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Dynamic Capital Structure Adjustment in an Emerging Market: Asymmetric Responses, Macroeconomic Drivers, and COVID-19 Evidence from Indonesia's Property Sector

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Abstract

The property sector in Indonesia provides a unique and previously unexplored context to examine capital structure change. This research explores capital structure dynamic adjustment in Indonesia's property industry between slow and fast capital adjustments, using 42 listed firms as panel data from 2015 to 2024. By employing System GMM estimators and the threshold model to investigate the speed of adjustment (SOA) and the influence of macroeconomic variables and creditor behavior on leverage during the COVID-19 crisis. We identified a SOA moderately between 22–24% during normal conditions increasing to an SOA of dramatically to 44.5%, indicating considerable asymmetric adjustment behavior, during a dividend or issued-stock financing shift. The onset of COVID-19 temporarily increased leverage by a mean of 2.6 percentage points, which later returned to pre-crisis leverage paths over time. Interest rates emerged as a prominent macroeconomic variable, notably reducing leverage, with a distinctive role for the real estate sector in Indonesia, highlighting the sector's sensibility to monetary policy shifts. Overall, the results robustly confirmed both pecking order and trade-off theory, while also recognizing distinct institutional features of Indonesia's property market, including the relatively mute role of tangible collateral in financing decisions. The research provides useful empirical and practical insights for corporate managers making capital structure decisions in volatile emerging market environments and for policymakers considering stability-inducing interventions in capital-intensive sectors.

Keywords: Capital structure, speed of adjustment, dynamic panel model, COVID-19, Indonesia, property sector, leverage.

INTRODUCTION

Firms' capital structure decisions how firms balance their use of debt and equity are typically the most important and strategic financial decisions made by corporate managers (Hansen & Block, 2021; Li et al., 2023; Nguyen & Nguyen, 2020). These decisions, in turn, impact firm value, cost of capital, financial flexibility, and exposure to risk. In emerging markets such as Indonesia, with less developed capital markets and growing institutional structures, the determinants and dynamics of capital structure give rise to numerous challenges for both academics and practitioners (Oztekin & Flannery, 2012). This issue is of particular concern for asset-heavy sectors, such as property, that require substantial external funding due to their long investment horizons and high fixed costs (Rajan & Zingales, 1995; Deng et al., 2023).

The property sector in Indonesia provides a unique and previously unexplored context to examine capital structure change. The property industry is one of the most capital-intensive and dependent industries, making property

firms sensitive to changes in the macroeconomic environment, financing conditions, and market sentiment. Despite its relationship with national development and national infrastructure projects, there is a dearth of empirical research concerning how Indonesian property firms change their capital structure over time, with limited studies on how capital has shifted in the face of systemic shocks, such as the COVID-19 pandemic in Indonesia (Adiba, 2021; Mawitjere et al., 2022). The pandemic interrupted global economic activity, provided different credit conditions, created more uncertainty, and produced potential consequences on financing behavior (Baker et al., 2020). Additionally, as will be shown later in this paper, the Indonesian property market has a distinct feature where firms prefer intangible collateral (*land rights*) more so than other tangible forms of collateral, challenging key assumptions of the trade-off theory.

What sets this research apart from previous studies is the clear emphasis on an asymmetric speed of adjustment (SOA) in capital structures—that firms adjust leverage at a faster rate when deviations away from target levels are larger, and more slowly otherwise (Dang et al., 2012). While SOA has received attention in developed markets, it has not garnered sufficient further interest in emerging-economic settings, particularly in the area of threshold dynamics. Further, this paper is one of the first, in a systematic manner, to examine how "macroeconomic-financial" indicators (e.g., interest rates, inflation) and crisis periods (COVID-19) impact leverage dynamics in a developing economy like Indonesia in the property sector. Our approach is particularly distinct in that we do not interact all potential firm-level variables with crisis or macro-level indicators, which can lead to complex identification strategies and an increase in all the potential instruments included in the System GMM estimation. Here, we specify an additive model that estimates average period-level effects and allows for potentially useful inference. Nonlinear rebalancing behaviors are captured using threshold models, which present a clearer and more stable format for qualitative analysis comparisons.

Due to market frictions, it is impossible for companies to have capital structures that never change. Hence, firms adjust toward their target debt ratio over time; in other words, the speed of adjustment (SOA) is an essential focus due to the extreme ramifications it can have on financial stability, financial accessibility, and market resilience during periods of extreme volatility (Flannery & Rangan, 2006; Lemmon et al., 2008; Strebulaev, 2007; Faulk and Faulkender, 2011). The partial adjustment model, notably utilized in capital structure literature, assumes that the previous adjustments toward the firm's optimal debt ratios are partial, as adjustment costs and other factors such as asymmetric information and institutional inertia inhibit the process (Strebulaev, 2007; Faulkender et al., 2012). This is of paramount significance in emerging markets, where access to external financing is subject to greater variation and governance arrangements may hinder any prompt financial responses to circumstances at hand.

Existing literature has examined capital structure decisions in developed markets extensively, identifying firm-specific determinants such as profitability, firm size, investment opportunities, and liquidity (Frank & Goyal, 2009; Titman & Wessels, 1988). However, these findings cannot be easily generalized to developing countries because of differences in institutions, financial system context, and regulatory pressures (De Jong et al., 2008; Fan et al., 2012). Although capital structure theories such as the trade-off and pecking order provide a foundation for understanding capital structure decisions, they do not account for the unique challenges emerging markets face from adjustment costs, asymmetric information, and economic volatility (Myers, 2001; Graham & Leary, 2018). Capital structure studies from developed countries have reported SOA (speed of adjustment) of 25–35%, while SOA in emerging markets will be slower due to institutional frictions (Nguyen & Nguyen, 2022; Antoniou et al., 2008). However, we do not know how firms behave with large deviations from their target leverage or how this deviance changes during a crisis.

In response to these questions, we formulate a set of theoretically derived hypotheses, which we will put to the test empirically using dynamic panel models and threshold adjustment models, as we detail in a later section. By answering these questions, this research serves to build the literature by producing a unified empirical framework that captures firm-level determinants, macro-financial determinants, and crisis-period shocks. The findings will be of practical benefit to corporate managers who are engaged in uncertain financing situations and to policy-makers whose task is to introduce stabilizing interventions across capital-intensive sectors. Ultimately, the research adds to the literature on capital structure adjustment by providing empirical evidence from a sector and country context that is somewhat lacking in global finance research.

RESEARCH METHODS

This research is based on a balanced panel dataset comprised of 42 property companies that are listed on the Indonesia Stock Exchange (*IDX*) from 2015 to 2024. The sample selection was conducted based on three criteria: (1) listed for the entire period of the research, (2) complete audited financial statements were available, and (3) the primary business is property development. Financial data were collected from audited financial reports, *investing.com*, *emiten.kontan.co.id*, and the *IDX* database, while macroeconomic indicators (GDP growth, BI 7-day reverse repo rate, and inflation) were sourced from Bank Indonesia, *BPS*, and World Bank databases. All data processing and statistical analysis were conducted using Stata 17, which is particularly suited for advanced dynamic panel data estimations such as System *GMM* and threshold models.

Overall, the final dataset consisted of 420 firm-year observations (42 firms × 10 years). All continuous variables were winsorized at the 1st and 99th percentiles to mitigate the effects of outliers. Table 1 provides definitions of the variables constructed and an overview of the measurements, which are in accordance with previous capital structure literature but adjusted to consider Indonesia's unique accounting standards.

Table 1. Variable Definitions

Variable Type	Variable	Measurement	Reference
Dependent Variable	Leverage (lev)	Total debt ÷ Total assets	Flannery & Rangan (2006); Oztekin & Flannery (2012)
Firm-Specific Independent Variables	Profitability (prof)	Net income ÷ Total assets (Return on Assets – ROA)	Myers & Majluf (1984); Frank & Goyal (2009)
	Firm Size (size)	Natural logarithms of total assets	Rajan & Zingales (1995); Chen (2004)
	Asset Tangibility (tang)	Net fixed assets ÷ Total assets	De Jong et al. (2008); Frank & Goyal (2009)
	Growth Opportunities (growth)	Market-to-book ratio (market value of equity ÷ book value of equity)	Titman & Wessels (1988); Lemmon et al. (2008)
	Tax Shield (tax_shield)	Interest Expense × Corporate Tax Rate	Modigliani & Miller (1963); Graham (2000); Frank & Goyal (2009)
	Non-Debt Tax Shield (ndts)	Non-interest tax deductions ÷ Total assets	Bradley et al. (1984); Chen (2004)
	Liquidity (liq)	Current assets ÷ Current liabilities (Current ratio)	Ozkan (2001); Frank & Goyal (2009)
Macroeconomic Control Variables	GDP Growth (gdp_growth)	Annual percentage growth of real GDP	World Bank; Graham et al. (2015)
	Interest Rate (interest)	Annual average policy interest rate (%)	Bank Indonesia; Oztekin & Flannery (2012)
	Inflation (inflation)	Annual percentage change in consumer price index (CPI)	World Bank; Frank & Goyal (2009)
Crisis Dummy Variables	COVID-19 Dummy (d_covid)	Dummy = 1 for 2020–2021; 0 otherwise	Author-defined
	Post-COVID Dummy (d_post)	Dummy = 1 for 2022–2024; 0 otherwise	Author-defined (based on timeline of economic recovery)

This study estimates the *(speed-of-adjustment)* toward target capital structure levels by utilizing both linear and threshold-type partial adjustment specifications. The specification follows a similar structure to past research by Flannery and Rangan (2006), Dang et al. (2012, 2014), and Memon et al. (2019). With regard to leverage adjustments, it allows for asymmetric behavior across crisis periods (or *non-normal* environments like COVID) and non-crisis periods (*normal* environments, not necessarily COVID-related). Due to concerns regarding endogeneity and unobserved heterogeneity, the Generalized Method of Moments (*GMM*) was selected as the estimation strategy.

The first step involves estimating a firm's target leverage ratio LEV_{it}, which is assumed to be a function of firm-specific determinant.

$$LEV_{it} = X_{it}\beta + \mu_i + \varepsilon_{it}$$

Where:

LEV_{it} is the unobserved target leverage for firm *I* at time *t*.

X_{it} is a vector of firm-specific explanatory variables (Profitability, Size, Growth, Tax Shield, Non-Debt Tax Shield, and Liquidity)

μ_i represents firm fixed effects.

β is the vector of parameters to be estimated.

The estimate of target leverage is captured through fixed-effects panel regression to control for the unexplained heterogeneity that does not vary over time. The fitted values of the target leverage are then used to inform the subsequent dynamic specifications with which we assess speed of adjustment and adjustment asymmetry.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 2. Statistics Descriptive Result

Variable	Mean	Std. Dev.	Min	Max
Leverage	0.3567	0.1868	0.0092	0.8796
Profitability	0.0289	0.0727	−0.3752	0.4283
Size	29.2905	1.4149	24.6227	31.9621
Tangibility	0.0888	0.1274	0.0001	0.7044
Growth	1.2471	1.7523	0.0429	12.7696
Tax Shield	0.0045	0.0030	0.0001	0.0343
Non-Debt Tax Shield	0.0091	0.0085	0.0001	0.0503
Liquidity	3.9202	7.9174	0.1005	83.8729

Table 3. Correlation Matrix

	lev	prof	size	tang	growth	tax_shield	ndts	liq	VIF
Leverage	1.000								
Profitability	-0.180	1.000							1.190
Size	0.330	0.162	1.000						1.280
Tangibility	0.053	-0.007	-0.184	1.000					1.660
Growth	-0.007	0.214	-0.245	0.312	1.000				1.270
Tax Shield	0.646	-0.171	0.237	0.077	-0.036	1.000			1.170
Non-Debt Tax Shield	0.141	-0.068	-0.062	0.585	0.178	0.157	1.000		1.560
Liquidity	-0.326	0.075	-0.158	-0.080	-0.085	-0.193	-0.105	1.000	1.090
								Mean VIF	**1.317**

Descriptive statistics reveal the extent of variation in the financial characteristics of Indonesian property firms from 2015-2024. The average leverage ratio of 35.7% indicates that the firms in this sample have taken on moderate levels of debt but with a range from 0.9% to 88%, we see substantial variation in financing decisions within the sector. Profitability, represented by Return on Assets (ROA), is on average, 2.9%, however, the extreme values (-37.5% to 42.8%) show there is certainly a lot of volatility, with some firms showing significant losses while others show considerable returns. Firm size, measured with the natural log of total assets averaged 29.3 confirming that across the sample firms are predominantly mid-to-large-sized firms.

Overall, tangibility averages just 8.9%, with values ranging from near-zero to percent or 70%, in line with the nature of the sector dependence on intangibles like land rights, for which traditional accounting does not sufficiently record. The average market-to-book ratio was 1.25, with a maximum of 12.7, illustrates different expectations for future performance among investors when considering growth opportunity. The sample also had widely varied liquidity levels with a mean current ratio of 3.92 but with some firms demonstrating extreme liquidity (maximum 83.7) facilitated by active short-term money management. Tax-related effects (including tax shields (average = 0.0045) and non-debt tax shields (average = 0.0091)), also displayed differences in firms taking advantage of tax benefits of usage.

The correlation analysis also provided expected theoretical outputs: the expected negative profitability and leverage (observed -0.180) is consistent with pecking order theory and expected firm size and leverage (observed 0.330) is consistent with trade-off theory. There was also no strong multicollinearity present among the dependent and independent variables as evidenced by a mean VIF = 1.317, adding confidence to the interpretations of next regression analyses. The evidence above suggests there are myriad financial circumstances within the overall robustness of Indonesia's property sector. This research located in Indonesia wanted to develop the lenses used demonstrate how organizations within the property sector have diversified their capital structures, and also some potentially different adjustments to the capital structure in response to observed factors.

Fixed Effects Estimation of Target Leverage

Table 4. Fixed Effect Estimation Result

Variable	Coefficient	Std. Error	t-stat	p-value	Interpretation
Profitability	-0.232***	0.052	-4.500	0.000	Strong pecking order effect (negative impact on leverage)
Size	0.080***	0.015	5.440	0.000	Larger firms have higher leverage
Tangibility	0.005	0.053	0.100	0.924	Insignificant collateral role
Growth	0.017***	0.003	5.690	0.000	Growth increases leverage
Tax Shield	29.925***	2.014	14.860	0.000	Strong tax incentive effect
Non-Debt Tax Shield	4.112***	0.810	5.070	0.000	Substitutes for debt tax benefits
Liquidity	-0.002***	0.001	-3.020	0.003	Liquid firms use less debt
Constant	-2.172***	0.435	-4.990	0.000	Significant intercept
R-squared (Within)	0.561				
R-squared (Overall)	0.726				
F-statistic	65.670				
Prob > F	0.000				

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

The fixed effects regression results estimating the determinants of target leverage reveal many theoretically consistent patterns while capturing some interesting sector-specific tendencies. The pronounced negative relationship between profitability and leverage (coefficient = -0.232, $p < 0.001$) provides strong support for the primary argument of the pecking order theory that once a firm is profitable, it will pursue internal financing first (Myers & Majluf, 1984; Frank & Goyal, 2009) and is particularly relevant for firms in emerging markets with weak capital markets (Booth et al., 2001). The positive impact of firm size (coefficient = 0.080, $p < 0.001$) is consistent with trade-off theory predictions that larger firms enjoy lower bankruptcy risk and better access to debt financing (Rajan & Zingales, 1995; De Jong et al., 2008). Growth opportunities had an unexpected positive effect (coefficient = 0.017, $p < 0.001$) which is contrary to agency theory predictions (Jensen & Meckling, 1976), although this may simply reflect that Indonesian property firms were prepared to use debt to seize growth opportunities during periods of growth.

Despite the technically insignificant effect of tangibility ($p = .920$) raising doubts about reliance on collateral based explanations (Harris & Raviv, 1991), it remains consistent with the operational realities of the property industry in Indonesia, in which intangible land rights effect decision-making on finance. The solid positive contributions of both tax shields (coefficient = 29.93, $p < 0.001$) and non-debt tax shields (coefficient = 4.11, $p < 0.001$) provide additional evidence that the importance of taxes has decreased, but is still relevant to capital structure choice, and the negative effect of liquidity (coefficient =-0.0018, $p < 0.01$) also supports pecking order behavior. The strength of the model was also confirmed to be robust with a significant result. This model, also explains 56.1% of within-firm variation (overall $R^2 = 0.726$) which is demonstrably strong; even comparable to leading capital structure studies (Flannery & Rangan, 2006; Öztekin, 2015). Further to this conclusion is the F-statistic (65.67, $p < .001$) confirming joint significant.

Overall, these findings provide credible support for firm-specific factors, which contribute toward providing evidence that Indonesian property firms have sectoral factors that are distinct from developed market expectations regarding the impact of asset tangibility and firm growth financing activities lately. The findings also support the importance of firm-specific financial attributes that shape capital structure decisions in an emerging market context. In particular, profitability, size, growth and tax influences are prominently parts of capital structure decision making, while the unexpected finding that tangibility is not significant warrants more investigation due to potential connections with sector-specific financing practices or institutional factors.

Results Linear Partial Adjustment Model (System GMM One-Step & Two-Step)

Table 5. Linier Partial Adjustment Model Result (System GMM One-Step and Two-Step)

Variable	One-Step Coefficient	p-value	Two-Step Coefficient	p-value	Interpretation
Lagged Leverage (L.lev)	0.758***	0.000	0.779***	0.000	High persistence in leverage.
Profitability	-0.765***	0.001	-0.769***	0.001	Supports pecking order theory.
Firm Size	-0.007	0.774	-0.005	0.818	Statistically insignificant.
Tax Shield	3.859	0.237	2.823	0.417	Insignificant long-term effect.
SOA (**λ**)	24.20%	—	22.10%	—	Moderate adjustment speed.
AR (2) Test (p-value)	0.588	—	0.631	—	No autocorrelation.
Hansen Test (p-value)	0.651	—	0.651	—	Valid instruments.

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

The System GMM estimations provide strong evidence on the dynamic adjustment of capital structures for Indonesian property firms. The annual speed of adjustment (SOA) estimates of 22.1–24.2% suggest that firms are slowly adjusting capital structure toward target levels. This moderate adjustment speed is consistent with emerging markets, but slower than firms in developed economies (e.g., 30% for U.S. firms; Flannery & Rangan, 2006), and shows the institutional frictions and financing constraints of Indonesia's property sector.

The second key finding is the strong negative relationship profitability (PROF) and leverage ($\beta = -0.765^{***}$ one-step; $\beta = -0.769^{***}$ two-step), which is consistent with the pecking order theory (Myers & Majluf, 1984). This indicates firms that earn profit rely on internal funding over debt, with these firms decreasing leverage approximately 0.77% for every 1% increase in profitability. In contrast, firm size (SIZE) suggests no effect ($p > 0.7$), which deviates from expectations from the trade-off theory can imply financing specific behaviours emerging from sector norms. The tax shields (TAX_SHIELD) were also statistically insignificant ($p > 0.2$), which indicates tax incentives do not persistently guide leverage decisions in the long run.

The diagnostic tests confirm the validity of the model. The AR (2) tests (p = 0.588 one-step; p = 0.631 two-step) rule out second-order autocorrelation, and the Hansen test (p=0.651) confirms instrument exogeneity, despite having a large instrument count (45 for 42 firms) (Roodman, 2009). The lagged leverage coefficient (L.lev) has a value of 0.758–0.779 which implies that capital structure decisions are persistent. Firms appear to exhibit inertia in restructuring, as the decision to do so is well-propagated in each firm throughout the observation period.

Threshold Partial Adjustment Model

Table 7: Threshold Partial Adjustment Model Result

Variable	Coefficient	Std. Error	t-stat	p-value	Interpretation
Lagged Leverage (L.lev)	1.148***	0.171	6.71	0.000	High persistence in capital structure
Low Deviation Regime	0.179	0.604	0.30	0.768	No significant adjustment (≤4.27%)
High Deviation Regime	0.445**	0.190	2.34	0.024	Fast rebalancing (>4.27%)
Profitability	-0.665***	0.108	-6.13	0.000	Strong pecking order effect
Tangibility	-0.222*	0.130	-1.71	0.094	Weak collateral role (sector-specific)
Tax Shield	4.038	3.411	1.18	0.243	Positive but insignificant
Threshold (Median Dev.)	0.0427	—	—	—	Median absolute deviation from target
Hansen Test (p-value)	1	—	—	—	Valid instruments
AR (2) Test (p-value)	0.649	—	—	—	No autocorrelation

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

The threshold partial adjustment model provides significant insight with respect to the nonlinear adjustment dynamics of Indonesian property firms' capital structure. Any inferential explanation of the empirical sample's 4.27% median absolute deviation threshold possesses important economic significance, for three primary reasons. First, in Indonesia's collateral-constrained property sector with firms relying on intangible land rights instead of tangible assets, this threshold represents the point at which lenders view deviations as materially increasing default risk and subsequently enforcing covenants or other pressures for refinancing. Second, given the sector's high operating leverage and Indonesia's macroeconomic volatility, deviations beyond 4.27% likely signal unsustainable debt burdens that could impair firms' ability to service obligations during downturns (Krugman, 1999). Third, the threshold converges with refinancing cost breakpoints in emerging market economies as a result from two pricing considerations: i) empirical estimates of reasonable ranges between 4% - 5%; and ii) leverage at or around the relevant upper and lower bounds of repayment terms is acceptable when the economic costs associated with correcting leverage gaps are reflected (e.g. origination charges, equity issuance, etc.).

When adjustments stay under this 4.27% threshold, firms seem to adjust little, and the average adjustment is only 17.9% (p = 0.768), in line with strategic inaction theories under moderate adjustment costs (Strebulaev, 2007). However, when deviations go past this critical threshold, the adjustment accelerates to 44.5% (p = 0.024) as firms react to increased monitoring from creditors and rising risks of financial distress. The strong pecking order (profitability coefficient = −0.665, p < 0.001; Myers & Majluf, 1984) and industry-specific perspectives, as shown by a weak collateral role (−0.222, p = 0.094) of tangible assets, hold in contrast to trade-off theory. Robust diagnostics (Hansen p = 1.000; AR (2) p = 0.649) confirms the model fit to the data are robust, and high lagged leverage coefficient (1.148, p < 0.001) indicates the progressive character of capital structure adjustment for emerging market firms. These results together.

Table 8: Covid-19 Impact Result

Variable	Coefficient	Std. Error	t-stat	p-value	Desc.
Lagged Leverage (L.lev)	0.805***	0.071	11.35	0.000	High persistence in leverage.
COVID-19 Dummy (d_covid)	0.026**	0.012	2.24	0.030	Temporary leverage increase.
Post-COVID Dummy (d_post)	-0.008	0.008	-0.91	0.368	No persistent effect.
Profitability	-0.574***	0.100	-5.75	0.000	Internal financing preference.
Tax Shield	7.763**	3.695	2.1	0.042	Tax benefits leveraged during crisis.
AR (2) Test (p-value)	—	—	—	0.610	No autocorrelation.
Hansen Test (p-value)	—	—	—	0.998	Valid instruments.

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

Two-step System GMM estimation provides strong evidence for the manner in which Indonesian property firms developed their capital structures in response to the COVID-19 pandemic. During the acute crisis period (2020-2021), firms exhibited a statistically significant 2.59 percentage point increase in leverage (coefficient = 0.026, p = 0.030) indicating a clear strategic shift towards debt financing to sustain liquidity to cover severe disruptions to revenue. This depicts an apparent pattern of leveraging during a crisis consistent with patterns observable in other emerging markets (Demirgüç-Kunt et al., 2021). Importantly, the results infer that the consequences of the pandemic were temporary, rather than structural, with respect to capital structure. During the post-crisis recovery period (2022-2024), leverage had not significantly changed from its pre-pandemic trajectory (coefficient = -0.008, p = 0.368), suggesting that firms either rebalanced their capital structures, or returned to their target levels as conditions improved. This transitory effect is encouraging and provides further support to policies being followed by

property firms during the crisis, representing resilience of the capital structure decisions made by property firms in Indonesia.

The findings also show that firm-specific characteristics continued to play critical roles in capital structure decisions throughout the pandemic period. For example, profitability maintained its robust negative relationship with leverage (coefficient = -0.574, $p < 0.001$), offering strong support for pecking order theory even in times of unusual markets (Myers & Majluf, 1984). The positive and significant coefficient for tax shields (7.763, $p = 0.042$) shows that firms had become more aware of tax financing related benefits compared to the pre-crisis period (Graham et al., 2022). The diagnostic tests demonstrate the model was appropriate, as we did not find second-order autocorrelation (AR (2) $p = 0.610$) and we did find evidence of the exogeneity of the instruments (Hansen $p = 0.998$). The high persistence of leverage (lagged leverage coefficient = 0.805) demonstrates that Indonesian property firms were generally stable in their capital structures and changes to their leverage occurred gradually, despite the presence of exogenous shock.

Table 9: Macroeconomic Control Model Result

Variable	Coefficient	Std. Error	t-stat	p-value	Interpretation
Interest Rate	-2.633***	0.758	-3.47	0.001	Strong monetary policy effect
GDP Growth	-0.262	0.158	-1.66	0.104	Marginal pro-cyclical effect
Inflation	0.241	0.28	0.86	0.393	No significant impact
Profitability	-0.447***	0.092	-4.88	0.000	Pecking order behavior
Tax Shield	30.492***	7.105	4.29	0.000	Strong tax incentive effect
Lagged Leverage	0.553***	0.109	5.1	0.000	High persistence (SOA = 55.3%)
AR (2) Test (p-value)	—	—	—	0.481	No autocorrelation (valid instruments)
Hansen Test (p-value)	—	—	—	0.999	Instruments valid

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

The results from the dynamic panel-data estimation model from two-step system GMM estimation show a number of interesting findings on the determinants of leverage (lev) for the firms of interest. The data has a total of 42 firms with 9 years of observations displayed in Table 2 (2015-2024) with controls for macroeconomic and firm fixed effects. As expected, the lagged leverage (L.lev) coefficient is positive (coefficient is 0.553 and statistically significant ($p < 0.001$)) and suggests firms take a persistent approach to leverage and financing consistent with the dynamic adjustment model under capital structure theories (Flannery & Hankins, 2013). Profitability (prof) has a significant negative effect on leverage (coefficient is - 0.447) providing

support for the pecking order theory (Myers & Majluf, 1984) stating firms that are profitable prefer to use internal financing over external financing. The tax shield (tax_shield) has a strong and positive association with leverage (coefficient is 30.492 and statistically significant at $p < 0.001$) such that firms are encouraged to use debt financing for their overall debt levels consistent with the trade-off theory predictions (Kraus & Litzenberger, 1973). The interest rate (interest) also impacted leverage but negatively (coefficient is -2.633 and statistically significant at $p = 0.001$) whereby higher interest rates contributed to lower levels of leverage that reflects higher borrowing costs for firms in emerging markets.

Other characteristics specific to the firm, such as size, tangibility, growth, liquidity and macroeconomic factors (i.e, GDP growth and inflation) did not reveal any statistical significance indicating poor rationalization based on the firm context; similar to what has been found in sector-specific studies of property firms (Rajan & Zingales, 1995; Öztekin, 2015). The Arellano-Bond tests show that the model doesn't suffer from aliased autocorrelation since there is no evidence of a second-order autocorrelation (AR (2): $z = -0.70$, $p = 0.481$) thus demonstrating the possible instruments used (i.e., Arellano & Bond, 1991). However, the Sargan test ($p = 0.020$) may suggest issues of overidentification which is a common problem for any GMM (Roodman, 2009). The Hansen test ($p= 0.999$) suggests the instruments used may be suitable, but this is still weakening due to the number of possible overidentifying instruments (over 75 in this case with 378 total observations). It is important to note this as an inherent possibility in finite samples. Overall, the key findings are that dynamics, profitability and tax effects are important aspects in a firms leverage decisions, while firm attributes and macroeconomic conditions in this sample played little role in a firms leverage. In general, diagnostic test results support the GMM done here, but caution is to be taken due to the number of instruments represented.

Discussion and Comparison with Prior Literature

The results in this research provide important insights into the capital structure dynamics of Indonesian property firms especially during the onset of the COVID-19 pandemic. The estimated speed of adjustment (SOA) of between 22% - 24% in normal conditions and 44.5% in large deviations illustrates the relatively conservative adjustment of firms in the Indonesian property sector. Additionally, it is not surprising to see a moderate SOA similar to that of other emerging market countries, which as shown in previous literature, experience institutional and financial frictions that slow the rebalancing of capital structure relative to more developed economies (Oztekin & Flannery, 2012). However, the faster adjustment of firms in the presence of large deviations highlights the asymmetric nature of capital structure adjustments discussed by Dang et al. (2012) which reflects creditor pressure and risks associated with financial distress.

These outcomes validate both the pecking order hypothesis and the trade-off theory in the Indonesian context. The consistently positive and significant negative association between profitability and leverage is in keeping with the pecking order theory (Myers & Majluf, 1984), which implies that internally financed firms seek less debt as the reliance on debt financing is lower. Similar findings have been reported in other Southeast Asian economies, like Thailand (Suto, 2003) and Malaysia (Abor, 2008) as information asymmetries and the lack of mature equity markets influence firm preferences for financing.

The positive and significant impacts of the tax shields on leverage support the trade-off theory, while the tax shield remains a key factor for firms in their corporate financing decisions as evidenced worldwide by Graham (2000) and Frank & Goyal (2009) and the existence of tax optimization is important even as a financial market develops. In some developed markets, tangibility and firm size are regular predictors of leverage for firms, yet they held minimal statistical significance in this research which might reflect the distinctive sector characteristics of Indonesia's property market, including intangible assets often dominate the more tangible physical assets, and formal credit channels are underutilized.

The COVID-19 pandemic caused a temporary but substantial increase in leverage of 2.6 percentage points, showing the change in strategic priority in firms toward debt for liquidity during the crisis. This supports a body of global literature which points to crisis-induced leveraging (Baker et al., 2020; Demirgüç-Kunt et al., 2020). Normalization of leverage post-crisis is a strong indicator that shocks of this magnitude are transient, showing resilience in the sector. The macroeconomic situation, particularly interest rates, played a critical role, with a 1% increase reducing leverage by 2.63 percentage points. This points to the property sector's sensitivity to monetary policy, which corroborates similar arguments made in Graham et al. (2015).

The threshold model indicates an asymmetric adjustment behavior, or adjustment to deviations which shows firms adjust at a faster rate for large deviations and is consistent with the findings of Dang et al. (2012), as well as demonstrating the aforementioned role of adjustment costs and market frictions in the structure of capital. The strong positive effect of the tax shield demonstrates the trade-off theory of capital structure while the negative effect of liquidity imply some ascendency of pecking order behaviour, and thus reinforce the dual foundations of theory that are evidenced in the results. Overall, this research brings several approaches in the literature together with respect to capital structure behaviour by using firm-specific dynamics, macroeconomic conditions and crises shocks in the context of an emerging market, while offering evidence on the contextual importance in capital structure decisions in contexts that are typically volatile and dynamic like Indonesia.

The findings of this research also provide several implications for policy and managerial practices. First, the faster speed of adjustment (SOA) under

large deviations, suggests firms get back to a more constituently capital structure proportionally as they experience financial pressure and re-adjust for events. Implies the necessity of consideration for financial flexibility and the need to actively manage debt. Second, that leverage is sensitive to both tax shields and interest rates links to the fact that effective and stable macroeconomic policy enables the expectations of firms throughout the business cycle and hence general environment is conducive to determine financing mix, placement, and revenue allocation. The state of the property development sector indicates that property firms may find ways to macro-hedge the moves of interest rate, and hold onto long-term credits available.

In conclusion, this research adds to the literature by providing strong empirical evidence on capital structure adjustment in a less studied sector and country context. This research enhances our understanding of firm-level financing decisions in an uncertain environment by incorporating firm-specific, macro, and work with the variable of a crisis period. The findings demonstrate the hybridity of classical capital structure theory as well as the unique institutional and structural characteristics that shape financial behavior in Indonesia's property sector.

CONCLUSION

This research analyzes capital structure adjustment policies among Indonesian property firms from 2015 to 2024. It focuses on the speed of adjustment (*SOA*), firm-level and macroeconomic determinants, as well as the temporary impact of the COVID-19 pandemic. Using fixed effects, two-step System *GMM*, and a dynamic threshold model, the results show that the normal *SOA* ranges between 22–24%, but increases significantly to 44.5% during large deviations from target leverage, indicating faster adjustments under financial distress.

These findings support both the pecking order theory (e.g., profitability reduces leverage) and the trade-off theory (e.g., tax benefits increase leverage). The COVID-19 pandemic temporarily raised leverage by 2.6 percentage points, but the effect reversed in the post-crisis period, demonstrating the sector's resilience. Interest rates emerged as a key macroeconomic factor, with higher rates acting as a strong deterrent to increasing leverage, highlighting the property sector's sensitivity to monetary policy.

Theoretically, this research contributes to the literature by modeling asymmetric adjustment dynamics alongside macro-financial shocks—an area often overlooked in sector-specific research. Practically, the results underline the importance of financial flexibility, long-term credit access, and macroeconomic stability. Property firms should promote diversified financing channels and *macro-hedging* strategies to build resilience. Policy recommendations include developing deep and flexible debt capital markets and implementing accurate interest rate governance to support capital-intensive sectors.

Future research could extend this analysis by including unlisted firms, comparing industry sectors, or incorporating qualitative insights from corporate managers to better understand strategic decision-making in resource-constrained environments. Overall, the research enhances our understanding of capital structure behavior in emerging markets and offers valuable insights for practitioners and regulators during times of financial uncertainty.

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