Capital Structure and Firm Performance in Emerging Market: An Empirical Analysis of Malaysian Companies

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Abstract

The aims of present study are to investigate the linear and inverted U-shaped relationship between capital structure and firm performance in the emerging market. Present study also examines the impact of financial crisis towards the relationship between capital structure and firm performance. The sample of this research is from all non-financial public listed companies in Malaysia from 2005 to 2016. This study utilized different methods such as generalized method of moment's methodology to eliminate invisible heterogeneity and endogeneity problems respectively. The results disclosed a reverse relationship between capital structure and firm's performance in Malaysian companies as emerging market and also confirm the existence of an inverted U-shaped relation between them. Additionally, the outcome of this study displays global financial crisis from 2007 to 2009 had a significant effect on the relationship between capital structure and firm performance in Malaysia as emerging market. Implications and recommendation for future research are discussed at the end of this paper.

1. Introduction

Capital structure is defined as the company's financial structure that includes a combination of various sources of equities and debts. The influence of capital structure on firm's performance is a fundamental strategic issue of financial economists for several years. The capability of companies to fulfill the shareholders' requirements is associated with debt policy. Therefore, managers attempt to utilize the right mixture of debts and equities to hold their true cost of capital as low as possible (Abor, 2005).

Modigliani and Miller (1958), as pioneer researchers in this area found that capital structure didn't affect company's performance. Modigliani Miller (MM) theory is according to constraining presumptions of a perfect capital market, that includes exceptional features and there are no taxes, bankruptcy expenses, information asymmetries transaction expenses and agency costs of which do not match with the real-world conditions. Considering the imperfect market, some principal theories that had been proposed by other researchers as substitution to Modigliani Miller's theory are trade-off theory, pecking order theory, and agency theory.

In line with trade-off theory, companies need to trade off the expenses and benefits of liability to maximize the firm's value. The cost of liability resulted from direct and indirect bankruptcy expenses while

benefits of debts are derived from the tax shield (Kim, 1978; Kraus and Litzenberger, 1973; Modigliani and Miller, 1963). The pecking order theory claims that in the first stage, companies utilized internal financing, followed by debts. Equity will be issued when companies were not capable of attaining more debts (Myers and Majluf, 1984; Ross, 1977). According to agency theory, managers must make an attempt to reach the optimal capital structure to maximize the firm's value which leads to reducing conflicts of interest between shareholders (Hart and Moore, 1994; Jensen and Meckling, 1976). Nonetheless, there is no comprehensive theory that can completely explain the impact of capital structure on firm's value since the real society is very intricate and differentiated (Ardalan, 2017). Capital structure decisions may influence the success rate of firm's investment. Therefore, incorrect determination of how a company finances its operation and development by consuming various sources of funds may lead to bankruptcy.

The impact of capital structure on company's performance may differ in various situations, and the result could also differ under special conditions. In other words, the new world of finance can be differentiated by operating new models, different perspectives on the current and future strategies, and new puzzle-solving. The most important goal of capital structure is minimizing the cost of financing and increasing the company's value. The capital structure model and its effect on the company's performance had been a difficult subject in accounting context and finance (Zeitun and Tian, 2007).

Capital structure is one of the most important decisions made by a company. From the technical view of capital structure, a right balance of debt and equity may affect day to day operations and future growth may have an impact on company's asset. From the tactical view, capital structure may affect the risk of gaining profit, source of funding, return of investors and lenders expectations. According to MM theory when a company decide to increase its debt, the cost of capital (WACC) increased and the company need to pay interest payment which will decline its profit and cash flow. So, high debt and high cost of financing increase the risk of default, unsuitable capital structure strategy influences the firm's health and success. Financial reports disclosed huge pool of external funds that were unnecessary which led to high cost of capital which led to bankruptcy.

The discussion over the impact of capital structure on firm performance is inconclusive regarding the empirical studies have yielded inconsistent outcomes ranging from positive to negative to no relationships at all. The study of the relationship between capital structure and firm performance have presented different results that disclose knowledge gaps and raises a substantial question about the linkage between capital structure and firm performance of firms listed at the Malaysia stock Exchange. Moreover, the concept of capital structure has been extensively studied in developing countries while there are a few studies of capital structure and firm performance in emerging market such as Malaysia, which is an export-based country. The recession in 2007 had significantly influenced firms' performance in many industries. Malaysia's export reduced around 28 percent in January 2009 and Malaysia GDP annual growth rate also dropped that may affect manager's decisions to choose the right structure of debts and equities. The objective of this research is to identify the association among capital structure and firm's performance in a linear and inverted U-shaped approaches and also to investigate this relationship during global financial recession in 2007-2009.

2. Literature Review

In accordance with MM theory, in perfect market, investors will sell their stock if the company use debt because there will be less risk of highly leverage company not able to pay high return. In imperfect market, there are several theories used include pecking order theory, agency cost theory, trade off theory and market timing theory. According to pecking order theory, companies prefer internal financing and will issue debt, followed by issuing equities if they are unable to provide more debt. This theory doesn't consider an optimum debt ratio to maximize company's value (Myers and Majluf, 1984).

There are different types of agency cost theory namely agency cost of equity and agency cost of debt. These theories are related to the contrasts among shareholders, bondholders and directors. Agency cost of equity is pointed to the conflict between managers and shareholders. Managers attempt for personal goals and not concentrating on maximizing the firm's value and returns. Thus, managers in high debt companies made an effort to invest on cost-effective and profitable projects to gain profits and pay off

their expenses. Therefore, firm's value influence by debt by decreasing agency cost concerning to managers and stockholders (Hart and Moore, 1994; Jensen, 1986).

In compliance with trade off theory, companies tend to make an optimal capital structure to maximize the firm's value. Therefore, they will trade off between debt expenditures and benefit which is related to the tax saving. As a result, company's value that utilized debt was similar to the company that didn't use debt plus tax shield after subtracting financial distress expenses (Kim, 1978).

Consistent with market timing theory, capital structure is affected by the circumstances of stock price market. In other words, managers' financing decisions depend on stock price market, so there is no concept of optimum capital structure to maximize firm performance in market timing theory. Managers may decide to select debt or issuing equity in different situation, for example, they will issue stocks when the price increase or overvalued, in order to take benefit of this conditions and utilize debt when they found a reduction of share prices (Baker and Wurgler, 2002; Kayhan and Titman, 2007; Myers and Majluf, 1984).

Lin and Chang (2011) analyzed data of 196 Taiwanese listed companies (1993–2005) and found the relationship between leverage and firm performance. When the leverage ratio is 9.86%, with increasing one percent in debt, companies can achieve 0.0546% more in company's value and when debt ratio is between 9.86% and 33.33%, with increasing one percent in debt, performance will increase 0.0057%.

Most of capital structure theories confirm the existence of association among debt and firm's value, which had been discussed in different ways and also led to different results. Abor (2005) found a positive relationship between capital structure and profitability. This study used Ghana Stock Exchange listed companies from 1998-2002. Berger and Patti (2006) examined banking industry in U.S. and concluded that a higher debt ratio was positively related with higher firm's value because if a company increased its debt around one percent, it can get six percent more in profit. Gill, Biger, and Mathur (2011) also found the positive linkage between short-term debt and long-term debt to total assets and firm performance. Nevertheless, there are several studies that conclude a negative relationship between capital structure and firm performance in developing market countries (Abor, 2007; Harris and Raviv, 1991; Majumdar and Chhibber, 1999; Zeitun and Tian, 2007). Malaysia is a developing market, where the economy is progressing towards advanced market by the rapid growth and industrialization. Therefore most companies in Malaysia use debts for their business operations and this study hypothesized that:

H_1. *Capital structure influence firm performance negatively in emerging market.*

The global financial crisis in 2007 had influenced many countries in developed and emerging market such as Malaysia. Many sectors such as manufacturing and investment sectors are affected by the global financial crisis. Malaysia exports had decreased around 45% (from RM64 billion to- RM38 billion), and this new economic condition forced managers to choose different policy in their capital structures, working capital and other financial issues. Therefore, this study attempts to examine the effect of financial crisis on capital structure and firm performance and hypothesized that:

H_2. *Global financial crisis affects the relationship between capital structure and firm performance in emerging market.*

Several researchers have detected a non-linear linkage among capital structure and firm performance, that implies, leverage can affect firm performance positively and negatively (Berger and Patti, 2006; Margaritis and Psillaki, 2010). At the low-level, leverage help companies to increase performance by the tax shield and decreasing agency costs. Nevertheless, when a company uses more debt, it can lead to lower performance since, there is financial distress and also agency costs of debt. Therefore, current study hypothesized that:

H_3. *There is a non-linear relationship among capital structure and firm performance in emerging market.*

3. Methodology of Research

One of the most important goal of this study, is to examine the relationship between capital structure and firm performance in linear and nonlinear approaches and to identify the impact of financial

recession on this association. Data was gathered longitudinally from a large panel of public listed non-financial firms in Malaysia from 2005 to 2016 (650 firms) because it includes Global recession and collapse of Wall Street in 2007-2009 that may affect Malaysia and the analysis also include the recent years. This paper utilized panel data methodology to remove unobservable heterogeneity and generalized method of moments (GMM) for problems on endogeneity.

The present study used three measures for firm performance based on accounting performance and market performance. Accounting performance includes Return on Asset (ROA) that is calculated by dividing earnings after interest and tax into total assets, and Return On Equity (ROE) that is calculated by dividing earnings after interest and tax into total equity (Jiraporn and Liu, 2008). Tobin'sQ is employed for presenting market performance that is calculated as the firm's market value to book value of debt (Driffield *et al.*, 2006).

Capital structure can be determined in several methods which includes book value and the market value (Cespedes *et al.*, 2010; Kayo and Kimura, 2011). This research used book value of total debts to total assets (TD/TA) and also market value of total debts to total assets (MTD/TA) as indicators of capital structure. This study used the book value of short term debt to total asset (SD/TA), book value of long term debt to total asset (LD/TA), market value of short term debt to total asset (MSD/TA) and market value of long term debt to total asset (MLD/TA) in the robustness test. Control variables include growth, tangibility, tax, risk, investment, cash flow, liquidity and size.

Panel data multiple regression analysis was performed to analyse the direction and degree of each variables' relationships. Pooled panel, Random effect (RE) and Fixed effect (FE) assessment approaches are Static Panel analysis. The linear regression may be written as follows:

$$y_{it} = \alpha + \beta x_{it} + u_{it} \qquad (1)$$

Where:
t: time and i firm.
y_{it}: regressand.
x_{it}: K × 1 vector of independent variables
β: K × 1 vector of coefficients
u_{it} : error term
α: Intercept or constant

If unseen heterogeneity is neglecting totally and the u_{it} is related to x_{it}, the OLS estimators are consistent and unbiased. If the unseen individual impacts (cross specific impacts) emerge, usual in non-trial study (Baltagi, 2005), RE and FE are preferred rather than OLS approach. The current study used cross error element at cross level and also disturbance is independent with both. Hence, the equation is:

$$y_{it} = \alpha + \beta x_{it} + \alpha_i + e_{it} \qquad (2)$$

If x_{it} is correlated to α_i, leading to the correlation between x_{it} and u_{it}, then the Fixed effect (FE) method would provide stable estimators whereas estimators of OLS would be inconsistent. If α_i and x_{it} are not correlated, estimators of OLS would be reliable but inefficient since u_{it} is auto-correlated and heteroskedastic. To improve its efficacy, the RE is recommended.

To select the most suitable method, an F-test (Pooled OLS vs the FE), the Breusch-Pagan Lagrange Multiplier (LM) test between Pooled OLS and RE, and the Hausman test between RE and FE methods were conducted. The desirable model would be chosen based on the results.

Furthermore, to improve effectiveness, auto-correlation checking through the Wooldridge method, group-wise heteroskedasticity with the Breusch Pagan (BP) approach, and Panel Unit-root tests for checking the stationary of each variable were performed. If the model has both autocorrelation and heteroskedasticity, write method (ROBUST) will be considered in estimating the model. Furthermore, the variable should be stationary in order to be applied in each equation regression.

Even though an adjusted standard error model can remedy the heteroskedasticity and autocorrelation. Wintoki *et al.* (2012) have noted endogeneity bias, nevertheless, lasts in the model, since

the RE and FE primarily restricts unobserved heterogeneity. They have no control on endogeneity by time-independent ones, the measurement errors and inverse interconnection. Consequently, RE or FE may not be unbiased, particularly in short-run data (Cameron and Trivedi, 2005). To solve it, researchers recommended dynamic panel GMM. Though, the issue when utilizing estimators is the trouble in designating valid instruments since with fragile instruments are more probable not to be unbiased. Hence, estimation with unreliable may not be desirable. So, the study utilized GMM, Arellano and Bond (1991) to remedy the abovementioned problem. GMM offers an abundance of instruments to simplify including instruments that make it useful for a few periods and achieving the valid instruments and overcome the problem of over-identification (Roodman, 2006). Since the current study has few periods, it applied first difference and System GMM. In this case, lagged differences are considered as instruments in first difference and levels.

Arellano and Bond (1991) provided two diagnostics for the validity of the GMM: Hansen test and Sargan test (or autocorrelation test in GMM) for over-identification (Wintoki *et al.*, 2012). Therefore, this research performed and reported the result of dynamic Panel data (GMM), since it's the best method for performing analysis.

3.1. Empirical model

To assess the association among company's performance and capital structure, the study applied this frame:

$$FP_{it} = \alpha + \beta_1 CS_{it} + \Upsilon Z_{it} + e_{it} \tag{3}$$

Where:
FP_{it} : Firm performance (Tobin Q, ROE and ROA)
CS_{it} : Structure of capital measured by the ratios of debts over asset market and book value;
Z_{it} : control variables.

Following H_1, leverage could negatively impact on DV, therefore, a negative indication of β_1 is predicted.

Additionally, testing linear relationship among company's performance and capital structure, current research applies the quadratic equation reinforced with Berger and Di Patti (2006) and also Margaritis and Psillaki (2010) to permit a non-linear function.

$$FP_{it} = \alpha + \beta_1 CS_{it} + \beta_2 CS_{it}2 + \Upsilon Z_{it} + e_{it}$$

Hypothesis 2 (H_2) recommended that Global Financial Crisis influence the association among capital structure and firm performance.

$$FP_{it} = \alpha + \beta_1 CS_{it} + \beta_2 DUM_{it} + \Upsilon Z_{it} + e_{it}$$

Hypothesis 3 (H_3) suggested the inverse U-formed association among firm value and capital structure. Especially, leverage is linked positively with value of firm; though, at a high value, the linkage shifts from direct to reverse. The acceptable range for the relationship is that $\beta_1 > 0$ and $\beta_2 < 0$.

3.2. Findings

The descriptive statistics summary of all variables are provided in Table 1. The average of TDTA and MTDTA overall account for 0.460 and 0.423 (2005 to 2016) and broadly dispersed, 0.003 to 232.75 and 0.001 to 1.01.

Performance indicators were measured by ROE, ROA and Tobin Q. The mean of returns on assets and equity are 0.04 and -0.01. The mean of TobinQ shows 1.17, table also shows that the range of Tobin's Q differs from 0.005 to 232.75. The other alternative showed a lower spread in their value. ROA ranged from −103.32 to 11.06, and the ROE ranged from −21.67 to 12.73. This suggests the significant performance gaps between Malaysian firms in this phase.

*Table 1.*Descriptive statistics

Variables	Observation	Mean	Std. Dev	Min	Max
Capital Structure					
TDTA	7,400	0.460	3.885	0.003	232.75
MTDTA	7,345	0.423	0.229	0.001	1.01
Firm Performance					
ROA	7,410	-0.011	1.583	-103.327	11.063
ROE	7,410	0.042	0.571	-21.674	12.730
Tobin Q	7,355	1.178	4.728	0.005	232.75
Control Variables					
TANGI	7,368	0.438	0.457	0.000	21.509
GROWTH	7,376	5.028	1.589	-2.995	10.384
TAX	7,383	0.168	1.848	-67.000	79.000
RISK	7,408	766.345	19247.78	-0.147	564346.1
INV	7,406	-0.046	0.354	-30.109	0.064
CASHF	7,396	-0.010	1.585	-103.327	11.063
LIQ	7,378	0.067	0.083	0.000	1.000
SIZE	7,410	5.624	1.524	-3.218	11.546

3.3. Correlation Analysis

The correlation among variables applied in this model is provided in Table 2. It may be inferred that the correlations of debt ratios were high, especially, the correlation among MTDTA and TDTA, which is 0.084. Hence, instead of mixing them, the study individually investigated the impact analysis to lower the collinearity problem. Other correlations were considerably small, suggesting no issue of collinearity.

Debt ratios, including MTDTA and TDTA were discovered to be reversed related to performance indicators since all coefficients were negative (except TDTA on ROE and Tobin Q) and meaningful at 5%. Precisely, the correlations amid TDTA with ROA, ROE and Tobin Q were −0.0642, 0.014 and 0.976, when the values of MTDTA were −0.055, -0.027 and -0.027.

Table 2. Correlation

	ROA		ROE		TOBINS		TDTA		MTDTA		TANGI		GROWTH		TAX		RISK		INV		CASHF		LIQ		SIZE	
ROA	1.000																									
ROE	-0.066	***	1.000																							
TOBINS	-0.890	***	0.001		1.000																					
TDTA	-0.642	***	0.014		0.976	***	1.000																			
MTDTA	-0.055	***	-0.027	**	-0.027	**	0.084	***	1.000																	
TANGI	-0.041	***	-0.287	***	-0.011		-0.023	**	-0.016		1.000															
GROWTH	0.078	***	0.105	***	-0.086	***	-0.039	***	0.145	***	0.036	***	1.000													
TAX	0.004		0.007		-0.004		-0.003		0.000		-0.003		0.022	*	1.000											
RISK	0.002		0.002		-0.005		-0.003		-0.014		0.009		0.016		0.000		1.000										
INV	0.744	***	-0.136	***	-0.001		-0.045	***	0.065	***	-0.021	*	0.019	*	0.002		0.003		1.000							
CASHF	1.000	***	-0.066	***	-0.890	***	-0.642	***	-0.056	***	-0.041	***	0.078	***	0.004		0.002		0.744	***	1.000					
LIQ	-0.066	***	0.036	***	0.150	***	0.101	***	-0.184	***	-0.100	***	-0.019	*	0.005		-0.006		-0.024	**	-0.066	***	1.000			
SIZE	0.131	***	0.073	***	-0.150	***	-0.113	***	0.117	***	-0.046	***	0.837	***	0.011		0.014		0.047	***	0.131	***	-0.152	***	1.000	

3.4. Unit Root Test

This study performed panel unit root tests (Augmented Dickey–Fuller and Phillips–Perron unitroot test) to check the stationary level of each variable، including dependent, independent and control variables: the z-statistic of R. D. Harris and Tzavalis (1999) and the two t-statistics of Im, Pesaran, and Shin (2003). It applied the tests to all variables، including dependent, independent and control variables for the whole sample. In all of the cases, unit root was rejected, hence, it revealed that all variables were stationary at level I(0). However, the small T sample size made these results on panel unit roots difficult to interpret.

Table 3. Unitroot test of all variables in the model

Variable	Augmented Dickey-Fuller Test	Phillips-Perron Test	panel Unit root test
	ADF Statistic	PP Statistic	Stationary
ROA	-12.16	-24.62	I(0)
ROE	-13.50	-29.82	I(0)
TOBIN'S	-11.73	-21.66	I(0)
TDTA	-7.23	-10.74	I(0)
MTDTA	-10.60	-24.69	I(0)
TANGI	4.66	-3.75	I(0)
GROWTH	-5.21	-14.48	I(0)
TAX	-18.79	-43.51	I(0)
RISK	-6.60	-22.29	I(0)
INV	-22.76	-43.43	I(0)
CASHF	-11.91	-24.58	I(0)
LIQ	-6.85	-23.77	I(0)
SIZE	15.55	-5.83	I(0)

3.5. Multicollinearity

While multicollinearity analysis is hard to interpret only from a correlation matrix, this study considered variance inflation factors (VIF) for all independent variables applied in this study, as shown in Table 5. The VIF determination was also a method of measuring the level of collinearity between the independent and control variables in a regression analysis (Gujarati and Porter, 2009).

VIF showed how much the variance of the estimated coefficients rose over the case of no correlation between the independent variables. If no two explanatory variables were correlated, then all values of the VIFs will be 1. If the value of VIF for one of the variables is greater than 10, there is high collinearity in this model.

All VIF values were less than 10, so, it was not conceivable to form the existence of significant issue of multicollinearity. That is, there were no meaningful multicollinearity issue, so no variables will be excluded from the models of this study except Cash flow variable in Model 1 that has VIF more than 10. So only the cash flow will be removed from model 1 to remedy the issue of Multicollinearity in this model. The rest of models had no issues of Multicollinearity

3.6. GMM Estimator

To strengthen the findings, system two-step GMM with adjusted standard error was performed to handle with the endogenous problem demonstrated in table 4. It approved the reversed impact of structure of capital on performance that was statistically meaningful at 10% and 1%, except for TDTA in the Tobin Q model. That is reversed but not meaningful. The outcomes of the diagnostics were also stated. All AR(2) p-values were greater than 0.10, that showed, no second-order serial correlation. Likewise, the results of Hansen J were disclosed in Table 5.

Table 4. The impact of capital structure on company's performance - GMM Model

	Dependent variable: ROA				Dependent variable: ROE				Dependent variable: Tobin Q			
	(1)		(2)		(3)		(4)		(5)		(6)	
TDTA	-0.2945	***			-0.1608	***			0.4853			
	0.0087				0.0211				2.2732			
MTDTA			-2.8442	*			-1.3052	***			-1.9362	***
			1.5525				0.4036				0.1895	
TANGI	-0.2327		0.0839		-0.4936	***	-0.4712	*	2.4864		-0.1115	***
	0.1640		0.0974		0.0435		0.2415		3.1426		0.0389	
GROWTH	0.0752	***	0.0032		-0.3798	***	0.0724	***	-14.6493	***	0.1222	***
	0.0172		0.0495		0.0228		0.0268		2.6290		0.0251	
TAX	0.0004		-0.0023		0.0044		-0.0004		0.1388		-0.0010	
	0.0015		0.0040		0.0096		0.0020		0.2019		0.0024	
RISK	0.0000	**	-0.000001	**	0.000003	***	0.0000		0.0002	***	-0.000001	***
	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
INV	3.2832	***	0.5645		-0.4098	**	-0.9723		22.7098		-0.8845	***
	0.0072		0.4717		0.1877		0.5938		16.1813		0.1979	
CASHF	2.3382		1.2808	***	0.2939	***	0.0527		7.8665		-0.7521	***
	0.1044		0.4401		0.0566		0.2142		6.6560		0.2166	
LIQ	-0.3152	**	-2.0384	*	3.3785	***	-0.6364	*	114.3628	***	-0.3526	
	0.1430		1.0458		0.2547		0.3626		21.8708		0.2170	
SIZE	-0.0485	**	0.0552		0.1944	***	-0.0189		3.6272		-0.0661	*
	0.0192		0.0426		0.0230		0.0258		2.4814		0.0257	
L.ROA	-0.0216		0.2361									
	0.0730		0.1565									
L.ROE					0.2261	***	-0.0128					
					0.0117		0.1275					
L.TOBIN Q									0.0722	**	0.1644	***
									0.0359		0.0603	
Constant	0.2604	***	0.8913	**	1.5515	***	0.5034	***	70.2886	***	1.4688	***
	0.1001		0.4394		0.0795		0.1824		9.0048		0.1040	
Observations	6,560		6,528		6,560		6,528		6,500		6,480	
Wald Chi2	981427.47		61.030		2481.560		24.490		3016.040		522.57	
Prob > Chi2	0.000		0.000		0.000		0.006		0.000		0.000	
AR (1)	0.007		0.218		0.000		0.031		0.000		0.001	
AR (2)	0.267		0.421		0.778		0.970		0.523		0.280	
Hansen J test	0.996		1.000		0.130		0.154		0.531		0.646	

3.7. Robustness Check

The result of the robustness performed was reliable with the principal results of research in supporting the negative impact of the capital-structure on performance. Table 5 revealed the regression outcomes of these 12 robustness models considering SDTA, LDTA, MSDTA and MLDTA as independent variables.

This study then applied the alternative indicators of structure to confirm the original model. Short-term and long-term debts (book and market) were considered as capital structure. In line with the main empirical outcomes, the coefficients of leverage were all reversely significant at the 1% and 5% level while applying the alternatives. Similarly, the coefficient of booked value was meaningful at the 10% and negative, correspondingly except for LDTA in ROA and Tobin Q and also ROE models except in case of Tobin-Q model with STDA as IV. The results of others seemed to be robust under different calculations of structure of capital indicators.

3.8. Dummy for Crisis in Model

This study inspected the effect of crisis 2007-2009 as a dummy variable (DUM) in the Panel data analysis. This dummy was indicated by number one for the year of 2007 and 2009 and zero for all other years. Based on the impact of crisis on the dependent variable, it was expected that this dummy variable had a significant coefficient with a negative sign. Table 6 obviously revealed that the crisis dummy is significant and negative for all models of ROA and ROE except for case of TDTA in ROE model. However, in two equations of Tobin Q, this dummy variable is insignificant.

Table 5. Robustness check for the impact of capital structure on company's performance – GMM regressions

	Dependent variable: ROA				Dependent variable: ROE				Dependent variable: Tobin Q			
	1	2	3	4	5	6	7	8	9	10	11	12
SDTA	-0.000009				0.029599				0.557588 **			
	0.000014				0.021229				0.275946			
LDTA		0.000002				0.031474				-0.051032		
		0.000226				0.099263				0.175875		
MSDTA			0.000003				-0.142284 *				-2.006957 **	
			0.000023				0.072945				0.247687	
MLTDTA				0.000081				0.047389				-1.412173 ***
				0.000323				0.061692				0.223128
TANGI	-0.000038	-0.000005	-0.000025	-0.000004	-0.059434 *	-0.006654	-0.052029 *	-0.021480	-0.073190	-0.079952 ***	-0.147724 ***	-0.073511 ***
	0.000072	0.000056	0.000041	0.000063	0.043859	0.026783	0.026691	0.014049	0.044406	0.026023	0.089465	0.028629
GROWTH	-0.000003	-0.000003	-0.000006	0.000002	0.030211 ***	0.001896	0.050080 ***	0.009793 *	0.026303	0.029513 *	0.210922 ***	-0.005134
	0.000013	0.000014	0.000013	0.000000	0.010642	0.012141	0.016570	0.005485	0.044146	0.018071	0.036516	0.021479
TAX	0.000000	0.000001	0.000000	0.000020	0.029644	0.013550	0.000562	0.000088	-0.033304	-0.000366	0.000103	-0.000841
	0.000000	0.000000	0.000000	0.000000	0.018991	0.011048	0.000425	0.000381	0.029108	0.001889	0.001880	0.002271
RISK	0.000002	0.000003	0.000003	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-0.000001	-0.000001	-0.000001
	0.000000	0.000000	0.000000	2.970000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
INV	0.000055	0.000009	0.000027	0.000070	-0.874134 *	0.303785	0.870039 *	-0.104604	-1.096819 *	-1.153354 ***	-0.328953	-1.475126 ***
	0.000097	0.000043	0.000123	0.000232	0.466724	0.309636	0.546937	0.090392	0.917510	0.256747	0.210321	0.265222
CASHF	0.999982 ***	0.999997 ***	0.999994 ***	0.999996 ***	0.210676	0.802380 ***	0.449657	1.172703 ***	-0.875715 **	0.049759	-1.512773 ***	-0.050275
	0.000031	0.000013	0.000011	0.000011	0.135743	0.265991	0.236698	0.169332	0.390753	0.243106	0.449071	0.237846
LIQ	-0.000084	-0.000057	-0.000061	-0.000046	-0.202195	-0.154401	-0.187384 ***	0.055569	0.707423 ***	0.706009 ***	-0.249667	0.469583
	0.000139	0.000145	0.000112	0.000155	0.141855	0.093180	0.142422	0.028965	0.213138	0.271577	0.220538	0.277540
SIZE	0.000012	0.000008	0.000018	-0.000001	-0.005400	0.001965	-0.036076 *	-0.003479	-0.033407	-0.024503	-0.198040	0.044017 *
	0.000022	0.000021	0.000000	0.000031	0.005606	0.010759	0.018116	0.004911	0.049441	0.019388	0.035475	0.022662
LROA	-0.000005	-0.000001	0.000000	-0.000001								
	0.000007	0.000008	0.000001	0.000008								
LROE					0.013805	0.074198	0.177682	0.046077				
					0.073494	0.043032	0.120058	0.052158				
LTOBIN Q									0.655969 ***	0.213088 ***	0.375605 ***	0.185806 ***
									0.059992	0.073683	0.090044	0.071596
Constant	-0.000049	-0.000041	-0.000038	-0.000016	-0.088278 ***	0.024535	0.090891	-0.019311	0.226512 **	0.670459 ***	1.460828 ***	0.621385 ***
	0.000108	0.000076	0.000070	0.000096	0.033657	0.028163	0.065600	0.014605	0.107872	0.094206	0.134405	0.094560
Observations	6564	6560	6555	7221	6553	6549	6524	6518	6492	6479	6490	6479
Wald Chi2	8.0600E+12	1.1E+13	1.22E+11	284000000000	102.17	132.8	136.87	463.75	1980.29	522.74	539.13	467.84
Prob > Chi2	0	0	0	0	0	0.022	0.02	0	0	0	0	0.000
AR (1)	0.209	0.209	0.218	0.218	0.015	0.691	0.503	0.03	0.563	0.066	0.003	0.482
AR (2)	0.365	0.365	0.378	0.378	0.43	0.646	0.359	0.41	0.924	0.253	0.200	0.328
Hansen J test	1.000	1.000	1.000	1.000	0.101	0.646	0.359	0.368	0.924	0.253	0.125	0.328

Table 6. The effect of capital structure on company's performance considering crisis - GMM Model

	Dependent variable: ROA			Dependent variable: ROE			Dependent variable: Tobin Q		
	(1)		(2)		(3)	(4)	(5)		(6)
TDTA	-0.2944	***			-0.2455		-1.8720	**	
	0.0087				0.0818		0.8574		
MTDTA			-3.8545	**		-1.4183			-0.7495
			1.6932			0.3989			0.8759
DUM	-0.0353	***	-0.2533	**	-0.0040	0.0781	0.5939		-0.0638
	0.0110		0.1128		0.0348	0.0270	0.7936		0.0596
TANGI	-0.2328		-0.2916		-0.4231	-0.4821	1.4373		0.1325
	0.1635		0.1949		0.2922	0.2521	3.0068		0.1999
GROWTH	0.0741	***	0.0872	*	-0.3497	0.0731	-15.4381	***	0.0094
	0.0171		0.0480		0.0866	0.0278	2.7158		0.0584
TAX	0.0006		0.0002		0.0045	0.0003	0.1431		-0.0017
	0.0015		0.0039		0.0038	0.0020	0.1895		0.0025
RISK	0.0000	**	0.0000	**	0.0000	0.0000	0.0002	***	0.0000
	0.0000		0.0000		0.0000	0.0000	0.0000		0.0000
INV	3.2835	***	0.1285		0.5313	-0.9201	27.2148		-0.3067
	0.0076		0.5858		0.0730	0.5951	16.8455		0.3779
CASHF	OMITTED		OMITTED		OMITTED	OMITTED	OMITTED		OMITTED
LIQ	-0.2938	**	-2.7450	**	2.1720	-0.6317	112.1512	***	0.5017
	0.1435		1.1338		0.7635	0.3452	21.1732		0.5845
SIZE	-0.0465	**	0.0499		0.1770	-0.0110	4.7466	*	-0.0661
	0.0192		0.0581		0.0833	0.0280	2.7000		0.0453
L.ROA	-0.0235		0.2087						
	0.0733		0.1331						
L.ROE					0.2083	-0.0131			
					0.0500	0.1212			
L.TOBIN Q							0.0663	*	0.4461	**
							0.0358		0.2090
Constant	0.2495	**	1.1170	**	1.3973	0.4859	70.3677	***	1.1371	***
	0.1001		0.4939		0.2606	0.1891	9.1540		0.1707
Observations	6,560		6,528		6,560	6,528	6,500		6,493
Wald Chi2	842806.75		25.4700		3649.6900	25.96	3,086.48		539.29
Prob > Chi2	0.0000		0.0050		0.0000	0.0000	0.0000		0.0000
AR (1)	0.0070		0.1790		0.000	0.031	0.000		0.0630
AR (2)	0.2560		0.433		0.833	0.966	0.467		0.232
Hansen J test	0.117		0.100		0.500	0.600	0.766		0.100

3.9. Non-linear relationship among capital structure and performance

In this section, analyses were performed to conclude the non-linear linkage among capital structure and company's performance. The results in Table 7 displayed a non-linear linkage emerges almost in all models but strongly in model 1 to 5. The coefficient of the debt ratio was negatively meaningful and its square value meaningfully positive while the TDTA was independent variable, but these coefficients had reverse sings when MTDTA acts as an independent variable (IV). This revealed a reverse linkage among debt and ROA and ROE and Tobin-Q in low levels and positively related in high level in the case that TDTA acted as IV (MODEL 1 and 3 and 5). On the other hand, when MTDATA acted as an IV, both relationships in low and high level had reverse signs.

Table 7. Non-linear Model

	Dependent variable: ROA			Dependent variable: ROE			Dependent variable: Tobin Q		
	(1)		(2)		(3)		(4)	(5)		(6)
TDTA	-0.1647	***			-2.0800	***		-19.4385	**	
	0.0536				0.2989			8.0643		
TDTA2	0.0012	***			0.0171	***		0.1658	**	
	0.0005				0.0027			0.0724		
MTDTA			26.3228	*			9.2382	*		-6.7370
			15.3499				4.8009			5.3174
MTDTA2			26.3664	*			-9.4303	**		5.9434
			15.0268				4.6809			4.7732
TANGI	-0.2256		-0.2492		-0.4904	*	-0.4802	**	1.3779		0.1277
	0.1616		0.1541		0.2732		0.2328		3.2525		0.1962
GROWTH	0.0719	***	-0.2013		-0.3391	***	-0.0136		-14.8324	***	0.0571
	0.0175		0.1566		0.0794		0.0573		2.6044		0.0876
TAX	0.0007		0.0082		0.0027		0.0026		0.1039		-0.0014

	Dependent variable: ROA			Dependent variable: ROE			Dependent variable: Tobin Q		
	(1)		(2)	(3)		(4)		(5)		(6)
	0.0014		0.0082	0.0038		0.0036		0.1762		0.0032
RISK	0.0000		0.0000	0.0000	***	0.0000		0.0002	***	0.0000
	0.0000		0.0000	0.0000		0.0000		0.0000		0.0000
INV	3.3422	***	-1.4348	-0.3334	**	-1.4605	**	23.7772		-0.2268
	0.0244		0.8848	0.1511		0.7080		16.6965		0.2934
CASHF	4.2233		2.4233	1.6543		0.5819		2.4406		0.1068
	0.4888		0.422	0.1565		0.4271		0.3901		0.8087
LIQ	-0.2538	*	2.2343	1.7310	**	0.9158		107.5884	***	-0.0047
	0.1449		1.9035	0.7450		0.7241		22.0325		0.7808
SIZE	-0.0492	**	-0.0802	0.1905	**	-0.0702	*	4.3192	*	-0.0425
	0.0201		0.0848	0.0819		0.0409		2.6055		0.0546
L.ROA	-0.0068		0.2093							
	0.0809		0.1386							
L.ROE				0.0848	***	-0.0006				
				0.0304		0.1193				
L.TOBIN Q								0.0551		0.3896
								0.0352		0.2742
Constant	0.2295	**	-3.4268 *	2.0684	***	-1.0715		77.3154	***	1.9956 ***
	0.1055		2.0475	0.3041		0.6706		10.2518		0.7594
Observations	6,560		6,528	6,560		6,528		6,500		6,493
Wald Chi2	4530000.0		15.2	7888.6		20.61		3,326.07		458.230
Prob > Chi2	0.000		0	0.000		0.04		0.000		0.000
AR (1)	0.012		0.136	0.000		0.04		0.000		0.137
AR (2)	0.343		0.413	0.60		0.83		0.394		0.294
Hansen J test	0.130		0.71	0.19		0.10		0.76		0.10

4. Conclusions

This study represents a comprehensive study on the relationship between capital structure and firm performance from different perspectives including accounting and market based perspectives particularly in Malaysia as emerging market. Additionally, the various parts of this research examine the influence of global financial crisis during 2007-2009 on the relationship between capital structure and firm performance and also to investigate nonlinear relationship between capital structure and firm performance in Malaysia from 2005 to 2016.

Current study tried to use different proxies such as firm performance including accounting and market based proxies and also economic proxies. Present study utilized different method in comparison with previous studies. GMM model used as panel dynamic method to examine the relationship between capital structure and company's performance. As mentioned above current research used two accounting based performance measurement, including ROA, ROE and utilized Tobin'Q as the market-based performance. This study used different method for measuring capital structure include book value and market value method. The outcomes of this study provide evidence that confirms significant and negative relationships among Book value of Total debt ratio (TD/TA) and ROA, and ROE. Moreover, market values of the total debt ratio significantly and negatively affect ROA. The result of current research proved that global financial recession during 2007-2009 had a significant effect on the relationship between capital structure and firm performance. In this survey, we also investigated a nonlinear relationship between capital structure and company's performance in non-financial companies in Malaysia and found that an inverted U shaped relation (positive relationship) will be appeared when the capital structure was measured by book value of TD/TA and performance was measured by ROA, ROE, Tobins'Q. Also, there was a nonlinear relationship between the market value of total debt's ratio and ROE.

Finally, this paper contributes to the growing literature on studies of the relationship between capital structure and firm performance from different perspectives. The outcomes of this study are not consistent with developed market that demonstrated a positive relationship between capital structure and company's performance, but is in accordance with several researchers in the context of emerging markets (Abor, 2007; Enekwe *et al*., 2014; Velnampy and Niresh, 2012; Zeitun and Tian, 2007). The findings of this study provide implications for firms' management where they need to find the optimal capital structure, since suitable funding strategy may affect the firms' operations and increase companies' profitability in the future. Managers that are capable of recognizing the appropriate mixture of equities, debts and optimal capital structure, can minimize cost of financing, increase return, and also decrease the agency conflicts between

themselves and shareholders. From creditor's perspective, knowing the impact of capital structure on firm performance in emerging market helps banks to determine suitable strategies and specify the possibility of bankruptcy related to financially distressed companies. The future study is suggested to consider different measures of capital structure and firm performance to obtain more comprehensive results.

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