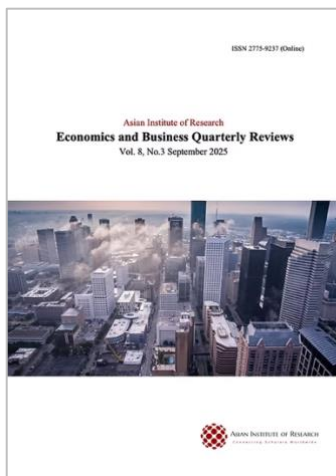




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Unveiling Dynamic Capital Structures on Manufacturing Firms: Insight from System GMM Estimation

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Abstract

This research investigates the factors that influence the capital structure of manufacturing companies in Indonesia. The novelty of this study lies in its advanced methodology, utilising a dynamic model, system-generalised methods of moments (Sys-GMM) estimation, and post-estimation analysis. Our study employs data from 159 publicly traded manufacturing firms. We focus on firm-specific factors, including leverage, profitability, sales, equity, and non-debt tax shields. Our findings suggest that determinant of leverage in Indonesian manufacturing firms, influenced by firm-specific factors and time-varying variables, particularly profitability, which has a negative impact on leverage. Firms with high profits are more likely to use internal sources of finance, whereas firms with low profitability are more likely to use loans, as they often lack sufficient retained earnings. Leverage among manufacturing firms exhibits persistence, as reflected by the significantly positive coefficient of the lagged leverage variable. This suggests that leverage decisions are path-dependent and gradually adjusted toward a long-term target. The time effect (year dummies) is significantly positive, indicating an upward trend in corporate leverage over time, which reflects the influence of macroeconomic conditions and fiscal/monetary policies on financing decisions. The practical implications of our research are significant, as it provides valuable insights into the capital structure and economic constraints of manufacturing companies in Indonesia, aiding management and other relevant stakeholders in making informed policy decisions.

Keywords: Capital Structure, Dynamic Model, Firm-Specific Factor, Profitability, Leverage

1. Introduction

The capital structure encompasses two well-established theories: the trade-off and pecking order theories (Abeywardhana, 2017; Jahanzeb, 2013; Luigi & Sorín, 2009; Miglo, 2010). The trade-off theory posits that corporations have an optimal debt ratio that balances the costs and benefits of debt and equity financing (Abeywardhana, 2017). Research on capital structure has expanded from developed to emerging economies, revealing similarities and differences. Studies across multiple developing countries have found that firm-level factors influencing capital structure decisions are similar to those in developed nations (Booth et al., 2001; Sibindi, 2016). However, significant country-specific differences persist, suggesting the impact of unique institutional features (Booth et al., 2001). Notably, corporations in developing countries tend to use more external and equity

finance than their developed counterparts (Singh, 1991). In Malaysia, profitability, size, and tangibility influenced debt ratios, whereas growth, risk, and investment opportunities had a lesser impact, contrary to findings in developed markets (Pandey & Chotigeat, 2004). The inverse correlation between profitability and debt ratios in Malaysia aligns with the pecking order theory observed in emerging markets. These studies underscore the need for additional research to comprehend the role of institutional differences in shaping capital structures across diverse economic contexts.

Another factor to consider in capital structure, especially within the trade-off theory, is whether a static or dynamic framework is applied by Myers (1977). In a dynamic framework, it is assumed that firms are aware of their leverage targets and are progressing towards them, but may not necessarily achieve them due to market inefficiencies and the costs required to adjust leverage. As a result, the current debt level might not be suitable (Memon et al., 2015). Recent studies have embraced a dynamic approach, using dynamic adjustment models because capital structure decisions are not static (Öztekin & Flannery, 2012). Due to various fluctuations, a company's financial structure is not always optimal.

The capital structure is often adjusted based on the cost of making changes (Anisti & Chalid, 2021; Drobetz & Wanzenried, 2006; Haron, 2016). A static model cannot capture the diversity of organisations in a cross-sectional analysis (Strebulaev, 2007). There is a discrepancy between the leverage a company has and its target. Thus, static models fail to accurately reflect the appropriate level of leverage, the costs involved, and the time required for adjustments (Haron, 2016). Many researchers have proposed partial adjustment or dynamic capital structure models.

Recent studies have increasingly favoured dynamic models for determining the optimal capital structure and the cost of adjustments, leading to their growing popularity (Drobetz & Wanzenried, 2006; Haron, 2016). This research aims to gain a deeper understanding of capital structure, with a focus on Indonesia as an emerging market. A dynamic model approach is used to analyse how the capital structure behaviour of a manufacturing corporation listed on the Indonesia Stock Exchange (IDX) evolves. While building on previous research (Anisti & Chalid, 2021; Haron, 2016), the novelty of this study lies in its advanced methodology, utilising sys-GMM estimation and the latest post-estimation analysis.

2. Literature Review

Harris and Raviv (1991) propose that leverage increases when fixed assets, non-debt tax shelters, financial asset allocation opportunities, and corporation size grow. Conversely, leverage declines with higher volatility, advertisement expense, bankruptcy risk, profitability, and product uniqueness. Our analytical study, however, will focus on four specific determinants: firm size, equity, non-debt tax shields, and profitability. These factors have been chosen to help achieve the optimal leverage ratio for each company. This section provides a brief explanation of the reasons for selecting these factors for our study.

Various factors affecting capital structure behaviour have been found in previous studies. First, corporate capital behaviour is influenced by tax protection. According to the trade-off theory, tax protection may encourage corporations to increase debt and the debt ceiling in their capital structure. However, an excessive increase in debt increases the risk of interest default, potentially leading to financial distress or bankruptcy. On the other hand, a Non-debt tax shield does not directly impact the company's operating profit, especially before depreciation and amortisation, thus making it a valid instrument for leverage.

Alternatively, firms might utilise other strategies, such as carrying forward losses, investment tax credits, and depreciation (Anisti & Chalid, 2021; L.-J. et al., 2011; Haron, 2016). These strategies are known as non-debt tax shelters (NDTS). Therefore, NDTS will negatively impact leverage, as they offer an alternative to the tax benefits of debt financing (Ameer, 2013; Anisti & Chalid, 2021; Haron, 2016). The research by Sutomo et al. (2019) shows that manufacturing companies in Indonesia have a high level of debt, especially in terms of size, profitability, and company growth, which are proven determinants of debt. This also confirms the Pecking Order Theory. The model used in the research, along with the hypothesis, is shown in Figure 1.

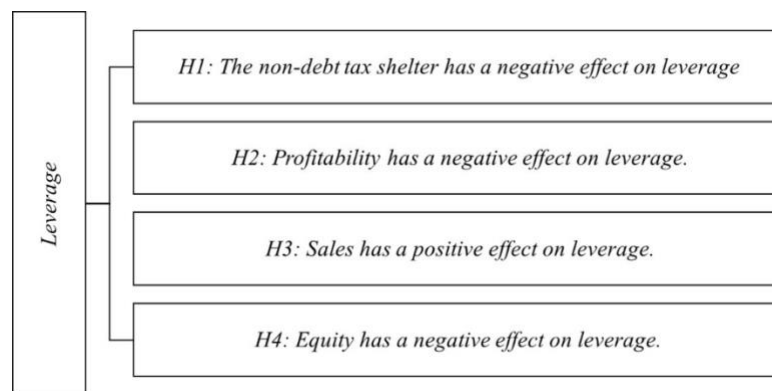


Figure 1: Model of The Current Research

H1: The non-debt tax shelter has a negative effect on leverage

The relationship between non-debt tax shields (NDTS) and corporate leverage has been a topic of debate in financial research. While some studies predict a negative relationship between NDTS and leverage (Pilotte, 1990), empirical evidence has been mixed. Downs (1993) found no evidence of NDTS crowding out debt financing, suggesting firms with substantial depreciation cash flow maintain higher debt levels. Manuel and Pilotte (1992) observed that firms with highly correlated output make similar leverage decisions, indicating a positive relationship between debt and net debt-to-total sales (NDTS). However, Kolay et al. (2011) introduced a novel "tax spread" measure for NDTS and found a negative relationship between NDTS and debt tax shields, supporting the substitution theory. The inconsistent findings across studies may be due to differences in NDTS measurement methods and the complexity of isolating NDTS effects from other firm-specific factors influencing capital structure decisions (Pilotte, 1990).

The research findings suggest that the non-debt tax shield has a significant negative impact on leverage in the context of capital structure decisions among manufacturing companies in Indonesia (Salsabila & Afriyanti, 2022; Suryani & Sari, 2020). This implies that corporations with a lower non-debt tax shield tend to increase their debt levels to benefit from tax deductions on interest expenses. In contrast, those with higher risk levels prefer internal financing to reduce their reliance on debt (Suryani & Sari, 2020). Additionally, the study on tax avoidance in consumer non-cyclical manufacturing corporations found that leverage did not have a positive effect on tax avoidance, indicating a lack of a direct relationship between leverage and tax avoidance in that specific sector (Viorent & Arief, 2023). These insights collectively highlight the intricate interplay between non-debt tax shields, leverage, and capital structure decisions in shaping the financial strategies of manufacturing firms.

H2: Profitability has a negative effect on leverage

The second component is connected to the internal financial source, profitability. Firms with high profits are more likely to use internal sources of finance, whereas firms with low profitability are more likely to use loans, as they often lack sufficient retained earnings (Jermias & Yigit, 2019). As a result, profitability is assumed to have a negative effect on leverage (Moosa & Li, 2012; Ameer, 2013; Haron, 2016 ; De Jong, Kabir, & Nguyen, 2008; Moosa & Li, 2012; Ameer, 2013; Haron, 2016; Anisti & Chalid; D. A., 2021).

The relationship between profitability and firm leverage is complex and varies across different industries and sectors. While some studies have shown a positive correlation between profitability and firm leverage (Oktaviani et al., 2024), others have indicated a negative effect of profitability on corporate leverage (Erlisa et al., 2024). The negative relationship between profitability and leverage, often considered inconsistent with trade-off theory, is supported by multiple studies. Bensaadi et al. (2023) found that profitability has a negative impact on leverage, even in firms with negative profits. This relationship persisted during the COVID-19 pandemic. Frank & Goyal (2015) argue that the inverse relation is due to profitability's direct impact on equity value rather than a flaw in trade-off theory. They observed that firms adjust their capital structure in response to changes in profitability, albeit incompletely, due to the presence of transaction costs. Chen et al. (2019) propose that operating leverage is

the key factor driving this relationship. Operating leverage increases profitability while reducing optimal financial leverage, accounting for approximately 70% of the negative relationship between profitability and corporate leverage. Specifically, research on manufacturing firms in the agricultural products sector found that higher profitability was associated with lower tax avoidance behaviour, which suggests a negative impact on firm leverage (Chen et al., 2019).

Additionally, the study on coal sector firms listed on the Indonesia Stock Exchange revealed that leverage can strengthen the relationship between dividend policy and firm value, indicating a potential negative effect of profitability on firm leverage (Sihombing et al., 2024). Therefore, profitability may negatively impact a firm's leverage, influencing its financial decisions and strategies.

H3: Sales have a positive effect on leverage

Studies examining the relationship between sales, leverage, and profitability in Indonesian companies have yielded inconsistent findings. Some research indicates it has yielded mixed results. While some studies found that sales growth positively affects leverage (Sudaryono & Mulyani, 2019), others reported that other studies have found no significant impact (Susanti et al., 2022). Leverage has been associated with both positive and negative effects, which have been shown to impact tax avoidance positively (Sudaryono & Mulyani, 2019) and negatively affect profitability (Sukadana & Triaryati, 2018). In contrast, sales growth consistently has a positive influence on profitability (Sukadana & Triaryati, 2018; Tresnawati, 2021). The relationship between corporation size and leverage remains to be determined, with some studies reporting inconclusively, and one study finding no significant effect (Susanti et al., 2022). These results suggest that the dynamics of interplay between sales, leverage, and profitability are complex and may vary depending on industry sector and period-specific factors. Further research is needed to clarify these relationships and their implications for corporate financial management.

H4: Equity has a negative effect on leverage

Research consistently shows that equity has a negative effect on leverage. Firms with higher brand equity and more liquid stocks tend to use less debt and prefer equity financing (Mauer et al., 2022; Rashid & Mehmood, 2017a). This negative relationship between equity market liquidity and leverage decisions holds even after controlling for various firm-specific factors (Rashid & Mehmood, 2017b). The impact of equity on leverage is further supported by evidence that managerial decisions, particularly those of CFOs, significantly influence corporate leverage (Frank & Goyal, 2006). Moreover, equity mispricing influences the rate at which firms achieve their target leverage. Overvalued firms, which are above their target leverage, adjust more rapidly by issuing equity or retiring debt, while undervalued firms, which are below their target, adjust more slowly (Warr et al., 2011). These findings demonstrate the inverse relationship between equity and leverage across different contexts and measures.

3. Research Method

3.1 Empirical Models

We utilise the dynamic panel regression: system GMM estimation technique introduced by Blundell & Bond (1998) with two-step robust standard errors (Windmeijer, 2005). This approach improves over the previous GMM models that utilised first-difference and non-linear GMM estimators. The estimation involves two alternative linear estimators. The initial restriction justifies employing an extended linear GMM estimator, where lagged differences of y serve as instruments for level equations and lagged levels of y act as instruments for first-difference equations (Arellano & Bover, 1995). The second restriction supports using the error components GLS estimator for an extended model that considers the observed initial values.

Previous research by Drobetz and Wanzenried (2006) utilized first-difference GMM and one-step GMM. Similarly, Anisti and Chalid (2021) employed the first-difference GMM developed by Arellano and Bond (1991). To improve the performance of GMM, we adopt the methodology proposed by (Blundell & Bond, 1998; Windmeijer, 2005).

We employ firm characteristics data, including leverage, non-debt tax shield, profitability, sales, and equity. The total debt-to-total assets ratio is the leverage ratio employed in this study. This figure represents the percentage of a company's assets that are funded by debt (liabilities) for over a year. If a firm has a high ratio of debt to total assets, it is more likely to be exposed to high risk and, consequently, default. This situation causes lenders to be wary of lending money and investors to buy stocks (Chava & Purnanandam, 2010; Valta, 2014). This ratio represents a company's long-term financial status, making it more relevant to time-series studies on capital structures.

$$llev_{it} = \beta_0 + \beta_1 llev_{it-1} + \beta_2 lndtax_{it} + \beta_3 ROA_{it} + \beta_4 lsales_{it} + \beta_5 lequity_{it} + \varepsilon_{it} \quad (1)$$

Where is the natural logarithm of leverage, the natural logarithm of the leverage of the previous period, the natural logarithm of the non-debt tax shield, the proxy of profitability, the natural logarithm of sales, and the natural logarithm of equity.

3.2. Data

For this study, we used data from publicly traded corporations on the IDX. The majority of the data is sourced from Bloomberg. In the manufacturing sector, there are 159 firms, comprising primary industry, chemicals, companies in consumer products, and companies in miscellaneous industries. Companies with missing data and negative equity are eliminated to get balanced panel data. We have data on 78 firms. In addition, before being modelled, the data is cleaned first with the following criteria: 1). Exclude observations with $ROA < -0.5$ and $ROA > 0.5$; 2). Exclude observations with significantly increased Debt to Assets; 3). We exclude outlier sales. The details of each variable are presented in Table 1.

Table 1: Variable and definition

No	Variable	Label	Definition	Exp Sign	References
1	Leverage	llev	Ln(Debt to Asset Ratio)		
2	Non-debt tax shield	lndtax	Ln(Annual depreciation expenses to Total Assets)	(-)	Ameer (2013); Anisti & Chalid (2021); Haron (2016); (Kolay et al (2011); Pilotte (1990)
3	Profitability	ROA	Net Income to Total Assets Ratio	(-)	Ameer (2013); Anisti & Chalid (2021); Haron (2016); Bensaadi et al (2023); Erlisa et al (2024)
4	Sales	lsales	Ln(sales)	(-)	Sudaryono & Mulyani (2019); Sukadana & Triaryati (2018); Susanti et al (2022); Tresnawati (2021)
5	Equity	lequity	Ln(equity)	(-)	Frank & Goyal (2006); Mauer et al (2022); Rashid & Mehmood, (2017); Warr et al (2011)

This study analyses the dynamic perspective of capital structure behaviour among manufacturing corporations in Indonesia, using financial data from 2009 to 2020. It builds on previous research by Ameer (2013), Anisti & Chalid (2021), Bensaadi et al. (2023), Erlisa et al. (2024), and Haron (2016) applying a dynamic model to explore the optimal capital structure, key determinants, and their implications. Table 2 provides a descriptive and explanatory summary of statistics. It shows that over the twelve years from 2009 to 2020, Indonesian manufacturing corporations had an average leverage ratio (lev) of 0.252. The average return on assets (ROA) was 0.046. The average non-debt tax shield (tax) value was 0.036.

Table 2: Statistics descriptive

Variable	Obs	Mean	Std. Dev.
lev	936	0.252	0.174
roa	936	0.046	0.077
sales	936	9,046,704.2	25,445,377
equity	936	9,963,489.7	21,305,831
ndtax	935	0.036	0.019

Table 3 presents the correlation matrix for all variables. All correlation coefficients are below 0.95, indicating that multicollinearity is not a concern and all explanatory variables are suitable for inclusion (Gujarati & Porter, 2009).

Table 3: Correlation matrix

Variables	lev	roa	sales	equity	ndtax
lev	1.000				
roa	-0.374	1.000			
sales	-0.077	0.238	1.000		
equity	0.007	0.011	0.231	1.000	
ndtax	0.033	-0.001	-0.062	-0.079	1.000

3.3. Result and Discussion

This study investigates the dynamic perspective of capital structure behaviour among Indonesian manufacturing firms using financial data from 2009 to 2020. The model is informed by prior studies such as Ameer (2013), Anisti and Chalid (2021), Bensaadi et al. (2023), Erlisa et al. (2024), and Haron (2016), which employed dynamic models to explore optimal leverage, key determinants, and their implications. Unlike some earlier studies (e.g., Anisti & Chalid, 2021; Drobetz & Wanzenried, 2006), this research excludes macroeconomic variables.

The novelty of this study lies in its use of relatively recent specification tests, particularly the under-identification test (Windmeijer, 2018). Testing for instrument relevance is crucial prior to interpreting estimation results. After conducting a comprehensive suite of specification tests and evaluating the significance of explanatory variables along with AIC, BIC, and HQIC criteria, the results from Model 1 are presented in Table 4.5.

3.3.1. Model Specification

This study employs the System Generalised Method of Moments (System GMM) approach to analyse the determinants of capital structure among manufacturing firms in Indonesia. The GMM technique is chosen for its ability to address potential endogeneity and unobserved heterogeneity in dynamic panel data settings. The dataset comprises 76 publicly listed manufacturing firms over the period 2010–2020. The dependent variable is the firm's leverage (llev), while the independent variables include profitability (ROA), sales (LSALES), equity (LEQUITY), depreciation-to-total-assets ratio (LNTAX), and year-specific dummies to control for time effects.

Prior to estimating the model, a series of diagnostic tests was conducted to ensure its validity. The Hansen J-test yielded a p-value of 0.65, indicating that the instruments are not overidentified and are statistically acceptable. Post-estimation robustness tests include: (i) the Sargan-Hansen test, (ii) serial correlation tests AR(1) and AR(2), (iii) over-identification tests, and (iv) under-identification tests. Information criteria, including AIC, BIC, and HQIC further supported model selection.

The Arellano-Bond test results show a significant first-order serial correlation (AR(1)), but no significant second-order serial correlation (AR(2), p-value = 0.25), which aligns with the underlying assumptions of GMM estimation.

Furthermore, the over- and under-identification tests yield p-values of 0.62 and 0.61, respectively, confirming that the instrumental system is valid and the model is properly identified. Thus, the diagnostic checks indicate that the model is well-specified and suitable for further interpretation.

The Hansen J-test yields a p-value of 0.69, again indicating no overidentification problem. The Arellano-Bond test confirms significant AR(1) and non-significant AR(2) serial correlation (p-value = 0.23), consistent with GMM assumptions. Over- and under-identification tests yield p-values of 0.57 and 0.39, supporting instrument validity and correct model identification.

The estimated GMM model demonstrates relatively low information criteria values: AIC = -21.63, BIC = -75.24, and HQIC = 43.73. These metrics indicate a favourable balance between model fit and parsimony, which is essential for dynamic panel estimation.

The model is based on 680 firm-year observations from 76 cross-sectional units, which is adequate to produce stable and representative estimates. The use of 39 instruments remains within the acceptable threshold, as it does not exceed the number of cross-sectional units, mitigating the risk of instrument proliferation. Accordingly, the GMM model is statistically valid and appropriate for inference.

3.3.2. GMM Estimation Results: Determinants of Leverage in Manufacturing Firms

This study focuses on the dynamic aspects of optimal leverage determinants among manufacturing firms listed on the Indonesia Stock Exchange. Firm-specific variables—including leverage, the depreciation-to-assets ratio, profitability, sales, and equity—are found to influence capital structure decisions. According to the hypothesis, leverage is negatively associated with profitability. Return on assets (ROA) is a significantly negative predictor of leverage. In Model 1, a 1-unit increase in ROA leads to a 1.27%, in Model 2, indicating a 0.09% decrease in leverage for each 1% increase in ROA (significant at the 10% level).

Moreover, the lagged dependent variable (L.llev) is positively significant at the 1% level (coefficient = 0.57), indicating persistence in leverage behavior. This implies that past leverage levels have a positive influence on current leverage, reflecting gradual and cautious adjustments toward target leverage ratios in both Model 1 and Model 2. Meanwhile, ROA retains its negative influence (significant at the 10% level), whereas other variables (lsales, lequity, lntax) are not statistically significant. Year-specific dummies for 2012–2020 are mostly significant, suggesting notable time effects on leverage decisions.

The four coefficients of llev are significantly positive. In models 1 and 2, ROA is a negatively significant independent variable in relation to leverage. In the other two models, sales, equity, and income tax are insignificant. These results are contrary to the results of (Anisti & Chalid, 2021), that lev is associated with three variables, namely: (i) non-debt tax shield (NDTS), (ii) tangibility (TAG), and (iii) share price performance (SPP). Furthermore, all model dummy years are positively significant, indicating that firms' leverage ratios differ over the research period.

Table 4: The Sys GMM Results

	(1)	(2)
llev		
L.llev	0.57 ***	0.69 ***
	(4.36)	(5.42)
(1) Roa	-1.27 *	-0.09 *
(2) LRoa		
	(-1.69)	(-1.73)
lsales	-0.11	0.00
	(-1.31)	(0.19)
lequity	-0.00	-0.04
	(-0.02)	(-1.16)

lndtax	0.01	0.40
	(0.02)	(1.10)
Time Effect		
2011	0.25 **	0.33 **
	(1.99)	(2.40)
2012	0.29 ***	0.39 ***
	(2.80)	(3.46)
2013	0.32 **	0.28 **
	(2.54)	(2.33)
2014	0.42 ***	0.48 ***
	(4.10)	(3.71)
2015	0.34 ***	0.36 ***
	(2.85)	(3.05)
2016	0.39 ***	0.41 ***
	(4.20)	(3.92)
2017	0.29 ***	0.35 ***
	(2.72)	(3.54)
2018	0.32 **	0.39 ***
	(2.57)	(3.16)
2019	0.37 ***	0.40 ***
	(3.27)	(3.14)
2020	0.31 **	0.29 **
	(2.15)	(2.28)
Constant	2.69	2.03
	(1.10)	(1.06)
Observations	843	680
Number of id	78	76
No. Instruments	45	39
Goodness of Fit in GMM (<i>Postestimators</i>)		
P(Hansen)	0,14	0.38
P(AR1)	0,000	0,000
P(AR2)	0,21	0.23
P(Overidentified)	0,25	0.57
P(Underidentified)	0,05	0.39
AIC	-20,83	-21.63
BIC	-89,17	-75.24
HQIC	-49,04	-43.73
Incremental <i>Hansen p-value of the instruments (ins.)</i>		
Ins. 1	0,86	0.73
Ins. 2	0,26	0.69
Ins. 3	0,21	0.26
Ins. 4	0,61	0.61
Ins. 5	0,36	0.51
Ins. 6	0,23	0.10
Ins. 7	0,34	0.55
Ins. 8		
Ins. 9		

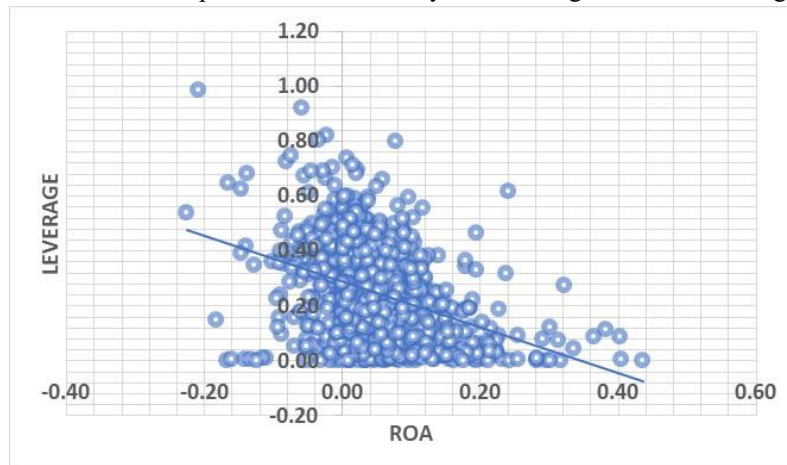
Ins. 10

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

We did not employ macroeconomic variables in models as in previous works (Anisti & Chalid, 2021; Drobetz & Wanzenried, 2006). The last work's macroeconomic variables (economic growth and inflation) are insignificant. The novelty of this paper lies in our application of a relatively new specification test, specifically under-identification tests (Windmeijer, 2018). The test to check the relevance of our instrument variable is strictly required before interpreting the estimation results. After considering the string of specification tests, several significant variables, and figures of AIC (Akaike Information Criterion), BIC (Bayesian Information Criterion), and HQIC (Hannan–Quinn Information Criterion), we consider Model 2 the most robust.

Figure 4.1. Relationship between Profitability and Leverage in Manufacturing Firms



This finding is further supported by Figure 4.1, which provides empirical evidence of the negative correlation between profitability and leverage. Highly profitable firms tend to rely on internal financing rather than external debt, whereas less profitable firms are more inclined to seek external borrowing.

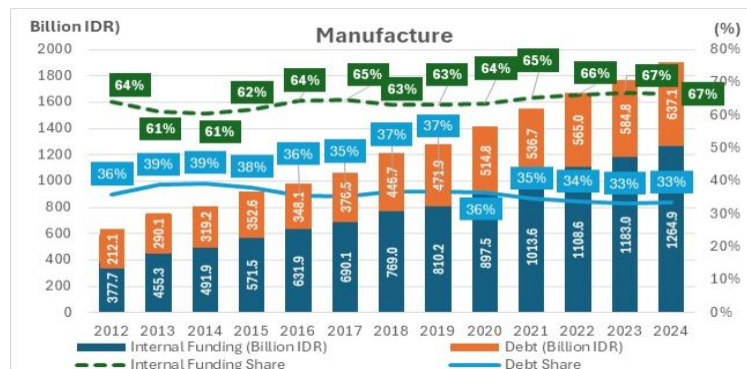


Figure 4.2: Relationship between Internal Funding dan Debt in Manufacturing Firms

This high share of internal financing among manufacturing firms explains the lower reliance on debt financing (see Figure 4.2).

4. Conclusion and Recommendations

This research focuses on the dynamic aspects to emphasise the optimum capital structure and other variables that impact manufacturing firms' optimal leverage on the IDX. Firm-specific factors, including leverage, non-debt tax shields, profitability, sales, and equity, influence capital structure choices. According to the hypothesis, leverage is affected by profitability. Return on Assets (ROA) is a negatively significant independent variable to leverage. Firms with high profits are more likely to use internal sources of finance, whereas firms with low profitability are

more likely to use loans, as they often lack sufficient retained earnings. Leverage among manufacturing firms exhibits persistence, as reflected by the significantly positive coefficient of the lagged leverage variable. This suggests that leverage decisions are path-dependent and gradually adjusted toward a long-term target. The time effect (year dummies) is significantly positive, indicating an upward trend in corporate leverage over time, which reflects the influence of macroeconomic conditions and fiscal/monetary policies on financing decisions.

This study has two limitations. First, this study only uses a sample of the manufacturing industry. Therefore, future research can expand the sample size by comparing different sectors or countries to determine whether this affects the research results. Second, this study focuses on corporate performance indicators, including the non-debt tax shelter, profitability, sales, and equity. In our opinion, the relationship between leverage and other variables, such as the level of competition and the impact on company performance and growth assets in the new average era following the COVID-19 shock, needs to be considered in the analysis of whether there are differences in the structure of the relationship. Research on financial constraints in Indonesia should be included, as it provides valuable insights into the capital structure of manufacturing companies, which will significantly aid management and other relevant stakeholders in making informed policy decisions.

Future research can also utilise other variables, such as macroeconomic indicators and benchmarking, to examine more detailed types of performance, including aspects of market structure.

4.1. Managerial Implications and Policy Recommendations

This study provides several managerial implications for the manufacturing sector:

1. **Leverage Persistence**
Manufacturing firms tend to maintain consistent financing structures, possibly due to long-term credit commitments or capital-intensive fixed assets (e.g., machinery, plants). This indicates that debt levels are not frequently adjusted and that leverage changes are implemented cautiously over time.
2. **Significant Time Effects**
Annual variations in leverage performance reflect broader macroeconomic conditions such as (i) energy and input prices, (ii) trade and export-import policies, (iii) exchange rate stability, and (iv) interest rates.
3. **Countercyclical Policy Design**
Significant time effects highlight the sensitivity of leverage to external shocks. Thus, fiscal and monetary policies must be responsive to manufacturing dynamics—such as implementing tax reliefs during demand downturns or accelerating public spending on labor-intensive and processing industries during crises.

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