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CAPITAL STRUCTURE AND FINANCIAL PERFORMANCE OF MALAYSIAN CONSTRUCTION FIRMS

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ABSTRACT

This study investigated the impact of capital structure on financial performance of Malaysian construction firms. The empirical data was taken from 41 construction firms listedon the main board of Bursa Malaysia and observed from 2011 to 2015. Capital structure is the financing decision on the proportion between debt and equity. The right proportion leads to optimal capital structure. This study adopts two theories namely trade-off theory and pecking order theory, to explain the concept of optimal capital structure. Capital structure is the independent variable and is measured by short-term debt (STD), long-term debt (LTD), total debt (TD), meanwhile the dependent variable, financial performance, is proxy by return on asset (ROA) and return on equity (ROE). The results indicated positive and significant association between LTD and ROE. However, STD was significant but negatively correlated with ROE. Meanwhile, TD was positive but insignificantly associated with ROE. Nevertheless, STD, LTD and TD were negatively and insignificantly associated with ROA. The findings suggested that financing decisions are influenced by the objective of the firms. If the goal of the firms was to maximize return on asset, the pecking order theory was employed, however if the firms' objective was to maximize return on equity then the trade-off theory was appropriate to explain the concept of optimal capital structure. The concentration on one industry and the relatively narrow five-year period for data collection were the main limitations of this study. The findings of the research will contribute towards capital structure literature.

Contribution/ Originality: This study is one of very few studies to investigate the impact of capital structure on the financial performance of Malaysian construction firms. It reports that the financing decisions are influenced by the goal of the firms.

1. INTRODUCTION

Firms' financial performance refers to an environment of how well firms employ their resources, for example capital structure, to generate revenues. By measuring financial performance, it reflects the result of firms' policies and operations in monetary terms. These results are communicated through the firms' return on assets, return on equity. Hence, it is an indicator of firms' financial health over a given period of time (Mohammad and Bujang, 2019).

In relation to this, capital structure relates to firms' financing decisions. Firm can finance its operations either by using debt, equity, or a combination of these two sources (Ross *et al.*, 2001; Abor, 2005; Brealey *et al.*, 2009). Debt comprises long-term debt and short-term debt, where equity refers to common equity and preferred equity. There are advantages and disadvantages associated with each source of financing. Firms may issue debt because of the tax advantages i.e. the interest payments are tax-deductible and debt also allows the firm to retain ownership. In addition, in times of low interest rates, debt is abundant and easy to access; therefore debt becomes an alternative to raise capital in the capital markets. However, the excessive use of debt may increase possibility of financial distress and downgrading of the firms' credit rating (Addae *et al.*, 2013).

As an alternative to debt, the firm can raise capital through equity. Equity is relatively expensive than debt especially when interest rates are low and the high rate of return that the potential investors expect from the firm in order to attract investment. Abor (2005) attributed this to information asymmetries between the firm and the potential investors. The firm has greater access to information than the potential investors and as a result the potential investors expect a higher rate of return on their investment. In addition, capital structure decisions involve cost-benefit analysis. The firm in making the financing decision will have to consider the costs as well as the benefits that the firm expects to obtain from either debt or capital. Eventually, the right proportion between debt and equity lead to optimal capital structure which ultimately improve firms' financial performance (Nirajini and Priya, 2013).

Despite the interest shown by scholars in the challenges of firms' financing decision (Ting and Lean, 2011; Salim and Yadav, 2012; Addae *et al.*, 2013) most prior studies had focused on the comparison between industries. Studies on the impact of capital structure on financial performance and establishing the financing pattern of firms in one industry such as construction in developing countries such as Malaysia are sparse. 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 (Morri and Cristanziani, 2009).

In accordance to this, the current study fills the gap in the knowledge of capital structure and financial performance in Malaysian construction firms by: first investigating the relationship between capital structure and financial performance and second establishing the pattern of financing either in line with trade-off theory or pecking order theory. The findings of the study may guide firms' managers to effectively design business strategies in order to improve firms' financial performance.

The remainder of this paper is structured as follows. The next section, Section 2 provides the literature review on the two theories adopted in this study. Section 3 presents the research methodology. This is followed by Section 4 which outlines the results of the data analyses and discussions. The last section which is Section 5 concludes the study.

2. LITERATURE REVIEW

A theory on capital structure was introduced by Modigliani and Miller (1958) called the M&M propositions. According to M&M propositions, firm operating in a perfect market is independent of capital structure decisions. However, as economy evolves and progresses, the market becomes imperfect. As a result of market imperfections, costs such as taxes, transaction costs, bankruptcy costs and agency costs need to be considered in explaining the relationship between capital structure and financial performance. To examine the capital structure decisions as to how do firms choose their capital structure to finance their operations and how does the choice of capital structure financing affect the value of the firm, two theories, trade-off theory and pecking order theory, were applied in this study in explaining the relationship between capital structure and financial performance.

The trade-off theory of capital structure states that optimal capital structure can be achieved if the benefit of debt financing equals to the debt-related costs. The trade-off between the costs and benefits of borrowing determines the optimal debt ratio. Examples of debt-related costs are bankruptcy costs, taxes, agency costs and non-debt tax shield (Jensen and Meckling, 1976; DeAngelo and Masulis, 1980).

Bankruptcy costs are predicted to increase when profitability declines and consequently the less profitable firms will target lesser debt. Firms with volatile earnings have greater risk of bankruptcy costs thus forcing them to lower target debt. As for taxes, it has two offsetting effects on the optimal capital structures. The first effect is deductibility of corporate interest payment pushes firms towards more target debt while for personal tax on debt which is higher, relative to equity will push them towards lower target debt. According to Miller and Scholes (1978) the personal tax rate on the pricing of a firm's interest payments does not vary with its debt. Even the marginal benefit of the corporate tax deduction is constant at all levels of gain or loss; taxes do not produce an interior optimum for debt. The debt level depends on the constant tax saving whether it is greater than the cost, less than or equal to the cost.

DeAngelo and Masulis (1980) created a model that allows the marginal benefit of the corporate tax deduction of interest to vary with debt and able to produce an interior optimum for debt. In the model, the optimal debt is affected by the firm's non-debt tax shields such as the cost for research and development and depreciation. Firms with larger non-debt tax shields will have a larger non-taxable income, a lower corporate tax and a lower expected pay-off from interest tax shields. DeAngelo and Masulis (1980) predicted that debt was inversely related to the level of non-debt tax shields and this model did not only focus on non-debt tax shields but also showed a general prediction about leverage and profitability. They used the asymmetric taxation of profits and losses as their argument.

The government tax policy focuses more on its taxes on profit rather than subsidizing the firm's losses. This will cause firms with higher profit to face greater taxes while for lower levels of earnings, progressive corporate tax rates reinforce the link between the expected tax rate and expected profitability. Hence, the expected payoff from interest tax shields is higher for more profitable firms and firms with lower volatile earnings. Therefore, the deductibility of corporate interest will cause more profitable and less volatile firms to have higher level of debt.

In the agency cost as in the agency models of Jensen and Meckling (1976) the premiums of directors are not adjusted to those of equity holders and managers have a tendency to waste free cash flow on speculations. Dividends will control these agency issues by driving managers to pay out a greater amount of the firm's abundance cash flow. A firm's free cash flow is controlled by the income from its benefits set up and the extent of its beneficial speculations. The model predicted that to control the agency expenses made by free cash flow, firms with more productive resources set up confer a bigger part of their pre-premium profit to debt payment and dividend. Subsequently, controlling for speculation opportunities, the dividend pay-out and debt are absolutely identified with productivity.

On the other hand, firms with more investment relative to income have fewer requirements for the control of dividend and debt. Along these lines, controlling for productivity, firms with more investments have lower dividend pay-out and less debt. Lastly, dividend and debt are substitutes for controlling free-income issues, so the anticipated connection between target influence and the objective pay-out proportion is negative.

Finally, with the adjustment financing expenses, Myers (1984) forms the pecking order model on the assumption that asymmetric information data issues and other financing expenses over power the strengths that focus ideal influence in the trade-off model. In any case, if financing expenses do not overwhelm different components, the trade-off model survives and firms measure all expenses and advantages when setting leverage targets. The target is influenced by the conformity or financing expenses of the pecking order. The movement towards less debt is bigger for firms with lower expected benefits, bigger expected investment and more volatile net cash flow. In total, asymmetric information issues and other financing expenses fortify the trade-off model's forecasts about target debt and the dividend pay-out proportion. Controlling for different impacts, firms with more resources, less investment and less volatile profit and net cash flow have higher debt and pay-out targets. Financing expenses hinder development toward the target in the pecking order model. However, in the trade-off model these expenses do not overpower alternate variables that focus on target proportion.

Meanwhile, the pecking order theory is an alternative to the trade-off theory which has emerged based on asymmetric information problems (Haron, 2014). The problem of information asymmetric occurs when one party, for example the firm manager, has more access to information than the other parties, such as investors and creditors. Due to the existence of information asymmetric in firms, it gives rise to financial hierarchy such as internal funds, debt and equity (Myers and Majluf, 1984).

Pecking order theory was introduced by Myers (1984) and Myers and Majluf (1984). Myers and Majluf (1984) argued that information is the basis that managers and investors depend upon when making a decision regarding issuing equity or borrowing money. Managers will hesitate to issue equity if they feel that it is undervalued (low priced equity) by the market, consequently, the wealth will be transferred to the investors. In this situation, retained earnings and debt will be preferred to equity. Thus, both managers and investors react according to the information that is available to them. This theory suggests that firms consider all the financing methods available and choose the least expensive option. This offers a framework which states that when financing new projects, the hierarchy of financing is retained earnings, debt and equity.

This theory considers dividend in its financing decision. Myers (1984) stated that there was no explanation for why firms pay dividend in the pecking order model. However, if firms do pay dividends, pecking order considerations should affect dividend decisions. Since it requires more cost to finance investment with new risky securities, high debt and dividends are less attractive for firms with less profitable assets in place, large current and expected investment. Thus, it is required to control for other effects, such as where more profitable firms pay out more of their earnings as dividends, however investment opportunities and debt are negatively related to the pay-out ratio.

According to Myers (1984) in the short term, dividends are sticky, leaving variation in net cash flows to be absorbed largely by debt. Firms applying pecking order theory can keep the dividend pay-out ratio and debt low as long as the investment is relative to earnings. Meanwhile, public listed firms have more access to equity to finance future investments; therefore, they are more willing to bear the high financing costs of new equity.

Another item that this theory considers in its financing decision is debt. This theory suggested that, ideally, debt would increase when the investment was higher than retained earnings and decrease when investment was lower than retained earnings. Thus, if profitability and investment outlays continue, investment is fixed, debt is lower for more profitable firms and given the profitability, debt is higher for firms with more investments. According to Myers (1984) most firms are concerned with future and current financing cost. To balance current and future costs, and to avoid financing with new risky securities or foregoing future investments, normally firms with large expected investment will maintain low-risk debt profile. By controlling other effects, it can help to reduce current debt by firms with large expected investment.

Volatility is another issue being considered in pecking order theory. The prediction is in how dividend and debt are affected by volatility of net cash flow considering future and current financing costs. To refrain from issuing new risky securities or foregoing profitable investments, firms with volatile net cash flow will lower their dividend pay-out ratio and debt.

Both theories depict different pattern of relationships between capital structure and financial performance. The trade-off theory assumes that there is a positive association between capital structure and financial performance (Krasker, 1986; Narayanan, 1988; Gaud *et al.*, 2007; Strebulaev, 2007). The pecking order theory assumes that there is a negative association between capital structure and financial performance (Myers, 1984; Myers and Majluf, 1984; Friend and Lang, 1988; Rajan and Zingales, 1995; Fama and French, 2002; Frank and Goyal, 2003).

3. RESEARCH METHODOLOGY

This paper is based on the following research framework in Figure 1:

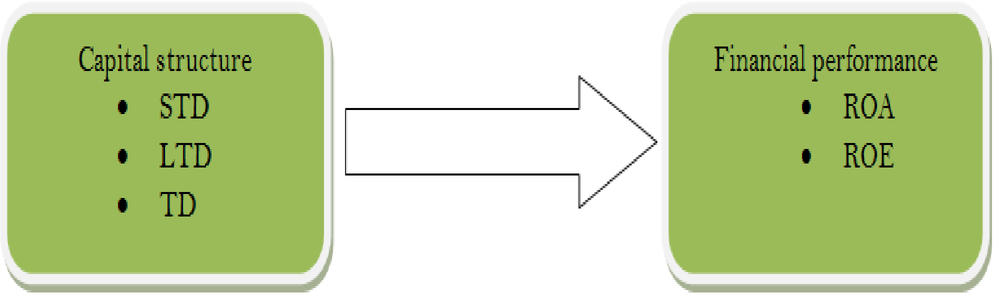

Figure-1. Research framework.

Where, STD is short term debt, LTD is long term debt and TD is total debt and they are indicators for capital structure. Meanwhile, ROA is return on asset and ROE is return on equity and both are financial performance indicators. Capital structure is the independent variable and financial performance is the dependent variable in the study.

This study used short-term debt, long-term debt and total debt as indicators of capital structure due to reasons put forward by scholars. According to Ting and Lean (2011) it is common to use only total debt over total assets to measure capital structure in analyzing firms' leverage ratio, however, some scholars disagreed by stating that the analysis of leverage based only on total debt may screen important differences between short-term debt and long-term debt (Barclay and Smith, 1995; Hall *et al.*, 2004). Therefore, the three capital structure indicators namely short-term debt, long-term debt and total debt were used in this study.

Short-term debt ratio was calculated as the short-term debt divided by total assets, the ratio of long-term debt was calculated as the long-term debt divided by total assets and the total debt ratio was calculated as total debt divided by total assets (Abor, 2005; Addae *et al.*, 2013). Short-term debt refers to items where the repayment period is lesser than twelve months such as account payables, accruals. Long-term debt represents debts that take more than one year repayment period and total debt is the addition of short-term and long-term debt. Total capital is the sum of equity, long-term debt, short-term debt and the aggregate amount is equal to the total asset of the firm (Addae *et al.*, 2013). Meanwhile, ROA and ROE were used as financial performance indicators. ROA was calculated as operating profit divided by total assets and ROE was calculated as operating profit divided by equity (equity comprises share capital and reserves). ROE represents returns on equity and it is recognized as an important financial indicator for owners. Meanwhile, ROA reflects the efficiency of utilizing available assets in creating profits (Al-Musali and Ismail, 2014). ROA and ROE were adopted from the study of Abor (2005); Addae *et al.* (2013).

The relationship between capital structure and financial performance was hypothesized as follows:

Hypothesis 1 STD relates positively to financial performance.

Hypothesis 2 LTD relates positively to financial performance.

Hypothesis 3 TD relates positively to financial performance.

To test these hypotheses, four regression models were formulated as follows:

Regression Model 1 $ROA_{it} = \alpha_{it} + \beta_0 STD_{it} + \beta_1 LTD_{it} + \varepsilon_{it}$ (1)

Regression Model 2 $ROA_{it} = \alpha_{it} + \beta_0 TD_{it} + \varepsilon_{it}$ (2)

Regression Model 3 $ROE_{it} = \alpha_{it} + \beta_0 STD_{it} + \beta_1 LTD_{it} + \varepsilon_{it}$ (3)

Regression Model 4 $ROE_{it} = \alpha_{it} + \beta_0 TD_{it} + \varepsilon_{it}$ (4)

3.1. Data and Methodology

Data was drawn from the audited annual reports of 41 construction firms listed in the construction sector from the main board of Bursa Malaysia. The period of analysis was from 2011 to 2015 and the number of observations was 205.

This study was based on panel data analysis which is also known as a longitudinal study that combines both time series and cross-sectional. Thus, it increased the number of observations in comparison to the time series or cross-sectional analysis. As a result, according to Hsiao *et al.* (1995) the findings would be more efficient and accurate particularly in exploring the parameter of coefficient in empirical model. The large number of observations in panel data can reduce the standard error in the model regression and the collinearity problem among the independent variable will be minimized as the degree of freedom increases (Baltagi, 2001; Frees, 2004). In addition, panel data analysis can control the individual heterogeneity (Mouchart, 2004) and can establish causality and correlation more accurately and efficiently than time series and cross-section analysis (Frees, 2004).

The advantages of using panel data analysis are numerous.

First, the data set in panel data involves more information with larger observations. In panel data analysis, the data would be collected from different samples involving a large number of individuals and period of time. The number of observations in panel data is greater than time series and cross-sectional analysis because panel data are pooling the time period with the different samples or individuals in order to provide more data availability and information. Thus, the data has more variability and can avoid the problem of multicollinearity that usually occurs in the time series analysis and the variation between units or individuals is much larger than variation within units or individuals (Mouchart, 2004).

Second, the model estimators are more accurate and efficient. Hsiao *et al.* (1995) argued that panel data analysis can estimate the parameter of coefficient in the model regression more accurately and efficiently in comparison to time series and cross-sectional analysis. Baltagi (2001) stated that the degree of freedom generated by panel data analysis is greater than time series and cross-sectional analysis which can reduce or avoid the problem of perfect collinearity or multicollinearity among explanatory variables. As a conclusion, panel data analysis has the ability to reduce the standard error and generate more significant results (Hsiao *et al.*, 1995; Baltagi, 2001; Frees, 2004).

Third, panel data analysis can control the individual heterogeneity. A study by Mouchart (2004) documented that individual heterogeneity in the model regression of panel data can be solved using panel data regression. The study involved the relationship between dependent variable being demand for cigarettes and the independent variables which were the demand for cigarettes, price of cigarettes, income, time invariant, religion and education. However, many of the independent variables were not available to be related with the dependent variable. It is called a heterogeneity problem and omitting these variables would create bias in the regression model. In order to solve the problem of heterogeneity, the panel data analysis would not omit these variables but convert them into dummies in the model regression.

Fourth, panel data analysis studies the dynamic of adjustment easier in comparison to cross-sectional analysis. Mouchart (2004) has explained the difference between panel data and repeated cross-section. Based on his study, repeated cross-section involves different samples or individuals and also different time periods, while panel data consist of different samples or individuals but involves the same time period for each of the samples. This situation makes the cross-sectional studies unable to adjust the samples over the time period with the panel data that can adjust the individuals over time. Frees (2004) stressed that the dynamic relationship among the samples can be detected using panel data set which involve repeated observation with the period of time.

Fifth, correlation and causality can be established in panel data. Frees (2004) argued that cross sectional analysis cannot establish the correlation and causality in the cross sectional model in comparison to panel data model. This is because cross-sectional analysis does not involve repeated time periods. Thus, the causality test can be performed in panel data analysis in order to know whether the dependent and independent variable had causality relationship or long-term relationship.

Despite the numerous advantages, panel data analysis has a disadvantage: the problem of collecting a large amount of data. The common problem linked to panel data lies in its very nature that is the large number of observations required for the analysis. Panel data analysis requires a larger number of observations in comparison to time series and cross-sectional. However, this problem can be minimized by resorting to collecting data through secondary means such as financial statements, and data streams (Mouchart, 2004).

After weighing the pros and cons associated with panel data analysis and considering the argument put forth by Plümper and Troeger (2011) that the results of panel data analysis is more accurate and reliable in comparison to time series or cross-sectional analysis, thus, this study adopted panel data analysis.

Static panel data procedures were used to diagnose the data before performing the analysis. The detailed diagnostic procedures carried out in this study under static panel data is illustrated in Figure 2.

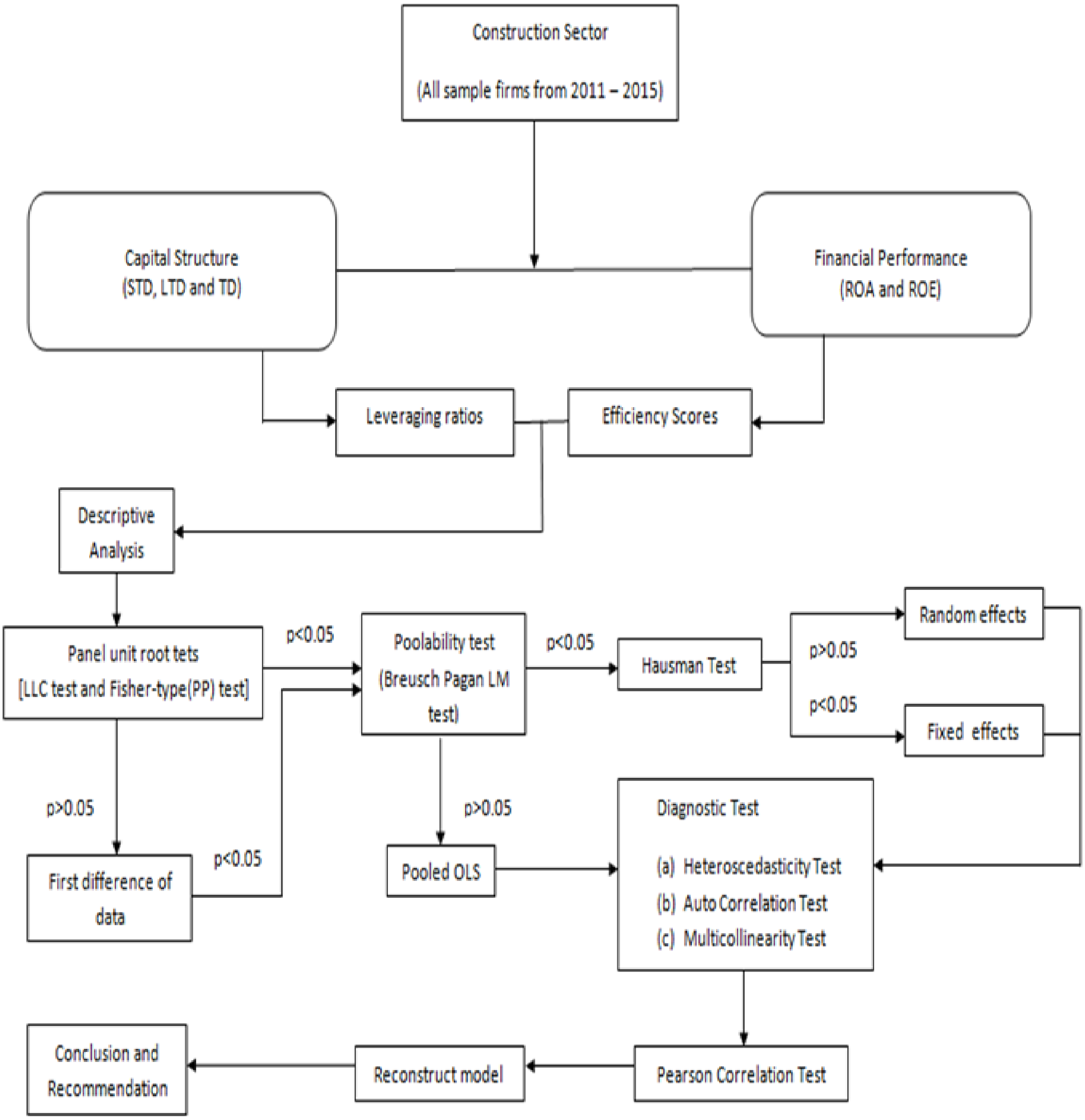

Figure-2. Static panel data procedure.

3.2. Panel Estimation Procedure

There are some problems associated with panel data namely multicollinearity, heteroscedasticity and serial correlation. Therefore, some tests were required to ensure the panel data do not exhibit these problems. The result of these tests would enable the selection of the appropriate model estimator.

The first test is called Panel Unit Root Test. This test is performed to determine the stationary status of the data. Two tests were performed for this study namely the (Levin *et al.*, 2002) test and Fisher-Type Philip Perron. All the above panel unit root tests had the same hypothesis as follows:

H_0 (null hypothesis) – panel data has unit root (not stationary).

H_1 (alternative hypothesis) – panel data does not have unit root (stationary).

When *p-values were* less than 0.1, the null hypothesis would be rejected indicating that the panel data was stationary.The following Table 1 shows the results of unit root test of the study:

Table-1. Panel unit root tests.

Variables	LLC test	Fisher PP
STD	20.3542*** (0.0000)	162.960*** (0.0000)
LTD	119.940*** (0.0000)	195.651*** (0.0000)
TD	23.5592*** (0.0000)	160.000*** (0.0000)
ROA	99.0103*** (0.0000)	190.105*** (0.0000)
ROE	236.434*** (0.0000)	202.192*** (0.0000)

Notes: Values in parentheses are p-values. ***,** and * indicates rejecting the null hypothesis of non-stationery at the 1%, 5% and 10% at level, respectively.

Table-2. Poolability test.

Regression models	(1) $ROA_{it} = \alpha_{it} + \beta_0\ STD_{it} + \beta_1\ LTD_{it} + \varepsilon_{it}$			(2) $ROA_{it} = \alpha_{it} + \beta_0\ TD_{it} + \varepsilon_{it}$		
	FE	RE	Pooled OLS	FE	RE	Pooled OLS
Constant β t-value p-value	13.4427 1.52 (0.129)	9.5803 3.17 (0.000)***	9.5598 3.19 (□.002)***	13.5757 1.56 (0.121)	9.4337 3.45 (0.000)***	9.4337 3.45 (0.000)***
STD β t-value p-value	-0.0890 -0.70 (0.486)	-0.0237 -0.79 (0.428)	-0.0236 -0.79 (0.428)	N/A	N/A	N/A
LTD β t-value p-value	-0.0701 -0.35 (0.724)	-0.0387 -0.33 (0.739)	-0.0389 -0.34 (0.738)	N/A	N/A	N/A
TD β t-value p-value	N/A	N/A	N/A	-0.0862 -0.69 (0.488)	-0.0254 -0.98 (0.329)	-0.0254 -0.98 (0.329)
R-Square F-statistic Sig F-statistic Wald Chi-Sq p-value	0.0030 0.25 (0.7826) N/A N/A	0.0023 N/A N/A 0.96 (0.62□0)	0.0047 0.48 (0.6183) N/A N/A	0.0030 0.48 (0.4880) N/A N/A	0.0030 N/A N/A 0.95 (0.3287)	0.0047 0.95 (0.3298) N/A N/A
Breusch Pagan LM Test Chi-Sq p-value	0.04 (0.8396)			0.04 (0.8427)		
Hausman Test Chi-Sq p-value	0.31 (0.8585)			0.25 (0.6159)		

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 results indicated that the null hypothesis of unit root (non-stationery) was rejected for all variables. Therefore, this study concluded that the variables were stationery at levels which implied that these series were integrated at order zero, $I(0)$.

Breusch Pagan LM tests were performed to identify either the model regression can be pooled using Pooled OLS or Random effect/Fixed effect model. If the p-value was greater than 0.05 then the Pooled OLS would be chosen and if the p-value was lesser than 0.05, the Hausman test would determine either the model regression would be pooled using the Random effect (p-value > 0.05) or Fixed effect (p-value < 0.05). Poolability tests were run on the four regression models and the results are presented in Table 2 and Table 3. Each table summarizes the results for each regression model.

The p-value of Breusch Pagan LM tests for regression model 1 and 2 were greater than 0.05 (p=0.8396: p=0.8427), therefore, the model regressions were pooled using the Pooled OLS.

Table-3. Poolability test.

Regression models	(3) $ROE_{it} = \alpha_{it} + \beta_0 STD_{it} + \beta_1 LTD_{it} + \varepsilon_{it}$			(4) $ROE_{it} = \alpha_{it} + \beta_0 TD_{it} + \varepsilon_{it}$		
	FE	RE	Pooled OLS	FE	RE	Pooled OLS
Constant β t-value p-value	-143.2153 -2.31 (0.022)**	-11.0860 -0.50 (0.614)	-10.4379 -0.48 (0.629)	-108.7652 -1.70 (0.091)*	0.0724 0.37 (0.712)	25.2752 1.24 (0.218)
STD β t-value p-value	1.2983 1.45 (0.150)	-0.3522 -1.62 (0.104)	-0.3537 -1.66 (0.099)*	N/A	N/A	N/A
LTD β t-value p-value	6.2983 4.44 (0.001)***	3.4158 4.07 (0.001)***	3.3797 4.06 (0.001)***	N/A	N/A	N/A
TD β t-value p-value	N/A	N/A	N/A	2.0373 2.23 (0.027)**	0.0724 0.37 (0.712)	0.0692 0.36 (0.721)
R-Square F-statistic Sig F-statistic Wald Chi-Sq p-value	0.1103 10.04 (0.0001)*** N/A N/A	0.0883 N/A N/A 16.84 (0.002)***	0.0767 8.39 (0.0003)*** N/A N/A	0.0297 4.99 (0.0268)** N/A N/A	0.0297 N/A N/A 0.14 (0.7124)	0.0006 0.13 (0.7212) N/A N/A
Breusch Pagan LM Test Chi-Sq p-value	0.01 (0.9680)			0.02 (0.9020)		
Hausman Test Chi-Sq p-value	6.43 (0.0410)**			4.87 (0.0273)**		

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 Breusch Pagan LM tests for regression model 3 and 4 were greater than 0.05 (p=0.9680: p=0.9020), therefore, the model regressions were pooled using Pooled OLS.

Heteroscedasticity and Serial Correlation tests were performed after obtaining an appropriate model through the poolability test. The testing of heteroscedasticity and serial correlation are essential in panel data analysis. This is because the presence of heteroscedasticity and serial correlation problem would affect the reliability of the model regressions.

In order to identify the presence of heteroscedasticity in the data, the modified wald test for groupwise heteroscedasticity in fixed effect regression model was performed. The assumption of the problem lies in the p-value, if the p-value was lesser than 0.05 (p<0.05), then the null hypothesis was rejected indicating the presence of heteroscedasticity problem in the regression models (variances are not constant). The results of the modified wald test for groupwise heteroscedasticity in fixed effect regression model are presented in Table 2.

The p-values of the test on the 4 regression models were lesser than 0.05, so the results indicated the presence of heteroscedasticity problems in the data.

Meanwhile, to detect if the data had a serial correlation problem, the wooldridge test was performed. Similarly, the assumption of the problem lies in the p-value, if the p-value was less than 0.05 ($p<0.05$), then the null hypothesis was rejected concluding that the data has first-order autocorrelation. The results of the wooldridge test are presented in Table 4. The results indicated that all regression models had serial correlation problems.

Table-4. Heteroscedasticity test and serial correlation tests.

Regression models	1	2	3	4
Heteroscedasticity Test p-value	730.46 (0.0000)***	2.2e+08 (0.0000)***	8874.41 (0.0000)***	3.7e+08 (0.0000)***
Serial Correlation Test P-value	5818.24 (0.0000)***	5438.452 (0.0000)***	7940.488 (0.0000)***	9460.112 (0.0000)***

Notes: Values in parentheses are p-values. ***,** and * indicates rejecting the null hypothesis of non-stationery at the 1%, 5% and 10% at level, respectively.

The presence of heteroscedasticity and serial correlation problems required the treatment of the data. If both problems existed in the data then the OLS with heteroscedasticity and serial correlation robust standard error needed to be used to rectify it. This problem can be treated by producing standard robust errors that change the significance of the tests.

4. EMPIRICAL RESULTS

4.1. Descriptive Analysis

Information on descriptive statistics including the number of observations, mean, minimum, maximum and standard deviation of all the variables is provided in Table 5.

Table-5. Descriptive analysis.

Industry	Variables	Mean	Min	Max	Std.Dev.
Construction	LTD	17.2816	0.0178	117.8714	18.8428
	STD	50.8263	1.2885	593.5945	73.4571
	TD	68.1079	10.2760	641.2378	80.7315
	ROA	7.7071	-21.9002	425.0063	29.9237
	ROE	29.9909	-110.7735	3152.9120	222.9510

Number of observation 205.

TD is the sum of STD and LTD. The mean of TD was 68 percent indicating that the capital structure of construction firms is dominated by debt financing. STD contributed approximately 51 percent and LTD contributed 17 percent to the financing strategy of construction firms. These ratios suggested that short-term financing was the most convenient form of financing to most firms in construction. The mean of both financial performances were positive indicating that during the period under investigation the firms were profitable. However, it was noted that the mean of ROE was greater which suggested that the return generated to the equity owner was higher.

4.2. Correlation Analysis

The correlation analysis is presented in Table 6 as follows:

Table-6. Correlation analysis.

Variables	STD	LTD	TD	ROA	ROE
STD	1.000				
LTD	0.2769***	1.0000			
TD	0.9745***	0.4854***	1.0000		
ROA	-0.0648	-0.0405	-0.0684	1.0000	
ROE	-0.0374	0.2534***	0.0251	0.1685**	1.0000

Notes: ***,**,* correlation is significant at 0.01, 0.05 and 0.1 level respectively.

The three indicators of capital structure, STD, LTD and TD, demonstrated insignificant associations with ROA. Likewise, insignificant associations between STD, TD and ROE were also documented. However, LTD was found to be positive and significantly associated with ROE ($r=0.2534, p<0.0001$) but it was a weak association. STD, LTD and TD recorded significant association among themselves but the strength of the association varied from weak to strong. The strongest association was exhibited by STD and TD with correlation coefficient of 0.9745 ($p<0.0001$), while LTD and TD demonstrated moderate association ($r=0.4854, p<0.0001$) and the weakest association was between STD and LTD ($r=0.2769, p<0.0001$).

If the explanatory variables were highly correlated, in excess of 0.8, it indicated the presence of multicollinearity (Gujarati, 2004). The above pairwise correlation analysis between two independent variables, STD and TD, was high (0.9745), thus the two variables were separated during regression to mitigate multicollinearity. Multicollinearity is a statistical phenomenon in which two or more independent variables in a regression model are highly correlated. In the presence of high multicollinearity, the estimates of coefficients may change erratically in response to small changes in the model. Multicollinearity does not reduce the predictive power or reliability of the model, but it affects coefficients of independent variables. Lastly, the analysis exhibited a weak association between ROA and ROE implying that when one performance measure increased, the other measure was likely to decrease (Nimtrakoon, 2015).

4.3. Data Analysis

The regression results are presented in Table 7 as follows:

Table-7. Regression results.

Dependent variables:	ROA		ROE	
Independent variables	Model 1	Model 2	Model 3	Model 4
Intercepts	9.5598*** (3.19)	9.4337*** (3.45)	-10.4379 (-0.48)	25.2752 (1.24)
STD	-0.0236 (-0.79)		-0.3537* (-1.66)	
LTD	-0.0389 (-0.34)		3.3797*** (4.06)	
TD		-0.0254 (-0.98)		0.0692 (0.36)
R^2	0.0047	0.0047	0.0767	0.0006
F-value	0.48	0.95	8.39	0.13
Sig F-value	0.6183	0.3298	0.0000***	0.7212
N	205			

Notes: ***,**,* indicate statistical significance at the 1, 5 and 10 percent level respectively. The figures in the parentheses are the t-statistics. N is number of observation. N/A is not applicable.

The value of R^2 of model 1 and model 2 was 0.0047, suggesting that both models were able to explain approximately about 0.5 percent variation in the firms' ROA, which was very low and both models were not reliable for prediction (F-value statistically insignificant). The result of model 1 showed negative and insignificant association between both indicators of capital structure, STD and LTD, with ROA. The findings did not support

H1 and H2. Likewise, the result of model 2 showed a negative association between TD and ROA. Hence, the finding did not support H3.

Meanwhile, the value of R^2 of model 3 was 0.0767 which was higher than the previous two models, suggesting that the model was able to explain approximately about 8 percent variation in the firms' ROE and was statistically reliable for prediction (F-value of 8.39, $p<0.0003$). The result of model 3 showed a negative association between STD and ROE. However, LTD and ROE was positive and significantly associated. Hence, the findings did not support H1 for ROE but H2 was supported. For model 4 with R^2 of 0.0006 and F-value of 0.13 (statistically insignificant), the result of model 4 showed an insignificant association between TD and ROE. Thus, the finding did not support H3.

Several conclusions can be drawn from the above results. First, the findings showed that all the three indicators of capital structure, STD, LTD and TD, were negatively associated with ROA implying that when leverage increased, the firms' profitability decreased. The findings suggested that the financing patterns of construction firms were in line with pecking order theory. According to the theory, profitable firms prefer to finance new investment opportunities by using retained earnings rather than issuing debt.

This result was consistent with the findings of Reza *et al.* (2015) for Malaysian construction firms' and Al-Taani (2013) for Jordan manufacturing firms.

On the contrary, the result of model 3 reported a positive and significant association between LTD and ROE, indicating that the shareholders' wealth creation was influenced by long-term debt. The estimated coefficient of LTD in model 3 was 3.3797 and significant at the 1 per cent level inferring that when LTD increased by RM1, the ROE would increase by RM3.3797, implying that the higher the long-term debt, the higher the return to shareholders. The findings suggested that the firms limit their exposure to risk by using long-term debt capital (Abor, 2005; Addae *et al.*, 2013).

Second, the R^2 as depicted by all the four models were less than 10% which was considerably low. R^2 indicated the extent of changes in dependent variable which were explained by the independent variables. In model 1 and model 2, for example, the R^2 were 0.5 which suggested that the models were only able to explain approximately about 0.5 percent variation in the firms' financial performance, implying a weak relationship between the leverage ratios and financial performance. With regard to this, in the study of Abor (2005) the inclusion of size and sales growth as control variables in the model had further strengthened the relationship between leverage and financial performance.

5. CONCLUSION AND RECOMMENDATION

This paper investigated the relationship between capital structure and financial performance as well as the financing pattern of Malaysian construction firms. The result indicated a positive association between capital structure and financial performance measured by ROE in Malaysian construction firms. It implies that the creation of shareholders' value was linked to leverage, thus higher leverage would lead to the maximization of shareholders wealth. In the meantime, a negative association between capital structure and financial performance measured by ROA was also detected among firms in the construction industry. Thus, the findings suggested that both theories namely the pecking order and trade-off theories, were able to explain the concept of optimal capital structure in construction firms. The trade-off theory was appropriate when firms wanted to maximize shareholders' wealth. In the meantime, the pecking order theory explained the concept of optimal capital structure specifically when firms wanted to maximize the return on assets.

Some practical implications of the research findings were identified in the context of Malaysian construction industry. The research findings suggested that the financing pattern of construction firms should be guided by the goal of the firms either to increase the return on assets or the return on equity. This will assist the design of firms' business strategies in enhancing their financial performance.

This study had several limitations that need to be acknowledged. The concentration on one industry and the relatively narrow five-year period for data collection were the main limitations of this study. Therefore, future study on capital structure and financial performance should be extended to other industries in order to establish the pattern of financing.

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