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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 identifiying variables that influenced capital structure based on both theory. 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 as the base year to discover the changes) and 2009. Subsequently there were two companies were excluded because the availability of data and the reports were submitted in US Dollars. From 44 companies, there were 28 companies were excluded because there was 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**.**

Keywords: Trade off theory, Pecking order theory, Capital structure.

1. Introduction

To this 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*. As the assumption is 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) 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 support for the pecking order theory. In line with this finding, Fama and French (2002) explain that in the short term, investment and income are partially used to repay debt (the financing is absorbed by debt). Other support is such as the research Frank and Goyal (2003) and Atiyet (2012). Siefert and Gonenc (2010) who conducted the research in 23 developing countries show that in order to meet the deficit of financial of the companies, they decide to issuing equity. Darminto and Manurang (2008) concluded that in the long-term financing, based on market timing, is not a source of funding.

TOT model as proposed by Kraus and Litzenberger (1973) describes the optimal capital structure is influenced by the benefits and the costs due to the issuance of debt. TOT model describes both static and dynamic models, which is the dynamic model is to explain the speed of adjustment of actual debt and debt targets. If there is any difference, there should be adjustment. Static model assumes that if the determinants of decision to debt are static, so that companies do not need to adjust with 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 to 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 in the company with a high level of investment it will make adjustments to its capital structure, even from 7 % to 18%. Babalola Yisauand (2012) describethat the optimal capital structure of the food company is 34.31% while for the beverage company is 34.64%. Labba and Östholm (2011) however, only describeas long as the debt gives benefits in the form of tax advantage, it means that the capital structure is normal even though it is not explained for the optimal point.

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As there were several inconsistent results from previous studies, so the objectives of this study are to investigate how the fulfillment of the companies based on the sources of funding of the companies. Based on POT financing deficit 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 that 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 on manufacturing companies that pay dividends Fama and French (2002). Companies that are profitable and to increase the possibility of investing it will pay dividends, so that the companies that pay dividends may either choose the sources of funding which are from the profits or from debt. This study was conducted in 2009 to 2010 with some considerations namely (a) the merger Jakarta Stock Market (JSX) and Surabaya Stock Market (SSX) to become be Indonesia Stock Market (IDX) in 2007, so the year of 2008 was considered as a t-1 and 2009 as the year *t*; (b) the data available at the time of the study in 2011 were data in 2010. Another reason was there have been few researches that focus on testing TOT and POT models.

This article will be described in Section II which describes Review of Literatures and Hypotheses, Section III for data and methodology; section IV describes the results of research and discussion, and part V of the conclusions.

2. Riview of Literatures 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 findingof 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. In other testing at the same time, it was found that the TOT was better than POT. The hypothesis for POT was rejected by the DEF model added with an additional variable in TOT. The equation for POT model is as follows:

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

Where:

$\Delta D_{it}$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). DEF in this case 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 based on 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:

$$DEF_{it} = Div_{it} + I_{it} + \Delta \mathrm{WC}_{it} - C_{it} + e_{it} \dots\dots\dots (ii)$$

Where

DEF is financing deficit

DIV is dividends

I is investment

ΔWC the difference of working capital of the company added with cash dan cash equivalents

C is cash after tax and interest

ΔD is net debt issued 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 issuance subtracted by share buyback

The implication of equation (ii) is that at the time of the condition of DEF so 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:

$$DEF_{it} = Div_{it} + I_{it} + \Delta \mathrm{WC}_{it} - C_{it} + e_{it} = \Delta D_{it} + \Delta E_{it} \dots\dots\dots (iii)$$

The testing of POT is aimed at determining 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, thus the equation becomes the following:

$$= \Delta D_{it} = Div_{it} + I_{it} + \Delta \mathrm{WC}_{it} - C_{it} + e_{it} \dots\dots\dots (iv)$$

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

The model of POT can be predicted that is 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 α = 0 and β_{PO} = 1.

The model of TOT aims to determine the optimal capital structure of the company. Various results of previous studies have employed this optimal capital structure as the determinants. Darminto and Manurang (2008) and Dang (2006) stated that the determining factor or 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) is then described related to the presence of difference between the target and the actual capital structure, so that it is necessary to make adjustmenttowards these conditions. The big difference in D_{it}- $D_{(it-1)}$ it is necessary to make adjustment which is δ. At the time of the target leverage in the capital structure is not enough to meet the financial needs; 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:

$$D_{it} - D_{it-1} = \delta(D_{it}^{*} - D_{it-1}) + e_{it}$$
$$D_{it} = \delta(D_{it}^{*} - D_{it-1}) + D_{it-1} + e_{it}$$
$$D_{it} = \delta D_{it}^{*} - \delta D_{it-1} + D_{it-1} + e_{it}$$
$$D_{it} = \delta D_{it}^{*} + D_{it-1}(1-\delta) + e_{it} \dots\dots\dots (i)$$

Where

Ditis as actual debt ratio and Dit* is the debt ratio target of 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 dependent on the company. The equation for the target leverage can be formulated as follows:

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

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

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

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

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

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:

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

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)

Explanation by Shyam-Sunder and Myers can be illustrated in the research findings. It is known that POT may predict that (α) = 0 and $\beta_{PO} = 1$, then the issuance of debt is used to cover the financing deficit (DEF) or to support POT. If the coefficient on 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 based the coefficient is a target adjustment based on the TOT model, which is not really reliable to predict the fulfillment 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

TOTTesting

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 as the base year to discover the changes) and 2009. Subsequently there were two companies were excluded because the availability of data and the reports were submitted in US Dollars. From 44 companies, there were 28 companies were excluded because there was 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, 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 subtracted by 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 Result

The description of the data can be presented in the following table:

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

Based on the CVAS it showed that the average companies have fixed assets amounted to 26.46% and with 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 was more than 100%. This is an interesting description where the revenue of the companies as 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 Ln of 28.173 with the variance was relatively small (around 10%), thus it can be concluded that the total assets of the sample companies are relatively homogeneous.

POT model testing through the following equation

$$\Delta \boldsymbol{D_{it}} = \boldsymbol{\alpha} + \boldsymbol{\beta_{PO}} \boldsymbol{DEF_{it}} + \boldsymbol{e_{it}}$$

It was gained the following results presented in the table:

Coffeicients[a]

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 was discovered that DEF is significant with the $\boldsymbol{\beta_{PO}}$ was far more than 1 and $\boldsymbol{\alpha}$ was not equal to 0. The next was disclosed the R2 amounted to 0.451.

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 that 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 was far away from 1 and the contribution to the model was only 45.1%.

Coffeicients[a]

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

a. Dependent Variable: DDEBT

TOT model testing with no significant results with the student test (t-test) was noted that the significance was more than 5%. Those results were the indication that the use of debt in the capital structure does not comply with the TOT model.

4.2. Discussion

The results of regression showed the level of confidence was 5% that 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 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 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 at the time of the fixed assets of the company are smaller than the total assets, so to increase 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 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 in order to meet the financing of the company can be predicted. The company will attempt to reduce the asymmetry of information to the market if it will issue equity. In these conditions, the company will issue equity compared with debt. Constantinides and Grundy (1989) argued that the information asymmetry is that lead to the weak explanation of the POT model. When there are many funding alternatives, the company does not always followthe hierarchy on this POT model.

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