

Dynamic Capital Structure and Its Speed of Adjustment: a Case of Listed Manufacturing Firms in Indonesia

Novia Putri Anisti, Dony Abdul Chalid[✉]

Faculty of Economics and Business, Universitas Indonesia, Depok, Indonesia

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Abstract

This study examines the determining factors and the speed of adjustment of manufacturing firms' capital structure in Indonesia. This research uses data of 118 listed manufacturing companies from 2014 to 2018 and offers a continuation of Indonesia's existing literature by applying a dynamic model. The results reveal that Indonesian manufacturing firms practice optimal capital structure and are altered by firm-specific and time-varying factors. Firms' decisions regarding capital structure are determined by firm-specific factors: non-debt tax shields, tangibility, and stock price performance. The results also indicate the speed of adjustment does exist, although the speed of adjustment finds lower than in previous research. The slowdown of the manufacturing industry growth from 2014 to 2018 turns out to be in line with the slow pace of leverage adjustment.

Struktur Modal Dinamis dan Kecepatan Penyesuaiannya: Kasus Perusahaan Manufaktur Terdaftar di Indonesia

Abstrak

Penelitian ini mengkaji faktor penentu dan kecepatan penyesuaian tingkat struktur modal perusahaan manufaktur di Indonesia. Penelitian ini menggunakan data perusahaan manufaktur publik yang mencakup periode tahun 2014 hingga 2018, dan menawarkan kelanjutan dari literatur tentang struktur modal di Indonesia yang ada dengan menggunakan model dinamis. Hasil penelitian menunjukkan bahwa perusahaan manufaktur Indonesia mempraktikkan struktur modal yang optimal dan dipengaruhi oleh faktor spesifik perusahaan dan waktu yang bervariasi. Keputusan perusahaan mengenai struktur modal ditentukan oleh faktor-faktor spesifik perusahaan seperti pelindung pajak non-hutang, aset berwujud, dan kinerja harga saham. Hasil penelitian juga menunjukkan bahwa kecepatan penyesuaian memang ada, meskipun kecepatan penyesuaian ditemukan lebih rendah dari penelitian sebelumnya. Perlambatan pertumbuhan industri manufaktur dari 2014 hingga 2018 ternyata sejalan dengan lambatnya penyesuaian ke struktur modal optimal.

JEL Classification: G32, G23, G15

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[✉]Correspondence Address

Jl. Margonda Raya, Pondok Cina, Kecamatan Beji, Kota Depok, Jawa Barat 16424
Email: donny.abdul@ui.ac.id

INTRODUCTION

Discussion on capital structure is still intense, although it has been more than half a century after Modigliani and Miller's seminal work in 1958. There are at least two widely known theories on the capital structure: trade-off and pecking order theories (De Haas & Peeters, 2006). An extensive effort has been made to examine these theories empirically in the different economic contexts, both developed and developing countries. In the beginning, empirical research on the capital structure was conducted mainly in developed countries. Nevertheless, many pieces of research also have been done in developing countries recently. Developing countries are considered to have different contexts, such as lower financial market efficiency, higher asymmetric information, and different institutional settings (Eldomiaty, 2007; Ramjee & Gwatidzo, 2012).

Another topic on capital structure, especially related to trade-off theory, is whether we use the static or dynamic framework (Myers, 1977). The static framework assumes that firms have the leverage target and believe that all firms are already at their targets. This framework believes that variation in leverage ratio across firms influenced by the firm's trade-off between the cost and benefits of debt. Unlike the static framework, the dynamic framework approach suggests that although firms have their leverage target, they may not achieve their target. This condition happens because of market imperfections and costs associated with leverage adjustment. Therefore, the observed debt level might not be optimal (Memon et al., 2015). Realizing that capital structure decisions are not static, recent research on capital structure considers the dynamic perspective of the capital structure and has used dynamic adjustment models (Öztekin & Flannery, 2012). The firm's capital structure is not always optimal due to various disturbances, and the capital structure will undoubtedly be adjusted periodically based on the cost of adjustment (Drobetz & Wanzenried, 2006; Haron, 2016). According to Strebulaev

(2007), research using a static model cannot explain differences between companies in a cross-section because of the gap between actual and target leverage. Therefore, static models cannot be used to confirm the existence of optimal leverage and the cost and speed of adjustment (Haron, 2016). Realizing this limitation, many researchers developed a partial adjustment or dynamic model of capital structure. Therefore, dynamic models with a better approach to identifying optimal capital structure, speed of adjustment, and adjustment cost become a tendency in recent studies (Drobetz & Wanzenried, 2006; Haron, 2016).

Despite a massive effort, no universal consensus on the perfect debt and equity ratio has been reached so far for a firm to use in its capital structure (Booth et al., 2001; Haron, 2014). This research tries to extend our understanding of the capital structure, especially in a developing country. This research investigates the dynamic aspects of manufacturing firms' capital structure decisions on the Indonesia Stock Exchange (IDX), using a dynamic model. This research's main contribution is extending previous research using new data and focus on the manufacturing industry (Saadah & Prijadi, 2012; Haron, 2016). The use of this new data is needed, given the significant changes in the manufacturing industry's context.

This study makes a novel contribution to adding insight into capital structure research in Indonesia by utilizing the latest data. The selection of one industry is expected to contribute to more specific literature on capital structure, bearing in mind that different industries also have different business characteristics and capital requirements. We suspect that the slowdown in manufacturing industry growth from 2014 to 2018 will also be represented by firms' slow adjustment to optimal leverage.

Also, this study uses a dynamic model with Generalized Method of Moments (GMM) estimation. The dynamic aspect referred to here is about the perspective mentioned above, that firms do not always opera-

te optimally at one point of the same leverage from time to time. In other words, the capital structure is not static. Previously, research on capital structure is still mostly done using static models, and only a few of them use dynamic models (Haron, 2016).

Hypothesis Development

Relationship between Two or More Variables

Previous works of literature have been recognized several determinants of capital structure decisions. The first factor is related to tax-shield. As we know in the trade off-theory, the tax shield's benefits will motivate firms to include more debt in their capital structure. However, debt that is too high will give firms a high chance of default in interest payments, resulting in financial difficulties and even bankruptcy. As an alternative, firms may choose other ways, such as tax-loss carry-forward, investment tax credits, and depreciation (Chen & Chen, 2011; Haron, 2016). These alternatives are referred to as non-debt tax shields (NDTS). Thus, we can expect that NDTS has a negative impact on leverage since it is the alternatives to tax shields provided by debt financing (Ameer, 2013; Haron, 2016).

H1: Non-debt tax shield has a negative impact on leverage.

The second factor is related to the internal source of funding, such as profitability. Firms with large profits tend to use internal funding sources, while firms with small profits tend to choose debt because they do not have enough retained earnings (Jermias & Yigit, 2019). Therefore, profitability is believed to influence leverage negatively. (De Jong et al., 2008; Moosa & Li, 2012; Ameer, 2013; Haron, 2016).

H2: Profitability has a negative impact on leverage.

The third factor is related to the firm's ability to asking for debt and repay the debt, such as size, liquidity, and tangibility. Larger firms usually have a better reputation in the

debt market and therefore have lower debt costs. Therefore, they are more likely to use debt financing (Jermias & Yigit, 2019). Thus, there is an assumption of a positive relationship between and leverage and firm size (De Jong et al., 2008; Ameer, 2013; Haron, 2016). Another variable related to the firm's ability to repay the debt is liquidity. Firms that have high liquidity ratios must use more debt to fulfill their obligations on time. On the contrary, another theory claiming that firms with higher liquidity will choose internal funds compared to debt. Therefore liquidity may have a negative impact on leverage (Deesomsak et al., 2009; Moosa & Li, 2012). Another variable is the tangibility of assets. Tangible assets can usually maintain their value when firms experience financial difficulties. Types of firms with intangible assets (technology-based firms) tend to have difficulties borrowing money from banks due to lack of collateral (Jermias & Yigit, 2019). The higher the value of a firm's tangible assets, the more debt that the firm can take. We can hope that there is a positive relationship between asset tangibility and leverage (De Jong et al., 2008; Moosa & Li, 2012; Haron, 2016).

H3: Size has a positive impact on leverage.

H4: Liquidity has a negative impact on leverage.

H5: Tangibility has a positive impact on leverage.

The fourth factor is related to the firm's opportunity, such as growth, business risk, and share price performance. The growing firms tend to lower their debt levels and choose equity financing to show that they are not experiencing any problems, such as underinvestment or asset substitution problems. Moreover, when investment opportunities and growth are smaller than retained earnings, the debt ratio will decrease. So growth will have a negative relationship with leverage (DeAngelo & Masulis, 1980; De Jong et al., 2008; Jermias & Yigit, 2019). The firm's business risk is represented by earnings volatility. When firms have a high-profit volatility level, they may face debt

repayment failure and reduce their debt financing. Thus, it is assumed that there is a negative relationship between leverage and business risk (De Jong et al., 2008; Ameer, 2013). Another factor that can be part of this group is the share price performance. If its stock performs well, a firm is more likely to use equity. This belief is based on market timing theory, which predicts the negative relationship between leverage and stock performance (Moosa & Li, 2012; Haron, 2016).

H6: Growth has a negative impact on leverage.

H7: Business risk has a negative impact on leverage.

H8: Share price performance has a negative impact on leverage.

The fifth factor is related to the economic condition, such as GDP growth and inflation. The economic condition can influence the availability of funds. Gajurel (2006), in his research on macroeconomic influence on capital structure, found that inflation has a negative correlation with the leverage ratio. A study by Assaf (2014) reviewed the effect of inflation on capital structure. In that study, it is stated that if the uncertainty caused by inflation correlates with tangibility, it will cause a decrease in leverage. The results showed that inflation has a strong negative relationship with the firm's long-term leverage (Assaf, 2014). There are research evidence that capital markets develop along with general economic development (Rajan & Zingales, 1995). Then, as the capital market develops, companies tend to use more debt. Another finding that GDP growth has a negative relationship with total debt and short-term debt but positive with long-term debt ratio (Gajurel, 2006). Higher economic growth will encourage companies to use more long-term debt, and as the capital market develops, debt becomes a viable option. In this study, we will also assume the same thing. It is expected that there will be a positive relationship between GDP growth and leverage (we use long-term debt/ total assets).

H9: GDP growth has a positive impact on leverage.

H10: Inflation has a negative impact on leverage.

METHOD

In this study, we collect data from public manufacturing companies listed on the Indonesian Stock Exchange. There are 185 companies listed under the manufacturing sector. We eliminate companies with incomplete data and negative equity. Finally, we have data of 118 companies from 2014 to 2018, with a composition of 52 companies in basic industry and chemicals, 34 companies in the consumer goods industry, and 32 in miscellaneous industry. Most of the data is financial data drawn from Thomson Reuters.

The study uses the first difference GMM approach by Arellano and Bond (1991). This approach is starting with transforming all regressors, differentiating, and using generalized methods of moments called GMM differences. This study assumes that all variables mentioned earlier will affect the optimal leverage of the firm. This study refers to a previous studies model (Assaf, 2014; Haron, 2016), with two domestic macroeconomic variables. The leverage ratio used in this study is total long-term debt divided by total assets.

This measurement represents the percentage of the company's assets financed by long-term debt, which is the company's long-term liability, for more than one year. If the company has a relatively high ratio of long-term debt per total assets, then the company will tend to be exposed to high risk, and in the end, may have defaults. This condition often makes lenders skeptical in providing debt and makes investors full of suspicion in buying shares (Kenton, 2019). This ratio describes the company's long-term financial position, so it becomes more relevant to research on capital structures that have time series. The estimation model of this research will be:

$$\Delta\text{Levi,t} = \Delta\text{Levi,t-1} + \beta_1\Delta\text{NDTSi,t} + \beta_2\Delta\text{PROFi,t} + \beta_3\Delta\text{RISKi,t} + \beta_4\Delta\text{TANGi,t} + \beta_5\Delta\text{SIZEi,t} + \beta_6\Delta\text{GROWTHi,t} + \beta_7\Delta\text{LIQI,t} + \beta_8\Delta\text{SPPi,t} + \beta_9\Delta\text{INFLi,t} + \beta_{10}\Delta\text{GDPGi,t} + \Delta\mu_{i,t}$$

The detail of each variable can be seen in Table 1.

factors, the speed of adjustments, and the aiding theories to explain the findings.

Table 1. List of Variables and Measurements

Code	Variable	Measurement	Expected Impact on Lev
Lev	Leverage	Total long-term debt divided by Total assets	NA
NDTS	Non-debt tax shield	Annual depreciation expenses divided by Total assets.	(-)
PROF	Profitability	EBIT divided by Total assets	(-)
SIZE	Firm size	Ln (total assets)	(+)
TAG	Tangibility	Net fixed assets divided by Total assets	(-)
LIQ	Liquidity	Current assets divided by Current liabilities	(+)
GROWTH	Growth	Market value equity divided by Book value equity	(-)
SPP	Share price performance	Yearly change in year-end share price	(-)
RISK	Business risk	The standard deviation of ROA (three years)	(-)
INFL	Inflation	Yearly inflation	(+)
GDGG	GDP growth	Yearly GDP growth	(-)

RESULT AND DISCUSSION

This study examines the dynamic aspects of manufacturing firms' capital structure decisions in Indonesia, using financial data covering the period 2014 to 2018. This paper offers a continuation of Indonesia's existing literature using a dynamic model, including the existence of optimal capital structure, the determining

In Table 2, there is a summary of descriptive statistics of all the variables. Table 1 shows that in the period of five years from 2014 to 2018, Indonesian manufacturing companies had an average debt (LEV) of 0.0973 in their capital structure. NDTS were at an average of 0.0309. PROF has a range of values from -0.0496 to 0.1977 and has an average of 0.0654. TANG has an average of 0.4685. SIZE has the highest standard deviation among other variables, so it

Table 2. Descriptive Statistics 2014-2018

Variable	Obs. (N)	Mean	Std. Dev.	Min	Max
Lev	590	.0973	.1244	.0000	.3866
NDTS	590	.0309	.0132	.0120	.0555
PROF	590	.0654	.0633	-.0496	.1977
RISK	590	.0271	.0207	.0034	.0770
TANG	590	.4685	.1677	.2187	.7495
SIZE	590	14.7309	1.3751	12.7129	17.3526
GROWTH	590	1.2817	1.2185	.1269	4.1865
LIQ	590	2.0370	1.2510	.7778	5.1130
SPP	590	.1199	.4984	-.6178	1.6833
INFL	590	.0466	.0142	.0320	.0639
GDP	590	.0503	.0010	.0488	.0517

can be said that it has high variability (firm size varies greatly). GROWTH has an average value of 1.2817 in five years. LIQ lies around 2.0 in both periods. SPP has an average of 0.1199. The variability of the SPP is quite substantial because it has a standard deviation of 0.4984 (greater than the average). It also has an extensive range between the minimum and maximum points.

Table 3 summarizes the correlation data of all the variables. All correlation coefficients are below 0.95, the collinearity of these variables is not an issue, and all variables can be used in this study (Gujarati & Porter, 2009). Table 4 shows that the Variance Inflation Factor (VIF) value of all variables is smaller than 10, which means there is no multicollinearity problem.

cant at the 0.01 level. The existence of speed of adjustment proves that trade-off theory can dynamically apply to explain the capital structure of the listed manufacturing firms in Indonesia. The speed of adjustment, in general, has a significant influence also in determining policies related to capital structure.

The results indicate that the speed of adjustment does exist but can be considered slow (below 0.5). Previous studies by Tzang, Wang and Rahim (2013) found that the speed of adjustment coefficient of 0.6177, and Haron (2016) found that speed of adjustment coefficient of 0.6274. Both are higher than 0.5, which means the faster speed of adjustment. According to previous research, it can be seen that for

Table 3. Correlation Matrix

	LEV	PROF	RISK	TANG	SIZE	GROWTH	LIQ	SPP	INFL	GDP
LEV	1									
PROF	-.2161**	1								
RISK	.0732*	-.0859**	1							
TANG	.4909**	-.3263**	-.0246	1						
SIZE	.3804**	.1881**	-.0758*	.3032**	1					
GROWTH	-.2381**	.5273**	.0366	-.1776**	.1647**	1				
LIQ	-.2753**	.3371**	.0338	-.3554**	-.1046**	.1661**	1			
SPP	-.0001	.2116**	-.0047	-.0303	.0773*	.1506**	-.0017	1		
INFL	-.0485	-.0612	-.0462	.0118	.0737*	.0046	.0445	.0739	1	
GDP	.0338	.0405	.0345	-.0363	-.0622	.0023	-.0169	.0099	-.8040**	1

Notes: *Significant at 0.1; **Significant at 0.05; *** Significant at 0.01

λ_0 denotes the coefficient of optimal leverage, and the speed to optimal leverage, which is a partial adjustment, has a value of less than one with the symbol δ , which is $1 - \lambda_0$. From the GMM regression results, obtained optimal coefficient of leverage of 0.5757. Thus, the speed adjustment coefficient will 0.4243 ($1 - 0.5757$). So, on average, manufacturing firms on the IDX need 2.36 years ($1 / \delta$) to be at the optimal leverage. These firms were able to close only 42.43 percent of the gap between actual leverage and targeted leverage within 2.36. The coefficient for speed adjustment parameter (δ) is signifi-

manufacturing firms, in the 2014-2018 period, they have a slower speed of adjustment to the target leverage. The slower adjustment speed may result from the condition of the manufacturing industry recently.

Three firm-specific determinants, namely: NDTs, TANG, and SPP, appear to have a significant effect on the target leverage of the entire sample (Most of the manufacturing firms on the Stock Exchange) during the study period. NDTs has a significant negative relationship with leverage. While this study shows a significant positive relationship between TANG

Table 4. The GMM Results

	Coef.	Std. Err.	z	P>z	95% Conf. Interval	VIF
LEV _{t-1}	.5757***	.1225	4.7000	.0000	.3355 .8158	1.53
NDTS	-3.0198**	1.3270	-2.2800	.0230	-5.6208 -.4189	1.41
PROF	.0337	.3470	.1000	.9230	-.6464 .7139	1.74
RISK	.2162	.4900	.4400	.6590	-.7443 1.1766	1.04
TANG	.5056***	.1780	2.8400	.0050	.1566 .8545	1.99
SIZE	.0317	.0487	.6500	.5140	-.0637 .1271	1.45
GROWTH	-.0131	.0228	-.5800	.5650	-.0578 .0316	1.41
LIQ	-.0153	.0250	-.6100	.5390	-.0643 .0336	1.27
SPP	-.0367*	.0189	-1.9500	.0510	-.0737 .0002	1.08
INFL	-.6628	.5816	-1.1400	.2550	-1.8028 .4772	2.28
GDPG	-6.7976	7.4003	-.9200	.3580	-21.3019 7.7067	2.23
AR (1)		z		P > z		
		-5.26		.000		p-value < 0.05 → as per the requirement
AR (2)		z		P > z		
		.64		.522		p-value > 0.05 → as per the requirement
Sargan test of overid. restrictions		chi-square		P > chi-square		
		12.86		.800		p-value > 0.05 → as per the requirement
Difference-in-Sargan tests of homogeneity of instrument subsets: iv (INFL GDP)						
Sargan test excluding the group		chi-square		P > chi-square		
		11.87		.753		p-value > 0.05 → as per the requirement
Difference (null H = exogenous)		chi-square		P > chi-square		
		.99		.609		p-value > 0.05 → as per the requirement

Notes: *Significant at 0.1; **Significant at 0.05; *** Significant at 0.01

and leverage. SPP has a significant negative relationship with leverage. Nevertheless, this study's results indicate that some determinants are ultimately insignificant, although initially expressed as an essential variable when the study was conducted using static methods. These results are different from previous results (De Jong et al., 2008; Ameer, 2010; Moosa & Li, 2012, Haroon 2016). The influence of determinants can change depending on the period and what is happening in the economy. In addition, two macroeconomic factors (inflation and GDP growth) also do not significantly influence optimal leverage.

CONCLUSION AND RECOMMENDATION

This study discusses the dynamic aspects of capital structure; most will discuss the optimal capital structure, the speed of the conversation, and various factors that affect the optimal leverage of manufacturing firms on the IDX. Firms' decisions regarding capital structure are determined by firm-specific factors, namely: non-debt tax shields, tangibility, and stock price performance, with varying time factors. From the study results, two domestic macroeconomic factors, inflation and GDP growth, did not have a significant influence on the determination of

the capital structure of Indonesian manufacturing firms on the IDX. The slow adjustment can result from the firm's difficulty in getting long-term capital (financial constraints). This condition can also be affected by other factors such as government policy, interest rates, and global economic conditions.

The studies of optimal capital structure have important managerial implications, both in terms of financial management and investment decisions. Firms that have a capital structure that is worse than expected tend not to be able to maximize their tax shield and also cannot control debt well. Under these conditions, management must be more careful in managing cash flow and not investing as much money as possible in projects where the returns are not optimal. Companies with the capital structure above expectations must also remain vigilant and pay attention to risks and the possibility of financial distress that could adversely affect the relationship between the firm and its shareholders. If the firm routinely identifies and considers various factors that impact capital structure optimization, managers will have more precise and more comprehensive guidelines to maximize the firm's value.

The slowing growth of the manufacturing industry (2014-2018) turns out to be in harmony with the slow pace of leverage adjustment. However, to be truly sure of the harmony between the slowing of leverage adjustment and the slowing down of the economy, further study needs to be done in other periods to compare this study, it can be in a period of slow economic growth or rapid economic growth. In our opinion, the literature on financial constraints in Indonesia also needs to be added because rich literature (about capital structure and financial constraints of manufacturing companies) will significantly assist management and other related parties in determining policy.

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