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ANALYSIS OF DETERMINANTS OF OPTIMAL CAPITAL STRUCTURE ADJUSTMENT SPEED IN ENERGY SECTOR COMPANIES IN INDONESIA

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Abstract. This study aims to analyze the speed of adjustment (SOA) toward the optimal capital structure of energy sector companies listed on the Indonesia Stock Exchange for the 2021-2023 period. By employing a partial adjustment model on panel data from 38 companies, this research examines the internal determinants influencing capital structure dynamics. The empirical results demonstrate that firm size has a positive and significant effect on the speed of adjustment, suggesting that larger firms with better market access can reach their optimal targets more efficiently. Conversely, asset tangibility and profitability exhibit a negative and significant influence, indicating financial rigidity and a preference for internal funding as posited by the pecking order theory. Growth opportunities were found to have no significant impact on the adjustment rate. These findings provide critical implications for managers in the energy sector to achieve efficient capital structure equilibrium in a post-pandemic economy.

Keywords: Capital Structure; Speed of Adjustment; Dynamic Trade-off Theory; Pecking Order Theory; Energy Sector

I. INTRODUCTION

Capital Structure Decision is one of the most crucial strategic decisions in corporate financial management because it directly impacts the cost of capital and firm value [1]. Capital structure reflects the proportion of funding derived from a combination of debt and equity, making the determination of the right mix highly important, particularly in capital-intensive industries such as the energy sector. Companies operating in the energy sector require massive initial investments for infrastructure and exploration, possess relatively high business risks, and have performance that is highly sensitive to government regulations as well as global macroeconomic fluctuations. These unique characteristics cause managers in the energy sector to face more complex challenges in balancing financing policies compared to other industrial sectors.

In the modern financial perspective, companies are rarely in an ideal capital structure position continuously. The existence of adjustment costs, information asymmetry between managers and investors, and limited access to funding markets cause companies to adjust their capital structure gradually toward the desired target [2]. This phenomenon is explained by the Dynamic Trade-off Theory, which posits that a firm has an optimal target capital structure and will actively respond to any deviation by making adjustments to balance the benefits of tax shields against bankruptcy costs [3]. The speed at which a firm corrects this deviation is known as the Speed of Adjustment (SOA).

The rate of capital structure adjustment is not uniform across companies; rather, it heavily relies on firm-specific characteristics. The Pecking Order Theory further complements this dynamic by suggesting that companies follow a strict financing hierarchy to minimize information asymmetry costs, prioritizing internal funds before seeking external debt [4]. Consequently, internal factors such as firm size, asset structure (tangibility), growth opportunities, and profitability act as the main determinants of the adjustment costs a company must bear [5]. For instance, large-scale firms generally have lower information asymmetry and broader access to credit markets, which in turn lowers transaction costs and accelerates the adjustment process [6].

Recent empirical studies have highlighted the significance of these internal determinants, yet the results remain highly debated across different industrial sectors. For example, recent evidence emphasizes that adjustment speed towards the target capital structure differs significantly depending on internal financial conditions [7]. In the Indonesian context, studies demonstrate that the speed of capital structure adjustment varies across industrial sectors and is heavily influenced by the firm's specific financial capabilities [8]. Furthermore, other researchers have confirmed that these internal determinants play a critical role in shaping how quickly managers can rebalance their portfolios [9].

Despite the extensive literature on capital structure, empirical research regarding the dynamics of adjustment speed in Indonesia still yields inconclusive results. Furthermore, a significant research gap exists because most previous studies have predominantly focused on the manufacturing or property sectors, leaving the energy sector largely under-researched,

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especially during the crucial period of 2021-2023. This specific timeframe represents a highly critical phase for the Indonesian economy, characterized by intense post-COVID-19 pandemic recovery efforts and extreme volatility in global primary energy prices. Such highly uncertain external environmental conditions have a substantial potential to affect managers' courage in taking on debt and their speed in restructuring the company's capital [10].

To fill this void, this study aims to analyze the speed of adjustment toward the optimal capital structure and its internal determinants within energy sector companies listed on the Indonesia Stock Exchange during the 2021-2023 period. By focusing on a highly volatile and capital-intensive sector during a period of economic recovery, this research provides a novel contribution to the existing literature on corporate finance. The findings are expected to offer critical implications for financial managers in formulating efficient capital equilibrium strategies amidst post-pandemic macroeconomic uncertainties.

Dynamic Trade off Theory

The Dynamic Trade-off Theory is an extension of the static model stating that a firm has an optimal capital structure target determined by the balance between tax shields and bankruptcy costs. In the dynamic model, it is acknowledged that firms face various impediments in the form of adjustment costs, such as transaction costs, securities issuance costs, and information asymmetry, which prevent them from being at the target point continuously. The speed of adjustment (SOA) reflects how effectively managers close the gap between the actual debt ratio and its target level [11], [12]. The firm's decision to adjust depends heavily on the comparison between the costs of deviating from the target and the costs required to make the adjustment. If the cost of remaining deviated is greater than the transaction cost to adjust capital, the firm will move faster toward the target. Conversely, if transaction costs are deemed too expensive, managers tend to let the deviation persist longer [13], [14].

Pecking Order Theory

The Pecking Order Theory developed by Myers (1984) suggests that firms follow a strict financing hierarchy to minimize information asymmetry costs . Firms will prioritize the use of internal funds (retained earnings) before deciding to seek external financing through debt, placing the issuance of new equity as the last resort. In this perspective, a firm's capital structure is not determined by a fixed target point but is the result of accumulated financing decisions over time [15]. Regarding the speed of capital structure adjustment, this theory predicts that firms with abundant profitability will have a slow or even negative SOA because managers with access to large internal funds feel no urgency to interact with external capital markets [16].

Capital structure Adjustment Speed

The Speed of capital structure adjustment illustrates how quickly a firm adjusts its actual capital structure toward the optimal target. This concept stems from the dynamic trade-off theory, which posits that a firm has an optimal capital structure but cannot achieve it instantaneously due to adjustment costs [4]. Empirically, the speed of capital structure adjustment is influenced by internal firm characteristics, as well as external factors like market conditions and institutional environments [8]. Therefore, SOA is selected as the dependent variable in this study because it represents the dynamics of corporate financing policies more comprehensively.

Firm Size

Firm size reflects the scale of operations, economic capacity, and financial stability of a firm. Large firms generally have better business diversification, lower bankruptcy risks, and broader access to capital markets [3]. Large firms tend to have lower adjustment costs and higher financing flexibility, enabling them to adjust their capital structure faster toward the optimal level [12], [17]. Within the dynamic trade-off theory framework, firms with lower adjustment costs will be more responsive to deviations. Empirical research shows that firm size positively affects SOA [18], [9]. Therefore, the larger the firm size, the faster the firm adjusts its capital structure.

H1: Firm size has a positive effect on the speed of capital structure adjustment.

Tangibility

Asset structure illustrates the proportion of tangible assets owned by a firm, such as land, buildings, and equipment. Tangible assets play an important role as collateral in obtaining debt financing [3]. Nevertheless, a high proportion of tangible assets can reduce the firm's financial flexibility and encourage the firm to maintain a certain capital structure for a longer period 18. Firms with high tangibility levels tend to have a more stable capital structure and thus do not aggressively adjust their capital structure. Several empirical studies have found that tangibility negatively affects SOA because firms with large tangible assets tend to maintain their existing financing structure for a longer period [8].

H2: Asset structure has a negative effect on the speed of capital structure adjustment.

Growth

Growth opportunities represent future investment potential that can increase the firm's market value beyond its book value. Firms with high growth opportunities tend to have substantial capital needs to fund business expansion and new innovation projects [19], [12]. From a dynamic trade-off theory perspective, firms with high growth opportunities tend to delay capital structure adjustment due to high agency costs. Furthermore, the pecking order theory explains that growing firms prefer internal funding and financial flexibility over aggressive capital structure adjustments. Several studies have found that firm growth has a negative or even insignificant effect on SOA, especially in sectors with high uncertainty [20], [8].

H3: Firm growth has an effect on the speed of capital structure adjustment.

Profitability

Profitability indicates a firm's ability to generate profits from its operational activities. Firms with high profitability levels have adequate internal funding sources, so they tend to rely on retained earnings rather than external financing [4]. According to the pecking order theory, firms with adequate internal funds tend not to immediately adjust their capital structure toward the optimal target due to the absence of pressure to issue new debt or equity. In the context of SOA, this condition causes more profitable firms to adjust more slowly [17], [8].

H4: Profitability has a negative effect on the speed of capital structure adjustment.

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II. RESEARCH METHOD

This study employs a quantitative research approach utilizing secondary data. The research sample consists of 38 energy sector companies listed on the Indonesia Stock Exchange (IDX) during the 2021-2023 period, selected using a purposive sampling method. The data were obtained from the companies' annual financial reports.

The dependent variable in this study is the speed of capital structure adjustment (SOA). SOA is measured using a partial adjustment model referring to [21] and [3]. The independent variables analyzed as the internal determinants include firm size, asset structure (tangibility), firm growth, and profitability.

The analytical method used in this research is panel data regression. The selection of the most appropriate regression model was conducted through the Chow test, Hausman test, and Lagrange Multiplier test. Hypothesis testing was performed with a significance level of 10 percent. Prior to hypothesis testing, a descriptive statistical analysis was conducted to provide a general overview of the research data characteristics. Furthermore, it is important to note that because this study utilizes panel data estimated via the Random Effect Model using the Generalized Least Squares (GLS) approach, issues related to classical assumptions commonly found in Ordinary Least Squares (OLS), such as heteroscedasticity and autocorrelation, are methodologically mitigated. Therefore, the standard classical assumption tests are not presented, as the GLS weighting automatically controls for these error variance violations.

III. RESEARCH AND DISCUSSION

A. Target Capital Structure Estimation

Before examining the speed of adjustment, it is essential to estimate the unobservable target leverage (LEV*) using the selected Random Effect Model. The estimation results of the target capital structure are presented in Table I.

TABLE 1
TARGET CAPTAL STRUCTURE ESTIMATION RESULTS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.235454	1.366.657	0.172285	0.8635
SIZE	0.188016	0.153253	1.226.835	0.2225
TANG	-0.849628	0.684292	- 1.241.617	0.2170
GROWTH	0.463320	0.278400	1.664.221	0.0989
PROF	-3.002.217	0.984734	- 3.048.759	0.0029

Source: Processed Data, 2026

The regression results in Table I are utilized to calculate the target leverage by incorporating the coefficients into the target capital structure equation. This estimated target is then used to determine the deviation level that the firm needs to adjust in the subsequent partial adjustment model.

B. Partial Effect Model (T-Test)

The partial hypothesis testing (t-test) was conducted to determine the individual impact of each independent variable on the capital structure adjustment speed (SOA). The results are shown in Table II.

TABLE II
PARTIAL EFFECT TEST RESULTS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.205589	109.827	0.18719	0.8519
SIZE	0.214145	0.12306	174.004	0.0847
TANG	-0.944009	0.54606	-172.875	0.0867
GROWTH	-0.033489	0.22754	-0.14717	0.8833
PROF	-1.752.979	0.79596	-220.233	0.0297

Source: Processed Data, 2026

Based on Table II, firm size (Size) has a positive and significant effect on SOA (Prob. 0.0847 < 0.10). Asset structure (Tangibility) and profitability (Prof) both exhibit a negative and significant effect on SOA, with probability values of 0.0867 and 0.0297, respectively. Meanwhile, firm growth does not show a significant effect on the capital structure adjustment speed (Prob. 0.8833 > 0.10).

C. Simultaneous Effect Test (F-Test) And Determination Coefficient

The simultaneous effect test (F-Test) and the coefficient of determination (Adjusted R-squared) were analyzed to assess the overall model fitness.

TABLE III
SIMULTANEOUS EFFECT TEST (F-TEST) AND DETERMINATION COEFFICIENT

Indicator	Value
R-squared	0.081884
Adjusted R-squared	0.048192
F-statistic	2.430.350
Prob (F-statistic)	0.051918

Source: Processed Data, 2026

The F-test results in Table III show an F-statistic value of 2.430350 with a probability of 0.051918. Because the probability value is less than the 0.10 significance level, it can be concluded that firm size, tangibility, growth, and profitability simultaneously have a significant effect on the speed of capital structure adjustment. Furthermore, the Adjusted R-squared value is 0.0481 (4.8%), indicating that 4.8% of the variation in the speed of adjustment can be explained by the independent variables in this study, while the remaining 95.2% is influenced by other factors outside the research model.

The Effect of Firm Size on Capital Structure Adjustment Speed

The research findings demonstrate that firm size positively and significantly influences the speed of capital structure adjustment. Theoretically, this finding is consistent with the dynamic trade-off theory, which states that larger firms have lower bankruptcy costs and broader access to external funding. Consequently, they are capable of adjusting their capital structure toward the optimal target more rapidly. Empirical research also affirms that firm size is a crucial determinant in

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the capital structure adjustment process, where larger firms exhibit a higher speed of adjustment compared to smaller ones [7], [22]. This finding aligns with cross-country empirical studies indicating that capital structure adjustment speed differs across firms and is affected by financial conditions and firm-specific characteristics. Thus, the positive effect of firm size on SOA in this study strongly supports the dynamic trade-off framework, implying that financially stronger companies can move faster toward their optimal capital structure equilibrium [23].

The Effect Tangibility on Capital Structure Adjustment Speed

Based on the testing results, asset structure (tangibility) is proven to have a negative and significant effect on the speed of capital structure adjustment in energy sector companies. This indicates that firms with a high proportion of fixed assets tend to be slower in adjusting their debt levels toward the optimal target. Theoretically, although fixed assets can serve as collateral, the capital-intensive nature of the energy sector creates severe financial rigidity. Massive investments in long-term physical infrastructure make firms more bound to fixed financing commitments, thereby making the adjustment costs more expensive and deterring managers from aggressively altering the capital structure [7], [19]. This aligns with empirical evidence showing that large tangible asset ownership can decelerate leverage adjustment due to limited operational flexibility in responding to market dynamics [8]. The focus of energy sector companies during the observation period seemed directed toward optimizing existing assets rather than conducting rapid debt restructuring. This confirms that long-term funding stability is prioritized over responsiveness to capital structure targets, particularly to maintain stable cash flows amidst fluctuating energy commodity prices [9].

The Effect of Growth on Capital Structure Adjustment Speed

The firm growth variable exhibits a negative but insignificant effect on the speed of capital structure adjustment. This condition indicates that high investment opportunities are not always accompanied by an acceleration in leverage adjustment, as firms tend to face cash flow uncertainties and require highly flexible funding. Recent literature suggests that the determinants of SOA depend heavily on economic conditions; during certain periods, external factors and market uncertainty can reduce the adjustment speed even if the firm possesses high growth prospects [24]. Additionally, industry heterogeneity demonstrates that the rate of adjustment differs significantly depending on the sector and specific firm characteristics [25]. The insignificance of the growth variable is also consistent with research indicating that SOA variation is influenced by a combination of internal factors, country risks, and broader institutional conditions, meaning a single growth variable is insufficient to explain leverage adjustment dynamics [26]. Thus, these results remain aligned with the dynamic trade-off theory but emphasize that the impact of growth on SOA is highly contextual and not always statistically significant.

The Effect of Profitability on Capital Structure Adjustment Speed

Profitability is proven to have a negative and significant effect on the speed of capital structure adjustment. Firms with high profit levels tend to utilize internal funding, thereby substantially lowering the pressure to adjust leverage toward the external target. Recent empirical studies indicate that capital structure adjustment decisions are closely related to expected returns and information asymmetry, where imperfect information conditions can moderate the relationship between SOA and market performance [12], [18]. Furthermore, cross-country research affirms that internal characteristics like profitability play a pivotal role in determining leverage dynamics, especially during periods of economic stability [24]. However, some studies suggest that leverage adjustment speed can increase when firms face fundamental risk changes or specific external pressures. A decrease in country risk, for instance, is proven to accelerate SOA by lowering structural adjustment costs [26]. These varying findings confirm that the relationship between profitability and SOA is not entirely uniform, but overall, the results of this study firmly support the combination of the pecking order theory and the dynamic trade-off theory in explaining corporate capital structure behavior.

IV. CONCLUSIONS

Based on the research findings, it can be concluded that the speed of capital structure adjustment in energy sector companies is significantly influenced by internal firm characteristics. Firm size is proven to accelerate the capital structure adjustment process, whereas asset structure (tangibility) and profitability tend to slow down the adjustment toward the optimal capital structure. Meanwhile, firm growth does not exhibit a significant effect on the adjustment speed. These findings confirm that operational stability and funding flexibility play a more dominant role than growth opportunities in determining the capital structure dynamics within the capital-intensive energy sector.

Pratically, the results of this study provide valuable considerations for corporate management in formulating more efficient long-term financing strategies, and for investors in assessing a firm's financial capability to continuously adjust its capital structure amidst macroeconomic uncertainties. For further research, it is recommended to explore external macroeconomic factors or compare the adjustment speed across different capital-intensive sectors to provide a broader perspective on corporate financing behavior in emerging markets.

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