The Impact of Financial Crisis on the determinants of Capital Structure among Shariah Constructions Firms

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Abstract — The **aim of this empirical study is to explore the factors that affect the capital structure of construction firms and to investigate whether the capital structure models derived from Western settings provide convincing explanations for capital structure decisions of the Malaysia firms. This study focuses on Shariah compliant construction companies since this industry has been contributing significantly towards Malaysia economic growth. In addition, this study also includes the impact of financial crisis towards firms' capital structure decision. Panel data from 11 Shariah compliant construction companies in Malaysia were analyzed for duration of 17 years (2001-2017). Different conditional theories of capital structure are reviewed i.e. trade-off theory, pecking order theory, agency theory, and theory of free cash flow, in order to formulate testable propositions concerning the determinants of capital structure of the construction firms. The dependent variable that being used is debt ratio, while independent variables are firm size, profitability, tangible asset, growth opportunity, liquidity, and crisis respectively. Finding indicates that firm size, profitability and tangible asset are significant towards debt ratio. However, other variables including financial crisis did not have any significant impact on capital structure decision. The results of this study provide important implication to investors and manager of firms in making best decision on capital structure. This study also adds values to the existing knowledge regarding determinants of capital structure and financial crisis.**

Keywords – Construction firms, Financial Crisis, Islamic capital market, Panel Data Shariah,

I. Introduction

Manager of the firms plays an important role in maximizing the firm value. They have the responsibilities in making decision on investment and also capital structure. Through capital structure, the firm can increase their value and protect the shareholders' interest. In other words, soundness of capital structure will lead to the maximization of the return and increase the profit thus benefitting the shareholders. Capital structure can be categorized into two aspects, namely debt and equity as source of funds. It means that firms finance their whole operations by using different available source of funds (San & Heng, 2011). Past researcher found several firms used debt as the source of funds in their capital structure because leverage is more suitable for firm in running business as it is easier to obtain compared to equity (Mohamad Nizam, Amirul, Ismail, Sharifah, 2017; Harrison & Widjaja, 2013). Moreover, debt enable firm to earn extra earning after tax by exploiting tax shields which in other words, debt is a source of finance where it is deductible expenses for payment of interest (Finance Management, 2018).

There are several theories explained on the capital structure decision namely, Modigliani and Miller theory (Modigliani & Miller, 1958), trade-off theory (Kraus & Litzenberger, 1973), pecking order theory (Myers & Majluf, 1984) and agency cost theory (Jensen & Meckling, 1976). Modigliani and Miller theory was the first capital structure theory introduced taxation system and firms need to increase debt level to receive tax advantage. While, Trade-off theory emphasizes on taxes and give ideas to the firms in choosing debt as source of financing which related to financial distress cost and leads firms to choose debt to gain tax deduction. According to Myers and Majluf in 1984 through pecking order theory stated that a firm prefer to utilize internal finance rather than external finance since it will help the firms in having lower leverage level. However, agency theory that has been introduced by Jensen and Meckling (1976) is associated with free cash flow and the conflict arising between manager and shareholders.

However, under certain circumstances, capital structure of the firms is also being affected by economic condition. There are certain sectors such as construction, financial institutions and others were vulnerable

toward economic uncertainty such as financial crisis. For instance, the global financial crises in 2008 has severely affect Malaysia's GDP growth which was declined to -7.4% in 1998 from 7.3% in 2007 (Khoon & Hui, 2010). Nevertheless, Malaysian government had announced several stimulate packages started with the first package worth RM7.0 billion on 4th November 2008 to revive the economic by focusing on high impact infrastructure projects such as housing, roads and schools (Gallagher & Wilkins, 2012). For example, RM1.2 billion is provided to build more low and medium cost houses, RM600 million for small projects such as village roads, small bridges and RM500 million for public facilities like roads, hospitals and schools. Then, second stimulus package with larger amount of RM60 billion was announced on 10 March 2009 (Khoon & Hui, 2010). Therefore, this study wants to investigate the determinants of capital structure of construction sectors and either it is affected by the financial crisis or not. This study is also focusing on *Shariah* construction sectors in choosing the capital structure for their firms.

II. Literature Review

The financial crisis began in the United States which occurred at the end of 2007 where United States' financial market fell under credit crisis of historic proportions. Then, it caused the stock market to collapse in 2008 (Samour & Hassan, 2016). Numerous research conducted their study using firm as the independent variable to examine the determinants of capital structure. From the previous studies, natural log for assets of a firm is a common proxy employed to represent firm size. However, there are mixed findings regarding to the relationship between firm size and debt. Many studies found that there is a positive relationship between firm size and debt such as Harrison, Panasian and Seiler (2011), Ahmed Sheikh and Wang (2011), Harrison and Widjaja (2013) and Forte, Barros and Nakamura (2013) Nizam et all (2017). According to Harrison and Widjaja (2013), there is a significantly positive relationship between firm size and debt which the result is lined with trade-off theory where size of firm and debt shows positive correlation to each other. In contrast, a study done by Alipour, Mohammadi, and Derakhshan (2015) revealed that there is a negative relationship between size of a firm and capital structure.

Profitability is an ability of a business to gain profits in the form of return from any investment. There are few researcher that finds out profitability has a negative correlation to total debt ratio. Supported by Khademi (2013), company prefer internal fund to finance their business rather than external. There are several previous studies that also have proven that negative relationship exists between profitability and debt done by Proenca, Laureano and Laureano (2014), Morri and Artegiani (2015), and Trinh and Phuong (2015). There is a positive relationship found between profitability and debt ratio because companies able to obtain tax advantage from the interest by using higher amount of debt (Harrison & Widjaja, 2013). It is in line with Ting and Lean (2011) where trade-off theory states that a firm that have high profit have opportunities to issue debt and gain benefits of minimizing tax burden.

Tangible asset is also another variable that influence the capital structure. Tangible asset refers to the asset that have physical form able to be touched and seen through human sense. According to trade-off theory, tangibility and debt have positive correlation between each other since the firms are able to use their tangible asset to their benefit and obtain more external financing against their tangible asset. Most of empirical researchers found that there is a positive relationship between tangibility and total debt (De Jong, Kabir & Nguyen, 2008; Mostarac & Petrovic, 2013; Harrison & Widjaja, 2014; Iqbal & Kume, 2015; Muijs, 2015). From studies by Trinh and Phuong (2015), tangibility has negative relationship with the debt. In their research, they explained that even though tangible assets are able to secure the debt through collateral, then the firms will reduce the liquidity factors where it is very important to the firms especially during crisis period. It is consistent with Entabang (2002) where it indicates tang tangibility is negatively correlated towards debt.

Growth opportunity also another determinant that influences capital structure of the firms. Growth is an "investment opportunity or project that has the potential to grow significantly, bringing profit to the companies" (Ross, Westerfield, & Jordan, 2011). Generally, the firms that have significant future growth opportunities tend to face financial distress raised from debt financing. This is because intangible assets are unable to be collateralized. The agency theory also has similar suggestion described by trade-off theory. Thus, both theories indicate that there is a negative relationship between growth opportunity and debt ratio. This is consistent with studies by Ali (2011), Harrison, Panasian and Seiler (2011), Ahmed Sheikh and Wang (2011) and Morri and Artegiani (2015). Besides, pecking order theory have contradicting suggestion which is the growth opportunities should have positive relationship with debt level. It is because the theory estimated that there exists an asymmetrical information problem among the firm managers and investors. The previous studies that have similar results as proposed by pecking order theory are Khademi (2013), Saarani and Shahadan (2013) and Youssef and El-Ghonamie (2015).

Liquidity works as the key financial indicator which measures whether the firm can fulfil its debt commitment without undesired losses (Ghasemi & Ab Razak, 2016). Empirical studies found that there is a positive relationship between liquidity and debt. For instance, a study by Khademi (2013) and Putek, Mahmood, Baharuddin and Mahadi (2014) found that liquidity have positive correlation to total debt. They stated that the firms which have higher liquidity prefer using cash more to invest in long term investment and finance the short-term debt. Contradict, Lipson and Mortal (2009) demonstrated that the more highly-liquid firms have less debt due to internal cost of capital for liquid firms is lower than the cost for debt and equity. It is consistent with the suggestion proposed by pecking order theory where internal fund is the first source that should be considered by the firms in choosing capital structure. This theory is also aligned with the agency theory. This finding is also similar with studies by Mazur (2007), Antoniou, Guney, and Paudyal (2008), Akdal (2010), Harrison and Widjaja (2014) and Ghasemi and Ab Razak (2016).

Financial crisis affects many firms but it is not confirmed on how the financial crisis give effects on the capital structure of the firm since the firms have different capital structures. According to Zarebski and Dimovski (2012), they had a researched on the effect of the leverage of Australian Real Estate Investment Trusts before and after the crisis. In their study, they found that the global financial crisis really give effect on capital structure of the firms. Another study by Iqbal and Kume (2015) also examined the impact of the financial crisis on capital structure decision, evidence from UK, French and German. Based on their study, there were changes of the equity and debt levels during crisis and post-crisis and the debt is increased on both period of crisis. However, Trinh and Phuong (2015) whom also studied on the effect of financial crisis on capital structure have contradicting result from other studies. In their study, they found that capital structure of listed firms in Vietnam have no significance towards the financial crisis. This is because the financial system in their country is well controlled and monitored by the government.

III. Empirical Methodology and Measurement of the Variables

Research Methodology

In order to carry out this research, descriptive analytical research designs were employed. Both descriptive and analytical research design used. There are 11 *shariah* compliant companies listed under construction sector in the main market from the period of 2001 until 2017. To determine the relationship between each independent variable and dependent variable, model develop based on empirical findings aid by Econometric Views 9

a. Empirical Model – Multiple Regression

$$Dr_{it} = \beta_0 + \beta_1 SIZE_{i,t} + \beta_2 PRO_{i,t} + \beta_3 TANG_{i,t} + \beta_4 GR_{i,t} + \beta_5 LIQ_{i,t} + \beta_6 CRISIS_t + \varepsilon_{i,t} \tag{1}$$

Where,

$DR_{i,t}$ = Dependent variable which represent debt ratio
β_0 = Constant variable
β_1 = Coefficient beta value
$SIZE_{i,t}$ = Firm size of company *i* at year *t*
$PRO_{i,t}$ = Profitability of company *i* at year
$TANG_{i,t}$ = Tangible assets of company *i* at year *t*
$GR_{i,t}$ = Growth opportunity of company *i* at year *t*
$LIQ_{i,t}$ = Liquidity of company *i* at year *t*
$CRISIS_t$ = Dummy variable which represents crisis of 2008
$\varepsilon_{i,t}$ = Error terms

IV. Empirical Analysis

4.1 Descriptive Analysis

Table 1: Descriptive Statistic

	DR	SIZE	PRO	TANG	GR	LIQ
Mean	0.263939	5.847330	0.113675	0.301046	0.705586	2.034637
Median	0.257500	5.730400	0.058000	0.269500	0.078200	1.860000
Maximum	0.685000	7.313800	11.50310	8.870100	110.5111	8.570000
Minimum	0.004400	3.187300	-0.472500	0.000500	-0.970000	0.010000
Std. Dev.	0.130524	0.681345	0.842549	0.646423	8.080930	1.227852

Skewness	0.574952	-0.188954	13.31050	12.55106	13.52470	1.820510
Kurtosis	3.091301	4.395114	180.4885	166.9176	184.2754	7.941531
Jarque-Bera	10.36770	16.27802	250976.2	214263.7	261741.1	293.5569
Probability	0.005606	0.000292	0.000000	0.000000	0.000000	0.000000
Sum	49.35650	1093.451	21.25730	56.29560	131.9446	380.4772
Sum Sq. Dev.	3.168769	86.34690	132.0394	77.72248	12146.06	280.4176
Observations	187	187	187	187	187	187

Table 1 shows the descriptive information of beta (systemic risk) and six independent variables for 11 shariah compliant listed companies for 9 years period from 2001 to 2017. Based on the above result, as what can be clearly identified, , the mean value for liquidity (LIQ) is 2.0346 which means the sampled companies have 2.03 times more of current assets compared than current liabilities to meet short-term obligations. This reflects that the companies under review did have some liquidity problem. Moreover, the range limit acceptance for skewness and kurtosis is between -2 to +2 for normal univariate distribution (Gravetter, Wallnau, & Forzano, 2016). From the results above, it shows that the data is not normally distributed.

4.2 Correlation Analysis
The results of correlation analysis are shown in Table 4.2 for *Shariah* compliant construction sector. Correlation analysis was conducted to examine the relationship between all the variables in this study and the matrix used shows the strength relationship among the variables.

Table 2: Spearman Correlation Matrix

	Correlation (P-Value)					
Variables	**DR**	**SIZE**	**PRO**	**TANG**	**GR**	**LIQ**
DR	1.000000					
SIZE	0.177674 (0.0150)**	1.000000				
PRO	-0.180694 (0.0133)**	-0.048068 (0.5136)	1.000000			
TANG	-0.060770 (0.4087)	-0.177791 (0.0149)**	-0.160028 (0.0287)**	1.000000		
GR	0.079574 (0.2790)	0.231519 (0.0014)***	0.387405 (0.0000)***	-0.411698 (0.0000)***	1.000000-	
LIQ	-0.169499 (0.0204)**	0.028484 (0.6988)	0.497716 (0.0000)***	-0.162862 (0.0259)**	0.089693 (0.2222)	1.000000-

Note: ***, ** denotes significance at 1% and 5% respectively

Based on Table 2, it shows that DR was correlated with SIZE, PRO and LIQ at $\alpha = 0.05$. Besides that, SIZE was also correlated with TANG at $\alpha = 0.05$, while being correlated with GR at $\alpha = 0.01$. In addition, PRO was correlated with GR and LIQ at $\alpha = 0.01$ and had been correlated with TANG at $\alpha = 0.05$. Furthermore, TANG is correlated with GR and LIQ at $\alpha = 0.01$ and $\alpha = 0.05$ respectively.

In the correlation analysis, the correlation value which is more than 0.9 will lead to multicollinearity problem existing in the sample data (Asteriou & Hall, 2015). Thus, highest correlation between independent variables and dependent variable is profitability (PRO) at -0.180694 with 5% level of significance. Hence, it can be summarized that there is no multicollinearity problem in the sample data for *Shariah* compliant construction sector.

4.3 Choosing the best model

4.3.1 Likelihood Ratio Test

Likelihood Ratio Test is applied in this study to choose the best model between Pooled Ordinary Least Squares (POLS) model and Fixed Effects Model (REM). The hypotheses under Likelihood Ratio Test are as follows:
H_0 = POLS model is preferred
H_1 = Fixed Effects Model is preferred

Table 3: p-value p-value of cross-section F and cross-section Chi-Square

Effects Test	Statistics (P-Value)
Cross-section F	12.853570 (0.0000)***
Cross-section Chi-square	105.298034 (0.0000)***

Based on Table 3, p-value of cross-section F and cross-section Chi-Square statistics were 0.0000. Thus, the results are showed that statistically significant since the p-value is less than $\alpha = 0.01$. This can be concluded that the null hypothesis in Likelihood Ratio Test is rejected and that the Fixed Effects Model (FEM) is preferred.

4.3.2   Hausman Test

There are two types of models that may be applied in this study which are Fixed Effects Model (FEM) and Random Effects Model (REM). When Likelihood Ratio Test shows that FEM is preferred, then the Hausman Test must be conducted to select whether FEM or REM are preferred in this study. The hypotheses statement are as follows:
H_0 = Random Effects model is preferred
H_1 = Fixed Effects model is preferred

Table 4: p-value for cross-section random statistics for *Shariah* compliant

Test Summary	Statistics (P-Value)
Cross-section random	0.000000 (1.0000)

According to Table 4, p-value for cross-section random statistics for *Shariah* compliant construction companies was 1.0000. Since the p-value exceed than $\alpha = 0.05$, then the alternate hypothesis was rejected and accepts null hypothesis. Then, it concluded that Random Effects model is preferred.

Table 5 : Random Effects Model

Variables	Coefficient	t-statistics	(P-Value)
SIZE	0.099144	5.530322	(0.0000)***
PRO	-0.078971	-1.975526	(0.0497)**
TANG	0.107748	2.042560	(0.0426)**
GR	-0.001510	-1.623458	(0.1062)
LIQ	0.006751	0.752230	(0.4529)
CRISIS	0.049432	1.588684	(0.1139)
F-Statistics	6.002957 (0.000010)***		

Adjusted R-Squared	0.138960
Durbin Watson	0.812694

Note: ***, ** denotes significance at 1% and 5% respectively

V. Finding and Conclusion

From the results obtained, firm size (SIZE) which is represented by natural logarithm of total assets of the company is found to be the most significant variable at $\alpha = 0.01$, which has positive coefficient value towards debt ratio of *Shariah* compliant construction companies. This result is supported by trade-off theory, where indicates that the increase of firm size will increase debt ratio of the company. The results in this study is also similar with the studies done by Leeuwen (2011), Khademi (2013), Zabolotna (2013), Morri and Artegiani (2015), Trinh and Phuong (2015) and Tripathy and Asija (2017). Nevertheless, this finding contradicts with the findings of Harrison and Widjaja (2014) and Danso and Adomako (2014). Profitability (PRO) which was represented by the return on assets is a significant determinant of debt ratio in *Shariah* compliant construction companies. Profitability has a negative coefficient, implying that *Shariah* compliant construction companies that have high profitability levels will have lower debt ratio. In this study's case, high profitability will take lower debt because construction companies prefer lower cost of financing and tend to use retained earnings as their source of financing. This finding is consistent with previous studies done by Khademi (2013), Mostarac and Petrovic (2013), Zabolotna (2013), Morri and Artegiani (2015), Trinh and Phuong (2015) and Tripathy and Asija (2017), but contradicts to Morri and Parri (2017).

Tangible asset (TANG) also found as significant variable with positive coefficient at p-value of $\alpha = 0.05$. It illustrated that *Shariah* compliant construction companies with high tangible asset will have higher debt. This is because the companies used the tangible assets as collateral in making decision on lending (Danso & Adomako, 2014). This result supported by trade-off theory where tangible asset and debt have positive relationship with them. Besides that, this finding also parallel with research done by Khademi (2013), Trinh and Phuong (2015) and Morri and Parri (2017). It shows that tangible asset is important and significant variable on debt ratio. Other than that, the growth opportunity (GR) where measured by changes of total assets from previous total assets to present year was found to be insignificant on debt ratio of *Shariah* compliant construction companies. This clarification is opposite with the results shown on tangibility as mentioned earlier. This result can be supported by previous studies that have insignificant relationship between growth opportunity and debt ratio such as Ting and Lean (2011) and Trinh and Phuong (2015). However, these findings contradict with prior researches conducted by Zabolotna (2013), Proenca, Laureano and Laureano (2014), Vergas, Cerqueira, and Brandao (2015), and Morri and Parri (2017). Liquidity (LIQ) has been found as insignificant determinant for debt ratio of *Shariah* compliant construction companies. It is demonstrated that liquidity has no impact or influence the decision of taking debt by *Shariah* compliant construction companies similar with Zarebsi and Dimovski (2012) and Harrison and Widjaja (2013). However, it contrary with a study done by Harrison and Widjaja (2014), Proenca, Laureano and Laureano (2014), Zabolotna (2014), and Tripathy and Asija (2017) where they found strong relationship between liquidity and debt ratio. Crisis (CRISIS) as other variable and known as dummy variable was used to capture the effect of financial crisis on the debt ratio of *Shariah* compliant construction companies. This finding in line with study by Trinh and Phuong (2015) where they found that financial crisis has no significance towards capital structure of listed firms in Vietnam. This is because the financial system in their country is well controlled and monitored by the government. Therefore, in this study, the financial crisis occurs in 2008 does not affected the capital structure decision because the Malaysia government had implemented fiscal stimulus package to help construction companies to grow up during period of crisis (Gallagher & Wilkins, 2012).

From the result obtained, it can be concluded that there are three variables that have significant relationship with debt ratio which are firm size, profitability and tangible asset that p-value less than $\alpha = 0.01$ and $\alpha = 0.05$ respectively. This finding will help managers of companies to focus on the most significant variable which is firm size that positively influence decision of debt financing. However, the financial crisis occurs in 2008 does not influence the debt ratio of the companies. Thus, this can be concluded that the firms can survive when financial crisis occur because they have generated more assets in their companies. Other than that, this finding also gives insight to firm managers in deciding the best financing that should be taken for the companies. This study also gives exposure to firm managers in focusing on factors that need to be considered to reduce the impact of financial crisis. Moreover, the investors will receive benefits from this finding. In the investors views,

they may obtain benefits when it can assist them to make the right investment on good company which is not affected by threatening economic. This finding also provides better understanding to the investors regarding capital structure and making the right decision on investment. The investors also made aware that the financial crisis does not affect the capital structure of *Shariah* compliant construction companies.

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