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## Article

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## Speed of Adjustment and Leverage Deviation - Cost of Equity Nexus: Evidence from Emerging Markets and Crisis

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### ABSTRACT

**Purpose:** This study investigates the impact of leverage deviation on the cost of equity under the specifically mentioned condition in ASEAN-5 considering the global financial crisis and the sensitivity of the cost of equity on leverage deviation.

**Design/methodology/approach:** This study employs the Generalized Least Square (GLS) model and the dynamic panel estimation based on the two-step difference GMM to analyze the data.

**Findings:** The regression analysis found deviated from the target leverage impact unfavorably on the firm's cost of equity. The results also show that the more sensitive the cost of equity is to the leverage deviation from the target, the faster the adjustment. However, firms will adjust their capital structure for a lower cost during the crisis. Additionally, it shows a compelling behavior in the relation between the sensitivity of the cost of equity to leverage deviation on the leverage speed of adjustments.

**Research limitations/implications:** The higher sensitivity of the cost of equity is to the leverage deviation from the target, the faster the adjustment. It implies that the disregard of heterogeneity in SOA will mislead the adjustment period to the target leverage.

**Originality/value:** Using manually collected data, this study provides empirical evidence on the importance of leverage deviation and the sensitivity of the cost of equity and the speed of adjustment to the target debt level to analyze capital structure decision in an enormous leverage usage in ASEAN. Second, this paper presents new evidence of the effect both in normal economic conditions and crisis periods, which is rarely examined in the ASEAN emerging market.

*Keywords: Dynamic Trade-off Theory, Leverage Deviation, Cost of Equity, Speed of Adjustment, Emerging Markets, Crisis*

## I. Introduction

The capital structure still becomes an interesting topic for further investigation. Initiated by Modigliani and Miller (1958), they found that the firms' capital

structure is irrelevant to evaluate a firm's value. Furthermore, the company's weighted average cost does not depend on its debt level with assumptions without considering bankruptcy costs, tax and agent charges. Traditional capital structure theories describe the option between debt and equity; however, they do not explain the use of various debt sources linked to the need, access and borrowing capacity (Orlova, Harper, and Sun, 2020).

The trade-off theory explains that when a company

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should decide its financial structure, it should scrutinize the benefit and cost of using debt (Marinsek, 2015). The static trade-off theory suggests that the company will have an optimal capital structure when marginal cost of debt financing equals to its benefits. This trade-off implies that the benefits of using debt is equal to its deadweight-cost of bankruptcy (Frank and Goyal, 2008). This static trade-off theory focuses on corporate taxes and bankruptcy consequences in determining capital structure (Kraus and Litzenberger, 1973). However, this static theory ignores the potential for a mean reversion of debt and financial structure change over time due to recapitalization costs. In contrast, the dynamic capital structure theory considers the debt ratio variation over time (Myers, 1984).

The dynamic trade-off theory introduced how to deal with the mean reversion problem in the static trade-off model. Thus, the company can follow and apply dynamic trade-off theory if it exhibits behavior that adjusts to the target leverage and if its deviation can be changed and gradually eliminated. Thus, the target adjustment hypothesis gets more empirical research support than the static trade-off theory or pecking order hypothesis (Frank and Goyal, 2008). The dynamic trade-off theory suggests that companies have a target of leverage and the level of debt held by each company trying to approach the expected debt target (Marinsek, 2015). However, the level of debt in the company is not always following the expected debt target. Zhou et al. (2016) classified the debt level as overleveraged and under-leveraged for a company with a debt level above the expected target and below the target, respectively. Therefore, there is a deviation from each company by reducing the actual leverage level ratio with the expected target leverage.

Previous studies found that leverage deviation has a positive and significant impact on the cost of equity. Then, for over-leveraged firms, the more sensitive the cost of equity capital, the lower the leverage deviation from the company's target leverage. Moreover, they also found that companies with a more sensitive cost of equity to leverage deviation will experience a faster adjustment towards the optimal capital structure. Using data from North America, Zhou et al. (2016)

found that leverage deviation positively impacts the cost of equity in overleveraged samples. This finding implies that increasing debt will bear high credit risk. Furthermore, Aflatooni and Khazaei (2020) find that leverage deviation is positively affected by asymmetry information.

Many previous studies examined the relationship between debt and equity, such as George and Hwang (2010). They found a negative relationship between debt and stock returns. Fama and French (1992) found the same conclusion that financial debt has a negative relationship with stock returns, but Dhaliwal (2006) found contradictory results. A study by Tulcana-Prieto and Lee (2019) examines internal and external determinants of the capital structure of large Korean firms. They found that the use of debt will decrease as increasing firm's profitability and liquidity. Additionally, Tao et al. (2017) found that the companies have a specific debt level ratio and a leverage target. Furthermore, An et al. (2021) found that foreign institutional firms positively affect the speed of adjustment to their leverage target. Thus, target leverage is a factor that must also be taken into account in researching capital structure to reduce the presence of cross-sectional heterogeneity.

Over time companies face financial surpluses or deficits. Thus, they need to adjust their capital structure with low transaction costs (Byoun, 2008). The speed of adjustment defines how quickly the company adjusts its current leverage level with optimal leverage. (Zhou et al., 2016). Adjustments that occur in this capital structure depend on direct transaction costs and company incentives to access the capital market for other reasons (Faulkender et al., 2012). Previous research found that the speed of adjusting the capital structure of companies that are in above-target debt conditions with a financial surplus is around 33%, the speed of adjusting the capital structure of companies that are in below-target debt conditions with financial deficits is around 20% (Byoun, 2008). According to Huang and Ritter (2009), Lemmon et al. (2008), and Welch (2004), the speed of adjustment (SOA) to target leverage varies significantly (Huang and Ritter, 2009; Lemmon et al., 2008; Welch, 2004). Although the theories can explain this phenomenon, it fails to explain cross-sectional heterogeneity in

its observations regarding capital structure, even though explaining heterogeneity in capital structure is still crucial (Welch, 2013). This study considers include speed of adjustment as a result of the sensitivity of the cost of equity.

The characteristics of the owner of the company also affect the capital structure that must be considered for use by the company (Dimitris Margaritis, Maria Psillaki, 2008). Most of the companies in East Asia have concentrated ownership (Clessens et al., 2002). In contrast to Canada and the US, most firms in East Asia are controlled by single ownership (Djankov and Lang, 2000; La Porta et al., 1999). So, the complexity of the companies in each country is also different. Companies with more concentrated ownership characteristics usually use higher debt in their capital structure (Margaritis and Psillaki, 2008).

The tremendous level of debt of firms in ASEAN makes this market an interesting place to examine its debt policy. They continuously increase their debt exposure, affecting the firms' capital structure and its impact on the cost of equity. Overall, corporate debt owned by ASEAN firms has a positive trend from 2010 to June 2018. This condition reflected by the ratio of external debt per Gross National Income (GNI) owned by ASEAN firms which exceeded the average of developing countries in 2016, which was 26%, except for the Philippines and Myanmar. The highest leverage poses by firms in Laos with an external debt to GNI ratio of 93.1%, followed by Malaysia in the second position at 69.6%, and Cambodia in the third position at 54.4%.

The discussion of capital structure cannot be separated from macroeconomic conditions, especially the threat of crisis. Goh et al. (2005) found the effect of the 1998 global financial crisis on Asian countries and the rest of the world (Dungey et al., 2015). Additionally, Jermias and Yigit (2019) found that companies must adjust their leverage to meet their need for financing during and after the financial crisis. Thus, it supposed that the crisis could create market uncertainty, impacting the capital structure (Balios et al., 2016; Proenca et al., 2014).

This paper extends Zhou et al. (2016) with particular

attention to corporate debt level in ASEAN countries. The unique condition of companies' debt composition in ASEAN countries makes this study different from previous studies on leverage. In line with Berger and Turtle (2011), this study also considers the influence of the global financial crisis on corporate debt and its impact on the cost of equity and leverage deviation from the target. Nevertheless, Zhou et al. (2016), only considered the pre-crisis period. Furthermore, the crisis also caused the share price to decline (Trunk and Stubelj, 2013). This condition enforces the firms to adjust their leverage to meet the need for debt and equity financing (Jermias and Yigit, 2019). Thus, this study incorporates the effect leverage deviation on the cost of equity and the effect of the sensitivity of the cost of equity on leverage deviation during the crisis periods. Thus, it will describe the company's behaviour in facing the global financial crisis. Considering the debt level of firms in ASEAN and the effect of the global financial crisis, this study would like to explore the leverage related issues of the firms in ASEAN by answering the below research objectives.

Motivated by the recent study by Zhou et al. (2016) on the effect of leverage deviation on the cost of equity, the purpose of this study is to examines the effect of leverage deviation on the cost of equity. Furthermore, this study evaluates the impact of the sensitivity of the cost of equity on leverage deviation. Both consider the normal condition and the effect of the financial crisis. Lastly, this study investigates the impact of the sensitivity of the cost of equity on the speed of leverage adjustment. This study found that leverage deviation positively affects the cost of equity in normal condition, but different results found in the period of the financial crisis. Furthermore, this study also found that the cost of equity's sensitivity to leverage deviation harms leverage deviation in reasonable condition. In contrast, the inverse effect found in the crisis period. Lastly, this study reveals that the more sensitive the cost of equity to leverage deviation, the faster adjustment to the target leverage.

This study contributes to the extant literature in two folds. First, it provides empirical evidence on the importance of leverage deviation and the sensitivity

of the cost of equity and the speed of adjustment to the target debt level to analyze capital structure decision in an enormous leverage usage in ASEAN. Second, this paper presents new evidence of the effect both in normal economic conditions and crisis periods, which is rarely examined in the ASEAN emerging market.

The reminder of this paper is structured as follows. Section 2 presents a brief review of the literature and hypothesis development, while Section 3 describes the research methodology, consist of sources of the data and empirical model development. Section 4 present results and discussion, and Section 5 conclude the paper.

## II. Literature Review and Hypotheses Development

### A. Leverage Deviation, Crisis, and the Cost of Equity

Leverage deviation stated as the difference between the level of debt and the target leverage of a company. A positive value indicates a level of debt that exceeds the target leverage, and a negative value indicates a level of debt that is lower than the company's target leverage (Zhou et al., 2016). Under the dynamic trade-off theory, each firm tried to obey its target capital structure. However, occasionally they cannot reach the target nor goes beyond the target. Earlier studies such as Zhou et al. (2016) confirmed a positive relation between leverage deviation and the cost of equity in an overleveraged firm. A positive relation between leverage and the cost of equity also proven by Dhaliwal et al. (2006) and Ippolito et al. (2012).

George and Hwang in 2010 found a negative relationship between debt and stock returns. This finding aligned with Fama and French's previous study in 1992, which found that stock returns and debt have a negative relationship. In contrast, Dhaliwal et al. (2006) and Ippolito (2012) found a positive relationship between debt and the cost of equity. It is undeniable that there is no empirical evidence to explain the relationship between debt and stock returns with

certainty (Gomes and Schmid, 2010). Adjustment of capital and other costs can prevent companies from reaching the capital structure's target level (Leary and Robert, 2005). Thus, companies are likely to experience a deviation from the optimal capital structure. This condition can result in heterogeneity of debts that are cross-sectionally observed (Korteweg, 2010). The intended heterogeneity incorporates using the difference in debt level approach with the target leverage (Ippolito et al., 2012). Therefore, the hypothesis is as follow.

**H1:** Leverage deviation has a positive effect on the cost of equity.

Furthermore, a study by Berger and Turtle (2011) found a mixed effect of the Asian Financial crisis on the US stock return. The crisis has a negative influence on the return of small stocks and vice versa. According to the agency theory by Jensen and Meckling (1976), there is a higher uncertainty in the crisis period, which cause lower stock returns. Thus, firms tend to adjust their debt to a lower ratio. Furthermore, Vo, et al. (2022) also found that firms adjusting to their target leverage is faster during a crisis. This situation puts the capital market as a provider as an alternative source of external capital, such as equity (Levine et al., 2016). Thus, the second hypothesis derived as follows.

**H2:** Leverage Deviation has a negative effect on the cost of equity during the financial crisis

### B. The Sensitivity of the Cost of Equity, Crisis and Leverage Deviation

Further analysis through a mathematical method by Zhou et al. (2016) suggest that the sensitivity of the cost of equity will change along with its changes in the company's level of debt. They also confirmed that the more sensitive the cost of equity, the smaller the leverage deviation from the debt target for companies with overleveraged conditions. However, there is no indication of an association between the sensitivity

of the cost of equity capital and the leverage deviation of firms underleveraged conditions. Albanez (2015) also found that companies tend to utilize more debt rather than equity under the condition of the high cost of equity. It is in line with the pecking order theory. So, the hypothesis is derived as follows.

**H3:** The sensitivity of the cost of equity affects leverage deviation.

Previous studies indicate that the financial crisis can create market uncertainty, which will affect the company's capital structure (Balios et al., 2016; Proenca et al., 2014, and Trinh and Phuong, 2016). Uncertain conditions and an increase in risk and decreased return expectations make borrowers reluctant to use long-term investment funding sources (Demirgunc-Kunt et al., 2015). Considering that debt usage in a financial crisis may affect the company's capital structure decision (Proenca et al., 2014), a crisis may affect the sensitivity of equity cost to leverage deviation differently. Thus, we proposed the fourth hypothesis as follows.

**H4:** The sensitivity of the cost of equity affect leverage deviation during the financial crisis.

### C. The Sensitivity of the Cost of Equity and Speed of Adjustment

Modigliani and Miller (1958) suggested a positive association between the cost of equity and leverage. Moreover, Zhou et al. (2016) expand the theory. They determined the effect of the sensitivity of the cost of equity to the speed of adjustment towards the target capital structure. The earlier study found that companies only make adjustments to the capital structure if the benefits obtained are higher than the costs incurred to balance the capital structure (Altinkilic and Hansen, 2000). The previous study also concluded that the more sensitive the cost of equity capital to leverage deviation, the smaller the leverage deviation of the target leverage for companies with over-leveraged conditions. Thus, the hypothesis is as follows.

**H5:** The more sensitive the cost of equity, the faster the speed of adjustment.

## III. Methodology

### A. Sample Selection and Variable Definition

The sample consists of 950 publicly traded ASEAN-5 (Indonesia, Malaysia, Singapore, Thailand, and the Philippines) non-financial firms. The dependent variable is the cost of equity, leverage (recorded debt), and leverage deviation. The cost of equity is measured by using the Capital Asset Pricing Model method, following Da et al. (2012).

$$\text{Cost of Equity} = R_f + \beta(E(R_m) - R_f) \quad (1)$$

Furthermore, since leverage deviation is defined as the difference between recorded debt and target leverage, finding the value of leverage deviation, the actual debt value, and the target leverage must be determined in advance. Therefore, to find the value of leverage deviation, we deducted target leverage from the recorded debt (Zhou et al., 2016, and Ippolito, et al., 2012). If the value is positive, then the company is called in an overleveraged condition. In contrast, if the result is negative, the company is in an underleveraged condition (Zhou et al., 2016. Ippolito et al., 2012). At the same time, recorded debt calculates as the ratio of total debt to total assets. We follow Zhou et al. (2016) to predict the target leverage for predicting the target leverage, which can be obtained by finding the fitted value of the annual cross-sectional regression of recorded debt with the determinant of capital structure with the following formula.

$$TL_{i,t} = \beta X_{i,t-1} + \epsilon_{i,t} \quad (2)$$

The independent variable used in this study is the levered the cost of equity. The formula is as follows.

$$\text{Levered } K_e = K_e + (K_e - K_d) * (1 - T_x) * TDebt$$

where  $K_e$  is the cost of equity,  $K_d$  is the cost of debt, and  $T_x$  is the corporate tax rate.

The independent variable includes the crisis period from 6th August 2007 to 14th May 2009 (Dungey et al. 2015) and the sensitivity of the cost of equity. Furthermore, some control variables are used to incorporate the firm-specific and macro-economic variables that may affect the cost of equity and leverage deviation. The variables definition and the formula are presented in Table 1.

To consider the different level of debt used by a firm, we separate the data into two sub-samples into over-leveraged and under-leveraged firms. These sub-samples are used to test model 1 and 2. Furthermore, we add a financial crisis in every model, represented in hypotheses 2 and 4, since the financial crisis may affect the capital structure (Balios et al., 2016; Proenca et al., 2014, and Truong and Nguyen, 2016). Thus, it would capture the heterogeneity of capital structure, leading to a more precise result. In addition, to test the third model, we divide the sample into two groups based on high and low levels of the sensitivity of the

cost of equity concerning the differences in speed of adjustment when the sensitivity of the cost of equity was higher (Zhou et al., 2016).

The analysis is divided into three sections. In the first part, we examine the impact of leverage deviation and leverage deviation in crisis period on the cost of equity. Second, we estimate the impact of the sensitivity of the cost of equity and the sensitivity of the cost of equity during the crisis on leverage deviation. Lastly, we investigate the effect of the sensitivity of the cost of equity on the speed of adjustment.

To obtain the best model, we conducted the Chow and Hausman tests to determine the sufficient model. We found that the GLS model is suitable for testing the first and second hypotheses and the fixed-effect model for testing hypotheses three and four. We also use the dynamic panel estimators based on a two-step difference Generalized Method of Moment (GMM) method developed by Arellano and Bond (1991) to avoid the endogenous effect that will lead to potential biases estimated coefficients. Table 1 describes the variables used in this study.

**Table 1.** Variables

| No | Variables                            | Definition  | Formula   | Source                |
|----|--------------------------------------|---|---|-----------------------|
| 1  | <i>Cost of Equity</i>                | Cost of equity financing  | $Rf + \beta(E(Rm) - Rf)$  | Zhi, et al, 2012      |
| 2  | <i>Levered Cost of Equity</i>        | Cost of equity which has been adjusted by leverage and tax                        | $Ke + (Ke - Kd) * (1 - Tx) * \text{Leverage Level}$                           | Zhou, et al, 2016     |
| 3  | <i>Leverage Level</i>                | Ratio of leverage financing   | $\text{Debt} / (\text{Total Asset})$  | Frank and Goyal, 2009 |
| 4  | <i>Target Leverage</i>               | Fitted Value from the target leverage estimation                                  | $TL_{i,t} = \beta X_{i,t-1} + \varepsilon_{i,t}$                              | Frank and Goyal, 2009 |
| 5  | <i>Sensitivity of Cost of equity</i> | Sensitivity of changes in cost of equity because of changes in leverage deviation | $(\text{Unlevered } Ke - Kd) * (1 - Tx)$                                      | Zhou, et al, 2016     |
| 6  | <i>Firm Risk</i>                     | Past 1-year stock liquidity   | $(\text{Std Dev of Daily Returns}) / (\text{Daily Returns Average})$          | Attig, et al, 2008    |
| 7  | <i>Ln Asset</i>                      | Natural Logarithm in Total Asset adjusted by GDP Level                            | $\ln ((\text{Total Assets}) / (\text{GDP Deflator 2007}))$                    | Frank and Goyal, 2009 |
| 8  | <i>Total Asset</i>                   | Total Asset adjusted by GDP Level   | $(\text{Total Assets}) / (\text{GDP Deflator 2007})$                          | Frank and Goyal, 2009 |
| 9  | <i>Stock Liquidity</i>               | Daily stock liquidity   | $(\text{Amount of non-missing value daily returns}) / (\text{Period Number})$ | Chen, et al, 2009     |
| 10 | <i>Tangibility</i>                   | Firm's Expenditure for expansion  | $(\text{Net PPE}) / (\text{Total Assets})$                                    | Frank and Goyal, 2009 |
| 11 | <i>Profitability</i>                 | Operating income in every asset used  | $(\text{Operating Income before Depreciation}) / (\text{Total Assets})$       | Frank and Goyal, 2009 |
| 12 | <i>Inflation</i>                     | Growth of CPI Indices   | $(CPI - CPI_{t-1}) / CPI_{t-1}$   | Frank and Goyal, 2009 |
| 13 | <i>Leverage Deviation</i>            | The difference of Leverage Level and Leverage Target                              | $\text{Leverage Level} - \text{Leverage Target}$                              | Zhou, et al, 2016     |

## B. Empirical Model

To test H1 and H2 we use the following model.

$$r_{E,t}^L = v + \rho r_{E,t-1}^L + \underset{\substack{\uparrow \\ \text{(H1)}}}{\varnothing} L_{i,t}^{Dev} + \pi \underset{\substack{\uparrow \\ \text{(H2)}}}{Crisisdummy_t} * L_{i,t}^{Dev} + \tau Controls_{i,t} + \epsilon_{i,t} \quad (1)$$

Where  $r_{E,t}^L$  is the cost of equity in year t, and  $L_{i,t}^{Dev}$  is leverage deviation in year t. In this study, control variables are a firm risk, firm size, and stock liquidity variables. The initial model (1) used in this study has not included the dynamic factor of cost of equity, so this study includes the lag of cost of equity in the independent variable because there may be a relationship of cost of equity in the past to the next period (Zhou et al., 2016). In addition,  $\pi Crisisdummy_t * L_{i,t}^{Dev}$  is used to examine the effect of leverage deviation on the cost of equity during a period of the financial crisis.

The test of H3 and H4 use the following model.

$$L_{i,t}^{Dev} = v + \rho \underset{\substack{\uparrow \\ \text{(H3)}}}{L_{i,t-1}^{Dev}} + \alpha \delta_{i,t} + \omega \underset{\substack{\uparrow \\ \text{(H4)}}}{Crisisdummy_t} * \delta_{i,t} + \psi Controls_{i,t} + \epsilon_{i,t} \quad (2)$$

The second model is established to test the third and fourth hypotheses. The second hypothesis's main focus lies in the value of  $\kappa$ , and the lag leverage variable deviation.  $\kappa$  shows the relationship between the sensitivity of the cost of equity to leverage deviation. A positive value is predicted to be obtained for sub-samples with underleveraged conditions. In contrast, negative value is expected to be obtained for sub-samples with overleveraged conditions (Zhou et al., 2016). Also,  $(\omega Crisisdummy)_t$  is used to consider the effect of the financial crisis on leverage deviation, and  $(\omega Crisisdummy)_t * \delta_{i,t}$  is used to examine the effect of cost of equity sensitivity on leverage deviation. The control variables used in model 2 are including tangibility, profitability, firm size, and inflation. To analyze the dynamic effect of the leverage, the model includes the lag leverage variable deviation.

This study examines how quickly the company adjusts the level of its capital structure. Furthermore, to deal with heterogeneity issue, this study divided the regression estimate into a total sample, low sensitivity (50% of the sample with the lowest cost of equity sensitivity), and high sensitivity of the cost of equity (50% of the sample with the highest cost of equity sensitivity). The cost of equity, which is more sensitive to leverage deviation, will have a faster adjustment speed. So, the hypothesis to be tested is whether the higher sensitivity of the cost of equity will cause a faster speed of adjustment. The previous study found that a firm will adjust the capital structure only if the benefits obtained are higher than the costs incurred to balance the capital structure (Altinkilic and Hansen, 2000). The previous study concluded that the more sensitive the cost of equity, the smaller the leverage deviation to the overleveraged companies' target leverage (Zhou et al., 2016).

To test hypothesis 5 we use the following model.

$$L_{i,t} = \underset{\substack{\uparrow \\ \text{(H5)}}}{(1-\lambda)} L_{i,t-1} + \beta Controls_{i,t} + \eta_{i,t} \quad (3)$$

The third model aims to test the fifth hypothesis. Thus, we would like to examine how the speed of adjustment heterogeneity occurs in firms with different conditions of equity capital cost. The speed of adjustment is obtained from (1- Lag Debt coefficient). The study will be divided into four quartiles from the quartile with the highest to lowest sensitivity and uses the partial adjustment model to control the endogeneity issue.

## IV. Results and Discussion

This section is focusing on descriptive statistics, the regression results and discussion. Table 2 shows the mean value, the dispersion and other statistical data of the sample. The leverage measures the firm's ability to pay off the debt so that the negative value of leverage shows a small exposure of debt in the firm. The cost



of equity is measured using the CAPM method. Because of the negative market return in 2009 as an impact of the Global Financial Crisis, the value of the cost of equity can be detrimental. This condition also documented by Da et al. (2012). the data is winsorized at 5% and 95% to exclude the outliers.

Table 2 shows that the debt level has an average value of 0.1, with a minimum value of -0.389 and a maximum of 0.615. This debt level variable has a standard deviation of 0.242. A minimum negative value indicates a low level of debt from the sample used in this study, like Delta Electronics, a company from Thailand with the lowest debt level. It indicates that the primary source of capital is equity—the highest value of 0.615 owned by Holcim Indonesia, which prefers debt to equity financing.

Furthermore, Leverage deviation, which is the independent variable in model 1 and the dependent variable in model 2, has an average of 0.099. The leverage deviation variable has a minimum value of -0.460 and has a maximum value of 0.640. The minimum value indicates the firm is underleveraged or below its optimal targets. A maximum value of 0.640 indicates there are companies with overleveraged conditions or above their optimal levels. This Leverage deviation variable is obtained from the reduction of the current leverage level with the target leverage resulting

from the fitted value of the regression estimation results of the Inflation, Tangibility, Profitability, and size for the leverage level of firms in ASEAN 5 (Indonesia, Malaysia, Singapore, Thailand, and the Philippines).

The mean value of the equity cost was 0.095, indicating that most of the ASEAN -5 used debt as their primary capital source. This variable is measured by considering the market return value. The minimum value of the cost of equity was -1.040. The cost of equity is measured as the stock return that is profoundly affected by the crisis, resulting in negative values. The third primary variable in this study is the sensitivity of the cost of equity. This variable has an average value of 0.041 and has a minimum value of -0.980 and a maximum value of 0.990. The standard deviation formed from the distribution of data on this variable is 0.25.

#### A. The Effect of Leverage Deviation and Leverage deviation during the Crisis on the Cost of Equity

Table 3 presents the regression results for hypothesis 1 and hypothesis 2. The estimation is conducted in two parts—the first part analyses subsample of overleveraged firms. The second part investigates underleveraged

**Table 2.** Descriptive statistics

| Variable                                      | Observation | Mean   | Std. Dev. | Min    | Max   |
|---|-------------|--------|-----------|--------|-------|
| <i>Leverage Deviation</i>                     | 12.350      | 0,099  | 0,256     | -0,46  | 0,64  |
| <i>Cost of Equity</i>                         | 12.350      | 0,095  | 0,292     | -1,04  | 1,28  |
| <i>Sensitivity of Cost of Equity</i>          | 12.350      | 0,041  | 0,25      | -0,98  | 0,99  |
| <i>Leverage Level</i>                         | 12.350      | 0,1    | 0,242     | -0,389 | 0,615 |
| <i>Firm Risk</i>                              | 12.350      | 0,162  | 0,105     | 0,02   | 0,51  |
| <i>Ln Firm Size</i>                           | 12.350      | 7,312  | 1,498     | 4,77   | 10,82 |
| <i>Liquidity</i>                              | 12.350      | 0,529  | 0,316     | 0,01   | 0,97  |
| <i>Tangibility</i>                            | 12.350      | 0,343  | 0,22      | 0,01   | 0,82  |
| <i>Profitability</i>                          | 12.350      | 0,104  | 0,084     | -0,07  | 0,32  |
| <i>Leverage Deviation x Crisis</i>            | 12.350      | 0,026  | 0,131     | -0,4   | 0,62  |
| <i>Sensitivity of Cost of Equity x Crisis</i> | 12.350      | -0,002 | 0,178     | -0,98  | 0,63  |
| <i>Inflation</i>                              | 12.350      | 0,032  | 0,024     | -0,01  | 0,13  |
| Total   | 950         |        |           |        |       |

firms. We found that the model using the GMM method is a valid model as indicated by the probability AR (2) and Probability (J-Statistics) value, which indicates no serial autocorrelation in the model.

The regression results in Table 3 show a positive and significant effect of the leverage deviation on equity costs. The effect is similar in the overleveraged and the underleveraged sub-samples using GLS. Besides, the result also similar in the under-leveraged firm using the GMM method. These results indicate that if the debt deviates from the target leverage, then the cost of equity will increase. These findings are consistent with the previous study by Zhou et al. (2016). The result implies that if there is an increase in the deviation of corporate debt, the firm must make adjustments to its investors by increasing the cost of equity. However, there is a different result between the GLS method and the GMM method in the underleveraged sub-sample. We apply the GMM method due to its advantages

of handling unobserved endogeneity and heterogeneity. We conclude that there is no influence of leverage deviation on the cost of equity for the underleveraged sub-sample. This finding indicates that when the level of debt decreases, the cost of equity decreases, and vice versa. This result aligns with studies previously conducted by Dhaliwal (2006) and Ippolito et al. (2012). It is also consistent with Yoo and Wu (2019), that found a negative correlation between leverage and capital stock because the cost of equity must increase to capture the risk of higher leverage.

We also found that in overleverage firms, the effect of leverage deviation on the cost of the equity is negative during the crisis period. This finding indicates that firms will adjust their capital structure for a lower cost. This finding is aligned with Howe and Jain (2010). They identify that when firms increase their use of debt during the crisis, it will reduce the returns for the shareholders. This condition can occur because

**Table 3.** The effect of leverage deviation and leverage deviation during the crisis on the cost of equity

| Variables (dep: <i>Cost of Equity</i> ) | <i>Sub sample Overleveraged Firms</i> |                        | <i>Sub sample Underleveraged Firms</i> |                         |
|---|---------------------------------------|------------------------|--|-------------------------|
|   | Baseline (GLS)                        | GMM Estimation         | Baseline (GLS)                         | GMM Estimation          |
| <i>Lag Cost of Equity</i>               |                                       | -0.9245***<br>(0.0812) |  | -1.2926***<br>(0.1604)  |
| <i>Leverage Deviation</i>               | 0.0622***<br>(0.01630)                | 3.5218***<br>-11.684   | 0.0619***<br>(0.01850)                 | 4,690277778<br>(0.6074) |
| <i>Leverage Deviation x Crisis</i>      | -0.0828**<br>(0.03310)                | -20.010***<br>-71.953  | 0.03000<br>(0.0394)                    | -10.380<br>-37.047      |
| <i>Firm Risk</i>                        | 0,227083333<br>(0.02900)              | -1.0745*<br>(0.6260)   | 0,253472222<br>(0.0337)                | -35.826<br>-24.244      |
| <i>Firm Size</i>                        | 0.00575***<br>(0.00194)               | -1.0218***<br>(0.2837) | 0.00557**<br>(0.0022)                  | -1.9951*<br>-10.900     |
| <i>Liquidity</i>                        | -0.0764***<br>(0.00930)               | -0.2921***<br>(0.1616) | -0.0419***<br>(0.0108)                 | 0.3174*<br>(0.1667)     |
| Observation                             | 8333                                  | 8333                   | 4017                                   | 4017                    |
| Firms number                            | 641                                   | 641                    | 309                                    | 309                     |
| Cons                                    | 0.0532***<br>(0.0182)                 |                        | 0.0528***<br>(0.0199)                  |                         |
| Prob AR (1)                             |                                       | 0.0011                 |  | 1,008333333             |
| Prob AR (2)                             |                                       | 0,304861111            |  | 0,151388889             |
| J-Statistics                            |                                       | 210.800                |  | 85.565                  |
| Prob(J-Statistics)                      |                                       | 0,495138889            |  | 0,507638889             |

when there is an increase in the level of corporate debt in times of crisis, there will be an increased risk of bankruptcy so that stock returns obtained by investors will decrease.

This result implies that companies with debt levels below their optimal targets have higher pressures during crisis conditions, so that company conditions are more uncertain than companies with debt above their optimal targets (George and Hwang (2010)). Thus, it makes the relationship between debt levels and the cost of the equity measures by stock return is negative. In terms of control variables, the study found a negative and significant effect of company risk on the cost of equity. The results are similar in both over and under-leveraged firms. This finding indicates that if the liquidity risk increases, the company will increase the debt, thereby reducing the return for the owner. Furthermore, this study also found a negative effect of firm size on the cost of equity. This finding implies that large firms generally have a lower level of risk, so the rate of return to investors is lower (Banz, 1981; Ibhagui and Okoloyo, 2018). Besides, the effect of liquidity on the cost of equity is negative in overleveraged firms. This finding demonstrates that firms with higher liquidity do not need additional equity. Therefore, it will reduce

the cost of equity, especially in over-leveraged firms. In contrast, under-leveraged firms will need more debt. Therefore, it will increase firm risk and the cost of equity.

## B. The Effect of the Sensitivity of the Cost of Equity and the Sensitivity of the Cost of Equity during the Crisis on Leverage Deviation

Table 4 shows that firms with overleveraged conditions experienced a negative and significant effect of the sensitivity of the cost of equity on leverage deviation both for the fixed-effect model and GMM estimation. This result indicates that the more sensitive the cost of equity, the deviation from the optimal debt use will decrease. The result implies that when there is an increase in the sensitivity of the cost of equity, the firm will adjust its debt to minimize the conflict of interest between shareholders and debt holders.

Theoretically, a potential conflict occurs between debt holders and equity holders (Jensen and Meckling, 1976). The conflict can occur since an increase in debt will increase agency costs from debt. After all, profits

**Table 4.** The effect of the sensitivity of the cost of equity and the sensitivity of the cost of equity during the crisis on leverage deviation

| Variable (Dependent variable:<br><i>Leverage Deviation</i> ) | <i>Sub sample Overleveraged Firms</i> |                       | <i>Sub sample Underleveraged Firms</i> |                       |
|--|---------------------------------------|-----------------------|--|-----------------------|
|  | Baseline<br>(Fixed Effect)            | GMM Estimation        | Baseline<br>(Fixed Effect)             | GMM Estimation        |
| <i>Lag L Dev</i>   |                                       | 0.5334***<br>(0.0644) |  | 0.4580***<br>(0.0448) |
| <i>Sensitivity Cost of Equity</i>                            | -0.0478***<br>(0.0140)                | -0.2925**<br>(0.0935) | -0.0827***<br>(0.0189)                 | 0.028<br>(0.1042)     |
| <i>Sensitivity Cost of Equity x Crisis</i>                   | 0.0394**<br>(0.0153)                  | 0.3716**<br>(0.1262)  | 0.0753***<br>(0.0222)                  | -0.054<br>(0.1446)    |
| <i>Profitability</i>   | -0.546***<br>(0.0591)                 | -0.8026**<br>(0.3213) | -0.475***<br>(0.0669)                  | -0.4232<br>(0.3115)   |
| <i>Tangibility</i>   | 0.218***<br>(0.0357)                  | 0.1852***<br>(0.0446) | 0.454***<br>(0.0561)                   | 0.4982***<br>(0.0455) |
| <i>Inflation</i>   | 0.486**<br>(0.2090)                   | 18.019<br>-15.226     | 0.913**<br>(0.3650)                    | 16.424<br>-16.055     |
| <i>Firm Size</i>   | 0.0714***<br>(0.0146)                 | 0.1838**<br>(0.0735)  | 0.0872***<br>(0.0186)                  | 0.2885***<br>(0.0464) |
| Observation  | 8333                                  | 8333                  | 4017                                   | 4017                  |

are borne by equity holders, while debt holders bear losses. Therefore, the firm will adjust the use of debt to minimize the conflict. The finding confirms the third hypothesis, that sensitivity of the cost of equity affects leverage deviation. The result is similar for the firm in underleveraged condition for the fixed effect model. However, we found a positive effect using the GMM estimation but insignificant. Thus, we can conclude that there is no significant effect of the sensitivity of the cost of the equity on leverage deviation in underleveraged firms.

This finding indicates that when overleveraged firms cost of equity is adjusted to alter the leverage deviation during the crisis, it will increase leverage deviation. The effect is similar for the underleveraged firms using the fixed effect model. However, there is a flipping effect when we use GMM estimation. The result indicates that although not significant, the effect of the sensitivity of the cost of the equity on leverage deviation is negative in the short run. Firms tend to choose a cheaper and optimal level of debt. The tendency is also relevant during crises, where the influence of leverage deviation on the cost of equity is negative. Thus, when companies increase debt, the cost of equity will be lower (George and Hwang, 2010). This condition occurs because companies with debt above the target have less systematic risk exposure than companies with smaller debts.

In a crisis, the capital structure becomes an important issue for the company (Yildiz, 2018). Boulton et al. (2014) suggest, a crisis is a very dynamic situation and high uncertainty, so there is a tendency for investors to secure their assets. Thus, as a precaution, the firm will try to make the investors feel safe by reducing debt and using equity to avoid the risk of default (Niemczak, 2013). Therefore, when the sensitivity of the cost of equity increases, it means that the increase in debt has an impact on the lower costs that the company must incur, so the company will increase the level of debt because it is cheaper than using lower debt (George and Hwang, 2010). This result implies that when underleveraged firms diverge their debt from the optimum level in the crisis period, the change of the equity cost will reduce the deviation in the

short run.

In terms of the effect of control variables on the leverage deviation, this study finds that profitability harms leverage deviation. This result indicates that firms with higher profits have less possibility of being distress (Frank and Goyal, 2009). This finding proof of the dynamic trade-off model, where profitability has a negative relationship with debt. Furthermore, the lower the likelihood of distress, and the fewer agency problems regarding debt, making a positive relation between tangibility and debt. This result indicates that firms with high business expansion will need more debt. Furthermore, we found that inflation has a positive effect on leverage deviation. This evidence shows that the more sensitive the cost of equity in conditions of high inflation, the company will add more debt.

### C. The Effect of the Sensitivity of the Cost of Equity and the Speed of Adjustment

The firm will adjust the existing conditions with the target capital structure to obtain the optimal capital structure. A regression estimation results show that a firm with a higher sensitivity of the cost of equity will adjust faster to the target level.

Table 5 presents the effect of the sensitivity of the cost of equity and the speed of adjustment. Results in Table 5 show the regression results of the relation between the sensitivity of the cost of equity to leverage deviation with the speed of adjustments. Column 1 reports the results of the entire sample. In contrast, column 2 and 3, respectively, present the lower 50th percentile sample with a lower sensitivity of the cost of the equity to leverage deviation and the high 50th percentile. The coefficient of interest is related to the lagged leveraged variable (1-SOA). It means that the higher the estimated coefficient, the lower the SOA.

The results show that the firms in the higher percentile adjust faster than firms in the lower percentile. Specifically, the higher percentile's average SOA value was 0.3732 (1-0.6268), while the average value of SOA of the lower percentile was 0.3324 (1-0.6676). These

**Table 5.** The sensitivity of the cost of equity and speed of adjustment

| Variables                 | Full Sample           | Low Sensitive Cost of Equity | High Sensitive Cost of Equity |
|---------------------------|-----------------------|------------------------------|-------------------------------|
|                           | Leverage Level        | Leverage Level               | Leverage Level                |
| <i>Lag Leverage Level</i> | 0.9093***<br>(0.1052) | 0.6676***<br>(0.0460)        | 0.6268***<br>(0.0363)         |
| <i>Lag Profitability</i>  | 0.2273***<br>(0.0482) | 0.2958<br>(0.0448)           | -0.0925<br>(0.0637)           |
| <i>Lag Tangibility</i>    | -0.1105<br>(0.0720)   | -0.0113<br>(0.0341)          | 0.1597<br>(0.0412)            |
| <i>Lag Inflation</i>      | 0.0354<br>(1.8133)    | 0.1487<br>(0.4002)           | 0.5904<br>(0.7996)            |
| <i>Lag Firm Size</i>      | 0.1682<br>(0.1214)    | 0.0715***<br>(0.0229)        | 0.0783*<br>(0.0287)           |
| Prob AR (1)               | 0.0000                | 0.0000                       | 0.0000                        |
| Prob AR (2)               | 0.0343                | 0.6481                       | 0.3832                        |
| J-Statistics              | 10.832                | 59.8938                      | 47.3454                       |
| Prob(J-Statistics)        | 0.6991                | 0.5877                       | 0.2295                        |

results indicate that the more sensitive the cost of equity is to the leverage deviation from the target, the faster the adjustment. In contrast, the estimated average SOA of the whole sample is the first column, which implies a slower adjustment than the lower and higher percentiles. It shows that the disregard of heterogeneity in SOA will mislead the adjustment period to the target leverage.

Lemmon et al. (2008) find that the firm's level of speed of adjustment depends on the debt distribution in cross-sectional terms. This study's findings are in line with the results of previous studies regarding the application of dynamic trade-off theory to speed of adjustment. They found that firm with a high cost of equity sensitivity had a greater degree of capital structure adjustment (Zhou et al., 2016). This condition has implications for corporate decision making; that is, the firm must have a contingency plan to keep the company stable. Besides, it is essential to include heterogeneity in assessing the speed of adjustment because companies with different characteristics have different adjustments (Fitzgerald and Ryan, 2019).

## V. Conclusion and Implication

The fact that ASEAN's debt exposure increased from 2010 to 2017 (S&P global ratings, 2017) motivates this study as debt has a vital role in a firm's capital structure (Balios et al., 2016; Proenca et al., 2014, and Truong and Nguyen, 2016). This study's main objectives are to determine the impact of leverage deviation of target leverage on the cost of equity in the ASEAN-5 region. Specifically, this study examines the sensitivity of the cost of equity to leverage deviation and the leverage speed of adjustment. This study also considers the effect of the global financial crisis in 2008, when most of the firm experienced financial difficulties.

We found that the leverage deviation is positively and significantly affect the cost of equity. Furthermore, the more sensitive the cost of equity, the deviation from the optimal debt use will decrease. This finding indicates that firms will adjust their debt to minimize the conflict of interest between shareholders and debt holders, supporting research conducted by Yoo and Wu (2019) that showed a negative correlation between leverage and capital stock. However, we find an inverse relationship in the underleveraged sub-sample. These findings imply a different level of importance of the cost of equity across the firms.

The effect of leverage deviation on the cost of the equity is negative during the crisis period. This finding indicates that firms will adjust their capital structure for a lower cost. It indicates that when firms increase their use of debt during the crisis, it will reduce the shareholders' returns. Moreover, this study finds a positive and significant effect of the sensitivity of the cost of equity on leverage deviation in overleveraged sub-sample. This finding indicates that when overleveraged firms cost of equity is adjusted to alter the leverage deviation during the crisis, it will increase leverage deviation. In contrast, although insignificant, the effect is negative in the underleveraged sub-sample, which implies that firms tend to choose a cheaper and optimal debt level.

We found compelling behaviour in the relation between the sensitivity of the cost of equity to leverage deviation on the leverage speed of adjustments. The result shows that the higher percentile firms adjust faster than firms in the lower percentile, indicating the higher sensitivity of the cost of equity is to the leverage deviation from the target, the faster the adjustment. In contrast, the estimated average SOA of the whole sample indicates a slower adjustment compared to both the firms in the lower and higher percentiles. It implies that the disregard of heterogeneity in SOA will mislead the adjustment period to the target leverage.

Our results also showed that trade-off theory would be more meaningful to be tested in more specific conditions. We found different results between the impact of leverage deviation on the cost of equity during normal conditions and financial crisis. Thus, future studies might consider the firm's leverage behavior during the COVID-19 pandemic. In addition, based on the research findings, it is expected that the related regulator provides such a standard of the company's debt structure and the sensitivity of cost equity. Thus, it will allow firms to realize whether in high or low-cost equity sensitivity conditions and establish contingency plans regarding the company's ability to adjust the level of capital structure. Thus, it is also beneficial for the regulator to adjust the regulation for the crisis and non-crisis conditions.

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