

DOES CEO EDUCATION INFLUENCE THE TARGET LEVERAGE AND SPEED OF ADJUSTMENT?

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Abstract:

This study addresses the importance of unobservable factor (CEO education) as the determinant of firm leverage along two stages: target leverage and speed of adjustment towards target leverage. Based on two-step GMM system, this study sheds light on the role of CEO education in these two stages and reveals how it influences the firms' total leverage, long-term leverage and short-term leverage. In the first stage, the results indicate that CEOs education is negatively associated with firms' leverage that measures by total leverage and long-term leverage; meanwhile, it has a positive impact on short-term leverage. In the second stage, CEOs' education is only positively related to the speed of adjustment towards short-term leverage. The reason for this is that when the cost of financial capital is high, highly educated CEOs are more entrenched to use more leverage. Furthermore, when the cost of adjustment is low, highly educated CEOs perceive that the benefits of adjusting towards target leverage exceed the costs of adjusting towards target leverage. The results are consistent with the Upper Echelons Theory regarding the reflection of the CEOs on the firms' strategic decisions. Taken together, this paper findings highlight the importance of considering unobservable factors into account when examining the firm leverage, which has received relatively little attention to date.

Keywords: CEOs' Education, Target Leverage, Speed of Adjustment towards Target Leverage (SOA), Dynamic Capital Structure, System GMM, Malaysia

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INTRODUCTION

A Chief Executive Officer (CEO) is a key person that makes the firms' strategic decisions, and often a qualified CEO is desirable by the firm owner in executing the necessary tasks that increase the shareholders' value. One of the factors that often represents the CEO qualification is CEO education as it signifies the cognitive ability and knowledge possessed by a CEO [1]. Highly educated CEOs have been proven as the determinant for a firm's success [2,3]; however, in finance studies, this unobservable factor has been largely overlooked in its relation with the firms' capital structure or leverage.

Responding to the issue, the management theory, namely Upper Echelon Theory, has long recognised that CEOs are the reflection of the firms' strategic decisions [1]. Meanwhile, the statistics from previous researchers also suggested a direct relationship between the CEO and the firms' leverage. For example, [4] as well as [5] clarified that the inclusion of CEO fixed effect in the capital structure model increased the adjusted R-square from 44% to 81.1% and 13.96% to 62.67% compared to that without the CEO fixed-effect, respectively. Nevertheless, the empirical findings regarding the direct relationship between CEO education and firms' capital structure remained scarce.

In examining the capital structure, studies focusing on the determinant of target leverage and speed of adjustment (hereafter, SOA) are necessary because the deviation from actual to target leverage represents the loss of firm value [6]. In addition, [7] indicated that a decrease of one unit in the SOA led to a decrease in firm performance by 28.36%. Besides, [8] asserted that true determinants of SOA have yet to be revealed. In this fact, past researchers have adjusted the static capital structure model to dynamic capital structure model (also known as first stage), then to speed of adjustment model (also known as second stage) for examining the determinants of target leverage and the determinants of the speed of adjustment toward target leverage [9-11]. Although the researchers considered both stages, the relationship between CEOs' education and capital structure remained under-investigated from this perspective. For example, [12-16] used the static trade-off model to study the relationship. Recently,

[17] as well as [18] developed a dynamic capital structure model that included the adjustment costs to examine the direct relationship between CEO and capital structure decisions. However, [17] only focused on CEO experience, whereas [18] focused on CEO power. Their model remained at the first stage of the investigation, making it insufficient in explaining the determinants of SOA from the CEO fixed-effect perspective.

Due to little studies investigating the direct influence of CEO education and capital structure from dynamic perspective, this study aims to fill the research gap. As an emerging country, Malaysia has several features that suit the purpose of investigation. First, Malaysia firms are operating under a concentrated ownership structure controlled by families and government [19,20]. This environment may pose different costs of capital compared to western countries since it is associated with high asymmetric information that may increase the costs of capital [21]. This suggests a need to investigate the target leverage and SOA determinants that reduce the effects of costs of capital in Malaysia. Since the CEO education represents the competency of managers in managing the firms, it is expected to influence firms' capital structure. [22] added that different financial market development in the emerging countries may impact the financial decision in different ways; hence, a study conducted by [4] in the USA context may not be generalised into the present study environment as different levels of SOA may influence the CEOs' managing style in a different way. Furthermore, this study used a more advanced econometric method (SYS-GMM) to generate efficient and consistent estimators compared to Fixed Effect Model employed by them.

Second, the external corporate governance in Malaysia is weaker compared to developed countries like the US and UK [23], while internal corporate governance in Malaysia has also been argued to be not as effective as the advanced countries [24]; thus, a study that investigates the competency of the CEOs based on education background in managing the firms operation is important, assuming that corporate governance is idle. Moreover, debt finance has been proclaimed as a better monitoring system that controls the entrenched manager behaviours in concentrated ownership firms. This signifies the

importance of investigating capital structure in Malaysia as if corporate governance failed to control the managers' discretion.

Third, the collectivist culture of decision making in Malaysia firms [25] may provide challenges for conducting an individualism (CEO) effect in making capital structure decisions. In such a culture, the CEOs may either follow to the top management team decisions or have no impact at all to the firms' decision since group decision making is more prevalent in the culture [17]. Nevertheless, the CEOs have the power to decide the final decisions of the firms; thus, the CEOs education is expected to have a direct impact on the firm target leverage and SOA decisions.

This study contributes to the dynamic capital structure in several ways. First, it shows the importance of unobservable factor (CEO education) in explaining the firms' target leverage and defining the SOA towards target leverage. Our results showed a negative relationship between highly educated CEOs and target leverage when the dependent variables were total leverage and long-term leverage, but positive when the dependent variable was short-term leverage, whereas highly educated CEOs were found positively related to the SOA towards short-term leverage. These differ from those of past studies like [10,11,26] assuming the CEO efficiency in the presence of corporate governance. This present study explicitly investigated the unobservable factors (CEO fixed effect) and showed a direct influence from CEO education to the target leverage and speed of adjustment decisions.

Second, this study integrates the Upper Echelon Theory and Dynamic Trade-off Theory to explain the relationship between CEO education and capital structure decision in a dynamic way within the [27] dynamic trade-off theory framework. Our findings portrayed an under-adjusted behaviour of Malaysia firms towards the target leverage, and the speed of adjustment towards target leverage was quicker when the recapitalisation cost is low. Meanwhile, highly educated CEOs were seen only to adjust quickly when the adjustment cost is low. These findings differ from [14] that investigated this relationship based on the static trade-off model and [21] that only examined the determinants of target leverage and SOA from the firm-level characteristics in Malaysia.

Third, the findings provide valuable information to the firms and policymakers concerning the academic qualifications of the CEOs that often become a prerequisite for a firm in hiring qualified CEOs. This study proved that the CEOs do not need to have a high educational level when deciding the capital structure of Malaysia firms, but in holding the educational level constant, the firms must find ways to reduce the cost of capital of leverage. Our results enhanced to the real-world practice regarding successful firms without higher education CEOs. For example, top CEOs in America such as Bill Gates and Mark Zuckerberg who have dropped out from college merely to start up their business; and in Malaysia, the successful CEOs like Tan Sri Dato' Seri Lim Goh Tong and Tan Sri Dato' Seri Yeoh Tiong Lay have only studied until secondary school.

The rest of the paper is organised as follows. Section 2 reviews the theories and empirical findings from previous studies and develops the hypotheses. Section 3 describes the estimation methodology. Section 4 discusses the findings and results of the study. Finally, Section 5 concludes the study.

RELATED LITERATURE

According to the Upper Echelons Theory (UET) [1], the CEO is the reflection of the firms performance. This is because their value and cognitive bases influence the perception of the perceived information. As it is hard to observed the value and cognitive bases of the CEO, the observable characteristics have been used to proxy the CEO personality. One of the characteristics that often applied as to represent CEO competency is CEO education. CEO education is the history of educational background obtained by a CEO [28]. Based on

human resource view, [29] argued that CEOs with high education background are valuable to their company as they have good cognitive ability, capacity for decision processing, high tolerance for ambiguity and propensity or receptivity to innovation, which will equip them with effective solutions for complex decision-making tasks. Different education backgrounds bring management to different viewpoints, perspectives, as well as cognitive paradigms and different professional development [30], in which their knowledge, ability, and intellect help them better understand firms' operation and deal with challenging intellectual activities [31]. CEO education also represents the valuable information that a CEO can exchange and share with their friends or members within the social or alumni network during the schooling period [2,32-34]. Other than that, highly educated CEOs are less risk-averse compared to low educated CEOs because they can tolerate the ambiguity generated from the risk-taking activities [12,14,35].

However, highly educated CEOs may inversely impact the firms' performance when the CEOs perceived that the education is an investment that they made for themselves, thus would expect a higher return for their high education level [13]. In such circumstances, they would be more cautious concerning risky financial strategies. Besides, [34] mentioned that highly educated CEOs are likely to engage in self-serving activities, spend more money on research and development activities, have high self-confidence, and take too much risks during decision-making processes. CEO education may impact the firm capital structure because CEOs with higher education are overconfident in making decisions [14], which have been argued to use more internal funding compared to external funding (debt and equity) [36]. According to [37], overconfident CEOs tend to choose short-maturity debt due to the high risk of long-term debt.

Past studies revealed that CEO education could impact various firms' strategic decisions. For instance, research and development spending [38], capital expenditure, dividend pay-out [12], environmental information disclosure [39], acquisition decisions, firm growth [40], diversification, investment cash flow sensitivity [41], volatility of corporate earnings [13], risk-taking activities [30], short-term operating performance [31], current performance [42] and future performance [2].

In its relations with capital structure decisions, [12] [USA] concluded that CEOs with an MBA degree in the US firms, on average, follow more aggressive strategies by holding more debts. [2] used the meta-analytic method and showed that formal education does not influence firm leverage. In a developing country, [15] [Kenya] studied the relationship between CEO education and capital structure and reported an insignificant relationship between both variables from 2008 to 2013. In Asia, [13] [China] related the CEO education with capital structure decision, revealing that highly educated CEOs in China used low leverage. [16] exhibited that CEOs with a postgraduate degree had chosen a higher level of financial leverage for Thailand firms from 2001 to 2005. All these studies used a static trade-off model to examine the relationship between CEO education and capital structure.

In Malaysia, [14] concluded that CEOs with a higher education preferred to employ more debt using the static trade-off theory, whereas [43] used more realistic to the real world capital structure theory to examine this relationship, in which based on the dynamic trade-off model from year 2008 to 2012, [43] found that the increase in education level increased firms' debt level.

Next, [4] were among the researchers that took deeper steps to study the influence of CEO education on the target leverage and SOA. Using the Fixed Effect estimation method, [4] discovered a positive relationship between CEO with MBA education and firms' target leverage as well as increased firms' adjustment towards target leverage by 9% for the US firms.

The studies of dynamic capital structure began with the concept of transaction costs of recapitalisation that prevent instantaneous adjustment towards the target capital structure [27]. The dynamic capital structure was divided into two stages. In the first stage, the researchers included a lagged leverage into the static trade-off capital structure model (STOT), generating a dynamic trade-off capital structure model (DTOT) that accounted for the dynamic nature of the leverage. The main focus of DTOT is the average SOA of a firm; normally, the target leverage is attributed by the firms characteristics and macroeconomic variables.

To date, majority of the past studies either remained at the STOT or DTOT model, with not many of them developed into the SOA model. For example, [44] [USA], who developed a partial adjustment model to investigate the SOA and determinant target leverage in one step, reported an average SOA of 34.4%. By using different estimation models, [45] reported an average SOA of 17%, 39%, and 25% for all firms in Compustat based on Pooled OLS, firm fixed effects, and GMM, respectively. By using a larger sample set, [46] found that different countries have different average SOA, specifically 25%-45%, 41%-65%, and 39-60% for Asia, Europe, and the USA firms, respectively. [22] as well as [47] mentioned that the differences in institutional settings led to the heterogeneous of SOA. In developing countries, [48] [China] exhibited an average SOA of 36.7%, [49] [African countries] reported an average SOA of 57.3%, whereas [22] [Nigeria] documented an average SOA of 68.2%.

In Malaysia, [50] reported an average SOA of 57% for Malaysia firms from 2000 to 2009 using the SYS-GMM. [21] investigated the average SOA from 2000 to 2009 and documented an adjustment speed of 69.97% towards the target debt ratio for Malaysian firms. Then, [51] showed a difference in average SOA of 28% when they considered the political patronage. In another study, [52] mentioned that firm characteristic, macroeconomic variables, and industry factors were the attributes of target leverage with an average SOA of 39.48%. Meanwhile, [53] added ownership concentration as the variable to represent the target leverage, which discovered that Malaysian firms adjusted approximately 21% to 26% per year from the year 2004 to 2013. Recently, [54] reported an adjustment cost (SOA) variable of 0.5930 (40.7%) using the fixed effect model. These past empirical studies exhibited the existence of adjustment costs in the capital structure decisions, and the heterogeneity of the adjustments motivated the past studies to further incorporate the speed of adjustment model when investigating capital structure decisions.

In the second stage, the dynamic trade-off capital structure model was developed into the speed of adjustment model (SOA) to study the determinants of the SOA. Traditionally, researchers examined firm characteristics as the factors that determine the SOA [8,26,55,56]. Likewise, this study observed a similar trend in Malaysia. For example, [9] and [21] examined firm-level factors such as profitability, firm size, and firm growth as the determinant of SOA. Apart from that, macroeconomic factors have also been discussed as factors that influence the SOA [7,57,58].

Recently, these factors have been challenged by [59] asserting that the severity of agency conflict causes the firms to deviate from target leverage, where the greater the agency conflict, the slower the SOA towards target leverage. Corresponding to their study, 10,11 and 26 proved that good quality corporate governance could reduce the conflict and hence increase the SOA. Their study is related to this study in regards to the efficiency of managers in influencing the SOA, but managerial efficiency is depending on the quality of corporate governance. This indirect relationship provides an incentive for this paper to study the competency of the CEO in a direct way.

From the empirical evidence, this study revealed that a majority of empirical evidence showed that CEO education influences firm capital structure decisions, whereas the

evidence from Malaysia remained in the dynamic trade-off model. At the same time, the Upper Echelon Theory [1] suggested that the CEOs' characteristics influence the firm strategic decisions resulting in firm performance. Capital structure is one of the strategic decisions acquired by firms to support their strategic goal (market standing goals, innovation goals, and productivity goals), whereas, through an efficient allocation of capital structure, the firms' strategic goals can be achieved and ultimately influence the firms' value or performance. Therefore, this study conjectured that CEO education has a direct influence on the firm target capital structure and speed of adjustment towards target leverage. Hence, the following hypotheses were formulated as follow:

H1: There is a range of speed of adjustment towards target leverage in Malaysia.

H2: CEO education is statistically significant with target leverage in Malaysia.

H3: CEO education is statistically significant with the speed of adjustment towards target leverage in Malaysia.

METHODOLOGY

Data source

The sample of the top 150 largest firms was drawn from non-financial firms listed on the Bursa Malaysia based on the highest market capitalisation as at 31 December 2017. These firms have covered 91.04% of the total market capitalisation. Initially, the total firms were 845; then, this study eliminated 146 financial firms (financial services, insurance, and REIT firms) and left out with 699 non-financial firms. In addition, 50 firms do not consist of full information on the CEO education information and financial data. Finally, the total firms included were the 100 largest non-financial firms from the year 2007 to 2017.

Estimation Models and Techniques

To reach the study objectives, the estimation model was divided into two stages. In the first stage, the average SOA and determinants of the target leverage were estimated using a dynamic capital structure model. In this study, the target (optimal) leverage was assumed as an attribute of CEO education and firm characteristics - firm size, profitability, growth, tangibility, and non-debt tax shield. These were written accordingly in the following equation:

$$LEV_{it}^* = \sum_{j=1}^k \beta_j X_{jit} + \mu_{it} \quad (1)$$

In a frictionless market, the target leverage is equal to the actual leverage, $LEV_{it} = LEV_{it}^*$. However, in an imperfect capital market, target leverage is unequal to the actual leverage because the existence of recapitalisation costs prevents an instantaneous adjustment from the actual leverage to the target leverage [27], in which the changes in actual leverage from the previous period is no longer equal to the changes in the current period $LEV_{it} - LEV_{it-1} \neq LEV_{it}^* - LEV_{it-1}^*$; thus, the firms were deviated from the optimal level of leverage. The deviation was represented by γ , which was written as follows:

$$LEV_{it} - LEV_{it-1} = \gamma_{it}(LEV_{it}^* - LEV_{it-1}^*) \quad (2)$$

Where LEV_{it} and LEV_{it-1} are the leverage for firm i in periods t and $t-1$, while γ_{it} indicates the SOA towards the target leverage. The value of γ is based on the restriction $|\gamma| < 1$, which is a condition that LEV_{it-1} tends to LEV_{it}^* as $t \rightarrow \infty$ [9,58]. The value is equal to 1 if the adjustment is complete, meaning that the deviation is closed within one period. The value will be less than 1 if the adjustment is below than the target leverage at time t , and vice versa [9].

To derive the reduced form partial adjustment model, Equation 1 and 2 were combined:

$$LEV_{it} = LEV_{it-1} + \gamma_{it}(LEV_{it}^* - LEV_{it-1}^*) \quad (3)$$

$$LEV_{it} = LEV_{it-1} + \gamma_{it}LEV_{it}^* - \gamma_{it}LEV_{it-1}^* \quad (4)$$

$$LEV_{it} = (1 - \gamma)LEV_{it-1} + \gamma_{it}LEV_{it}^* \quad (5)$$

$$LEV_{it} = (1 - \gamma)LEV_{it-1} + \gamma_{it} (\sum_{j=1}^L \beta_j X_{jit} + \mu_{it}) \quad (6)$$

$$LEV_{it} = (1 - \gamma)LEV_{it-1} + \sum_{j=1}^L \gamma_{it} \beta_j X_{jit} + \gamma_{it} \mu_{it} \quad (7)$$

Rewritten Equation 7, the following Equation 8 was obtained to test the Hypothesis 1:

$$LEV_{it}^* = \lambda_0 LEV_{it-1} + \sum_{j=1}^L \lambda_j X_{jit} + \omega_{it} \quad (8)$$

Where λ_0 is the SOA measured by $1 - \gamma_{it}$; $\lambda_j = \gamma_{it} \beta_j$ and $\omega_{it} = \gamma_{it} \mu_{it}$.

In the second stage, the SOA model was developed to investigate the SOA determinant. The speed of adjustment determinant was labelled with Z_{it} that represents the CEOs' education and firms' characteristics. Mathematically, it was written as follows:

$$\gamma_{it} = \alpha_0 + \alpha_j Z_{it}$$

(9)

Rewriting the dynamic model in Equation 3, treating target leverage, LEV_{it}^* as linearly dependent from the capital structure determinants as specified in Equation 2 and substituting the linear specification of adjustment speed, γ_{it} , from Equation 9, this study obtained the following equation for leverage ratio at time t:

$$LEV_{it} = \gamma_{it} LEV_{it}^* + (1 - \gamma_{it}) LEV_{it-1} + \mu_{it}$$

$$= (1 - \alpha_0 - \alpha_j Z_{it}) LEV_{it-1} + (\alpha_0 + \alpha_j Z_{it}) (\sum_{j=1}^L \beta_j X_{jit}) + \mu_{it} \quad (10)$$

Where μ_{it} is the error term. By multiplying Equation 10, this study arrived with Equation 11, a speed of adjustment model used to investigate the determinants of speed of adjustment towards the target leverage.

$$LEV_{it} = (1 - \alpha_0) LEV_{it-1} - \alpha_j Z_{it} LEV_{it-1} + \alpha_0 \sum_{j=1}^L \beta_j X_{jit} + \alpha_j \sum_{j=1}^L \beta_j Z_{it} X_{jit} + \mu_{it}$$

(11)

The primary concerns of Equation 11 are the α_j parameters, the coefficients of the interaction term between the explanatory variables as in Equation 9 and lagged leverage, which is $Z_{it} LEV_{it-1}$. As seen from the equation, the parameters were in negative sign, prompting the interpretation of the results to be done in an opposite manner. Specifically, positive sign signifies an inverse relationship of the CEOs education and speed of leverage adjustment and vice versa.

In the dynamic model where the lagged dependent variable is also one of the explanatory variables like the dynamic capital structure and SOA model, the econometric literature suggested the use of system generalised method of moments (SYS-GMM). SYS-GMM is a method introduced by [60]. The system enables the generation of consistent and efficient estimators as it controls the short panel bias and unobserved heterogeneity across firms that may not be captured by the Ordinary Least Squares (OLS) and Fixed-effect Model (FEM) if the dynamic model is applied [61,62].

The consistency of the two-step SYSGMM depends on three specification tests, namely the Wald-test, Sargan test, and Second-Order Autocorrelation test (AR2). If the Wald-tests (p-value is lesser than 0.05, the CEO education and firm characteristics variables can be considered as the explanatory variables of leverage. If the Sargan test p-value is greater than 0.05, the instruments used are valid. Meanwhile, the second-order autocorrelation (AR(2)) p-value must be larger than 0.05 to demonstrate the absence of second-order autocorrelation in the models. If all these tests are satisfied, the dynamic capital structure and SOA model can be considered well-specified. In this study, all the regression models have passed on the test; thus, the present regression models were well-specified.

Proxy of Leverage

This study used the book value leverage because it is not affected by outside factors that are not under the firm's direct control including the stock price fluctuations [17,63]. Furthermore, book value leverage is better in reflecting the management target leverage ratios than market value leverage [57,64,65]. Other than that, [66] showed that it is more accurate in estimating the speed of adjustment towards the target leverage than the market value leverage.

Following [49], this study used the book value leverage to investigate the determinants of target leverage and speed of adjustment. The book value leverage is proxy by three measures, which include total debt (TD) measured by book value of total debt to total assets ratio, long-term debt (LTD) measured by book value of long-term debt to total assets ratio and short-term debt (STD) measured by book value of short-term debt to total assets ratio. The first estimation was applied for the main estimation, whereas the latter two were tested as the robustness of the regression results. Although the measurement of leverage is strictly referred to long-term debt, this study also considered short-term debt as it constitutes around 26.01% of the total debt in our sample. In this regard, one must aware on the probability of diversion in the regression result for the reason that the costs of capital and the risk of default for short-term debt are lower compared to long-term debt, and it is claimed as a better mechanism to discipline the managers since it has shorter maturity commitment [67-70]. According to [71], the adjustment cost of long-term debt is higher compared to short-term debt because it is difficult to alter the long-term debt in the short run.

Explanatory Variables

To estimate the first regression and second regressions, the independent variable, which is CEO education (CEOEDU), was measured by the five-point rating scale adopted from [71]. A rating scale was applied rather than the dummy variable of zero since one is to avoid the dummy trap. In addition, this measurement is more suitable for the educational background of Malaysia. The five-point rating was 1 = Diploma and lower, 2 = Bachelor's degree, 3 = Professional qualification, 4 = Master's degree, and 5 = Doctorate. For the control variables, this study included firm size (SIZE) measured by Natural log of Total Assets, tangibility (TANG) measured by tangible fixed assets to total assets ratio, profitability (PROF) measured by earnings before interest and taxes to total assets ratio, non-debt tax shield (NDTS) measured by depreciation to total assets ratio and growth (GROWTH) measured by market to book value ratio. According to [26], these five firm's characteristics can sufficiently estimate the SOA and act as the determinant of target leverage. In addition, past studies conducted in Malaysia showed the importance of all these characteristics as the determinants of firm leverage in the capital structure regression model [21,50,52-54].

In this study, the time-varying common factor was controlled with the year fixed effect and heterogeneity of industry while making capital structure decisions with the industry effect. [17]. Both were measured by a dummy variable of 1 to respective years and industries, while zero otherwise.

ANALYSIS AND FINDINGS

Descriptive statistics and pairwise correlation

Table 1 reports the characteristics of the dependent and explanatory variables used in this study. Based on Table 1, the mean value of total leverage (TD) was 22.34%, whereas the mean value of long-term leverage (LTD) was 13.60%, and short-term leverage (STD) was 5.81%. The result indicates that Malaysia used more long-term debt compared to short-term debt to support firms' operation. This may be due to the increasing development trend of the debt market in Malaysia in recent years. As observed from the table, the mean values of all the dependent variables except SIZE were greater than the

median value, and these variables were positively skewed, whereas the firm's size was negatively skewed for Malaysia.

As suggested by [72], this study first performed the Pearson's Correlation tests for checking the multicollinearity problem of the variables, followed by Variance of Inflating Factor (VIF) to confirm the validity of the results. For the variables to be free from multicollinearity problems, they must have a value below

than 0.6 in absolute terms [73]. As shown in the Table, the variables have no multicollinearity issues with the coefficients of less than 0.6. Next, the sample data VIF value was less than 10 (mean VIF = 1.22), suggesting that these variables did not suffer from a multicollinearity problem. This is consistent with Pearson's correlation results; thus, no variables were excluded from the multivariate analysis [74].

Table 1. Descriptive Statistics

Variables	Min	Max	Mean	Median	S.D.
TD	0.0000	0.7722	0.2234	0.2095	0.1734
LTD	0.0000	0.7094	0.1306	0.0835	0.1421
STD	0.0000	0.5185	0.0581	0.0166	0.0935
SIZE	8.1371	16.5605	12.8318	12.8393	1.5215
TANG	0.0006	0.9208	0.3626	0.3426	0.2020
PROF	-0.4143	1.0542	0.1104	0.0943	0.1165
NDTS	0.0001	0.2883	0.0284	0.0241	0.0250
GROWTH	0.1800	157.3900	3.1639	1.6400	7.7937
CEOEDU	1.0000	5.0000	2.6800	2.0000	1.1444

Note: This table reports the characteristics of the variables. Observations (N) = 1100.

Table 2. Pearson's Correlation and Variance of Inflating Factors (VIFs) Results

	TD	LTD	STD	SIZE	TANG	PROF	NDTS	GROWTH	CEOEDU	VIF
TD	1									
LTD	0.7896 ^a	1								
STD	0.3972 ^a	-0.1563 ^a	1							
SIZE	0.3410 ^a	0.3261 ^a	0.1018 ^a	1						1.09
TANG	0.0039	0.0199	-0.0072	0.1487 ^a	1					1.44
PROF	-0.1891 ^a	-0.1481 ^a	-0.0832 ^a	0.0322	-0.0387	1				1.50
NDTS	-0.1936 ^a	-0.1472 ^a	-0.1099 ^a	0.0329	0.4909 ^a	0.2014 ^a	1			1.72
GROWTH	0.0183	0.0262	-0.0576	0.1010 ^a	0.0237	0.5666 ^a	0.4191 ^a	1		1.80
CEOEDU	0.1461 ^a	0.1438 ^a	0.0110	0.2098 ^a	0.1015 ^a	-0.0758 ^a	0.0990 ^a	0.0257	1	1.07
								Mean VIF		1.44

Note: This table presents pair-wise correlation coefficients and variance inflating factors (VIFs) results. Observations (N) = 1100.^{a&b} indicate the significance at 1% and 5%, respectively.

The Determinants and Average Speed of Adjustment towards Target leverage Results

The result in Table 3 shows that firms adjusted quicker towards the short-term debt compared to long-term debt and total debt as a result from the disciplinary effect of the short-term debt and low financing costs of short-term debt. Specifically, the firms adjusted at an average SOA of 31.53%, 31.34% and 45.80% for TD, LTD and STD, respectively, without the inclusion of managerial education in the regression model. When CEO education was integrated into the model of this study, the average SOA was altered to 35.19%, 37.90%, and 55.24%, for TD, LTD and STD, respectively. This shows that the conventional studies that overlooked the CEO characteristics may have caused the past studies to document the different level of SOA, and since the CEO education is statistically significant, it can be a potential determinant for the target leverage in Malaysia firms. The result is also supported by the adjusted R-squared results. The results of this study signified higher adjustment costs for long-term debt compared to short-term debt. Since the results were shown for the under-adjusted behaviour of Malaysia firms, this study failed to reject H1.

The regression results show that CEO education has negatively impacted the firms target total debt and long-term debt, but positively impacted the target short-term debt. These suggest that highly educated CEOs aim at less than optimal total debt and long-term debt, but higher than optimal short-term debt. This result is consistent with this study prediction that the use of long-term debt and short-term debt bring different results due to different properties of both measurements. In addition, the UET theory [1] stated that CEO education reflects to the firm capital structure decisions, which is aligned with this study expectation that CEO education has influence on the capital structure decision.

The present result is consistent with [13] reporting that highly educated CEOs employed less debt in the Chinese firms. The plausible justification for such relationship is that highly educated CEOs are more restrained to make risk related strategies since they perceive education as a self-investment they made on themselves and must be compensated with commensurate return. However, the usage of debt increases financial risk that is likely to jeopardise the firms' return on investment, hence making them to use less debt. Apart from

that, the negative relationship between CEO education and short-term debt indicates the overconfidence behaviour of highly educated CEOs in making the leverage for Malaysia firms. They tend to use hierarchical preferences to make leverage decisions. This is in line with [37] that documented a decrease (increases) in preference for long-term debt (short-term debt) when the CEOs are overconfidence for Malaysia firms. Since the CEO education was statistically significant, this study thus accepted H2.

As for the control variables, larger firms, more tangible asset firms, and higher growth firms have higher target total debt and long-term debt, whereas profitable firms have more non-debt tax shield associated with lower target debt and long-term debt. In the meantime, the attribute for target short-term debt was slightly different from the long-term and total debt in which only profitability and tangibility have significant coefficients.

Table 3. The Determinants of Target Leverage and the Average Speed of Adjustment towards Target Leverage Results

Variables	TD (main result)		LTD		STD	
SOA (1 - γ)	0.3153	0.3519	0.3134	0.3790	0.4580	0.5524
TD _{it-1}	0.6847 ^a (31.03)	0.6481 ^a (28.97)				
LTD _{it-1}			0.6866 ^a (33.91)	0.6210 ^a (32.27)		
STD _{it-1}					0.5420 ^a (11.21)	0.4476 ^a (21.88)
Half-life [ln(0.5)/ln (γ)]	1.83	1.60	1.44	1.45	1.13	0.86
CEOEDU		-0.0074 ^b (-1.99)		-0.0079 ^a (-2.99)		0.0081 ^a (2.67)
SIZE	0.0397 ^a (6.83)	0.0528 ^a (12.44)	0.0448 ^a (6.73)	0.0312 ^a (4.21)	-0.0061 (-0.99)	0.0004 (0.10)
TANG	0.0997 ^a (3.94)	0.0847 ^a (3.33)	0.1128 ^a (3.02)	0.1213 ^a (5.85)	-0.1047 (-1.74)	-0.0459 ^b (-1.97)
PROF	-0.3353 ^a (-7.19)	-0.4228 ^a (-15.56)	-0.2369 ^a (-9.29)	-0.2520 ^a (-9.19)	-0.1098 ^b (-2.23)	-0.1588 ^a (-7.29)
NDS	-1.4158 ^a (-5.82)	-2.0817 ^a (-10.63)	-1.6736 ^a (-6.59)	-1.2904 ^a (-0.34)	-0.3905 (-1.09)	0.0874 (1.68)
GROWTH	0.0023 ^a (6.58)	0.0037 ^a (9.20)	0.0029 ^a (9.00)	0.0021 ^a (13.31)	-0.0004 (-1.07)	-0.0007 (-0.89)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
AR(1) p-value	0.0001	0.0000	0.0000	0.0000	0.0024	0.0011
AR(2) p-value	0.0675	0.1551	0.7775	0.1713	0.0514	0.1715
Sargan test p-value	0.5624	0.5402	0.6010	0.3558	0.1356	0.4156
Wald Test p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Instruments	74	85	78	68	52	68

Notes: This table presents the results for H1 and H2. All the models were estimated using two-step system generalised method of moments (Stata "xtgpd" command). Figures in brackets are t-statistics. ^a and ^b indicate significance at 1% and 5 % level, respectively.

The Determinants of Speed of Adjustment Results

Table 4 shows that CEO education was insignificant with both the SOA towards TD and LTD, but significant with SOA towards STD. The negative sign indicates a positive relationship between CEO education with the SOA towards STD. The plausible justification is that highly educated CEOs perceive that the benefit of adjusting towards short-term debt is larger than the costs of adjusting towards STD, thus choosing to revert back to the optimal leverage quickly. The results also signify that when the firms are managed by the

highly educated CEOs, agency conflict between shareholders and manager reduces, hence managers' capital structure goal will be aligned with the shareholders at optimal leverage. However, since the CEO education was insignificant with SOA towards TD and LTD, this study conjectured that highly educated CEOs only adjust when the adjustment cost is low. The result is supported with UET posited that the leaders' education may reflect to the firms' strategic decisions, which is consistent with the prediction of this study regarding the

significant relationship between CEO education and SOA towards target leverage.

The result is in line with [4] documented a quicker adjustment towards target leverage for the US firms when the managers had MBA education using the fixed effect estimation model. It is also analogous with [30] reported for higher risk-taking activities for firms managed by CEOs with master and PhD as they are better informed with external environment. In addition, the insignificant relationship is comparable to [2] meta-analytic study regarding the relationship between CEO education and capital structure decision based on static model. Nevertheless, this study result is inconsistent with [41] who reported an inverse relationship between investment cash

flow sensitivity and CEO with financial education in the US firms. Since the results were only statistically significant with SOA towards STD, this study marginally accepted H3.

For the control variables, larger firms were seen adjusted slower to the target total debt. Firms with higher amount of tangible assets adjusted slower towards target total debt and long-term debt, but quicker towards short-term debt. Profitable firms preferred to adjust quicker towards target long-term debt and short-term debt. Firms that enjoyed higher amount of non-debt tax shield adjusted quicker towards long-term debt. Meanwhile, higher growth firms showed mix results where these firms adjusted quicker towards total debt, but slower towards long-term debt.

Table 4. The Determinants of Speed of Adjustment towards Target Leverage Results

Variables	SOA towards TD	SOA towards LTD	SOA towards STD
Lev _{it-1}	-0.8150 ^a (-2.86)	1.0826 ^a (5.36)	1.3406 ^a (14.75)
Lev _{it-1} X CEOEDU	-0.1167 (-1.19)	-0.0059 (-0.43 0)	-0.4722 ^a (-18.87)
Lev _{it-1} X SIZE	0.1359 ^a (5.78)	-0.0295 (-1.73)	0.0034 (1.84)
Lev _{it-1} X TANG	0.4047 ^b (1.96)	0.7317 ^a (5.41)	-0.1899 ^a (-3.73)
Lev _{it-1} X PROF	0.2848 (0.78)	-0.3896 ^a (-4.12)	-0.2680 ^b (-2.26)
Lev _{it-1} X NDTS	1.6987 (0.74)	-7.5383 ^a (-5.18)	0.3165 (0.42)
Lev _{it-1} X GROWTH	-0.0135 ^a (-3.10)	0.0034 ^b (2.28)	0.0018 (0.45)
Year dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
AR(1) p-value	0.0000	0.0000	0.0022
AR(2) p-value	0.1077	0.3266	0.3114
Sargan test p-value	0.3518	0.1144	0.2846
Wald Test p-value	0.0000	0.0000	0.0000
Instruments	93	99	97

Notes: This table presents the results for H3. All the models were estimated using two-step System Generalised Method of Moments (Stata "xtgpd" command). Figures in brackets are t-statistics. ^a and ^b indicate significance at 1% and 5% level, respectively.

CONCLUSIONS

This study was aimed at examining the whether or not CEO education is the potential determinant on the dynamic capital structure. Using the top 100 largest firms in Malaysia from year 2007 to 2017, it has been found that CEO education was a potential determinant for the target leverage (first stage) as well as the speed of adjustment towards target leverage (second stage). This study has discovered that Malaysia is under-adjusted towards target leverage; this could be attributed by the firms managed by highly educated CEOs since they preferred for less debt, especially the total debt and long-term debt. Other than that, this study has revealed that the speed of adjustment can be affected by the CEO education only when the adjustment cost is low. By ascertaining the determinants of the target leverage and speed of adjustment added to the dynamic capital structure literature regarding the importance of managerial factors to influence the Malaysia firms' target leverage and speed of adjustment towards target leverage decisions. Specifically, the findings lend insights to the firms as well as policy makers in respect to the academic qualification of the CEOs. This characteristic is crucial in formulating capital structure decisions that minimise the cost of capital while attaining optimal capital structure.

Despite the valuable knowledge obtained, this study also has a few limitations. First, it only examined the top 100 firms in Malaysia. Thus, low sample size may reduce the generalisability of the findings. Nevertheless, these firms covered a significant portion of the firms listed in Bursa Malaysia, which make the findings relevant to other emerging countries with similar business environment. Second, this study has merely investigated on an unobservable factor (CEO education), while other factors such as ethnicity or busyness may also influence the capital structure decisions. Future study may build upon these limitations to offer fruitful empirical findings regarding this topic.

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