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THE SPEED OF ADJUSTMENT TO CAPITAL STRUCTURE TARGET BEFORE AND AFTER FINANCIAL CRISIS: EVIDENCE FROM INDONESIAN STATE OWNED ENTERPRISES

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Abstract*: There are special characteristics possessed by the State Owned Enterprises (SOE) in determining the target capital structure before and after a crisis situation. This research objective is to examine whether Indonesian SOEs have a particular capital structure targets, and how fast is the speed of adjustment to the target before and after global financial crisis.*

This research includes all relevant state-owned enterprises in Indonesia Stock Exchange. Using Generalized Least Squares, the dynamic capital structure model are developed using multiple regressions. This model assumes capital structures adjust to its target partially each year. We separated the data for analysis before (1994-2007) and after crisis (2008-2014) to examine the difference in the speed of adjustment.

With reference to the capital structure theories, this study indicates that SOE have particular factors apart from common determinants of capital structure such as: dividend and initial leverage. Other factors that give significant impact in the dynamic model of capital structure include lagged variables of growth opportunity, asset intensity, firm size, and past leverage. This finding concludes that SOEs have capital structure target following trade off theory. Annually, before and after global financial crisis, the speed of adjustment toward capital structure target is 39.79% and 26.00% respectively. From the dynamic model, we conclude that the cost of adjustment after the crisis is higher than before.

Keywords: *Dynamic capital structure, speed of adjustment, SOEs capital structure, global financial crisis.*

I. INTRODUCTION

To maximize shareholder value, the company should be able to determine an optimal proportion between debt and equity as the main funding source companies.

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The composition between debt and equity arranged so it will minimize the cost of capital to a certain level in order to maximize the value of investments that lead to the value of the company.

The capital structure among State Owned Enterprises (SOE) has special characteristics because of its relationship with the government. In general, the literature on the capital structure does not separate these conditions. In dynamic adjustment model, the company speed of adjustment in achieving the target capital structure may be different. The potentially differing speeds of capital structure adjustment may appear because of the different environment or characteristic of the firms that are considered as cost of adjustment. Whenever the cost of adjustment is low then the speed of adjustment is quick and vice versa. This research will increase understanding about the SOE's capital structure especially in the period before and after global financial crisis in 2008.

Figure 1. IHSG Composite Index (finance.yahoo.com)

SOE in Indonesia have different treatment in terms of the dividends distribution policy. In general, dividends distributed after the fulfillment of all obligations and investment requirements are met. In this case the SOE are required to set aside funds to cover the needs of the state budget. This policy ultimately makes SOE consider for external funding other than accumulated earnings.

The global financial crisis is enough to make the Indonesian Stock Exchange (IDX) fell. This condition may affect the company's financial condition. The

financial crisis exposed the firm's financial weakness. Although not direct, the USA unfavorable economic conditions reduced amount of investment in Indonesia as an emerging market.

Based on the above background, this research will answer the following questions:

(a) What are the factors that influence the adjustment towards target capital structure?

(b) How quick firms adjust their capital structure towards the target capital structure before and after the crisis?

2. THEORETICAL ANALYSIS

The ultimate goal of the company is to maximize shareholder wealth. This goal can be reach using various financial policies include investing policy (capital budgeting / investing), financing policy (financing), and dividend policy. Any financial decision must consider whether it will increase the market values of the company. Management can influence the market by making good financial decision.

Capital structure theory began with Modigliani and Miller (1958) which assumes perfect capital markets. Perfect capital market include conditions such as no taxes, no transaction costs, and individuals & companies can obtain a loan with the same interest rate. Modigliani & Miller (1958) concluded that the value of the firm is independent of its capital structure (capital structure is irrelevant). In the later studies, Modigliani and Miller (1963) relaxed one important assumption which is tax condition. They found that company start to enjoy the benefits of having more debt because it could reduce the tax payment obligations so that company can increase its value by increasing the level of debt (capital structure is relevant).

After Modigliani and Miller (1958 and 1963), there are many capital structure research conducted to explain more about the problems of optimal capital structure. At first, the cost of bankruptcy and financial distress is not included in MM proposition. In the static tradeoff theory, modification of the MM proposition has put the cost of bankruptcy and tax saving benefits / tax shield. There is a tradeoff between the benefits of having debt and the increasing of financial distress that increase bankruptcy risk of the company.

Then Jensen and Meckling (1976) introduced the agency costs concept that explain about two kinds of conflicts that may occur in every public company called principal and agent. In this matter, shareholders act as the principal and managers as the agent. This conflict also exists between lenders and shareholders. By having

debt, lenders will closely supervise the company instead of shareholder, so it will reduce the agency problem.

In the pecking order model, Myers (1984) suggested that internal capital is preferred better than external capital when companies need additional capital. In certain condition, issuing debt or equity may not be the best interest for the company. Titman and Wessels (1988) found that profitable company tend to lower the leverage. This finding consistent with pecking order model, supported also by Rajan and Zingales (1995)

According to Fama and French (2002), who support the pecking order model, profitable company will use less debt, and firms with more investment has less market leverage. Furthermore, Frank and Goyal (2003) also clarify that dividend-paying company tend to have less leverage. It support some of trade off theory.

Baker and Wurgler (2002) introduced the model of market timing theory to explain about the behavior of companies when the stock price is relatively high. Instead of issuing debt, companies will tend to fulfill their financing need by stock issue. Alti (2006) explained that market timing models is more relevant in short-term capital structure but has limitations in explaining long-term changes. In the long-term it appears that capital structure is more consistent with trade off model.

The trade-off theory in general can be grouped into two models which are static and dynamic models. In the static model, companies arrange the capital structure towards the target in real time. In fact, the real-time adjustment to the optimal level would be unrealistic.

Faulklender, Flannery, Hankins and Smith (2011) stated that there is cost of adjustment for companies to adjust their capital structure towards the target in real time. When there is high cost of adjustment compare to the benefit, the adjustments speed will be slow. It is means that the pecking order theory is in place. When the adjustment towards the target capital structure is fast, then it explained the trade-off theory. The speed of adjustment towards target capital structure is the essence of dynamic capital structure research.

The traditional determinant of capital structure consists of: profitability, growth opportunity, assets intensity, and the size of the firm. This study offer new determinants to be investigated whether they related to the SOEs. Dividend, government ownership, and initial leverage are offered to be the new determinant. From the dynamic model, it can be tested the existence of target capital structure and speed of adjustment of capital structure target.

3. METHODOLOGY

This research use panel data linier regression technique. Some advantages offered by panel data analysis includes such as: more control to the data heterogeneity,

more extracted information, less collinearity among variables, and more degree of freedom. Baltagi (2001).

Best linier unbiased estimator (BLUE) test such as: normality, heterocedasticity, autocorrelation, and multicollinearity were used for the model. After that, the Hausman Test conducted to choose which estimation method between fixed effect and random effect.

This research excludes 5 companies from the available SOE lists at IDX, which are financial firms because of the difference in business pattern and reporting. After purposive sampling, this research will use final sample of 14 companies. The model will be run into two different time period for the purpose of this study which are before (1996 – 2007) and after (2009 – 2014) global financial crisis. SOEs companies are privatized in a different time so that the data sample is included in the unbalanced panel data.

3.1 Research Models

Dynamic model was used to test the lag variables as the determinant of the adjustment of capital structure to the target and λ will be used to calculate the speed of adjustment. To test whether SOEs have target leverage, this research will use partial adjustment model of Flannery & Rangan (2006) as follows:

$$LEV_{it} = \lambda\alpha + (\lambda\beta)x_{it-1} + (1-\lambda)LEV_{it-1} + \lambda e_{it} \tag{3.1}$$

where:

LEV_{it} = leverage of firm i and time t.

x_{it-1} = capital structure determinants at t-1 (lag) consisting of dividend, initial leverage, asset intensity, firm size, government ownership, growth opportunity, and past leverage.

λ = speed of adjustment to target leverage.

β = coefficient determinant

$e_{i,t}$ = random error term

Target leverage is a function of lag variables of its determinants, the Dynamic model is derived from the hypothesis that target leverage of LEV_{it} is impossible to observe but can be estimated, which can be written as follows:

$$LEV_{it}^{*} = \alpha + \beta x_{it-1} + e_{it} \tag{3.2}$$

The leverage evolves every time toward its target partially which can be written mathematically as follows:

$$LEV_{it} - LEV_{it-1} = \lambda(LEV_{it}^{*} - LEV_{it-1}) + e_{it} \quad (3.3)$$

After combining eq. 3.3 and 3.4, we can get the dynamic model, which is used for this research as follows:

$$LEV_{it} = \lambda\alpha + (\lambda\beta)x_{it-1} + (1-\lambda)LEV_{it-1} + \lambda e_{it} \quad (3.4)$$

Coefficient of λ shows the speed of adjustment. The coefficient of λ is expected between 0 and 1. Small λ tend to show that firms do not have target capital structure and vice versa.

4. RESULTS AND ANALYSIS

4.1 Dynamic Capital Structure Model

The linier regression result of dynamic capital structure model can be seen in Table 3 below:

Table 1
Dynamic Model Regression Result

Dependent Variable: LEV?
Method: Pooled EGLS (Cross-section random effects)

	1996 – 2007		*2009 – 2014*	
Variable	*Coefficient*	*Prob.*	*Coefficient*	*Prob.*
C	0.065125	0.8980	-0.332249	0.0315
DIV?(-1)	-0.217791	0.0115	-0.019614	0.0480
INIT?(-1)	0.363221	0.0017	0.128468	0.0445
AS?(-1)	0.043412	0.5922	-0.093282	0.0036
FIRM?(-1)	0.005009	0.7809	0.015387	0.0059
GOV?(-1)	-0.129361	0.2616	0.000135	0.6656
GRO?(-1)	-0.006395	0.0244	-0.014201	0.0132
LEV?(-1)	0.602057	0.0000	0.740073	0.0000
	Effects Specification			

	1996 – 2007		*2009 – 2014*	
	S.D.	Rho	S.D.	Rho
Cross-section random	0.000000	0.0000	0.000000	0.0000
Idiosyncratic random	0.078179	1.0000	0.040971	1.0000

Weighted Statistics

	1996 – 2007	*2009 – 2014*
R-squared	0.800424	0.941924
Adjusted R-squared	0.777522	0.935367
S.E. of regression	0.079375	0.046789
F-statistic	34.94966	143.6514
Prob(F-statistic)	0.000000	0.000000
Mean dependent var	0.446862	0.472550
S.D. dependent var	0.168284	0.184042
Sum squared resid	0.384328	0.135732
Durbin-Watson stat	1.732527	1.668291

Unweighted Statistics

	1996 – 2007	*2009 – 2014*
R-squared	0.800424	0.941924
Sum squared resid	0.384328	0.135732
Mean dependent var	0.446862	0.472550
Durbin-Watson stat	1.732527	1.668291

The result for the dynamic model is done before and after crisis period. This study concentrates on variables that influence the adjustment of capital structure to the target. In this model, important variables are those that are considered as part of cost of adjustment. What influences the speed of adjustment of capital structure to the target is the cost of adjustment. Whenever the cost of adjustment is low then the speed of adjustment is quick and vice versa.

From three new determinants beyond the traditional factor affected optimal capital structure, two are significant before and after crisis which are dividend and initial leverage but unfortunately not for government ownership. Those two determinants might be included to the capital structure traditional determinant.

These result confirm that SOE's have different characteristic when compared with other private company.

From the lagged determinant variable in the year before crisis (1996 – 2007), four (4) variable were found to be significant while after the crisis (2009 – 2014) the number increase to six (6) variable. The different between numbers of significant variable is due to difference condition of the data before and after financial crisis.

The lagged dividend appears to be significant with negative sign. Related with the SOE, firm is not so eager to acquire debt financing even they spend relatively high dividend. From the hypothesis, if we assume the dividend as an obligation from the government, then this become the cost for adjustment towards capital structure.

The initial leverage is a significant factor for the SOEs. The study related with this variable is from Lemmon, Roberts, and Zender (2006). They stated this variable is important in explaining changes of capital structure in the long run.

Lagged asset intensity is negatively significant after the period of crisis. Indonesian SOEs might not increase debt based on asset collateral but more to the perception of support from the government to the debt market. Bias could have happen when state owned banks give loan to other SOEs because of this support.

The result of lagged firm size after the crisis period agree with Flannery and Rangan (2006), Fama and French (2002), and Rajan and Zingales (1995). Potentially, big firms may have better access to bond market because of their economies of scale. The bigger size of the firm would have greater opportunity to increase their leverage.

The lagged growth opportunity is found to be significant in this study. According to market timing theory, it is implied that the capital structure is adjusted randomly. This finding may show that Indonesian SOEs may operate under market timing theory. With higher growth opportunity, firm will tend to issue additional equity especially when stock price relatively high. This is more preferable rather than issuing debt.

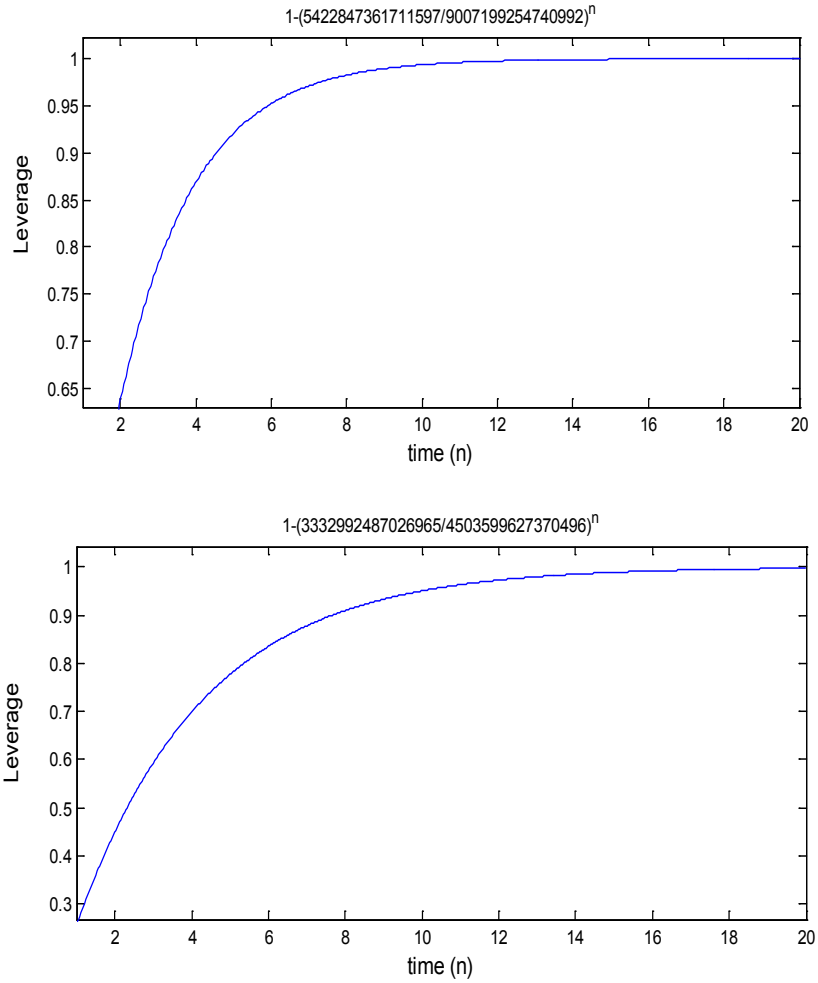
In accordance with partial adjustment theory, the adjustment of capital structure to the target depends to the benefit and cost needed. We can construct the speed of adjustment estimation from the variable coefficient of lagged leverage. The result shows that the coefficient of 1-λ is different before and after the crisis period. From 1996 – 2007 coefficient of 1-λ = 0.602057, so λ = 0.397943 or 39.79% while from 2009 – 2014 coefficient of 1-λ = 0.740073, so λ = 0.259927 or 25.99%. Therefore SOEs partially adjust the capital structure changes before and after crisis. This result shows us that cost of adjustment increase after the crisis period.

The speed of adjustment can be shown in term of year using the following equation:

$$n = \frac{\log (1 - Yn}{\log(1 - \lambda)}$$

The derivation of this equation can be seen in the appendix 1. Based on this equation this study found out that SOEs require 9.07 years to reach the capital structure before the financial crisis period and increase to 15.29 years after the crisis. The visualization of this speed of adjustment can be seen below:

Figure 2: SOEs capital structure adjustment toward the target before and after crisis



5. CONCLUSION

The adjustment towards target capital structure can be done by weighing the benefits companies operating in the optimal capital structure and adjustment costs (cost of adjustment). After the crisis, the variables that significantly influence the target capital structure are: lagged dividend, lagged initial leverage, lagged asset intensity, lagged firm size, lagged growth opportunity, and lagged leverage.

This dynamic model concluded that SOEs have a capital structure target and follow trade off theory. The managers adjust the capital structure toward its target partially each year. The speeds of adjustment are 39.79% and 25.99% annually before and after the crisis respectively. The target capital structure can be reached completely within 9.07 years and 15.29 years before and after the crisis. This change of the speed of adjustment indicates that Indonesian SOEs experience different cost of adjustment towards the capital structure target. The condition after the crisis makes it longer for SOEs to reach capital structure target

6. RECOMMENDATION

Practical advice addressed to SOEs management and the government in response to the results of the research as follows:

1. In making decision, government should consider the goal of the firm. All decisions should be done carefully and based on the added value that can be generated by the company to support goal of maximizing company value.
2. When SOE management reach target capital structure quicker, it is better for them to manage, so the cost of capital (cost of capital) SOE will be minimal and company value will be maximized.
3. SOEs should increase external funding to find new investment opportunities because of their potential in low level of debt.

This study could be expanded using different firm sample that have different characteristic. It also can be improve using different proxy, as well as incorporate new variables in our model, such as the influence of macroeconomic factors or other variables that can be considered as cost of adjustment that affects the speed of adjustment towards the capital structure target.

Appendix 1

The derivation of equation to calculate the time needed to reach the capital structure target

$Y_1 = \lambda$

$Y_2 = \lambda + \lambda\ (Y^*-\lambda) = \lambda + \lambda\ (1-\lambda)$; Y^* = Capital Structure Target = 1

$Y_{n+1} = Y_n + \lambda\ (1-Y_n)$; $n \geq 1$

$= Y_n + \lambda - \lambda . Y_n$

$= (1- \lambda) Y_n + \lambda$

$= (1- \lambda)((1-\lambda)Y_{n-1} + \lambda) + \lambda$

$= (1-\lambda)^2 Y_{n-1} + \lambda + \lambda(1-\lambda)$

$= (1-\lambda)^2((1-\lambda)Y_{n-2} + \lambda) + \lambda + \lambda\ (1-\lambda)$

$= (1-\lambda)^3 Y_{n-2} + \lambda + \lambda(1-\lambda) + \lambda\ (1-\lambda)^2$

..... and so on

Using Euler's elimination the equation can be simplified as follows:

$$Y_n = \lambda + \lambda\ (1-\lambda) + \ldots\ldots\ldots \lambda\ (1-\lambda)^{n-2} + \lambda\ (1-\lambda)^{n-1}$$
$$(1-\lambda)\ Y_n = \lambda\ (1-\lambda) + \ldots\ldots\ldots\ldots\ldots + \lambda\ (1-\lambda)^{n-1} + \lambda\ (1-\lambda)^n$$

$(1-1+\lambda)\ Yn = \lambda - \lambda(1-\lambda)^n$

$$Y_n = \frac{\lambda\ (1-(1-\lambda)^n}{\lambda}$$

$Y_n = 1- (1- \lambda)^n$

$(1- \lambda)^n = 1 - Y_n$

$n \log (1-\lambda) = \log (1 - Y_n)$

so the final equation will be as follows:

$$n = \frac{\log (1 - Y_n}{\log(1 - \lambda)}$$

This equation is used to calculate time needed to reach the capital structure target, where

Y_n = capital structure target

λ = speed of adjustment to capital structure target

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