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DETERMINANTS OF CAPITAL STRUCTURE AND CAPITAL STRUCTURE TARGET OF INDONESIAN INFRASTRUCTURE COMPANIES

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Abstract. *Construction of infrastructure in Indonesia was one of the main developments in the reign of Jokowi, period 2015-2019. Encouraged by the government and industrial revolution, many companies required additional capital for its development. It changed capital structure and might disturb the optimality of capital structure. Companies in the infrastructure sector had higher current capital expenditure compared to other sectors. Managers had to put more attention on the capital structure of infrastructure companies because it has to be managed properly in order to maximize company value as a company goal. This research aimed to analyze determinants of capital structure, determinants of capital structure target, and the speed of adjustment of infrastructure companies. The population is all companies in infrastructure, utilities, and transportation sector listed in Indonesia Stock Exchange. This research used secondary data from audited company reports to be analyzed using unbalanced panel data regression with GLS estimators. The models used are static and dynamic capital structure based on the trade-off theory. Determinants of capital structure based on static model is profitability, tangibility, and growth. Profitability and tangibility have positive significant effect on leverage ratio, while growth has negative significant effect. Determinant of capital structure target based on dynamic model is profitability. It has negative significant effect on leverage ratio target. Regression of dynamic model showed that there was an optimal target of capital structure in infrastructure companies that was being adjusted with adjustment speed of 49% per year. It also indicated that infrastructure companies need 6 years 10 month to close the gap between current and optimal target of capital structure. Findings of this research are expected to help manager in financing management and enrich financial literature.*

Keywords: *static capital structure; dynamic capital structure; speed of adjustments; infrastructure*

INTRODUCTION

Construction of infrastructure in Indonesia was one of the main developments in the reign of Jokowi for fulfilling the need of the people and economic growth of Indonesia. Based on information APBN 2019 published by Direktorat Jendral Anggaran Kementrian Keuangan Republik Indonesia, there is a significant increase of budget allocated to infrastructure compared to other presidents before Jokowi. Government also supported infrastructure development in companies by state financing. Besides that, revolution Industry 4.0 happened in Indonesia mostly in 2018, which means there are changes in how industry produce their products and services. Encouraged by government and industrial revolution, many companies required additional fixed asset marked by capital expenditure to face environmental changes and develop the business. Infrastructure sector has the most companies with high current capital expenditure compared to the other 8 sectors in Indonesia Stock Exchange. Capital expenditure indicates that there is additional capital which may impact current capital structure to be not optimal.
Capital structure theory has developed until now since the first research by Modigliani and Miller (1958) that argued that capital structure has no impact on company value. They revised their argument in 1963 and stated that debt financing is more advantageous than other securities due to tax shield. Their theory makes many researchers interested in capital structure and create theories such as static trade-off theory, agency cost theory, pecking order theory, and market timing theory. Recently, researcher found that there are two types of capital structure model based on trade-off theory, which are static and dynamic.

Capital structure decision is one of the most important decisions in corporate finance besides investment decision and dividend decision in order to maximize company value as its goal. So, it is important to have optimal capital structure target and adjust toward it as soon as possible. To have more comprehensive perspective, a company should also understand which determinants affecting static capital structure and dynamic capital structure. Overall, this research aims to answer these following questions

a. What are the determinants of capital structure in infrastructure companies listed in IDX?
b. Does optimal capital structure target exist in infrastructure companies listed in IDX?
c. If there is an optimal capital structure target, how quickly companies adjust its capital structure toward it?
d. What are the determinants of capital structure adjustment in infrastructure companies listed in IDX?

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LITERATURE REVIEW

A. Capital Structure Theory

Theory of capital structure was first initiated by Modigliani and Miller (1958) and concluded that the condition of capital market is perfect which means there is no taxes, no transaction costs, and no interest rate differences between individual and companies. They argued that leverage of a company does not affect weighted average of cost of capital and company value. In 1963, they revised their theory and stated that company can take advantage of debt financing through tax shield. They argued that optimal capital structure is reached if a company finance its asset using 100% debt which eventually will maximize company value. After MM theory, there are many research and controversy about capital structure. Then, the theory is modified to static trade off theory by introducing bankruptcy cost. The research proved that there is tradeoff between the advantage tax shield and the disadvantage of bankruptcy cost if a company uses debt financing. They argued that optimal capital structure is not 100% debt but adding a proportion of equity.

Jensen and Meckling (1976) introduced agency cost theory that identified that there is two kinds of conflicts that may occur in every public companies. First, conflicts between shareholders and managers which are triggered because managers do all activities in the company, but they share the gain with shareholders. It can be mitigated using debt financing by minimizing new equity and excess cash. The second is conflicts between shareholders and debtholders due to the differences in gain and loss which can be the form of agency cost. Therefore, Jensen and Meckling (1976) argued that optimal capital structure can be achieved by trading off the agency cost of debt against the benefit of debt. Pecking order theory was introduced by Myers and Majluf (1984) by explaining capital structure based on asymmetric information. The existence of asymmetric information between company and fund providers causes different financing cost among sources. The sequence of capital source from the lowest cost to highest is internal fund, debt, and equity. Baker and Wurgler (2002) enriched capital structure theories by introducing market timing theory and stated that when stock price is high or overvalue, a company prefers to sell shares than issuing debt to fulfill the fund needed.

There is 2 types of capital structure models which are static model and dynamic model. Static model indicates that a company is always in its optimal capital structure, while dynamic model indicates that optimal capital structure is adjusted over time.

B. Determinants of Capital Structure

Determinants		Relationship	Theories	Previous Studies
Profitability	Net Income to Total Equity	+	Trade-off, Agency Cost	(Sangeetha & Sivathaasan, 2013)
		-	Pecking Order	(Rajan & Zingales, 1995); (Deesomsak, Paudyal, & Pescetto, 2004); (Serrasqueiro & Nunes, 2005)
Tangibility	Total fixed asset plus inventories, to total asset	+	Trade-off, Pecking Order, Agency Cost	(Booth, Aivazian, Demirguc-kunt, & Maksimovic, 2001); (Frank & Goyal, 2003)
		-		(Rajan & Zingales, 1995);
Growth	Market to Book Ratio of Total Asset	+	Pecking Order	(Booth, Aivazian, Demirguc-kunt, & Maksimovic, 2001)
		-	Trade-off, Agency Cost, Market Timing	(Rajan & Zingales, 1995); (Deesomsak, Paudyal, & Pescetto, 2004); (Frank & Goyal, 2003); (Sangeetha & Sivathaasan, 2013)
Liquidity	Current asset to current liabilities	+	Trade-off	(Sangeetha & Sivathaasan, 2013)
		-	Pecking Order	(Deesomsak, Paudyal, & Pescetto, 2004)
Firm Size	Logarithm of total asset	+	Trade-off, Agency Cost	(Deesomsak, Paudyal, & Pescetto, 2004); (Serrasqueiro & Nunes, 2005); (Frank & Goyal, 2003); (Sangeetha & Sivathaasan, 2013)
		-	Pecking Order	(Rajan & Zingales, 1995)
Non-debt Tax Shield	Depreciation and amortization to total asset	+		(Serrasqueiro & Nunes, 2005)
		-	Trade off	(Haron & Ibrahim, 2012); (Deesomsak, Paudyal, & Pescetto, 2004)

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C. Speed of Adjustment

Researcher	Country Object	Speed of Adjustment
(Soekarno, et al., 2015)	Indonesia	26% - 39.8%
(Getzman, et al., 2014)	Asia	27% - 39%
(Ghazouani, 2013)	Tunisia	16.4% - 18.3%
(Haron & Ibrahim, 2012)	Malaysia	60.13%
(Huang & Ritter, 2009)	USA	17% - 23.2%
(Lemmon, et al., 2006)	Global	22-25%
(Flannery & Rangan, 2006)	Global	17-39%
(Gaud, et al., 2005)	United Kingdom	14% - 38.7%
(Serrasqueiro & Nunes, 2005)	Portugal	33% - 34%
(Shyam-Sunder & Myers, 1999)	USA	41%

METHODOLOGY

A. Data

The research used secondary data of listed companies in infrastructure sector from 2009 to 2018. The source of data is audited financial report, trusted financial websites, and reliable news. Total population is 73 companies that are listed in Indonesia Stock Exchange of infrastructure sector. The sample size is 22 companies and derived using purposive sampling method with 2 criteria. The criteria are (1) the company should publish at least 3 years complete financial report to public and (2) the market capitalization should be higher than 3 trillion rupiahs

B. Research Model

The data collected from 10 years of 22 companies are structured to be unbalanced panel data and used to conduct unbalanced panel data regression analysis. There are 2 types of panel regression model to be constructed, which are static model and dynamic model. Researcher should estimate the parameters and test hypotheses to construct the model. Estimation technique that is suitable to be used is fixed effect model and random effect model. Hausman test should be conducted to know which one better. The data should also be tested using BLUE test including heteroscedasticity, autocorrelation, and multicollinearity to ensure that the model is efficient and not biased. Finally, researcher use F-Test and T-Test for hypothesis testing.

1) Static Model

Static model is used to solve the first research question, which is identifying the variables which affect capital structure.

$$CAPS_{it} = (\alpha_i + \alpha_t) + \gamma X_{it} + \varepsilon_{it}$$

So, the regression equation of this research is

$$CAPS_{it} = (\alpha_i + \alpha_t) + \gamma_1 ROE_{it} + \gamma_2 TANG_{it} + \gamma_3 GROW_{it} + \gamma_4 CACL_{it} + \gamma_5 SIZE_{it} + \gamma_6 NDTS_{it} + \varepsilon_{it}$$

2)

3) Dynamic Model

Dynamic model is used to solve the second, third, and forth research question, which is finding out if there is optimal capital structure target, the speed of adjustment, and determinants of capital structure target.

$$CAPS_{it} = \lambda.\propto + (\lambda.\beta) X_{it-1} + (1-\lambda)\, CAPS_{it-1} + \lambda\varepsilon_{it}$$

So, the regression equation of this research is

$$CAPS_{it} = (\lambda.\propto) + (\lambda.\beta_1) PROF_{it-1} + (\lambda.\beta_2) TANG_{it-1} + (\lambda.\beta_3) GROW_{it-1} + (\lambda.\beta_4) CACL_{it-1} + (\lambda.\beta_5) SIZE_{it-1} + (\lambda.\beta_6) NDTS_{it-1} + (1-\lambda) CAPS_{it-1} + \varepsilon_{it}$$

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FINDINGS AND ARGUMENT

A. Findings

1) Static Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.060843	0.183447	-0.331663	0.7406
Profitability	0.031887	0.006899	4.622034	0.0000
Tangibility	0.646868	0.158886	4.071275	0.0001
Growth	-0.007768	0.003657	-2.124308	0.0353
Liquidity	0.006337	0.006202	1.021748	0.3085
Firm Size	-0.000371	0.032906	-0.011269	0.9910
Non-debt Tax Shield	0.263971	0.378244	0.697884	0.4863

2) Dynamic Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.371682	0.269145	1.380975	0.1701
Profitability	-0.019224	0.008138	-2.362205	0.0199
Tangibility	-0.022184	0.163431	-0.135741	0.8923
Growth	-0.001335	0.004614	-0.289342	0.7729
Liquidity	-0.008181	0.005868	-1.394256	0.1661
Firm Size	-0.031730	0.055374	-0.573010	0.5678
Non-debt Tax Shield	0.765683	0.533745	1.434549	0.1543
Leverage	0.510094	0.095852	5.321669	0.0000

B. Arguments

1) Determinants of Static Capital Structure

Determinants	Hypothesis	Result
Profitability	Positive significant	Positive significant
Tangibility	Positive significant	Positive significant
Growth	Negative significant	Negative significant
Liquidity	Positive significant	Not significant
Firm Size	Positive significant	Not significant
Non-debt Tax Shield	Negative significant	Not significant

Finding in profitability supports trade-off and agency cost theory, which indicates that more profitable infrastructure companies will have more long-term debt. Profitable company need higher tax shield because they have more tax, need to mitigate agency cost of managerial discretion, and have better reputation in debt financing. Finding in tangibility supports trade-off, agency cost, and pecking order theory, which indicates that more collateralizable asset infrastructure companies has, the more long-term debt it will has. It is because collateralizable asset can be used for secure debt and reduce agency cost of debt. Finding in growth supports trade-off, agency cost, market timing theory, which indicates that if infrastructure companies have high growth opportunities, they tend to have less debt. It is because it has high risk, high probability of agency cost of debt, and high market value. This research found that there is no significant effect of liquidity, firm size, and non-debt tax shield on leverage ratio. The finding is contradictive with trade-off, agency cost, and pecking order theory that argued that there is significant effect.

2) Capital Structure Target

Based on regression of dynamic model, there is a positive relationship between leverage ratio and leverage ratio target. It can be identified from probability t-test of leverage ratio (0.0000) that is lower than significance level. The relationship is identified to be positive because the regression generated positive coefficient of leverage ratio (0.510094). It means that listed companies in infrastructure sector have optimal target of capital structure and adjust toward it with specific speed of adjustment. This finding is in line with hypothesis which supports dynamic model of trade-off theory.

3) Speed of Adjustment

Regression of dynamic model showed that the coefficient of last year leverage ratio ($\overline{1-\lambda}$) is 0.510094. Based on the model, it

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can be identified that the estimated speed of adjustment (λ) is 49% per year. Considering 1% of tolerance level, target leverage adjustment is assumed to be 99%. So, infrastructure companies have closed 49% gap and have to close 50% gap between current capital structure and optimal target of capital structure. This research adopted the following equation from Soekarno et al. (2015) to calculate how long a company close its gap.

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

Based on the calculation, the period of adjustment speed (n) is 6.839. So, infrastructure companies need 6 years 10 months to close the gap between current and optimal capital structure target. Adjustment speed toward optimal target of capital structure is affected by adjustment cost. Quick adjustment with adjustment speed of 49% in infrastructure companies indicates that the cost is lower than the benefit of optimal capital structure

4) Determinants of Dynamic Capital Structure

Determinants	Hypothesis	Result
Profitability	Positive significant	Negative significant
Tangibility	Positive significant	Not significant
Growth	Negative significant	Not significant
Liquidity	Positive significant	Not significant
Firm Size	Positive significant	Not significant
Non-debt Tax Shield	Negative significant	Not significant

Based on trade-off theory, profitable company will have more long-term debt. It is in line with agency theory but contradictive with pecking order theory. The finding of this research supports pecking order theory, which indicates that more profitable infrastructure companies will have less leverage target. It is identified from static model that profitable company has more debt. It might be actually referring to profitable company in infrastructure has too much debt. So, they need to reduce debt in profitable company which resulting in negative correlation. Profitability is the only variable that is found significant in this research, but the model is able to explain 80.52% of target variation.

Other variables including tangibility, growth, liquidity, firm size, and non-debt tax shield do not have significant effect on leverage ratio. It is contradictive with hypotheses that is made based on trade-off theory. It could be because profitability itself which shows that they are able to issue debt shows that nowadays infrastructure companies issue too much debt. It is also shown from high capital expenditure of infrastructure companies currently which force them to issue debt. But fortunately, they have an optimal target and adjust toward it quickly.

CONCLUSIONS

In static model, profitability and tangibility has positive significant effect on leverage ratio. While growth has negative significant effect on leverage ratio. Those are the determinants of capital structure of infrastructure companies. Other determinants observed that do not have significant effect are liquidity, firm size, and non-debt tax shield. Whereas, in dynamic model, profitability has negative significant effect. It is the only variable that is found significant as determinant of capital structure target of infrastructure companies. Other determinants observed that do not have significant effect are tangibility, growth, liquidity, firm size, and non-debt tax shield.

From the regression of dynamic model, the researcher can identify the existence of optimal capital structure target and the speed of adjustment. The data analysis showed that there is relationship between last year leverage ratio and this year leverage ratio which indicates the existence of capital structure target. The researcher also identified adjustment speed of 49%, which indicated that optimal target capital structure is being quickly adjusted. Infrastructure companies need 6 years 10 months to close the gap between current capital structure and target capital structure.

The recommendations for advanced research and corporate finance management are:
- Identify other determinants of capital structure and capital structure target to explain variation that cannot be explained in this research.
- Do advanced research on active and passive adjustment as this research only cover the basic of adjustment.
- To have better figure of current condition, next researcher can use market value leverage and compared it to this research that use book value leverage.
- Research on other sector that is currently has high capital expenditure beside infrastructure sector.

- Create systematic plan to achieve optimal capital target within estimated time found in this research.
- Estimate the cost of adjustment and compared it to benefit of optimal capital structure. If the cost is higher, then the management should not adjust immediately but wait until the cost is lower.

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