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Capital Structure and Speed of Adjustment in Indonesian Listed Firms: Does Sharia Compliance Affect the Adjustment Speed?

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ABSTRACT
This study investigates how Sharia compliance and Islamic debt constraints influence capital structure and its adjustment speed among non-financial firms listed on the Indonesia Stock Exchange (2013–2023). Challenging the assumption that Sharia-compliant firms are always more conservative in debt usage, this research integrates Sharia-based variables into a dynamic Partial Adjustment Model (PAM) using the Generalized Method of Moments (GMM). The model incorporates target leverage, adjustment speed, and Sharia principles through compliance status and debt-to-equity ratio (DER) thresholds. Empirical results reveal that Sharia-compliant firms, while maintaining DER within the 45% limit, tend to use more debt and adjust faster toward target leverage. These findings suggest that Sharia norms enhance rather than constrain financial efficiency. The study underscores the strategic role of sukuk and values-based financing in promoting disciplined and adaptive capital structures, with key implications for regulators, firms, and investors.

1. INTRODUCTION

Capital structure refers to the combination of debt and equity used by firms to finance their operations and investments (Acedo-Ramírez & Ruiz-Cabestre, 2014; Alsaadi, 2024; Oktaviani et al., 2023; (Bandawaty et al., 2023)). The speed of capital structure adjustment denotes how quickly a firm adjusts its capital structure to reach the optimal level in response to changes in market conditions or internal factors (Myers, 1984; Aulia et al., 2019; Sugiharti et al., 2023; (Bandawaty & Sari, 2023). The importance of this adjustment lies in the firm's effort to minimize capital costs and financial risk (Putri & Willim, 2024; Loang, 2023), as well as to maintain financial flexibility, which is essential for survival in volatile economic environments (Hovakimian et al., 2014)

In the context of Sharia-compliant firms, capital structure adjustment takes on an additional dimension—compliance with Islamic principles that prohibit the use of interest-based debt instruments (Menne et al., 2024; Bisa, 2021; Handayani et al., 2020). As a result, Sharia-compliant firms are often more responsive in adjusting their capital structures to preserve market reputation and stakeholder trust (Hamdi et al., 2019).

This research seeks to examine how Sharia compliance influences both the capital structure and the rate at which capital structure adjustments occur in non-financial companies listed on the Indonesia Stock Exchange from 2013 to 2023. The significance of this study lies in the fact that, to date, no previous research has specifically analyzed the speed of capital structure adjustment in Sharia-compliant firms in Indonesia, nor has it compared them with their non-Sharia counterparts. Moreover, previous research in Indonesia has primarily focused on the impact of firm performance on capital structure adjustments (Bandawaty, 2024), without incorporating the dimension of Sharia compliance (Alnori, F., & Alqahtani, F., 2019).

This study also seeks to address another research gap: the absence of studies exploring the effect of Sharia debt limitations on the speed of capital structure adjustment using an integrated dynamic capital structure model. Such a model provides a more comprehensive framework for understanding how both Sharia-compliant and non-compliant firms adjust their capital structures over time, particularly in response to shisfting market conditions and regulatory constraints (Alnori & Alqahtani, 2019).

Previous studies have examined differences in the speed of capital structure adjustment between domestic and foreign firms (Çam & Özer, 2022), as well as the impact of other variables such as firm performance and COVID-19 on the speed of capital structure adjustment in the

healthcare and technology sectors on the Indonesia Stock Exchange (Bandawaty, 2024),, and in technology firms in the USA (Canarella & Miller, 2019). However, these studies have not considered the effects of Sharia variables on capital structure. To date, no empirical research in Indonesia has integrated Sharia compliance and Islamic debt constraints into the analysis of capital structure adjustment, making this study a significant contribution. It not only introduces a new perspective on the speed of capital structure adjustment within the context of Sharia compliance but also incorporates an additional variable—debt restriction—which may influence the adjustment speed.

By employing both static and dynamic capital structure models, this study investigates the influence of Sharia compliance and Islamic debt restrictions—defined by a maximum debt-to-equity ratio (DER) of 45%—on capital structure and the speed of adjustment. The static model will evaluate the effects of Sharia compliance and debt constraints using both market leverage and book leverage approaches (Alnori & Alqahtani, 2019). Meanwhile, the dynamic model will not only assess the impact of Sharia compliance and financing restrictions on optimal capital structure, but also on the speed at which firms adjust toward their target capital structure.

This research is expected to offer a meaningful contribution to financial literature, particularly within the context of Islamic capital markets. Preliminary findings indicate that Sharia-compliant firms in Indonesia tend to exhibit a faster speed of capital structure adjustment compared to non-Sharia firms, largely due to the need to maintain reputation and integrity in adhering to Sharia principles (Serrasqueiro & Rogão, 2009). Additionally, debt limitations embedded in the Sharia framework also have a significant influence on adjustment speed, further supporting the argument that Sharia-compliant firms are more adaptive to changes than their non-Sharia counterparts (Alnori & Alqahtani, 2019).

This study represents the first comprehensive evaluation of the impact of Sharia compliance and debt restrictions on the speed of capital structure adjustment in Indonesian firms using both static and dynamic capital structure models. Accordingly, the findings are expected to offer new insights for stakeholders, including investors, corporate managers, and regulators in understanding the dynamics of capital structure within the framework of Sharia compliance in Indonesia's capital market.

The novelty of this study lies in the development of an integrated dynamic capital structure model that incorporates Sharia-based variables into the Partial Adjustment Model (PAM),

estimated using the Generalized Method of Moments (GMM). While PAM and GMM are widely used in conventional finance research, few studies have simultaneously modeled the influence of Islamic values, particularly using dual proxies—compliance status and debt thresholds—on both target leverage and adjustment speed.

2. LITERATURE REVIEW

The theory of capital structure serves as a core foundation in corporate finance, emphasizing how companies decide on the appropriate mix of debt and equity to support their financing strategies (Ghosh et al., 2000). Two prevailing frameworks used to explain these decisions are the trade-off theory and the pecking order theory (Mangesti et al., 2020). The trade-off theory suggests that firms aim to establish an optimal capital structure by weighing the advantages of debt, such as tax shields, against its costs, including the risk of financial distress (Myers & Majluf, 1984). In contrast, the pecking order theory asserts that firms adhere to a financing preference order—starting with internal funds, then debt, and lastly issuing new equity (Myers & Majluf, 1984). Both theories indicate that firms continuously adjust to achieve their optimal capital structure (Jiang et al., 2021). The rate at which firms revert to their target capital structure after diverging—particularly due to external market forces or internal dynamics—is referred to as the speed of capital structure adjustment (Canarella & Miller, 2019). This concept becomes increasingly relevant when comparing Sharia and non-Sharia firms due to their differing principles and constraints.

Sharia screening methodology is the process used to ensure that firms included in Islamic indices meet strict Sharia criteria, both in terms of business activities and financial structure (Ashraf & Khawaja, 2016). In Indonesia, Sharia screening is conducted based on financial and non-financial criteria set by authorities such as the Financial Services Authority (OJK). These criteria include limits on debt-to-equity ratios, restrictions on non-halal income, and prohibitions on involvement in activities contrary to Sharia principles, such as gambling, alcohol, and interest-based transactions (OJK, 2017). Thus, Sharia-compliant firms must ensure that their operations and financial structures align with Islamic principles, which in turn can influence their overall capital structure policies (Abdullaev et al., 2023).

In line with Sharia screening, the Sharia debt restriction methodology in Indonesia also plays a key role in shaping the capital structure of firms operating under Islamic principles. This

restriction mandates that interest-bearing debt must not exceed 45% of total assets (OJK, 2017). The aim is to prevent firms from engaging in riba-based practices, which are strictly prohibited in Islamic finance. This constraint has direct implications on a firm's capital structure, as it limits the extent to which interest-based debt can be used. Consequently, Sharia-compliant firms tend to adopt more conservative capital structures compared to non-Sharia firms, potentially resulting in a different adjustment process.

Previous empirical studies have shown that Sharia-compliant firms generally exhibit more conservative capital structures than their non-Sharia counterparts (Alnori & Alqahtani, 2019b), mainly due to their adherence to Islamic principles that forbid high-risk activities and excessive reliance on interest-bearing debt berlebihan (Fatima Etudaiye-Muhtar & Ahmad, 2015). These studies also revealed that Sharia-compliant firms tend to have lower leverage ratios and more stable capital structures (Alnori & Alqahtani, 2019b). However, despite research into Sharia compliance and its influence on capital structure, the impact of debt restrictions on the speed of capital structure adjustment remains underexplored—particularly for non-financial firms listed on the Indonesia Stock Exchange (Andespa et al., 2024). Hence, this study aims to fill this gap by analyzing the influence of Sharia compliance and debt limitations on the speed of capital structure adjustment.

This study presents a different perspective from that of Alnori & Alqahtani (2019b), who argued that Sharia-compliant firms adjust more slowly than non-Sharia firms. Instead, this research posits that Sharia-compliant firms exhibit faster adjustment speeds due to strict requirements that must be met to maintain their Sharia-compliant status. This proposition aligns with (Yildirim et al., 2018) and (Haron & Ibrahim, 2012), who found that Sharia-compliant firms in Malaysia adjust more rapidly to capital structure changes than their non-Sharia peers.

The importance of adjustment speed becomes even more pronounced in the context of Sharia and non-Sharia firms. Adjustment speed reflects a firm's ability to return to its optimal capital structure following deviations due to internal or external changes. For Sharia-compliant firms, a rapid adjustment process is critical to maintaining reputation and integrity in upholding Sharia principles (Pujiastuti et al., 2022). In times of economic uncertainty, these firms must quickly realign their capital structures to remain within the boundaries set by Islamic law. In contrast, non-Sharia firms enjoy greater flexibility in adjusting their capital structures due to the absence of such constraints. Therefore, this study seeks to understand how Sharia compliance

influences the speed of capital structure adjustment and to identify the key factors that differentiate adjustment behavior between Sharia and non-Sharia firms.

Based on the theoretical foundation and previous empirical findings, the following hypotheses are proposed:

H1: Sharia-compliant firms differ significantly in their capital structure and adjustment speed compared to non-compliant firms.

H2: Firms with DER ≤ 45% adjust their capital structure faster than those exceeding the threshold.

3. METHODOLOGY

This study utilizes secondary data from non-financial companies listed on the Indonesia Stock Exchange (IDX) during the period 2013 to 2023. The total sample consists of 1,619 firm-year observations, including 1,155 Sharia-compliant observations and 463 non-Sharia observations. The dataset includes information on capital structure, Sharia compliance status, debt restrictions, and other relevant financial data required for analysis. The primary data sources are the companies' annual financial reports obtained from the official IDX website and each company's official reports. To determine Sharia compliance status, this study uses the Sharia Securities List issued by the Financial Services Authority of Indonesia (Otoritas Jasa Keuangan/OJK). The data are categorized into two groups—Sharia-compliant and non-Sharia firms—based on the classification established by OJK.

The data analysis begins with a descriptive analysis to provide an initial overview, followed by a univariate test to examine whether there is a significant difference in leverage between Sharia and non-Sharia firms. The next step involves testing the research hypotheses by examining the effects of Sharia compliance and financing restrictions under both static and dynamic capital structure models.

This study seeks to explore the extent to which Sharia compliance and debt limitations affect a firm's capital structure policy and the velocity of its adjustment toward an optimal leverage level, this study employs an integrated dynamic capital structure model based on the Partial Adjustment Model (PAM). PAM reflects the reality that firms do not immediately reach their optimal capital structure but adjust gradually over time. In the classical PAM framework, the Speed of Adjustment (SOA) is assumed to be constant. In general, the PAM can be modeled as follows:

$$\lambda = \frac{LEV_{it} - LEV_{it-1}}{LEV^*_{it} - LEV_{it-1}} \quad (1)$$

with:

1. Lambda (λ) represents the Speed of Adjustment (SOA), which takes a value within the interval of 0 to 1.
2. LEV^*_{it} refers to the target leverage in period t, representing the optimal capital structure determined by its underlying factors (determinant variables).
3. LEV_{it-1} is the actual leverage, representing the capital structure from the previous period, also referred to as a lagged variable.
4. ϵ represents the residual or error term.

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However, in practice, the Speed of Adjustment (SOA) varies across firms and over time. This indicates that the value of SOA is a function ($\boldsymbol{\lambda}_{ij}$) influenced by firm-specific characteristics, macroeconomic factors, corporate governance, as well as government policies and regulations. Therefore, in this study, the value of ($\boldsymbol{\lambda}_{ij}$) is modeled as a function determined by the variables of Sharia compliance and Islamic debt restrictions. Mathematically, this can be expressed in the following equation:

$$\lambda_{it} = \gamma_1 \mathrm{SY}_t + \gamma_2 BP_t \quad (2)$$

Where SY and BP are dummy variables. SY = 1 indicates a Sharia-compliant firm, while SY = 0 indicates a non-Sharia firm. Similarly, BP = 1 denotes firms with a debt-to-equity ratio (DER) ≤ 45%, and BP = 0 denotes firms with a DER above 45%.

By formulating λ_{it} as a function of **(SY)** and **(BP)**, the Partial Adjustment Model (PAM) becomes not only more flexible and realistic, but also more contextual and aligned with the realities of Sharia-compliant firms in Indonesia. Previously, in Equation (1), the SOA coefficient = λ was assumed to be homogeneous. However, in this extended model, $\lambda = \lambda_{it}$. Thus, the PAM equation is reformulated as follows:

$$\lambda_{it} = \frac{LEV_{it} - LEV_{it-1}}{LEV^*_{it} - LEV_{it-1}} \quad (3)$$

(LEV^*_{it}) measures the optimal capital structure, which is formulated as a mathematical function determined by the main variables of Sharia compliance (SY) and Islamic debt restriction (BP), along with control variables including firm size (UP), profitability (PR), growth opportunities (PT), earnings volatility (VP), and economic growth (PP). This can be expressed by the following equation:

$$LEV^*_{it} = \beta_0 + \beta_1 SY_t + \beta_2 BP_t + \beta_3 UP_t + \beta_4 PR_t + \beta_5 PT_t + \beta_6 VP_t + + \beta_7 PP_t \quad (4)$$

By substituting Equation (2) and Equation (4) into Equation (3), an integrated dynamic capital structure model is formulated as follows:

$$LEVi_{it} = \beta_0 + \beta_1 LEV_{t-1} - \beta_2 LEV_{t-1} * SY_t - \beta_3 LEV_{t-1} * BP_t + \beta_4 SY_t + \beta_5 BP_t + \beta_6 UP_t + \beta_7 PR_t + \beta_8 PT_t + \beta_9 VP_t + \beta_{10} PP \quad (5)$$

β_1 is the coefficient of the lagged variable, indicating that the speed of adjustment (SOA) is calculated as $(1 - \beta_1)$. The coefficient β_2 on the interaction term between Sharia compliance and the lagged variable ($LEVt{-}1 * SYt$) is expected to be negative, confirming that Sharia compliance accelerates the adjustment process. Likewise, the coefficient β_3 on the interaction between Islamic debt restriction and the lagged variable ($LEVt{-}1 * BPt$) is expected to be negative, confirming that firms with a debt-to-equity ratio (DER) below 45% tend to adjust more quickly toward their optimal capital structure. Conversely, if both coefficients are positive, it suggests that Sharia compliance and Islamic debt restrictions slow down the adjustment speed.

To ensure the robustness of the model, this study analyzes the variables Sharia compliance (SY) and Islamic debt restriction (BP) separately, using both market leverage and book leverage as alternative measures of capital structure. Thus, the models to be tested are as follows:

Static Capital Structure Model Using Market Leverage as a Proxy

$$LEVP_t = \beta_0 + \beta_1 SY_t + \beta_2 \ln(TA)_t + \beta_3 PR_t + \beta_4 PT_t + \beta_5 VP_t + \beta_6 PP_t \quad (4a\text{-}1)$$

$$LEVP_t = \beta_0 + \beta_1 BP_t + \beta_2 \ln(TA)_t + \beta_3 PR_t + \beta_4 PT_t + \beta_5 VP_t + \beta_6 PP_t \quad (4b\text{-}1)$$

Static Capital Structure Model Using Book Leverage as a Proxy

$$LEVB_t = \beta_0 + \beta_1 SY_t + \beta_2 \ln(TA)_t + \beta_3 PR_t + \beta_4 PT_t + \beta_5 VP_t + \beta_6 PP_t \quad (4a\text{-}2)$$

$$LEVB_t = \beta_0 + \beta_1 BP_t + \beta_2 \ln(TA)_t + \beta_3 PR_t + \beta_4 PT_t + \beta_5 VP_t + \beta_6 PP_t \quad (4b\text{-}2)$$

Dynamic Capital Structure Model Using Market Leverage as a Proxy

$$LEVP_t = \beta_0 + \beta_1 LEVP_{t-1} + \beta_2 LEVP_{t-1} * SY_t + \beta_1 SY_t + \beta_2 \ln(TA)_t + \beta_3 PR_t + \beta_4 PT_t + \beta_5 VP_t + \beta_6 PP_t \quad (5a\text{-}1)$$

$$LEVP_t = \beta_0 + \beta_1 LEVP_{t-1} + \beta_2 LEVP_{t-1} * \text{BP}_t + \beta_1 \text{BP}_t + \beta_2 \ln(\text{TA})_t + \beta_3 PR_t + \beta_4 PT_t + \beta_5 VP_t + \beta_6 PP_t \quad (5b\text{-}1)$$

Dynamic Capital Structure Model Using Book Leverage as a Proxy

$$LEV\text{B}_t = \beta_0 + \beta_1 LEV\text{B}_{t-1} + \beta_2 LEV\text{B}_{t-1} * SY_t + \beta_1 SY_t + \beta_2 \ln(\text{TA})_t + \beta_3 PR_t + \beta_4 PT_t + \beta_5 VP_t + \beta_6 PP_t \quad (5a\text{-}2)$$

$$LEV\text{B}_t = \beta_0 + \beta_1 LEV\text{B}_{t-1} + \beta_2 LEV\text{B}_{t-1} * \text{BP}_t + \beta_1 \text{BP}_t + \beta_2 \ln(\text{TA})_t + \beta_3 PR_t + \beta_4 PT_t + \beta_5 VP_t + \beta_6 PP_t \quad (5b\text{-}2)$$

The separation of the model using the debt restriction variable (BP) is intended to strengthen the findings related to the Sharia compliance variable (SY). Accordingly, this approach enhances the robustness and reliability of the estimation model.

4. RESULT AND DISCUSSIONS

Correlation Analysis

Table 1. Descriptive Statistics

Matriks korelasi untuk LEVP									
	LEVP	**SY**	**BP**	**lnTA**	**PR**	**PT**	**VP**	**GDP**	**VIF**
LEVP	1.000								
SY	-0.217	1.000							1.16
BP	-0.467	0.334	1.000						1.13
lnTA	0.059	-0.019	-0.022	1.000					1.08
PR	-0.335	0.091	0.138	0.063	1.000				1.06
PT	-0.030	-0.031	-0.040	-0.017	0.065	1.000			1.02
VP	0.008	-0.043	-0.094	-0.091	0.161	0.065	1.000		1.01
PP	0.033	0.030	0.009	0.031	-0.070	0.018	0.050	1.000	1.01
Matriks korelasi untuk LEVB									
	LEVB	**SY**	**BP**	**lnTA**	**PR**	**PT**	**VP**	**GDP**	**VIF**
LEVB	1.000								
SY	-0.270	1.000							1.16
BP	-0.513	0.336	1.000						1.13
lnTA	0.009	-0.020	-0.023	1.000					1.08
PR	-0.157	0.095	0.143	0.064	1.000				1.06
PT	0.002	-0.031	-0.040	-0.016	0.065	1.000			1.02
VP	0.106	-0.046	-0.098	-0.092	0.147	0.064	1.000		1.01
PP	0.017	0.030	0.008	0.031	-0.071	0.018	0.050	1.000	1.01

Table 1 presents the correlation matrix for LEVP (market leverage) and LEVB (book leverage), revealing several interesting findings regarding the relationship between leverage and

other financial variables. For LEVP, the correlation with the Sharia dummy, under both the SY and BP frameworks, is negative, indicating that Sharia-compliant firms tend to be associated with lower leverage. Meanwhile, the correlation between market leverage and total assets is positive but very weak. In the case of LEVB, a similar pattern is observed with the Sharia dummy under both the SY and BP frameworks, showing even stronger negative correlations. The correlation between book leverage and total assets is also very weak.

Profitability (PR) exhibits a weaker negative correlation with book leverage than with market leverage. Other variables, such as growth opportunities (PT), show correlations in different directions between book and market leverage, although the relationships are very weak or nearly negligible. Earnings volatility (VP) and economic growth (PP) show positive correlations with both book and market leverage. Regarding the potential issue of multicollinearity—or the interrelationships among independent variables in the regression model—the Variance Inflation Factor (VIF) values for all variables remain well below the commonly accepted threshold of 10. This indicates that there is no significant multicollinearity problem in the data, ensuring that these variables can be used simultaneously in the regression model without causing substantial distortion in the parameter estimates.

Descriptive Statistic

Table 2. Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min	Max
LEVP	1615	0.399	0.273	0.000	0.991
LEVB	1619	0.345	0.380	0.001	4.759
SY	1619	0.719	0.497	0.000	1.000
BP	1619	0.788	0.409	0.000	1.000
lnTA	1619	29.128	1.550	25.334	32.822
PR	1619	0.102	0.106	-1.057	2.000
PT	1619	1.017	68.666	-549.107	2613.955
VP	1619	0.034	0.057	0.000	1.133
PP	1619	4.397	2.083	-2.070	6.200

Table 2 presents the descriptive statistics, providing an overall overview of the data distribution for each variable used in this study. The variables of market leverage (LEVP) and book leverage (LEVB) exhibit considerable variation between their minimum and maximum

values, indicating significant differences in capital structure across the firms analyzed. Book leverage shows a higher standard deviation compared to market leverage, suggesting a more diverse distribution.

In terms of the number of Sharia-compliant firms, both under the SY and BP frameworks, the descriptive statistics indicate a greater representation of Sharia firms, as reflected by the mean values being close to one — where a value of one indicates that the firm is classified as Sharia-compliant. Meanwhile, among the financial control variables, the growth opportunity variable (PT) displays relatively high volatility, indicating substantial variation in growth prospects among the firms in the sample.

Table 3. Descriptive Statistics Based on Sharia Compliance (SY)

Variable	N	Mean	Std. Dev.	Min	Max
Sharia					
LEVP	1152	0.355	0.258	0.001	0.971
LEVB	1155	0.273	0.161	0.001	1.402
lnTA	1155	29.116	1.542	25.415	32.822
PR	1155	0.109	0.105	-1.057	2.000
PT	1155	-0.450	22.940	-549.107	388.670
VP	1155	0.032	0.058	0.001	1.133
Non-Sharia					
LEVP	462	0.508	0.281	0.000	0.991
LEVB	463	0.525	0.630	0.002	4.759
lnTA	463	29.160	1.571	25.334	32.086
PR	463	0.085	0.107	-0.444	0.730
PT	463	4.680	123.204	-248.242	2613.955
VP	463	0.038	0.055	0.000	0.478

Table 3 shows that when the data are grouped based on Sharia compliance (SY), which classifies firms into Sharia-compliant and non-Sharia groups, there are notable differences in the distribution of both market leverage (LEVP) and book leverage (LEVB) between the two groups. Firms classified as Sharia-compliant generally exhibit lower levels of leverage—both market and book—compared to non-Sharia firms. Among the other financial variables, only the growth opportunity variable (PT) displays a difference between the two groups, with Sharia-compliant firms having a lower average PT than their non-Sharia counterparts.

Table 4. Descriptive Statistics Based on Islamic Debt Restriction (BP)

Variable	N	Mean	Std. Dev.	Min	Max
Sharia					
LEVP	1272	0.333	0.240	0.000	0.955
LEVB	1275	0.244	0.122	0.001	0.450
lnTA	1275	29.110	1.576	25.334	32.822
PR	1275	0.110	0.105	-1.057	2.000
PT	1275	-0.400	24.189	-549.107	388.670
VP	1275	0.031	0.047	0.000	1.133
Non-Sharia					
LEVP	343	0.645	0.247	0.002	0.991
LEVB	344	0.721	0.668	0.451	4.759
lnTA	344	29.195	1.448	25.971	31.847
PR	344	0.073	0.107	-0.444	0.730
PT	344	6.271	141.538	-150.997	2613.955
VP	344	0.044	0.083	0.001	1.101

Table 4 shows that the separation of data based on BP (Islamic debt restriction) reveals a pattern similar to the classification based on SY (Sharia compliance). Firms falling under the Sharia-compliant category once again exhibit lower average leverage—both market and book—compared to their non-Sharia counterparts. Similarly, for other financial control variables, a consistent pattern is observed, particularly in the growth opportunity (PT) variable, where Sharia-compliant firms tend to have lower average PT than non-Sharia firms.

Difference Test Analysis

Table 5. Sharia and non-sharia firms leverage differences in means and medians (SY)

	Non-sharia	Sharia
LEVP		
Mean	0.508	0.355
Median	0.523	0.326
t-test (Mean difference)	0.153***	
Wilcoxon rank sum z (Median difference)	0.197***	
LEVB		
Mean	0.525	0.273
Median	0.419	0.262

t-test (Mean difference)	0.252***
Wilcoxon rank sum z (Median difference)	0.157***

*** (p-value < 0.001), ** (p-value < 0.01), * (p-value < 0.05), ·(p-value < 0.1).

Table 5 illustrates the differences in market leverage (LEVP) and book leverage (LEVB) between Sharia-compliant and non-Sharia firms, as initially observed in the descriptive analysis, and further validated through statistical tests, including the t-test for mean differences and the Wilcoxon rank sum test for median differences. Based on the group classification using the SY framework, the data reveal that non-Sharia firms exhibit higher mean and median values for LEVP compared to Sharia-compliant firms. This is reflected in the t-test results, which indicate a statistically significant difference in means between the two groups, as well as in the Wilcoxon rank sum test, which also confirms a significant difference in medians—both at the 5% significance level. A similar pattern is observed for LEVB, where non-Sharia firms again display higher average and median values than their Sharia-compliant counterparts. The consistent results from both the t-test and the Wilcoxon rank sum test indicate statistically significant differences at the same confidence level, suggesting that non-Sharia firms tend to operate with higher leverage in both market and book terms.

Table 6. Sharia and non-sharia firms leverage differences in means and medians (BP)

	Non-sharia	**Sharia**
LEVP		
Mean	0.651	0.333
Median	0.705	0.304
t-test (Mean difference)	0.318***	
Wilcoxon rank sum z (Median difference)	0.401***	
LEVB		
Mean	0.717	0.246
Median	0.552	0.255
t-test (Mean difference)	0.471***	
Wilcoxon rank sum z (Median difference)	0.297***	

*** (p-value < 0.001), ** (p-value < 0.01), * (p-value < 0.05), ·(p-value < 0.1).

Table 6, which presents the results based on the group classification using the BP (Islamic debt restriction) framework, reveals a similar pattern: non-Sharia firms exhibit higher mean and median values for market leverage (LEVP) compared to Sharia-compliant firms. This is reflected in the t-test results, which show a statistically significant difference in means between the two

groups, as well as in the Wilcoxon rank sum test, which also indicates a significant difference in medians. Both tests demonstrate significance at the 5% level. A comparable phenomenon is observed for book leverage (LEVB), where non-Sharia firms once again display higher average and median values than their Sharia-compliant counterparts. The consistent results from both the t-test and the Wilcoxon rank sum test confirm statistically significant differences at the same level, suggesting that non-Sharia firms tend to maintain higher leverage—both in market-based and book-based terms—compared to Sharia-compliant firms.

Static Regression Analysis

While the descriptive statistics and difference tests provide useful preliminary insights into the relationship between Sharia compliance and capital structure, these methods are insufficient for estimating causal relationships. To address this limitation, the application of panel data regression models becomes essential. This approach allows for controlling unobserved heterogeneity across firms, which may otherwise bias the estimation of relationships among the variables of interest. In the context of Sharia-compliant firms, panel data regression models—particularly those employing fixed effects estimation—offer a more robust analytical framework to assess the impact of Sharia compliance on capital structure. The fixed effects model controls for all unobserved variables that are constant over time but vary across firms, thereby enabling a more accurate isolation of the effect of specific independent variables, such as Sharia compliance, on firm leverage.

Table 7. Static Panel Regression Model (SY)

Variables	(1)	(2)	(3)	(4)
	OLS		FE	
	LEVP	LEVB	LEVP	LEVB
SY	-0.141***	-0.240***	0.038**	0.041**
	(0.015)	(0.029)	(0.015)	(0.014)
lnTA	0.010**	0.004	0.086***	-0.043
	(0.004)	(0.004)	(0.026)	(0.054)
PR	-0.784***	-0.499***	-0.234***	-0.136
	(0.155)	(0.136)	(0.055)	(0.126)
PT	-0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
VP	0.275	0.784***	0.171	0.390
	(0.290)	(0.219)	(0.123)	(0.200)

PP	0.027	-0.003	-0.011	0.015
	(0.059)	(0.045)	(0.019)	(0.015)
Constant	0.136	0.454	-2.060**	1.513
	(0.395)	(0.318)	(0.771)	(1.572)
Time dummies	Yes	Yes	Yes	Yes
Observations	1615	1619	1615	1619
R-squared	0.193	0.124	0.218	0.072

*** (p-value < 0.001), ** (p-value < 0.01), * (p-value < 0.05), ·(p-value < 0.1). The values in parentheses represent the standard errors.

In the Ordinary Least Squares (OLS) model, the Sharia compliance variable (SY) shows a negative and statistically significant relationship with both market leverage (LEVP) and book leverage (LEVB), with coefficients indicating that Sharia compliance leads to lower leverage levels. However, the results change notably in the Fixed Effects (FE) model. The coefficient for SY turns positive and significant at a lower level, suggesting that after controlling for unobserved firm heterogeneity, Sharia compliance is unexpectedly associated with higher leverage, both in terms of LEVP and LEVB. This finding implies that when latent firm-specific differences are accounted for, Sharia-compliant firms may in fact hold more leverage than previously estimated. It underscores the importance of accounting for firm-specific fixed effects when analyzing the relationship between religious compliance and capital structure decisions.

Table 8. Static Panel Regression Model (BP)

Variables	**(1)**	**(2)**	**(3)**	**(4)**
	OLS		**FE**	
	LEVP	**LEVB**	**LEVP**	**LEVB**
BP	-0.287***	-0.448***	-0.162***	-0.209***
	(0.016)	(0.034)	(0.019)	(0.024)
lnTA	0.009*	0.001	0.082***	-0.051
	(0.004)	(0.003)	(0.021)	(0.049)
PR	-0.641***	-0.298**	-0.155***	-0.037
	(0.142)	(0.111)	(0.042)	(0.126)
PT	-0.000	-0.000**	-0.000***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
VP	0.095	0.504**	0.091	0.299
	(0.264)	(0.170)	(0.100)	(0.154)
PP	0.006	-0.013 (0.037)	-0.009	0.028
	(0.057)		(0.022)	(0.017)
Constant	0.404	0.737**	-1.788**	1.837
	(0.382)	(0.267)	(0.639)	(1.426)

Time dummies	Yes	Yes	Yes	Yes
Observations	1507	1510	1510	1507
Adj.R-squared	0.305	0.288	0.21	0.305

*** (p-value < 0.001), ** (p-value < 0.01), * (p-value < 0.05), ·(p-value < 0.1). The values in parentheses represent the standard errors.

Table 8, which adopts the Sharia compliance framework based on the BP indicator (Sharia debt limitation), reveals a consistently negative relationship between Sharia compliance and leverage across both the OLS and Fixed Effects (FE) models. Notably, the magnitude of the coefficients under the BP framework is larger compared to those in the SY framework, indicating a stronger inverse association between Sharia-compliant firms (with DER ≤ 45%) and their leverage levels. This result differs from the earlier findings under the SY specification, where controlling for unobserved heterogeneity led to a positive relationship. In contrast, under the BP framework, even after accounting for firm-level fixed effects, Sharia-compliant firms continue to demonstrate lower leverage, reinforcing the argument that debt restrictions (such as the 45% DER cap) may serve as a more binding and effective constraint in shaping conservative capital structure policies.

Dynamic Integrated Regression Analysis

The subsequent analysis employs a dynamic model, which is essential in economic and financial research due to its ability to capture the long-term adjustment process in response to changes in market conditions or internal corporate policies. This type of model, commonly referred to as the Partial Adjustment Model (PAM), is particularly valuable because it enables a deeper understanding of how firms gradually adjust their capital structure over time toward an optimal target. In this study, a dynamic specification is developed by incorporating interaction terms between capital structure dynamics and Sharia compliance indicators (SY and BP). The purpose is to investigate whether adjustment speed differs between Sharia-compliant and non-Sharia firms in the long run. This allows the analysis to go beyond static relationships and observe behavioral differences in capital structure adjustment across firm types. The estimation is carried out using the System Generalized Method of Moments (System GMM), a widely accepted approach for dynamic panel data models, which helps to address potential endogeneity and autocorrelation problems. In addition, dynamic OLS and fixed effects (FE) models are also

estimated to validate the consistency of results and ensure that the GMM coefficients are not biased. These complementary estimations strengthen the reliability of the findings regarding how Sharia principles influence capital structure decisions over time.

Table 9. Model Panel Dinamis (SY)

Variables	OLS		FE		GMM (without interaction)		GMM (with interaction)	
	LEVP	LEVB	LEVP	LEVB	LEVP	LEVB	LEVP	LEVB
Lag leverage	0.880***	0.944***	0.578***	0.828***	0.713***	0.859***	1.003***	0.871***
(a)	(0.017)	(0.024)	(0.046)	(0.076)	(0.067)	(0.024)	(0.107)	(0.029)
SY (b)	-0.015	0.022	0.006	0.072**	0.021	0.001	0.187***	0.129***
	(0.011)	(0.016)	(0.017)	(0.025)	(0.015)	(0.011)	(0.053)	(0.027)
a*b	0.016	-0.087	0.019	-0.180*			-0.388***	-0.352***
	(0.020)	(0.051)	(0.033)	(0.074)			(0.093)	(0.054)
lnTA	-0.003	0.002	0.030	0.013	0.018	-0.001	0.005	-0.008
	(0.002)	(0.002)	(0.019)	(0.022)	(0.021)	(0.015)	(0.026)	(0.022)
PR	-0.064	0.008	-0.109*	-0.055	-0.238***	-0.204***	-0.199*	-0.187**
	(0.036)	(0.033)	(0.052)	(0.065)	(0.083)	(0.047)	(0.098)	(0.068)
PT	-0.000	0.000	-0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
VP	0.197	0.090	0.194	0.158	0.221	0.066	0.107	0.061
	(0.156)	(0.221)	(0.124)	(0.192)	(0.270)	(0.180)	(0.294)	(0.176)
PP	-0.016	-0.003	-0.022	-0.001	-0.005**	0.003	-0.005**	0.003
	(0.026)	(0.018)	(0.021)	(0.019)	(0.002)	(0.002)	(0.002)	(0.002)
Constant	0.235	-0.013	-0.557	-0.310	-0.369	0.080	-0.096	0.277
	(0.159)	(0.123)	(0.552)	(0.649)	(0.645)	(0.446)	(0.791)	(0.645)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1475	1479	1475	1479	1475	1479	1475	1479
Adj.R-squared	0.852	0.948	0.495	0.630				
AB test AR (1) (p-value)					0.000	0.000	0.000	0.000
AB test AR (2) (p-value)					0.196	0.120	0.160	0.057
Sargan test (p-value)					0.027	0.869	0.013	0.340

*** (p-value < 0.001), ** (p-value < 0.01), * (p-value < 0.05), ·(p-value < 0.1). The values in parentheses represent the standard errors. SOA = 1 - β_1 for the non-interaction model and SOA = 1 – (β_{1+} $\beta_{2)}$ for the interaction model.

Table 9 indicates that the Fixed Effects (FE) model tends to underestimate, while the Ordinary Least Squares (OLS) model tends to overestimate. In contrast, the Generalized Method of Moments (GMM) provides unbiased estimates due to its ability to address endogeneity issues within dynamic panel data models. Based on the results of the dynamic panel model under the Sharia compliance framework (SY), it is observed that the model using market leverage (LEVP) as the dependent variable may still be biased, as the coefficient β_1 from GMM is larger than the β_1

from OLS. However, for book leverage (LEVB), all estimates meet the assumption of unbiasedness.

Regarding other assumptions, both GMM models do not exhibit second-order autocorrelation in the dependent variable, indicating that the models are statistically sound in that respect. Nevertheless, in terms of instrument validity (as tested by the Sargan test), the results reveal that the instruments in the LEVP model are not valid, suggesting that only the LEVB model allows for interpretation without concern for violated assumptions. The key takeaway from this model is that Sharia-compliant firms tend to have higher leverage compared to their non-Sharia counterparts, as indicated by the positive coefficient of the SY variable. However, Sharia-compliant firms exhibit a significantly faster long-term capital structure adjustment, with a Speed of Adjustment (SOA) of 48.1% annually, compared to only 12.9% for non-Sharia firms. This finding implies that, despite having higher leverage, Sharia firms are more responsive in adjusting their capital structure toward the optimal level.

Table 10. Dynamic Panel Model (BP)

Variables	OLS		FE		GMM (without interaction)		GMM (with interaction)	
	LEVP	LEVB	LEVP	LEVB	LEVP	LEVB	LEVP	LEVB
Lag leverage (a)	0.860*** (0.027)	0.886*** (0.039)	0.489*** (0.059)	0.738*** (0.102)	0.680*** (0.067)	0.832*** (0.034)	1.021*** (0.135)	0.829*** (0.047)
BP (b)	-0.058** (0.020)	-0.047* (0.023)	-0.134*** (0.036)	-0.042 (0.052)	-0.081*** (0.020)	-0.100*** (0.013)	0.211** (0.076)	0.138** (0.046)
a*b	0.003 (0.030)	-0.068 (0.041)	0.058 (0.054)	-0.145 (0.103)			-0.551*** (0.131)	-0.566*** (0.090)
lnTA	-0.003 (0.002)	0.001 (0.002)	0.033 (0.017)	0.012 (0.022)	0.010 (0.022)	-0.016 (0.029)	0.019 (0.022)	-0.012 (0.033)
PR	-0.047 (0.037)	0.022 (0.034)	-0.057 (0.049)	-0.018 (0.069)	-0.138 (0.102)	-0.135 (0.081)	-0.197 (0.139)	-0.159* (0.08)
PT	-0.000 (0.000)	-0.000 (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
VP	0.171 (0.157)	0.077 (0.230)	0.152 (0.093)	0.141 (0.184)	0.125 (0.291)	0.057 (0.215)	0.101 (0.353)	0.008 (0.220)
GDP	-0.024 (0.028)	-0.007 (0.020)	-0.019 (0.026)	-0.002 (0.021)	-0.004** (0.001)	0.002 (0.001)	-0.003* (0.002)	0.003 (0.001)

Variables	OLS		FE		GMM (without interaction)		GMM (with interaction)	
	LEVP	LEVB	LEVP	LEVB	LEVP	LEVB	LEVP	LEVB
Constant	0.358*	0.114	-0.526	-0.195	-0.055	0.628	-0.531	0.418
	(0.174)	(0.130)	(0.496)	(0.662)	(0.648)	(0.847)	(0.676)	(0.963)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1283	1286	1283	1286	1283	1286	1283	1286
Adj.R-squared	0.854	0.939	0.518	0.654				
AB test AR (1) (p-value)					0.000	0.000	0.000	0.000
AB test AR (2) (p-value)					0.302	0.246	0.235	0.137
Sargan test (p-value)					0.057	0.803	0.095	0.090
SOA	0.137	0.182	0.453	0.407	0.320	0.168	0.530	0.737

*** (p-value < 0.001), ** (p-value < 0.01), * (p-value < 0.05), ·(p-value < 0.1). The values in parentheses represent the standard errors. SOA = 1 - β_1 for the non-interaction model and SOA = 1 – (β_{1+} $\beta_{2)}$ for the interaction model.

In the model using the BP framework, for market leverage (LEVP), only two out of three key assumptions are satisfied—instrument validity and absence of autocorrelation—while for book leverage (LEVB), all GMM assumptions are fully met. The main finding remains consistent: Sharia-compliant firms exhibit higher leverage compared to their non-Sharia counterparts, as indicated by the positive coefficient of the BP variable. However, Sharia-compliant firms demonstrate a significantly faster long-term capital structure adjustment, with a Speed of Adjustment (SOA) of 73.1% per year, which is even faster than under the SY framework. In contrast, non-Sharia firms only achieve an SOA of around 17.1% annually, indicating a slower adjustment process. The alignment of results between the BP and SY frameworks reinforces the robustness of the model.

Thus, the hypothesis accepted in this research is as follows:

H1: Capital Structure and Adjustment Speed in Sharia-Compliant Firms. The findings show that Sharia-compliant firms tend to hold higher levels of debt compared to non-compliant firms, yet remain within the Sharia-acceptable limit of DER ≤ 45%. More importantly, these firms demonstrate a significantly faster speed of adjustment toward their target capital structure. The

dynamic panel regression model (SY) estimates an annual adjustment speed of 48.1% for Sharia firms, compared to only 12.9% for non-Sharia firms. Thus, H1 is supported: There is a significant difference in both capital structure and adjustment speed between the two groups.

H2: Adjustment Speed Based on Debt Threshold (DER ≤ 45%). The interaction model using the BP dummy reveals that firms operating within the 45% DER threshold adjust their leverage significantly faster. The SOA for these firms is estimated at 73.1%, while firms exceeding the threshold adjust at a much slower rate (17.1%). Therefore, H2 is supported: Firms with DER ≤ 45% are more responsive in restoring capital structure to the target level.

By separating Sharia compliance (SY) and Sharia debt constraint (BP) variables in each model, the findings suggest that debt constraints strengthen the impact of Sharia compliance, leading to a faster capital structure adjustment in Sharia-compliant firms compared to non-Sharia firms. This implies that Sharia-compliant firms, when still within the allowed leverage limit, may actively utilize debt, but once approaching or reaching the regulatory boundary (e.g., DER ≤ 45%), they rapidly adjust their leverage to remain within Sharia principles. This reflects a strategic discipline to avoid being excluded from the Sharia index, thus maintaining their status and market reputation.

5. CONCLUSION

This study confirms the two proposed hypotheses. First, Sharia-compliant companies have a different capital structure and more debt than non-Sharia-compliant companies, but they remain within the bounds of Sharia compliance (H1, Accepted). Additionally, these businesses demonstrate a faster compliance rate with their leverage targets, indicating a higher level of financial discipline and a greater responsiveness (H2, Accepted). This supports the assumption that Islamic principles promote financial flexibility, and conversely, shows that Islamic law encourages capital efficiency. This study provides a theoretical contribution by integrating Islamic variables into a dynamic framework, and a practical contribution by recommending the use of sukuk and value-based Capital.

The results have important implications for regulators and market participants: promoting the strategic use of sukuk and encouraging values-based financial governance can strengthen the financial flexibility and resilience of listed firms. Future research may explore sector-specific

dynamics and cross-country comparisons to deepen understanding of capital structure behavior in Sharia-compliant environments.

LIMITATION

One limitation of this study is its focus on non-financial firms listed on the Indonesia Stock Exchange (IDX), which may limit the generalizability of the findings to financial sectors or capital markets in other jurisdictions. Future research is encouraged to expand the sample scope to include financial institutions and firms listed on other global exchanges, in order to develop a more comprehensive understanding. Moreover, the application of alternative analytical approaches, such as examining the sensitivity to macroeconomic conditions, could provide deeper insights into the factors influencing capital structure decisions and adjustment speeds. Further studies could also investigate the impact of other variables, such as ownership structure and dividend policy, on the capital structure and adjustment dynamics of Sharia and non-Sharia firms.

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