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Testing Pecking Order Theory and Trade off Theory Models in Public Companies in Indonesia

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ABSTRACT

The purpose of this paper was to test the trade off and pecking order theory of capital structure. We started with identifying variables that influenced capital structure based on both theories. In the study, the data were gathered from statistics and annual report of IDX in 2009. There were 46 companies that distributed dividends in 2008 (this year was as the base year to discover the changes) and 2009. Subsequently, there were two companies which were excluded because of the availability of data and the reports were submitted in US Dollars. From 44 companies, there were 28 companies that were excluded because there were not any financing deficits and the remaining 16 manufacturing companies were used as samples in this study. Despite the fact, these results support the POT model; they were weak to elaborate the POT model as there were only 45.1% of the companies taking financing decision through debt. This can be explained based on market timing theory in the decision making of capital structure.

JEL Classification: H10; H40; H50.

Keywords: Trade off Theory; Pecking Order Theory; Capital Structure.

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1. INTRODUCTION

To date, the theoretical explanations, related to any factors that may affect the optimal capital structure, remain controversial. Miller and Modigliani-MM (1958) put the basic foundation for a theory to explain this theoretical explanation in the form of capital structure irrelevance. The assumption is even difficult to obtain reality, i.e. perfect capital markets and no taxes, and then the fundamental theory develops into pecking order theory (POT) and trade off theory (TOT). POT as explained by Myers and Majluf (1984) that describes the optimal capital structure of one particular company which is determined by the order of the source of funding of the company, starting from the next internal to external financing sources. If the company uses external funding, then it is prioritized in debt to equity issuance. Several studies which have supported the POT apparently showed inconsistent results. Shyam-Sunder and Myers (1999) who conducted a study involving 157 companies in the United States found that, most companies meet the funding by deriving the financing source from debt; and this result supports the pecking order theory. In line with this finding, Fama and French (2002) explained that in the short term, investment and income are partially used to repay debt (the financing is absorbed by debt). Other supports are by the researchers Frank and Goyal (2003) and Atiyet (2012). Siefert and Gonenc (2010) who conducted a research in 23 developing countries showed that, in order to meet the deficit of financial of the companies, they decide to issue equity. Darminto and Manurang (2008) concluded that in the long-term financing which based on market timing is not a source of funding.

TOT model as proposed by Kraus and Litzenberger (1973) describes the optimal capital structure that is influenced by the benefits and the costs due to the issuance of debt. TOT model describes both static and dynamic models. The dynamic model explains the speed of adjustment of actual debt and debt targets. If there is any difference, there should be an adjustment. Static model assumes that if the decision determinants' debts are

static, so that companies do not need to adjust the factors. In order to increase the value of the company, we may refer to the level of debt in the optimal capital structure of the company. Therefore, the company should adjust the optimum level of debt. So, the optimal level of debt will move from time to time. Several studies which test the TOT model still showed inconsistent results. Fama and French (2002) describe that the company with a high level of investment will make adjustments to its capital structure, even from 7 % to 18%. Babalola Yisauand (2012) describe that the optimal capital structure of the food company is 34.31% while the beverage company is 34.64%. However, Labba and Östholm (2011) only describe the debt, as long as it gives benefits in the form of tax advantage. This means that the capital structure is normal, even though it is not explained for the optimal point.

As there were several inconsistent results from previous studies, so the objectives of this study investigate how the fulfillment of the companies based on the sources of funding of the companies. Based on POT financing deficit, it can be met through the issuance of debt compared to issuance of equity beforehand. Based on TOT, the companies will consider the tradeoff of benefits and cost of debt. If the tradeoff is known and if there are more costs than the benefits of the debt, the company will look for funding sources through the issuance of equity. This research was conducted by manufacturing companies that pay dividends Fama and French (2002). Companies which are profitable and increase the possibility of investing, they will pay the dividends. Thus, the companies that pay the dividends may either choose the sources of funding which are from the profits or from the debt. This study was conducted the years between 2009 and 2010 with some considerations namely (a) the merger Jakarta Stock Market (JSX) and Surabaya Stock Market (SSX) to become Indonesia Stock Market (IDX) in 2007, so the year 2008 was considered as a t-1 and whereas the year 2009 as the year t; (b) the data available at the time of the study in 2011 were data in 2010. Another reason was that there have been few researchers that focus on testing TOT and POT models. This article will be described in Section II which includes Review of Literatures and Hypotheses, Section III includes the data and the methodology; Section IV includes the results of research and discussion, and Section V is for the conclusion.

2. THE REVIEW OF LITERATURE AND HYPOTHESES

Shyam-Sunder and Myers (1999) conducted TOT and POT testing in the United States. The POT model was performed with regression variable net debt and net financing deficit issues. The finding of net financing deficit (DEF) was close to 1. Furthermore, it was interpreted to support the theory of POT because in the short term, the company prefers the use of debt funding needs. At the same time in other testing, it was found out that the TOT was better than POT. The hypothesis for POT was rejected by the DEF model and added with an additional variable in TOT. The equation for POT model is as follows:

$$\Delta D_{it} = \alpha + \beta_{PO} DEF_{it} + e_{it} \qquad (1)$$

Where: ΔD_{it} is net debt issued by company *i* in year *t*, DEF is the financial deficit and *e* is the error term, β is the DEF coefficient in the POT model and α is a constant. The equation mentioned above is based on the model by Shyam-Sunder and Myers (1999). This model is based on the predictions on categories of financing company used to cover the "financing deficit" (DEF). In this case, DEF is defined as the use of the company's cash flow in order to increase the assets of the company which is supposed to have been less than the increase of current liabilities (except for the proportion of the long-term debt) and less than the retained earnings. This means that the retained earnings of the company should be able to guarantee the current liabilities, and the current liabilities should be bigger than the asset purchases. In case of financing deficit, when the retained earnings are smaller than the liabilities and the assets purchase is bigger than the current liabilities, it needs "filled" through external financing. In short, according to POT, priority of mechanism from the external funding is through the issuance of debt.

The condition of financing deficit occurs when the company needs to pay dividends (*Div*), investment (*I*) and to increase the working capital (ΔWC) which is bigger than the profit of the company (C) in year *t* of the company *i*, so the equation for the DEF can be formulated as follows:

$$DEF_{it} = Div_{it} + I_{it} + \Delta WC_{it} - C_{it} + e_{it} \qquad (2)$$

Where: DEF is a financing deficit, DIV is dividends and I is investment. ΔWC the difference of working capital of the company is added with cash and cash equivalents. C is cash after tax and interest. ΔD is issued the net debt which is issuance of long-term debt subtracted by the payment of the long-term debt. ΔE is the net equity which

is the issuance of shares subtracted by share buyback. The implication of equation (ii) is that, at the time of the condition of DEF, it can be met with the increase of the issuance of debt and equity, so the condition can be formulated in the following equation (iii), such as:

$$DEF_{it} = Div_{it} + I_{it} + \Delta WC_{it} - C_{it} + e_{it} = \Delta D_{it} + \Delta E_{it} \qquad (3)$$

The testing of POT is aimed to determine how the company should choose the external source for financing. Due to the issuance of debt as the priority compared with the issuance of equity, the equation becomes the following:

$$= \Delta D_{it} = Div_{it} + I_{it} + \Delta WC_{it} - C_{it} + e_{it} \qquad (4)$$

$$\Delta D_{it} = \alpha + \beta_{PO} DEF_{it} + e_{it} \qquad (5)$$

The model of POT can be predicted when the company avoids or the external funding becomes the final option through the issuance of equity and in other words it is only through the issuance of debt, then $\alpha = 0$ and $\beta_{PO} = 1$. The model of TOT aims to determine the optimal capital structure of the company. Various results of previous studies have indicated this optimal capital structure as the determinants. Darminto and Manurang (2008) and Dang (2006) stated that the determining factor or the determinant (a) the collateral value of assets (CVAS) which is the book value of fixed assets divided by the book value of total assets, (b) non-debt tax shield which is the book value depreciation divided by the total assets, (c) profitability uses EBITDA (earnings before interest tax depreciation and amortization), (d) growth as measured by the changes in the total assets, and (e) the size of the company measured by Ln of total assets.

Ruslim (2009) conducted a study by using the determining factor, namely costs of the operation, depreciation, the level of sales, costs of sales, interest expense and income tax expense. The model of TOT by Fama and French (2002) then described relating to the presence of difference between the target and the actual capital structure, so that it is necessary to make adjustment towards these conditions. The big difference in D_{it}- $D_{(it-1)}$ is necessary to make adjustment which is δ. At the time of the target leverage, a capital structure is not enough to meet the financial needs; thus the company may increase the leverage. This capital structure is dynamic, so that company needs to make adjustments, if the target capital structure is considered not in accordance with the actual. As there is this adjustment, the equation is changed as follows:

$$\begin{aligned} D_{it} - D_{it-1} &= \delta(D^*_{it} - D_{it-1}) + e_{it} \\ D_{it} &= \delta(D^*_{it} - D_{it-1}) + D_{it-1} + e_{it} \\ D_{it} &= \delta D^*_{it} - \delta D_{it-1} + D_{it-1} + e_{it} \\ D_{it} &= \delta D^*_{it} + D_{it-1}(1 - \delta) + e_{it} \end{aligned} \qquad (6)$$

Where d_{it} is actual debt ratio and Dit* is the debt ratio target of the company *i* in year *t*, while δ is the rate of adjustment of the speed of the target leverage, after it was found the difference in the reality. In short, the debt ratio target for the companies is affected by determining factor for the company (X) and the specific effects of the companies that do not depend on time (U) and λ specific effects of time is not depended on the company. The equation for the target leverage can be formulated as follows:

$$D_{it} - D_{it-1} = \left(\sum_{k=1}^{n} \beta_k X_{kit} + U_i + \lambda_t + e_{it} \right) \qquad (7)$$

Various determining factors are significantly affected by the speed of adjustments towards the condition, so the condition can be formulated as follows:

$$D_{it} - D_{it-1} = \delta \left(\sum_{k=1}^{n} \beta_k X_{kit} + U_i + \lambda_t + e_{it} \right) \qquad (8)$$

If the determining factor is not affected by the company and the time is excluded from the capital, then:

$$\Delta D_{it} = \alpha + \beta_{TOT}(D^*_{it} - D_{it-1}) + e_{it} \qquad (9)$$

This model may predict that in time of $\beta_{TA} > 0$, then the company makes adjustment towards the target leverage, but it is also when $\beta_N < 1$, then the cost of the adjustment towards the leverage will be positive (smaller).
Based on the mode of determining factors by Darminto and Manurang (2008) in static TOT TOT, then the equation becomes:

$$\Delta D_{it} = \alpha + \beta 1\ CVAS + \beta 2\ NDTA + \beta 3\ EBITDA + \beta 4\ G + \beta 5\ S + e_{it} \qquad (10)$$

Where: (a) collateral value of assets (CVAS), (b) non-debt tax shield (NDTA), (c) profitability (earning before interest tax depreciation and amortization (EBITDA), (d) growth (G), and (e) the size of the company (S) an explanation by Shyam-Sunder and Myers can be illustrated in the research findings. It is known that POT may predict that (α) = 0 and β_{PO} = 1, then the issuance of debt is used to cover the financing deficit (DEF) or to support POT. If the coefficient of the POT is β_{PO} = 0.75 and R^2 is 0.68, then it can be predicted that POT is more capable to explain the fulfillment of corporate funding than the TOT (68%). The findings of the coefficient is a target adjustment based on the TOT model, which is not really reliable to predict the fulfillment of the debt financing in the capital structure (35%).

Hypotheses:

POT Testing

H1 = following the model by Shyam-Sunder and Myers (1999), if the regression coefficient $\beta_{PO}$is positive and close to 1, then the POT is more capable to explain the changes in the use of debt in the capital structure of TOT Testing.

H2 = following the model by Shyam-Sunder and Myers (1999), if the regression coefficient β_{PO} is positive and close to 1, then the TOT is more capable to explain the changes in the use of debt in the capital structure.

3. DATA AND METHOD

This study aims to test the hypotheses of TOT and POT models in two different equations. The data in the study were gathered from statistics and annual report of IDX in 2009. There were 46 companies that distributed dividends in 2008 (this year was the base year to discover the changes) and 2009. Subsequently, there were two companies which were excluded because of the availability of the data, and the reports were submitted in US Dollars. From 44 companies, there were 28 companies that were excluded because there were not any financing deficits and the remaining 16 manufacturing companies were used as samples in this study.

Variable testing:

In the POT model, the variable testing can be elaborated through the following aspects:

DEF is the payment for Div, changes in the working capital, and the availability of cash and investments divided by the total assets (Atiyet, 2012). Divis the payment for dividends in year t (Frank and Goyal, 2003) I is the investments, that is the sum of the fixed assets, depreciation, transfer fees and amortization divided by the total assets (Atiyet, 2012) ΔWC is the changes in the working capital added with the cash and cash equivalents (Frank and Goyal, 2003) C is the cash after tax and interest (Frank and Goyal, 2003) ΔD is net debt issued which is long-term debt issuance subtracted by the payment for the long-term debt (Frank and Goyal, 2003) ΔE is the net equity issued which is the issuance of shares that subtracted by the share buyback (Frank and Goyal, 2003). In the static TOT model, the variable testing can be elaborated through the following aspects (Darminto and Manurang, 2008).

(a) the collateral value of assets (CVAS) which is the book value of fixed assets divided by the book value of total assets, (b) non-debt tax shield which is the book value depreciation divided by the total assets, (c) profitability uses EBITDA (earnings before interest tax depreciation and amortization), (d) growth as measured by the changes in the total assets, and (e) the size of the company measured by Ln of total assets.

4. RESULTS AND DISCUSSION

4.1 Research Results

Based on the CVAS, it showed that the average companies have fixed the assets which amounted to 26.46% and the variance (0.021) of each company is relatively small. The proportion of the fixed assets compared to the total assets of the company is relatively homogeneous sample. NTDS showed the average depreciation of the total assets of 20% with the variance 0.017. EBITDA showed the average income before tax, amortization and depreciation amounted to 2,037,401,648,277 with the variance which was more than 100%. Descriptive statistics of the data can be presented in the following table:

Table 1. Descriptive Statistics

Variable	Mean	Var
CVAS	0.264619894	0.02196
NTDS	0.208593422	0.01759
EBITDA	2,037,401,648,277	3,128,646,251,823
Growth	0.161038478	0.00545
Size	28.1070276	2.67431
DEF	373,173,079,793	489,655,097,297

This is an interesting description where the revenue of the companies' samples varies or significantly varies. This may happen due to some reasons like; the sub-sectors in the manufacturing industry have different income levels. Growth showed the development of the companies than the previous period with the average of 16.1% and with small variance. The size of the company showed that the total assets of Ln was 28.173 with the variance which was relatively small (around 10%), thus it can be concluded that the total assets of the sample companies are relatively homogeneous.

POT model can be tested through the following equation:

$$\Delta D_{it} = \alpha + \beta_{PO} DEF_{it} + e_{it} \qquad (11)$$

The following results of regression are then presented in the table:

Table 2. Regression Results

Model		Unstandardized Coffeicients		Standardized Coffeicients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-7,39E-02,175	,032	,671	-2,343	,034
	DEF		,052		3,390	,004

a. Dependent Variable: DDDE

From the equation it was discovered that DEF is significant with the $\boldsymbol{\beta_{PO}}$ which was far more than 1 and $\boldsymbol{\alpha}$ was not equal to 0, and the R^2 was amounted to 0.451.

Table 3. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,671[a]	,451	,412	4,985E-02

a. Predictors: (Constant),DEF

Those results can be interpreted as; the use of debt in the capital structure of the company in Indonesia significantly prefers POT, but the result was very low due to the coefficient β of POT that was far away from 1 and the contribution to the model was only 45.1%.

TOT model testing without any significant results with the student test (t-test) was noted that the significance was more than 5%. Those results were the indication of the debt use in the capital structure which does not comply with the TOT model.

Table 4. Regression Coefficients

Model	Unstandardized Coffeicients		Unstandardized Coffeicients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-2,5E+12	1,6E+12		-1,567	,148
CVAS	8,6E+11	5,0E+11	,607	1,713	,117
NTDS	1,7E+11	5,2E+11	,106	,323	,754
EBITDA	-6,18E-02	,031	-,922	-1,986	,075
GROWTH	1,4E+11	7,7E+11	,049	,182	,859
SIZE	8,6E+10	5,8E+10	,668	1,487	,168

a. Dependent Variable: DDEBT

4.2 Discussion

The results of regression showed the level of confidence which was 5%, so the TOT model is not significant on all variables. This means that debt decisions of the company are not influenced by determinants such as hypothesis as proposed by Darminto and Manurang (2008) and Dang (2006). However, the result of POT model testing showed significant results, despite the fact it could provide complete elaboration. The POT model with only 45.1% showed that the financing decisions of the company is based on the order the issuance of debt and equity. In this static, POT model does not measure the speed of adjustment of the level of debt with the assumption, as the determinant variable is particular variable in a static model. The POT model testing was adopted from the model testing by Shyam-Sunder and Myers (1999) and modified by Frank and Goyal (2003), thus it is assumed that if the internal capital of the company is limited to meet the funding for investments and dividends, the company would access external funding. External funding priorities will take precedence to prioritize the issuance of debt compared to equity.

Only variable EBITDA gave negative influence, but not insignificant. These results can be interpreted that the greater of the profit of the company will use smaller debt. This is consistent with the predictions of POT model which is prioritizing internal financing through retained earnings, and then if the condition of internal funding is limited, external funding is considerable. Variable CVAS, NDTS, the growth of the company and the size of the company had positive but not significant influences. It can be interpreted that the fixed assets of the company are smaller than the total assets, so by increasing the assets of the company will use debt financing than equity issuance. Despite the fact, these results support the POT model; they were weak to elaborate the POT model as there were only 45.1% of the companies taking financing decision through debt. This can be explained based on the market timing theory in the decision making of capital structure (Baker and Wurgler, 2002). The company does not have preference towards the source of funding, but choosing the best alternative is based on the market opinion at that time. As the market gives negative opinion due to the issuance of equity, then company would issue debt, and vice versa. The reaction towards the equity issuance can be predicted in order to meet the financing of the company. The company will attempt to reduce the asymmetry of information to the market if it will issue the equity. In these conditions, the company will issue the equity compared with the debt. Constantinides and Grundy (1989) argued that the information asymmetry leads to the weak explanation of the POT model. When there are many funding alternatives, the company does not always follow the hierarchy on this POT model.

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