on the importance of some firm-specific determinants such as profitability, tangible assets, and firm size in order to determine the optimal level of capital structure for firms in these countries.

1. INTRODUCTION

Capital structure is a term used in corporate finance to describe the mix of a firm's long-term debt, short-term debt, common equity and preferred equity. It is how a firm finances its operations and its growth by using various accessible sources of funds. Accordingly, decisions concerning debt and equity result in a given capital structure of the firm. Sub- optimal financing decisions could lead to corporate failure. The objective of financing decisions is wealth maximization and the immediate way of measuring the quality of any financing decision is to examine the effect of such decision on the firm's performance (Mwangi, Makau, and Kosimbei, 2014). In addition, Abor (2005) argues that financing decision is important because it has an impact on the firm's ability to grow in a competitive environment and to maximize shareholders' wealth. According to Mardiyanto (2009) the decision of a firm's capital structure is the funding decision related to the long term funding composition obtained through either the debt issuance or owner's equity. Firm must be able to collect funds from anywhere outside of the firm efficiently, that is a condition in which the funding composition can minimize the capital cost which should be borne by the firm (Prabansari and Kusuma, 2005). The capital cost is the cost incurred as the consequence of the funding decision taken by the firm.

Prior studies examine various firm-specific determinants of capital structure such as growth, size, profitability, asset tangibility, non-debt tax shield and earnings volatility. However, the empirical findings are mixed and inconclusive. Some scholars argue that leverage is expanded with growth, size, profitability, asset tangibility, non-debt tax shield, and earnings volatility. However,other scholars have proven, that leverage is curbed with growth, size, profitability, asset tangibility, non-debt tax shield, and earnings volatility (Moradi and Paulet, 2019; Coelho, 2019; Kabeer and Rafique, 2018; Flor and Petersen, 2018; M'ng, Rahman and Sannacy, 2017; Nha, Loan and Nhung, 2016; Pratheepan and Yatiwella, 2016; Vo, 2016; Acaravci, 2015; Li and Islam, 2019; Zafar, Wongsurawat and Camino, 2019; Hamzah and Marimuthu, 2018; Khemiria and Noubbigh, 2018; Wagenvoort, 2016; Chipeta and Deressa, 2016; Hussain, Hamza and Miras, 2015; Hedau, Singh and Janor, 2018; Mallisa and Kusuma, 2017; Nguyen, Nguyen and Dang, 2017). Despite the numerous studies, the results remain inconclusive which makes the determinants of capital structure not clearly understood. Thus, further research is needed.

In addition, prior studies investigating firm-specific determinants of capital structure have been done on various industries. M'ng et al. (2017) examine the determinant

of capital structure on public listed companies in Malaysia, Singapore and Thailand. Hamzah et al. (2018) investigate the determinant of capital structure on Oil and Gas firms in Malaysia. Li et al. (2019) study the determinant of capital structure on Australian public listed firms. Kabeer et al (2018) assess the determinant of capital structure on manufacturing firms in Pakistan. Hussain et al (2015) investigate the determinant of capital structure on Food industry in Malaysia. The empirical findings of these studies document variations of determinants of capital structure. The variations are due to each industry has its own features or requirements which determines and influence the level of leverage. In addition, there is limited study on firm-specific determinants of capital structure focusing on a comparative analysis between construction firms in Malaysia and Singapore.

Accordingly, this study examines the impact of firm-specifics determinants on capital structure of Malaysian and Singapore construction firms. Construction industry is chosen because this industry plays an important role in any country's economic development. It establishes the infrastructure required for socio-economic development and ultimately contributing significantly towards economic growth. Malaysia and Singapore are selected for this study because both countries have common attributes, such as history, culture and geographical location. Moreover, firms operating in the same industry have been found to have a homogenous capital structure due to the same level of operating risk and thus, having equal optimal capital structure (Nha et al., 2016). Hence, the objective of this study is to extend prior work by investigating the impact of the determinants on capital structure on the construction firms in Malaysia and Singapore. The findings of this study may contribute to the body of knowledge on the importance of some firm-specific determinants such as profitability, tangible assets, and firm size in order to determine the optimal level of capital structure for firms in these countries.

The remainder of this paper is structured as follows. The next part, part 2 provides the literature review. Part 3 explains the data and methodology of this study. This is followed by part 4 which presents the findings and discussions on the data analysis. The last part, part 5 concludes the study.

2. LITERATURE REVIEW

To explain the determinants of capital structure, this study adopts three theories namely trade-off, pecking order and agency cost. The trade-off theory requires the setting of a target debt level and this is normally based on a trade-off between the costs and benefits of debt (Li et al, 2019). The theory suggests that firms should raise their debt level to the extent that the tax benefits is equal to the cost of financial bankruptcy. As such, it is assumed that bankruptcy cost is negatively

related to the leverage ratio. The literature shows that firms with high levels of asset tangibility represent lower risk for creditors; therefore, asset tangibility is expected to be positively related to leverage (Li et al., 2019; Frank and Goyal, 2009; Rajan and Zingales, 1995; Titman and Wessels, 1988). Similarly, larger firms have lower bankruptcy risk as they have better and greater access to a wider range of financial sources, and have flexibility in redeploying assets, as compared to smaller firms. Meanwhile, pecking order theory suggests that firms do not have a leverage target and focus on information costs and signaling effects. Some scholars argue that the cost of funds determine a firm's financial choices (Myers and Majluf, 1984; Li et al., 2019; M'ng et al., 2017). Three major sources of funds are available which include retained earnings, debt, and equity. Firms prefer to finance projects from internally generated cash flows such as retained earnings. When this source of funds is exhausted, than debt financing becomes available. Equity will be issued only when debt is not sufficient to meet financing needs as issuing additional equity is the most expensive source of financing as it encompasses information asymmetries between managers, existing shareholders and potential new shareholders. Thus, this hierarchy is justified by differences in financing costs. Therefore, pecking order theory suggests that profitable firms will have more retained earnings. Thus, become less leveraged, while unprofitable firms will have higher leverage ratios. Consequently, a negative relationship is predicted between profitability and leverage.

On the other hand, agency theory states that agency costs play an important role in financing decisions due to the conflict that may exist between shareholders and creditors (Li et al., 2019). An optimal capital structure is determined by minimizing agency costs and balancing the interests of the parties involved. Therefore, profitable firms with great potential are more likely to issue equity to fund new projects instead of borrowing, implying that growth opportunities and profitability are expected to have a negative impact on a firm's leverage ratio. In addition, tangible assets can be used as collateral to mitigate creditor risk, implying a positive relationship between tangibility and financial leverage, which is consistent with the pecking order theory.

2.1 Firm Size and Capital Structure

M'ng et al. (2017) investigate the determinants of capital structure from public listed companies in Malaysia, Singapore and Thailand and the sample firms are taken from public listed companies in Bursa Malaysia, Singapore Stock Exchange and Thailand Stock Exchange. The period of analysis is from 2004 to 2013 and they found that firm size has a significant and positive influence on capital structure for the three countries. The same findings is reported by Kabeer et al. (2018), they

study the relationship between firm size and leverage on 400 manufacturing firms in Pakistan and the period of analysis is from 2001 to 2014. A study by Moradi et al. (2019) on the firm-specific determinants of capital structure, using a sample from 559 firms in six European countries before and during the period of 1999 to 2015 find that firm size is significantly and positively correlated with leverage. They argue that large firms are more diversified, have access to capital market, borrow at favorable interest rates, have lower cost of bankruptcy and have lesser information asymmetry.

2.2 Profitability and Capital Structure

There are many studies that examined the relationship between profitability and leverage. For instance, a recent study by Moradi et al. (2019) on the relationship between profitability and leverage using a sample from 559 firms in six European countries before and during the period of 1999 to 2015, they found that profitability is negatively related to leverage. In Australia, a study by Li et al. (2019) uses a sample of Australian public listed companies and covering a period of 4 years from 1999 to 2012, found that there is a negative relationship between profitability and leverage. Most scholars document negative relationship between profitability and leverage suggesting profitable firms prefer to finance their operation using retained earnings and this is consistent with pecking order theory.

2.3 Asset Tangibility and Capital Structure

Most of the prior empirical studies show mixed results. M'ng et al. (2017) investigates asset tangibility and leverage of public listed companies in Malaysia, Singapore and Thailand from 2004 to 2013, their findings show that asset tangibility has a significant positive influence on capital structure for Malaysia and Singapore but insignificant for Thailand. In a similar study conducted by Moradi et al. (2019) reveal that assets tangibility has a positive and significant effect on leverage. Their study uses 559 firms in six European countries before and during the period of 1999 to 2015. Kabeer et al. (2018) examine asset tangibility and leverage on 400 manufacturing firms of Pakistan from 2001 to 2014 and the findings reveal that asset tangibility has a positive impact on leverage. The results are similar to a study by Wagenvoort (2016) which come to a conclusion that asset tangibility relates positively to leverage. He investigates the relationship between asset tangibility and leverage and the influence of the financial crisis on the relationship using Dutch firms. He compares two timeframes namely the pre-crisis period (2006 to 2007) and crisis period (2008 to 2009) and the findings reveal that asset tangibility is positively related to leverage before the crisis. Most prior studies on

asset tangibility and leverage document a positive relationship. The scholars argue that assets tangibility provides collateral; hence, lenders feel secured due to the guarantee provided.

3. DATA AND METHODOLOGY

The period of analysis for this study is from 2009 to 2018 and data are based on ten firms in construction industry in both countries, Malaysia and Singapore, which provide a panel of 200 observations. As of 31 December 2019, there are approximately 50 construction firms operating in the main board of Bursa Malaysia and 35 construction firms in Singapore. The data represent 20% (10 of 50) and 28.6% (10 of 35) of construction firms in both countries. The sample firms are collected based on convenience sampling technique and the availability of the data. Panel data procedure is employed to analyse the data.

3.1 Measurement of Dependent Variable

The dependent variable in this study is capital structure (Leverage). The proxy for capital structure is total debt over total asset. Total debt is the sum of short term debt and long terms debt. Total debt is a measure of firm's financing leverage. According to Kabeer et al. (2018) this ratio is used to measure capital structure provided by total debt in relation to the total assets of the firm. The total debt over total asset can be calculated using the formula below:

Leverage = Total Debt / Total Assets (3.1)

3.2 Measurement of Independent Variable

Independent variables are the variables that influence the dependent variable that can give negative or positive impact. This study uses three independent variables in order to examine the firm-specific determinants of capital structure evidence from construction firms in Malaysia and Singapore.

3.2.1 Firm size

The firm size is measured as the natural logarithm of total asset (Moradi et al., 2019; M'ng et al., 2017). The trade-off theory predicts a positive relationship between firm size and leverage considering that large firms have lower monitoring costs, less agency costs of debt, less volatile cash flows, easier access to credit market and need more debt to fully benefit from the tax shield (M'ng et al., 2017;

Sbeiti, 2010).

Firm Size = the natural logarithm of total asset (3.2)

3.2.2 Profitability

Return on assets (ROA) is a proxy for profitability which is the ratio of earnings before interest and tax (EBIT) over total assets (Moradi et al., 2019; Kabeer et al, 2018; M'ng et al, 2017). The trade-off theory predicts that capital market frictions such as agency costs, taxes, and bankruptcy costs substantially influence profitable firms' preference for debt financing thus profitability has a positive effect on firm leverage. Profitable firms are less likely to go bankrupt and can avail more debt at lower interest rates,thereby reducing bankruptcy costs when profitability increases (M'ng et al., 2017; Ali, 2011). Tax shields derived from interest payment deductibility prompt firms to raise debt financing.

Profitability = Operating Profit / Total assets (3.3)

3.2.2 Asset tangibility

Asset tangibility is defined as the ratio of net property, plant and equipment (Net PPE) to total assets (Moradi et al, 2019; M'ng et al, 2017). A high ratio of asset tangibility offers a high level of security since creditors can liquidate the collateral assets in the event of bankruptcy. The trade-off theory predicts a positive relationship between the tangibility of assets and leverage (M'ng et al, 2017).

Asset Tangibility = Net Property, Plant and Equipment / Total Assets (3.4)

Table 1: Summary of variables and measurements

Variables	Measurement	Adoapted from
Leverage	Total Debt / Total Assets	Moradi and Paulet (2019) Li And Islam (2019) Coelho (2019) Zafar, Wongsurawat and Camino (2019) Hamzah and Marimuthu (2018) Hedau, Singh and Janor (2018) Flor and Petersen (2018) Khemiria and Noubbigh (2018) M'ng, Rahman and Sannacy (2017)
Firm Sizes	Logarithm of Total Assets	Moradi and Paulet (2019) Li And Islam (2019) Coelho (2019) Zafar, Wongsurawat and Camino (2019) Hamzah and Marimuthu (2018) Safuan and Karim (2018) Flor and Petersen (2018) M'ng, Rahman and Sannacy (2017) Vo (2016) Acaravci (2015) Hussain, Hamza and Miras (2015)
Profitability	Operating Profit / Total Assets	Moradi and Paulet (2019) Li And Islam (2019) Coelho (2019) Zafar, Wongsurawat and Camino (2019) Hamzah and Marimuthu (2018) M'ng, Rahman and Sannacy (2017) Wagenvoort (2016) Mallisa and Kusuma (2017)
Asset Tangibility	Net PPE / Total Assets	Moradi and Paulet (2019) Li and Islam (2019) Coelho (2019) Zafar, Wongsurawat and Camino (2019) Hamzah and Marimuthu (2018) M'ng, Rahman and Sannacy (2017) Wagenvoort (2016) Nha, Loan and Nhung (2016) Pratheepan and Banda (2016) Chipeta and Deressa (2016) Vo (2016) Acaravci (2015) Hussain, Hamza and Miras (2015)

On the relationship between determinants of capital structure, some studies documented positive relationship and some scholars argue negative relationship, hence non-directional hypotheses are justified as follows:

Hypothesis 1: To examine the relationship between firm size and leverage
H0:   There is no relationship between firm size and leverage.
H1:   There is a positive and significant relationship between firm size and leverage.

Hypothesis 2: To determine the relationship between profitability and leverage
H0:   There is no relationship between profitability and leverage.
H1:   There is a positive and significant relationship between profitability and leverage.

Hypothesis3: To investigate the relationship between asset tangibility and leverage
H0:   There is no relationship between asset tangibility and leverage.
H1:   There is a positive and significant relationship between asset tangibility and leverage.

To test these hypotheses, the following regression model is adopted from prior studies:

$$\text{Lev}_{it} = \beta_0 + \beta_1 \, Firm \, Size_{it} + \beta_2 \, Profitability_{it} + \beta_3 \, Asset \, Tangibility_{it} + \varepsilon_{it} \qquad (3.5)$$

Where; Lev_{it} is Leverage, β_0 is Constant, β_1, β_2, and β_3 are Regression Coefficients and ε_{it} is Error term.

This study is based on the following research framework:
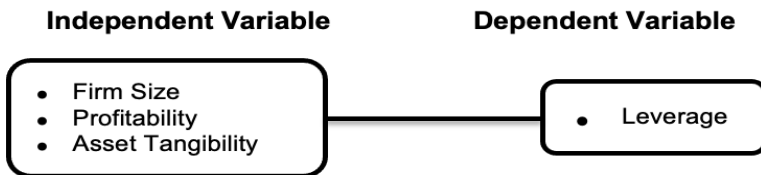

Figure 1: Research Framework

4. FINDINGS AND DISCUSSION

Table 2 shows a summary of descriptive statistics for variables in this study.

Table 2: Descriptive Analysis

Country	Variables	Mean	Min	Max	Std.Dev	Skewness	Kurtosis
Malaysia	Lev	0.3348	0.0078	0.6263	0.1616	-0.2331	2.3125
	LnTA	22.3311	19.7435	25.0366	1.3585	-0.0320	2.4067
	ROA	0.0715	0.0001	0.355	0.0671	2.4830	9.8358
	Asset Tangibility	0.5012	0.2865	0.9819	0.1305	0.3675	3.2635
	Number of observations is 100						
Singapore	Lev	0.2629	0.0435	0.5868	0.1132	0.3945	3.0286
	LnTA	20.3724	18.2319	22.9591	0.8971	0.5309	3.9313
	ROA	0.0780	0.0001	0.2946	0.060	1.6147	5.6404
	Asset Tangibility	0.3662	0.0248	0.7213	0.1800	0.0154	1.9095
	Number of observations is 100						

The dependent variable which is leverage has a mean of 33.48% for Malaysia and 26.29% for Singapore. These ratios suggest that 33.48% operations and growth activities of construction firms in Malaysia are financed using debt and for Singapore only 26.29%. It shows that Malaysian firms are relatively highly leveraged by 7.19% (33.48% - 26.29%). However, the mean of firm size for Malaysia is 22.33% and Singapore 20.37% suggesting that firms in both countries are not significantly different in terms of size. Meanwhile, the mean of ROA is between 7.15% for Malaysia and 7.80% for Singapore suggesting that firms in both countries are efficient in managing the uses of their assets to generate more earnings. On the asset tangibility, mean of Malaysia firms' is higher at 50.12% and Singapore stands at 36.62% implying the proportion of fixed assets over total assets was higher for Malaysia firms than Singapore.

Table 3 shows the result of probability tests. Three regression models for each country are presented in the following table.

Table 3: Regression Analysis

Country	Malaysia			Singapore		
	FE	RE	Pooled OLS	FE	RE	Pooled OLS
Constant						
β	0.0452	-0.5141	-0.4822	-1.9286	-1.5161	-1.4098
t-value	0.07	-1.69	-1.94	-4.07	-4.81	-6.73
p-value	0.9440	0.0920*	0.0550*	0.0000***	0.0000***	0.0000***
Firm Size						
β	0.0104	0.0272	0.0212	0.1091	0.0871	0.0806
t-value	0.36	1.94	1.84	4.56	5.63	8.07
p-value	0.717	0.052*	0.068*	0.000***	0.000***	0.000***
Profitability						
β	0.2609	0.265	0.3001	-0.2354	-0.1904	-0.0909
t-value	1.12	1.17	1.36	-1.48	-1.26	-0.61
p-value	0.2670	0.2440	0.1770	0.1430	0.2080	0.5430
Asset Tangibility						
β	0.0762	0.4443	0.6407	-0.0363	0.0510	0.1042
t-value	0.56	3.58	5.49	-0.40	0.77	2.14
p-value	0.5770	0.0000***	0.0000***	0.688	0.4410	0.0350**
R-Square	0.1771	0.3292	0.3383	0.3967	0.4291	0.4383
F-statistic	0.51	N/A	16.36	11.73	N/A	24.97
Sig F-statistic	0.6781	N/A	0.0000***	0.0000***	N/A	0.0000***
Wald Chi-Sq	N/A	23.18	N/A	N/A	45.18	N/A
p-value	N/A	0.0000***	N/A	N/A	0.0000***	N/A
BPLM Test						
Chi-Sq						
p-value		9.29			17.59	
		0.0012***			0.0000***	
Hausman Test						
Chi-Sq		55.03			2.39	
p-value		0.0000***			0.4961	

Notes: ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively. FE is Fixed Effect model, RE is Random Effect model.

The p-value of BPLM test for Malaysia is significant, therefore proceed to Hausman test. The p-value of Hausman test is significant, fixed effect is used as the model estimator. The p-value of BPLM test for Singapore is significant, proceed to Hausman test. The p-value of Hausman test is greater than 0.1 (p=0.4961), not significant, random effect is used as the model estimator.

The regression result for Malaysia shows an R-square of 18% suggesting that the independent variables can explain only 18% of the changes in the dependent variable. The F value is 0.51 and statistically insignificant at the 5% level implying the model is not fit for prediction. The result of the model shows insignificant but positive association between all independent variables and leverage. The findings fail to reject all the null hypotheses of the study. Meanwhile, the regression result for Singapore shows an R-square of 43% suggesting that the independent variables can explain approximately 43% of the changes in dependent variable. The Wald

Chi-square is 45.18 and statistically significant at the 5% level implying the model is fit for prediction. The result of the model shows significant and positive association between firm size and leverage. The findings suggest that bigger construction firms in Singapore resort to leverage to finance their operation and growth opportunities. In contrast, the results document negative and insignificant association between profitability and leverage. The findings suggest that financing pattern is in line with pecking order theory. However, the result of the model shows insignificant but positive association between asset tangibility and leverage. To sum up, the findings support the alternate hypothesis for firm size and leverage confirming that firms with greater size tend to have higher leverage. However, the findings fail to reject the null hypotheses for the association of profitability, asset tangibility and leverage.

5. CONCLUSIONS

Capital structure theories, such as trade-off theory, pecking order theory and agency theory suggest various determinants of capital structure. This study examines the determinants of capital structure on construction firms in Malaysia and Singapore. Three determinants of capital structure namely firm size, profitability and asset tangibility are examined in this study. The findings suggest that firm size is positive and significant with leverage for Singapore firms which are consistent with the literature. Meanwhile, profitability correlates negatively with leverage, while asset tangibility correlates positively but insignificant with leverage. As for Malaysian firms, the three determinants exhibit insignificant association with leverage. In addition, the findings of the study for both countries, Malaysia and Singapore, failed to reject the null hypothesis for H2 and H3. However, the result for Singapore accepted the H1 which is there is a positive relationship between firm size and leverage and Malaysia firms fail to reject the null hypothesis which is there is a negative relationship between firm size and leverage. Furthermore, the research findings support pecking order theory, the profitable firms will have more retained earnings, thus are becoming less leveraged, while unprofitable firms will have higher leverage ratios.

The study examines 10 construction firms in Malaysia and 10 construction firms in Singapore, the small sample size becomes the limitation of the study. Future study may consider taking all the firms in the construction industry in both countries as it will increase the number of observations and the findings generated would be more accurate and efficient in exploring the parameter of coefficient in the empirical models. Future research may also consider investigating manager/owner specific variables, such as age, race, education and their relations to leverage.

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