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Leverage Adjustment Speed: Evidence in Indonesia

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ABSTRACT
Using data from Indonesia Stock Exchange (IDX) during 2010 – 2019, this study investigates the speed of adjustment on the corporate leverage in reaching the optimal target leverage of the non-financial listed firms in Indonesia. This study cites the Generalized Moment Method (GMM) panel model to estimate the speed of adjustment value by. We found that firms in Indonesia are proven to adjust their capital structures to reach their optimal leverage ratios. Both use book leverage and market leverage, in observing all sectors and in split sectoral observations. This research has implications to contributes to the existing literature of the capital structure, and also to help company managers in their decision making, related to the factors affecting the speed of adjustment of firms' optimal target leverage ratios.

Keywords: *dynamic capital structure, target leverage, speed of adjustment.*

1. INTRODUCTION

In general, the capital structure reflects the optimum leverage and equity. [4] stated this as the most significant issue in modern finance. It is shown not only in formal forms of the corporate, yet also in vast researches conducted in these last four decades. These claims are justified by [21] and [14], for how capital structure serves as the core of modern corporate finance. Capital structure is crucial for a firm as it affects profitability, risks, and its value [36]. Hence, the capital structure of a firm must be at the optimum level, serving a purpose to maintain the flexibility of its corporate's finance.

In the existence of the perfect market, achieving the optimum speed of adjustment on the capital structure could be applied in instant, regardless of how factors such as size and price may affect it. There are several issues in the speed of adjustment decision on capital structure, which affect firm value and long-term target of corporate finance. Tax, deductible income, agency cost related to shareholders and managers, high adjustment, and unexpected cost are several criteria affecting the decision. Such an issue should be considered essential, as actions taken by the corporate served as signals to the market. Changes in capital structure may affect in declining firm's value, portraying a negative signal to the market [4].

The use of debt as capital would give a signal to the investors by delivering information on the quality of the firms and prospects. Debt would convey market that firms have monitored cash flow, preventing managers to engage in moral hazard conduct. Higher leverage would increase a firm's capability to achieve the optimum level, yet also increase its default risk. Another issue on excess debt is the delay of future investment while the firm achieves its debt optimum level. Therefore, optimum capital structure is established when default risk equals benefit obtained from tax income [31].

The issuance of equity would diminish the incentive problems caused by debt financing. While [11] note that stock markets serve an important function in the management of the conflict among stakeholders. All information regarding the prospects of listed companies is also circulated in the equity market. This information can be accessed by creditors as well as investors to support the firm's capital. The information and its quality, related to the analyzed firms, carry benefits to the investors through better monitoring.

A firm can maximize its value by applying a balance fund target between received benefits and the cost of capital structure [22]. However, due to asymmetric information, economic

volatility, and a firm's characteristics, funding could deviate from the optimum capital structure initially targeted. These are the motivations of firms to achieve optimum capital structure, which later established the term speed of adjustment (SOA). This refers to how fast a firm adjusts its optimum capital structure target. Acknowledge factors affecting SOA is essential to determine the right conduct on adjustment and minimize its cost, suffered from differences in characteristics and time period. According to [16], target funding cannot be completely observed, yet able to be tested by factors affecting SOA.

[4], [9], [29], [41] reported that size positively significant influencing speed of adjustment. While [9], [21], [29] found that profitability affecting the speed of adjustment toward optimal leverage. Liquidity also reported plays an important role to lower the transaction cost of capital structure adjustment by [23].

On part of growth opportunities, [4] found that firm's growth opportunities negatively correlated with speed of adjustment while [14] and [29] documented the contrary result that speed of adjustment positively correlated with speed of adjustment. Such different results may cause following [38] that a firm's capital structure reflects not only its own characteristics yet also influenced by the environment, traditions, financial institutions, legal and also political regulations in which it operates.

In this paper, the leverage adjustment speed of Indonesian public firms during 2010 – 2019 is investigated. We contribute by being the first to estimate the effect of stock price synchronicity on the corporate leverage of non-financial listed firms in Indonesia in reaching their optimal target leverage ratio. Our estimation model builds on [10] using lagged leverage of the dependent variable and lagged a few firm's characteristics to estimate the dynamic model of leverage adjustment speed. The rest of the paper is structured as follows. In section 2, data and methodology are described. In section 3, the result is presented, and in section 4, a summary and conclusions are provided.

2. DATA AND METHODOLOGY

This study analyzes the speed of adjustment toward optimal leverage of firms listed on the Indonesia Stock Market between the years 2010-2019. The data necessary for our analysis is obtained from DataStream Thomson Reuters, which gathers financial data for firms listed on Indonesia Stock Exchange through financial statements by the listed firms. Specifically, the firms in our sample met the following criteria: (1) only active publicly traded firms for the whole year period included; (2) firms delisted by index are excluded; (3) firms should have at least 2 years of available data; (4) firms missing data necessary for leverage calculation, either market leverage or book leverage are excluded.

All sectors based on the IDX sector index are covered with the exception of the IDX financials sector. This leaves us with a final sample of 336 firms for book leverage observations and 373 firms for market leverage observations. However, not all the firms in the sample have all the observations for the whole sample period, to minimize loss of information and losing much observation, leaving us with unbalanced panel data. Table 1 reports the mean, median, and standard deviation of the sample in all sectors and each sectoral summary statistics.

We also estimate the speed of adjustment from an industry perspective based on the IDX Industrial

3. VARIABLES

Table 1. Firm's distribution by sectoral index

Index Code	Index name	Firms
IDXENERGY	IDX Sector Energy	51
IDXBASIC	IDX Sector Basic Materials	66
IDXINDUST	IDX Sector Industrials	37
IDXNONCYC	IDX Sector Consumer Non-Cyclicals	63
IDXCYCLIC	IDX Sector Consumer Cyclicals	77
IDXHEALTH	IDX Sector Healthcare	14
IDXPROPERT	IDX Sector Properties & Real Estate	9
IDXTECNO	IDX Sector Technology	8
IDXINFRA	IDX Sector Infrastructures	39
IDXTRANS	IDX Sector Transportation & Logistic	15
Total		**379**

This study uses the calculation of book leverage and market leverage as the dependent variable. Several previous studies have debated which leverage should be used as the dependent variable in finding the value of leverage in speed of adjustment research. However [4], [5], [12], [17], [24], [26], [29], [36], [41] using these two forms of debt as the dependent variable. In the research of [41] it is proven in getting the speed of adjustment value, using both market leverage and book leverage. The results are not much different.

Table 2. Definition of variables

Firm characteristics variables	Formulation
Book Leverage	$\frac{Total\ Debt}{Total\ Assets}$
Market Leverage	$\frac{Total\ Debt}{Total\ Debt + Market\ Equity}$
Size	$ln\ (Total\ Assets)$
Growth	$MVTB$
Profitability	$\frac{EBIT}{Total\ Assets}$
Liquidity	$\frac{Current\ Assets}{Current\ Liabilities}$
Depreciation	$\frac{Depreciation}{Total\ Assets}$
Share Price Performance	$\frac{Share\ Price_{it} - Share\ Price_{it-1}}{Share\ Prices_{it-1}}$

3.1 Speed of adjustment model

Display equations should be flush left and numbered consecutively, with equation numbers in parentheses and flush right. First, use the equation editor to create the equation. Then, select the equation, and set the "Equation" Style. Press the tab key and type the equation number in parentheses.

To estimate the speed adjustment of leverage ratios towards optimal leverage ratios, this study used [10] equation model:

$$Lev_{it} = (1 - \lambda)Lev_{it-1} + \lambda\beta X_{it-1} + \varepsilon_{it} \quad (10)$$

In equation above, the coefficient on the lagged leverage ratio is $\mathbf{1} - \boldsymbol{\lambda}$, where $\boldsymbol{\lambda}$ is the convertion result as a proxy of measurement of the adjustment speed $\boldsymbol{X_{it-1}}$ represent firm characteristics variables (size, growth, share price performance, liquidity). The estimation of the speed of adjustment is for each firm *i* in year *t*.

We adopt panel estimator of Generalized Method of Moments System (SYS-GMM) to estimate the speed of adjustment value and correlation between stock price synchronicity and the speed of adjustment toward optimal leverage ratio. Some stated that SOA computed by Fixed Effects model may cause upward biased while OLS model may cause downward biased. To reduce such bias caused by estimating SOA for short time dimension data which many firms have only a few years of data, [19] rely on an instrumental variable of GMM model in their mean differencing estimation.

[6] document that the extended GMM (GMM-SYS) estimator of [3] reveals dramatic efficiency gains, for such short sample periods and persistent data. [6] further document that once lagged first-differenced and lagged levels instruments are included in the instruments set, one could reduce the finite sample bias substantially by exploiting the additional moment conditions in this approach. Size*(t-1)*, Growth*(t-1)*, Profitability*(t-1)*, Liquidity*(t-1)*, Depreciation*(t-1)* are used to be the additional instrument variables for each observation.

4. RESULT AND DISCUSSION

Table 3. Book leverage results

Book Leverage											
	ALL SECTOR	IDX TECHNO	IDX TRANS	IDX PROPERT	IDX NONCYC	IDX INFRA	IDX INDUST	IDX HEALTH	IDX ENERGY	IDX CYCL	IDX BASIC
Lev(*t-1*)	0.728***	0.908*	0.826***	0.488*	0.776***	0.347***	0.853***	0.844**	0.446*	0.934***	0.47***
	(5.31)	(1.97)	(3.95)	(2.12)	(3.60)	(3.52)	(7.79)	(2.56)	(1.91)	(4.31)	(10.93)
Size(*t-1*)	-0.236***	0.015	0.018	-0.079	0.022	0.031*	-0.007	0.008	-0.104***	0.013	0.012
	(-3.63)	(0.21)	(0.28)	(-3.96)	(1.54)	(1.88)	(-0.42)	(0.55)	(-2.8)	(0.14)	(1.18)
Growth(*t-1*)	-2.65e-5***	8.13e-4	0.039	0.003	6.33e-5	0.002	1.75e-4***	0.001	-1.22e-4	0.014	-9.96e-4
	(-2.88)	(0.18)	(0.83)	(1.5)	(-0.03)	(0.47)	(4.86)	(0.5)	(-2.76)	(0.01)	(-1.28)
SPP(*t-1*)	-0.959***	-0.79	-0.949***	-0.57**	-0.299**	-0.28**	-0.795***	-0.908***	-0.295***	-1.016***	-0.136**
	(-18.72)	(-1.29)	(-11.2)	(-3.48)	(-1.93)	(-2.44)	(-5.85)	(-0.33)		(-24.57)	(-1.72)
Liq(*t-1*)	-0.169	-0.022	0.105	-0.012	0.013	0.019	4.52e-5	-0.001	-0.013	-0.205	-0.007
	(-1.58)	(-0.11)	(0.63)	(-0.73)	(0.36)	(0.05)	(0.02)	(-0.1)	(-0.82)	(-0.38)	(0.23)
F-test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR(2)	0.421	0.760	0.398	0.469	0.106	0.378	0.074	0.281	0.458	0.706	0.353
Sargan test	0.540	0.092	0.956	0.084	0.460	0.250	0.927	1.000	0.300	0.963	0.929
Hansen test	0.322	0.962	0.746	1.000	0.128	0.190	0.394	0.955	0.159	0.857	0.464

Table 4. Market leverage results

Market Leverage											
	ALL SECTOR	IDX TECHNO	IDX TRANS	IDX PROPERT	IDX NONCYC	IDX INFRA	IDX INDUST	IDX HEALTH	IDX ENERGY	IDX CYCL	IDX BASIC
Lev(*t-1*)	0.438***	0.802***	0.334***	0.908***	0.490***	0.349***	0.413***	0.485**	0.799***	0.867***	0.412***
	(21.57)	(3.66)	(5.22)	(19.18)	(10.82)	(4.40)	(6.92)	(2.22)	(15.24)	(41.44)	(15.78)
Size(*t-1*)	0.031***	-0.021	0.016	0.016	0.046***	0.065***	0.060***	0.123***	0.154***	0.004	0.008**
	(3.73)	(-1.35)	(0.60	(2.64)	(3.83)	(3.72)	(3.16)	4.78	(12.75)	(1.29)	(3.01)
Growth(*t-1*)	4.16e-6***	0.015	-0.004	-6.52e-5	1.14e-4	-0.003***	2.71e-5***	-0.006	1.31e-5***	-3.52e-4	-2.83e-6***
	(3.09)	(1.56)	(-0.17)	(-0.12)	(0.17)	(-3.58)	(12.87)	(-1.15)	(9.53)	(-2.15)	(-3.82)
SPP(*t-1*)	-0.010***	0.002	-0.005	0.024	-0.009**	5.64e-4	-0.013***	-0.006***	-0.035***	-0.003	-0.014***
	(-6.25)	(0.36)	(-0.34)	(1.13)	(-1.92)	(0.07)	(-2.75)	(-4.23)	(-12.23)	(-0.83)	(-18.54)
Liq(*t-1*)	-1.91e-6	-0.006	0.026	0.001	-2.33e-4	-0.003	1.23e-5	0.006	0.001**	-0.005	-8.73e-4
	(-0.29)	(-0.25)	(1.41)	(1.05)	(-0.48)	(-0.91)	(1.60)	(0.70)	(2.23)	(-2.85)	(-0.98)
F-test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR(2)	0.125	0.520	0.075	0.115	0.136	0.176	0.145	0.235	0.150	0.430	0.105
Sargan test	0.095	0.734	0.129	0.890	0.075	0.111	0.076	0.080	0.099	0.781	0.096
Hansen test	0.632	0.081	0.267	0.077	0.766	0.713	0.782	0.894	0.188	0.108	0.541

The significance of the leverage coefficient means that firms in Indonesia are proven to adjust their capital structures to achieve their optimal leverage ratios. Both use book leverage and market leverage, in observing all sectors and in split sectoral observations. From the result of the leverage coefficient, it can be seen that the value of the speed of adjustment reaches the optimal leverage ratio

Targeted by the company with an estimated leverage coefficient of 1.

Table 2 presents estimation results for the book leverage. The results show that for all sector observation, firms close in one year about 27.2% of the gap between the actual and target leverage ratio.While for the separated sector observations, firms correct about 9.2% for IDXTECHNO, 1.74% for IDXTRANS, 51.2% for IDXPROPERT, 22.4%

for IDXNONCYC, 65.3% for IDXINFRA, 14.7% for IDXINDUST, 15.6% for IDXHEALTH, 55.4% for IDXENERGY, 6.63% for IDXCYCL, and 53% for IDXBASIC of deviation away from their target optimal value.

Table 3 report results of the market leverage observation. For all sector estimation, firms tend to adjust faster than using the book leverage estimation. The adjustment speed of these firms are 56.2% per year. While the fastest to reach their optimal value showed by IDXTRANS for 66.6%, followed by IDXINFRA for 65.1%, IDXBASIC for about 58.8%, IDXINDUST for 58.7%, IDXHEALTH for 51.5%, IDXNONCYCL for 51%. In contrast, firms within IDXPROPERT, IDXCYCL, IDXTECHNO, and IDXENERGY sector observation adjust their capital structures relatively slowly towards their target optimum value.

Stated from [32], these differences show that sector's financial risk may determine their adjustment speed. Firms within high financial risk sector tend to reach their target optimum value faster than their opposite. Hence, still more to discover as underlying factor determining adjustment speed. As presented in table 3, for all sector observation, size, growth and share price performance are negatively related with the coefficients are significant at the 1% level of significance. These results indicate that firm size, firm growth and firm share price performance are inversely related with firm book leverage.

A negative significant also found in relation between the firm size and the book leverage within IDXENERGY sector observation. The book leverage is also found to be negatively impacted by share price performance within IDX TRANS, IDXPROPERT, IDXNONCYC, IDXINFRA, IDXINDUST, IDXHEALTH, IDXENERGY, IDXCYCL, and IDXBASIC sector. A positive effect only found on firm's growth on the book leverage within IDXINDUST sector observation.

In table 3, results are reported that the book leverage is positively affected by firm size for all sector observation, IDXNONCYCL,

5. SUMMARY AND CONCLUSION

Recent studies in corporate finance have shown how several factors of firm characteristics affect the firm's capital structure decision. Empirical evidence suggests that specific imperfections may significantly affect the firm's financial and investment policies. Previous studies also suggest that firms optimally structure their financing decisions to reduce the economic costs that result from imperfections in the financial market. This study enriches current studies of capital structure by investigated the speed of the adjustment on the corporate leverage toward the optimal capital structure of the non-financial sector, Indonesian firms from 2010 – 2019.

We found that firms in Indonesia are proven to adjust their capital structures to achieve their optimal leverage ratios. Both use book leverage and market leverage, in observing all sectors and in split sectoral observations Taking all the firms in the sample together, using the book valued leverage ratio this study found that firms adjust to their optimum target leverage ratio around 27.2% per year. For the separated sector observation, the fastest adjustments showed by IDXINFRA sector estimation, opposite to IDXCYCL as the slowest sector to adjust to their optimum value.

While observing all sectors for the market leverage, this study found that these firms adjust faster than all sector estimations using the book leverage, in about 56.2% per year. The adjustment speed of IDXTRANS was found the be the fastest to reach their target value, and in contrast, firms within the IDXPROPERT sector adjust back towards their target capital structure relatively being the slowest.

As [15] stated that with the development of the stock market where firms have more choices for and fewer costs of equity, firms are induced to restrict their leverage. In the more developed stock market, firms tend to mitigate the use of debt as it instead promotes the use of equity. Added by [35] the external fund is required to minimize the inflation of internal funding. Therefore, firms with high capital may issue more shares to achieve the optimum level of their capital structure. For example, large firms would increase share issuance, claiming an act to hedge the inflation, as asymmetric information decreases. Such opportunity could be seized to accumulate cash reserve, through large-scale share issuance.

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