

What explain capital structure determinants choices of Shariah firms?



Raja Rehan¹⁺

Auwal Adam Sa'ad²

Romzie Bin

Rosman³

Qazi Muhammad

Adnan Hye⁴

^{1,2,3}IUM Institute of Islamic Banking and Finance, International Islamic University Malaysia, Kuala Lumpur, Malaysia.

¹Email: rajarehan@ium.edu.my

²Email: auwal@ium.edu.my

³Email: romzie@ium.edu.my

⁴Academic Research and Development Wing, Dubai, United Arab Emirates.

⁴Email: adnan.econ@gmail.com



(+ Corresponding author)

ABSTRACT

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This study aims to discover key capital structure determinants for the entire Shariah firms operating in dissimilar contexts. Moreover, it also estimates the adjustment speed for these firms to maintain targeted capital structures at all times. For this purpose, 321 Shariah firms that are operational in Saudi Arabia, Pakistan, the UAE, and Indonesia are nominated. The empirical analysis is conducted using 11 years, i.e., 2011-2021, of balanced Panel Data. The debt-to-asset and debt-to-equity ratios are used as variables of interest, whereas the asset tangibility ratio, current ratio, return on equity, size, non-debt-tax shield, inflation, and gross domestic product are used as explanatory variables. The robust estimator, i.e., Generalized Method of Moments (GMM), is executed to perform the analysis. The results show that the most important factors for Shariah-tagged firms are inflation, the gross domestic product, the asset ratio, the return on equity, the non-debt tax shield, and the lagged dependent variables. The important role of asset tangibility, lagged variables, and the presence of adjustment speed postulate that Shariah-tagged firms are following the provided guidelines of Dynamic Trade-Off theory to preserve capital structure. The findings are a new contribution to the limited empirical inquiries of Shariah firms' capital structure and a fresh addition to Islamic Finance literature. Besides, the outcomes are also helpful for policymakers and assist them in developing an optimal model of capital structure for Shariah-tagged firms that decreases overall capital costs and enhances these firms' market value.

Contribution/ Originality: This study is conducted to discover capital structure determinants for whole Shariah firms functioning in different nations. As per the authors' knowledge, this study is the first to discover core capital structure determinants for entire Shariah firms by exploring the largest data sample set, i.e., 321 Shariah-tagged firms operating in Saudi Arabia, Pakistan, the UAE, and Indonesia. The outcomes are a new addition to the financial literature, which helps policymakers develop a robust model to construct an optimal capital structure for all Shariah-tagged firms that moves them towards their ultimate target, i.e., profitability.

1. INTRODUCTION

Despite centurial research, investigators are still not able to come up with the final combination of those dissimilar determinants that generate capital structure for firms. Therefore, capital structure is still measured as one of the most significant issues in the corporate finance world [1]. Capital structure is how a firm combines different financial resources to finance its assets and run its operations [2]. The ideal mixture of various

appropriate financial resources, such as debt, retained earnings, equity, etc., to construct an optimal capital structure helps businesses target their core aim of generating the utmost return. An optimal capital structure not only enhances the business's overall market value but also decreases its cost of obtaining external capital [3]. Technically, a cost of capital is explained as a cost that a business faces while availing external financial resources to finance its assets and operations [4]. Undeniably, firms generate an optimal capital structure by blending numerous regional-specific, sectorial-specific, country-specific, and firm-specific capital structure determinants. The key capital structure theories, such as the Trade-off theory and Pecking Order theories, offer a guideline for firms to pick those determinants that assist them in generating an ideal mixture of different financial resources [5, 6]. Yet, constructing a capital structure for Shariah-tagged firms is a tricky solution. Typically, Shariah firms are those that abide by Islamic rules and regulations and are not involved in all those sorts of activities that are forbidden in Islam [7].

Principally, Shariah firms differ from non-Shariah firms in two different ways. Firstly, they are not involved in all those operations that are prohibited in Islam, such as gambling, interest, betting, etc., until they comply with strict screening Shariah standards [8]. Secondly, all facets of their business must adhere to financial screening. For this purpose, Shariah businesses are inspected by using different financial metrics to determine if they derive income from prohibited sources and, hence, verify that their operations conform to Shariah rules [9]. Also, Shariah firms are not allowed by various regulatory bodies to avail long-term interest-based financing beyond the allowed threshold. For instance, standard 21 of the Accounting and Audit Organizations for Islamic Financial Institutions (AAOIFI) explains that Shariah-tagged institutions are not permitted to avail debt finance up to 30% of the overall capital [10]. Likewise, according to the criteria set by the Dow Jones Islamic Market (DJIM) and Financial Times Stock Exchange (FTSE), Shariah firms are not allowed to maintain a debt-to-equity ratio of more than 33%, and their interest-based income must not exceed 9% of their overall profit [11, 12]. These distinctive characteristics of Shariah firms may imply different behavior from that of non-Shariah firms. Remarkably, different markets use various screening methods, which are considered an impulse for Shariah firms' financial performance [9]. Given these imposed limitations on Shariah firms, it is supposed that the capital structure-preserving practices of these firms are not unique and are different from those of non-Shariah.

Remarkably, Shariah-tagged firms are measured as secure and able to handle different economic regimes and financial fiascos. The recent pandemic, i.e., COVID-19, has spotted that Shariah-based businesses are less affected than conventional ones. Visibly, the Shariah indexes outperformed the conventional ones during the entire pandemic tenure. For instance, the Dow Jones Shariah indexes for emerging and European markets delivered an 8% higher return than their non-Shariah counterparts. A comparable trend was observed in the first quarter (Q1) of 2020 when the Shariah-tagged S&P BMI index dropped to -17%, whereas the conventional S&P BMI index dropped to -22% [13]. Thus, several investors, especially from Muslim countries, started turning towards Shariah businesses. However, due to numerous restrictions imposed on Shariah-tagged firms to manage their capital structure, it has become harder for these firms to manage finances for running operations and financing assets [14, 15]. Notably, the former inquiries that inquired about capital structure determinants for Shariah-tagged firms are rare and identify a large number of dissimilar significant determinants. Typically, most of these inquiries are country-specific and industry-specific and, thus, have not come up with holistic outcomes (see, for instance, [16, 17]). Therefore, there is a huge gap in understanding the Shariah firms' capital structure constructing practices. Importantly, due to the abundant restrictions imposed on Shariah firms, they have limited options to construct an optimum level of capital structure. Thus, it becomes even tougher for them to manage their finances [6, 18]. Therefore, it is required to identify key capital structure determinants for entire Shariah-tagged firms that are functioning in dissimilar contexts [9, 16].

To address the existing gap, this inquiry is an attempt to investigate capital structure determinants for entire Shariah firms. To conduct the empirical analysis, eleven-year balanced Panel Data of 321 Shariah-tagged firms that

are functioning in Saudi Arabia, Pakistan, Indonesia, and the UAE is scrutinized. The robust estimator, i.e., two-step Generalized Method of Moments (GMM), is executed to perform the analysis and identify the speed of adjustment (SOA). The results identify that tangibility, gross domestic products, profitability, inflation, and the non-debt tax shield are the key determinants that impact the capital structure-sustaining practices of Shariah firms. The outcomes are a fresh addition to the financial literature. Moreover, the outcomes offer a guideline for financial concerns to develop a robust model for Shariah firms that helps them maintain an optimum capital structure at all times and move these firms towards their target, i.e., to earn the utmost profit, which ultimately enhances these firms' overall market value.

The remaining research is organized into five further sections. The next part, part 2, comprehensively analyzes the literature about this research question. Section 3 elucidates the retrieved data and the established approach used to conduct the research. Section 4 is designated for the analysis and interpretation of the observed findings. Section 5 serves as the last part of the investigation, providing a comprehensive review of the findings and offering recommendations based on the inquiry.

2. LITERATURE REVIEW

Unquestionably, building an optimal capital structure that boosts firms' value in their prevailing market and reduces capital costs is a complicated process. However, the fundamental theories of capital structure and now their modern dynamic forms, which are the Modigliani and Miller (M&M), Trade-Off, and Pecking Order theories, provide a guideline for financial concerns to accept those core determinants that surge a firm's income and shrink its entire cost of capital. The Modigliani and Miller [19] and Modigliani and Miller [20] propositions set the foundation for the Trade-Off theory, which clarifies the certainty of an optimum capital structure. Clearly, this theory suggests that a firm can adopt a suitable level of debt and equity by balancing its overall costs and benefits. After that, the Pecking Order theory was presented, which is also measured as a competitor of the Trade-Off theory. Technically, the Pecking Order theory suggests the notion that a firm first uses its own idle reserves, i.e., its retained earnings, to achieve its funding needs. In cases where it requires more funds, it moves towards debt and, as a last resort, accepts the option of equity. Also, this theory explains that financing costs surge with the increase in asymmetric information. Additionally, the dynamic forms of the Trade-Off theory clarify that firms' capital structure is not static in nature but varies with time because of dissimilar factors, therefore holding dynamic characteristics. The dynamic Trade-off theory also specifies the presence of a speed of adjustment (SOA) for the firm to alter its capital structure at a targeted level. Typically, SOA clarifies that a firm's capital structure is not a static property and is dynamic in nature, and it may diverge from its optimum level. In the presence of adjustment speed, it quickly moves towards its optimal level in a definite period.

Visibly, previous inquiries that observed theoretical associations among capital structure and its nominated determinants designate that asset tangibility, liquidity, profitability, and size are the core determinants that construct the capital structure at a firm's level and industry level. Moreover, these inquiries also deliver clear indications that the country-level and regional-level settings and determinants such as gross domestic product (GDP) and inflation also play a core role in formulating a capital structure for the firms (see, for instance, [6, 8, 16, 21, 22]). However, in the case of Shariah-tagged firms' rare studies are conducted that indicate capital structure determinants for entire Shariah firms functioning in dissimilar nations. Most recently, Bugshan and Bakry [21] investigated the capital structure and maintenance practices of 200 Shariah firms that are operating in Malaysia and Pakistan. To perform experimental analysis, profitability, depreciation, risk, size, market-to-book ratio, gross domestic products, tangibility, and inflation are used as independent variables. Likewise, book leverage and market leverage are nominated as dependent variables to measure the investigated firms' capital structure. By performing two-step GMM and ordinary least squares (OLS) estimations, this inquiry specified the occurrence of SOA. Thus, it supports the existence of Trade-Off theory in emerging Shariah firms. Besides, this inquiry indicates that Shariah

firms are maintaining low-level debt in comparison with their counterpart, i.e., non-Shariah firms. The conclusions obtained from the Bugshan and Bakry [21] inquiry point out that Shariah firms are sustaining low debt levels. This is due to several restrictions on availing debt-based finance to Shariah-tagged firms by various regulatory bodies. The conclusion is in line with Alrajhi Capital [23] which reports that various Shariah firms concur on imposed restrictions by their regulatory bodies and not using debt facilities for more than 33% of their business total market capitalization.

Akbar, et al. [16] conducted an empirical investigation to specify differences among debt equity-maintaining practices and to explore the existence of SOA in Shariah and conventional Pakistani firms. The key determinants of capital structure are profitability, earning volatility, size, growth opportunity, liquidity, GDP, and non-debt tax shield (NDTS), which are used as independent variables. By performing GMM analysis on 117 Shariah and 68 non-Shariah firms, the study designated the presence of SOA for both types of firms. Moreover, tangibility, size, liquidity, and profitability are found to be significant but possess a negative relationship with firms' capital structures. Nevertheless, earning volatility and NDTS exhibit a positive and significant association with these firms' capital structures, which include market and book leverage. Additionally, this study also performed an F-test, which confirmed that the studied determinants are significant and correct choices for the firms operating in the context of Pakistan. Also, this inquiry found variations in the capital structure-maintaining practices of both types of firms and clarified that the theory of Pecking Order is more dominant in Shariah-categorized firms, whereas Trade-Off holds supremacy in non-Shariah firms. Interestingly, similar findings are reported by Abdul Hadi, et al. [8] and Rehan and Abdul Hadi [6] who explored capital structure determinants and SOA for Malaysian Shariah firms.

Abdul Hadi, et al. [8] performed a comparative investigation and recognized variations among the capital structure-preserving practices of Shariah and non-Shariah Malaysian firms. The debt-to-equity ratio is nominated to measure the capital structure of selected firms, whereas return on equity (ROE), current assets, earnings per share (EPS), total assets, and fixed assets are accepted as explanatory variables. Remarkably, the nominated variables are used to examine the profitability, tangibility, and liquidity impact of the nominated 558 publicly listed firms. The created data sample set was further subdivided into 117 Shariah and 441 non-Shariah firms. By using Panel Data Static models, the results revealed that asset tangibility, liquidity, profitability, and sales are the key determinants for Malaysian Shariah-tagged firms. Prominently, only profitability is detected as a negative but significant determinant for non-Shariah firms. Also, this study described the following guidelines from the Trade-Off theory for preserving the capital structure of Malaysian firms. Later, Rehan and Abdul Hadi [6] discovered the dynamic relations between Shariah- and non-Shariah-tagged firms in Malaysia. The current assets, fixed assets, sales, ROE, total assets, EPS, and total assets were selected as explanatory variables, whereas the debt-equity ratio was used as a dependent variable. By using 12 years, i.e., 2005-2016, of financial data for 351 Shariah and 95 non-Shariah firms, the results disclose that tangibility is the key determinant for non-Shariah firms and liquidity is a key determinant for Shariah firms. Besides, the significant lagged variable of the dependent variable identifies the presence of SOA and explains the application of dynamic Trade-off theory in Malaysian firms. Similarly, Ahmad and Azhar [18] capital structure determinants of Malaysian Shariah firms that were listed from 2009 to 2013. The study used a pooled times series model to look at cross-sectional data and found that the capital structure of Malaysian Shariah-tagged public listed firms is mainly determined by their profitability and tangibility. Also, none of the inspected macroeconomic variables—GDP and interest rate—are observed to be significant. The conclusions attained from the different investigations that were conducted to inspect Shariah firms' determinants, which are operational in Pakistan and Malaysia (see [8, 16, 18, 21]) explained that tangibility, profitability, GDP, sales, and liquidity are the essential determinants of capital structure. Likewise, the variations in these firms' capital structure identify that Shariah firms' capital structures are dynamic in nature.

Alzomaia [22] exposed the capital structure determinants for the firms that are operating in Saudi Arabia. This investigation was achieved by using 93 firms' financial data from 2000 to 2010 and by performing a cross-sectional pool data assessment method. The conclusions identify a positive and significant association between capital structure and growth. However, a significant but negative association between tangibility, risk, profitability, and capital structure is detected. Also, this study's conclusions support the supremacy of the Pecking Order theory in the Saudi Arabian context. Likewise, Alnori and Alqahtani [24] discovered the capital structure-preserving practices of Shariah-tagged firms operating in Saudi Arabia. By adopting data from the financial years 2005–2016 and implementing Multiple Regression, the results suggest that Shariah compliance has a significant influence on the capital structure-maintaining practices of Shariah firms. Furthermore, this investigation determined that, as compared to other firms, Shariah firms reserve low debt levels and lower SOAs.

Subsequently, Setiawan [25] investigated capital structure determinants for Indonesian public-listed Shariah and non-Shariah firms. For analysis purposes, 273 Shariah-tagged and 71 non-Shariah firms' financial data was examined by executing Panel Data Fixed Effect modeling tactics and a GMM estimator. The return on assets and equity were selected as explanatory variables to measure the capital structure of both firms. Moreover, debt to equity, debt to assets, size, and age of the firms were selected as independent variables. The outcomes indicate an important association between debt to equity and debt to asset with both dependent variables for Shariah-tagged firms. However, the return on assets has no impact on the debt-to-assets ratio. This study explained that, in comparison with their counterpart Shariah firms, they maintain low debt. Also, in terms of financial performance, Shariah firms manage to generate higher returns than non-Shariah firms. The outcomes obtained from Setiawan [25] are consistent with the former findings of Arif and Mai [26] who confirmed tangibility and profitability as significant capital structure determinants for Indonesian Shariah-tagged firms. Moreover, they explained that Shariah firms in Indonesia maintain low debt.

Given the above-discussed former inquiries (see [8, 16, 21, 22, 25]) it is clear that tangibility, liquidity, GDP, size, interest rate, and profitability are the core determinants that explain the capital structure-maintaining practices of Shariah-tagged firms. Nevertheless, to measure the capital structure, previous studies adopted dissimilar dependent variables such as debt-to-equity ratio, book-leverage ratio, debt-to-assets ratio, etc. Therefore, they do not provide conclusive and holistic findings. Also, in different contexts, the outcomes obtained from former inquiries are not parallel and report variation in capital structure-preserving practices of Shariah firms (see [21, 22, 25, 26]). Evidently, former inquiries used dissimilar measures of capital structure to recognize significant capital structure determinants for Shariah-tagged firms. Thus, an empirical inquiry is warranted to identify key capital structure determinants for Shariah-tagged firms operational in different contexts.

Considering the recognized gap and the need to deliver comprehensive outcomes, this empirical investigation is an effort to discover significant determinants of capital structure that are unique for all Shariah-tagged firms functioning in dissimilar countries. Thus, for this purpose and following the practices of former scholars (see [6, 27]) this study adopts debt-to-equity and debt-to-asset ratios as dependent variables. In order to produce comprehensive results that identify key capital structure determinants for entire Shariah-tagged firms, this inquiry technically adopts these two different measures of capital structure. Undeniably, most of the Shariah firms focused more on equity than interest-based long-term financing [18]. However, they avail of debt-based facilities up to the allowed limit; thus, debt-to-equity is considered one of the measures of capital structure for Shariah-tagged firms (see [6, 8, 25]). Likewise, Shariah-tagged firms are measured as tangible firms since their focus is more on preserving asset tangibility to avail short-term financing. Therefore, various researchers (see [25, 27, 28]) specify that debt-to-asset is also identified as a measure of capital structure for Shariah firms.

Besides, numerous explanatory variables are nominated to test their influences on Shariah-tagged firms' capital structure. For instance, SIZE is adopted to explain sales of Shariah firms, return on equity (ROE) specifies the profitability of these firms, and the current ratio is nominated to explore the liquidity position, and total assets are

selected to explore the tangibility of assets for Shariah firms' capital structure. Whereas, macroeconomic variables such as GDP and interest rate are selected to investigate their influences on the capital structure and maintaining practices of Shariah firms. The linked hypotheses of this study are explained below:

H₁: There is a positive influence of leverage on Shariah firms' tangibility.

H₂: There is a negative influence of leverage on Shariah firms' liquidity.

H₃: There is a positive influence of leverage on Shariah firms' Size.

H₄: There is a negative influence of leverage on Shariah firms' profitability (ROE).

H₅: There is a positive influence of leverage on Shariah firms' non-debt tax shield (NDTS).

H₆: There is a positive influence of leverage on Shariah firms' INF.

H₇: There is a negative influence of leverage on Shariah firms' GDP.

H₈: There is a dynamic influence of leverage on investigated determinants.

Notably, the expected signs of the above-constructed hypothesis are settled in view of the aforementioned deliberated former empirical literature. Table 1 clarifies the positive and negative (+/-) relationships of key capital structure determinants from a theoretical perspective.

Table 1. Capital structure determinants and theoretical association.

S#	Variables	Signs	Theory	References
1	Profitability	+	Trade-off	Bugshan and Bakry [21]; Sheikh and Wang [29] and Ahmad and Azhar [18]
		-	Pecking order	
2	Tangibility	+	Trade-off	Rehan, et al. [30]; Abdul Hadi, et al. [31] and Abdul Hadi, et al. [8]
		-	Pecking order	
3	Sales	+	Trade-off	Bugshan and Bakry [21]; Abdul Hadi, et al. [8] and Ahmad and Azhar [18]
		-	Pecking order	
4	Liquidity	+	Trade-off	Rehan, et al. [14]; Thabet and Hanefah [32] and Abdul Hadi, et al. [31]
		-	Pecking order	
5	NDTS	-	Trade-off	Bugshan and Bakry [21] and Jaworski and Czerwonka [33]
		+	Pecking order	
6	GDP	+	Trade-off	Bugshan and Bakry [21]; Ghani, et al. [34] and Zandi, et al. [35]
		-	Pecking order	
7	Inflation	NA	-	-
		NA	-	-

3. DATA & METHODOLOGY

This empirical inquiry is an effort to examine important capital structure determinants for all Shariah firms. For this purpose, for those Shariah-tagged firms that are functioning in Pakistan, Saudi Arabia, Indonesia, and the United Arab Emirates (UAE), their data sample set is extracted from the Bloomberg database. To accomplish the investigation, a total of 321 Shariah-tagged firms' eleven years, i.e., the 2011–2021 balanced Panel Data sample set, contains equal observations of nominated entities in all observed time intervals. Besides, a Purposive data sampling technique is adopted to create a final data sample set. In Purposive data sampling, researchers depend on their own decisions for finalizing the sample population [36-38]. Subsequently, following the practices of earlier researchers (see [39-41]), this study accepted only those firms that have been continuously tagged as Shariah firms in the last three consecutive periods. Moreover, all those firms that are operating in financial sectors are removed from the inquiry because they are bound by central banks to maintain their capital structure up to the instructed threshold [42, 43]. Thus, their capital structure maintaining practices are dissimilar to those of non-financial firms [44]. Also, those firms whose data are not available for the nominated dependent and independent variables are

excluded from the data sample set. The selected dependent and independent variables to perform the analysis with their measurements are displayed in Table 2.

Table 2. Variables and their measurements.

S#	Symbol	Variables	Measurement	References
01	DAR (Y ₁)	Debt to total assets	Total debt / Total assets	Hassan, et al. [27]; Setiawan [25] and Demirhan [28]
02	DER (Y ₂)	Debt to equity ratio	Total debt / Total shareholders' equity	Rehan, et al. [14] and Abdul Hadi, et al. [8]
03	TANG (X ₁)	Tangibility of firms' asset	Tangible fixed assets / Total assets	Sahudin, et al. [45]; Ahmad and Azhar [18] and Arif and Mai [26]
04	ROE (X ₂)	Return on equity	Net income / Equity	Rehan, et al. [30], Abdul Hadi, et al. [8] and Rehan [46]
05	CR(X ₃)	Current ratio	Current assets / Current liabilities	Akbar, et al. [16]; Mahvish and Quasar [47]; Zandi, et al. [1] and Hassan, et al. [27]
06	SIZE (X ₄)	Size	Sales	Akbar, et al. [16] and Abdul Hadi, et al. [8]
07	NDTS (X ₅)	Non-debt tax shield	Depreciation / Total assets	Akbar, et al. [16]; Sahudin, et al. [45] and Hassan, et al. [27]
08	INF (X ₆)	Inflation	Inflation rate	Bugshan and Bakry [21] and Ahmad and Azhar [18]
09	GDP (X ₇)	Annual GDP growth	GDP growth (Annual %) / 100	Akbar, et al. [16]; Sahudin, et al. [45] and Ahmad and Azhar [18]

The former studies (see [16, 31]) indicate that the capital structure of Shariah-tagged firms is a dynamic property. Hence, this observed inquiry has chosen the Panel Data Dynamic model that was previously executed by several investigators (see [2, 14]) to discover dynamic relations among the explored variables. Likewise, a robust estimator that is measured as the best estimator to perform dynamic analysis named the two-step Generalized Method of Moments (GMM), is executed to identify significant determinants and the speed of adjustment (SOA). Technically, the SOA explains that the capital structure of a firm is not static in nature and deviates from its targeted level; however, in the presence of adjustment speed, it returns to its optimal level rapidly [30]. Technically, the GMM evaluator is measured as the best estimator to examine dynamic associations and SOA among the nominated determinants [48]. Remarkably, the first-step GMM is a default estimator, whereas the two-step GMM is used to measure the SOA of the nominated firms. Also, it eliminates the endogeneity problem, which is present due to any significant association that exists between the selected variables of the model and the error term [35]. The basic Panel Data model is described in Equation 1, given:

$$y_{it} = \alpha_i + \gamma_t + \beta x_{it} + \varepsilon_{it} \tag{1}$$

Here, 'i' designates individuals, 't' indicates the time period, i.e., 11 years for this inquiry, 'y_{it}' explains the designated dependent variables, 'α_i' defines cross-sectional characteristics, and 'γ_t' are the characteristics of dissimilar time series throughout the nominated time period. In the same way, 'x_{it}' specifies the nominated explanatory determinant and 'ε_{it}' indicates the error term of models. Statistically, Equation 2 clarifies the single dynamic linear equation for the mobilized two-step GMM modeling.

$$y_{it} = (1 - \lambda)y_{i,t-1} + \beta_1 k_{it} + \beta_2 X_{it} + \mu_{it} \tag{2}$$

$i = 1, \dots, 43, t = 1, 2, 3, \dots, 11$

This investigation adopts the above-given model of Equation 2 to inspect significant determinants and SOA for Shariah-tagged firms by employing a two-step GMM. The raised econometric models for this empirical inquiry are given below in Equations 3 and 4:

$$DAR_{it} = (1 - \lambda)DAR_{i(t-1)} + \beta_1 TANG_{it} + \beta_2 ROE_{it} + \beta_3 CR + \beta_4 SIZE_{it} + \beta_5 NDTS_{it} + \beta_6 INF + \beta_7 GDP + \varepsilon_{it} + \mu_{it} \quad (3)$$

$$DER_{it} = (1 - \lambda)DER_{i(t-1)} + \beta_1 TANG_{it} + \beta_2 ROE_{it} + \beta_3 CR + \beta_4 SIZE_{it} + \beta_5 NDTS_{it} + \beta_6 INF + \beta_7 GDP + \varepsilon_{it} + \mu_{it} \quad (4)$$

Here, dependent variables, debt-to-equity and debt-to-assets ratios are denoted by their symbols (see Table 2) DAR and DER respectively. Similarly, $(1 - \lambda)DAR_{i(t-1)}$ and $(1 - \lambda)DER_{i(t-1)}$ designate lagged variables of the nominated dependent variables which impact on the error terms of both models. Furthermore, TANG, CA, ROE, SIZE, INF, NDTS and GDP are nominated explanatory variables, which are also explained in above given Table 2. Besides, ε_{it} of both Equations 3 and 4 clarify error terms and μ_{it} are the variations because of random effects in both designated variables. The first alteration of the two-step difference GMM estimator is as mentioned below in Equation 5 and 6.

$$\Delta DAR_{it} = \Delta DAR_{i,t-1} + \beta_1 \Delta TANG_{it} + \beta_2 \Delta ROE_{it} + \beta_3 \Delta CR_{it} + \beta_4 \Delta SIZE_{it} + \beta_5 \Delta NDTS_{it} + \beta_6 \Delta INF_{it} + \beta_7 \Delta GDP_{it} + \Delta \varepsilon_{it} + \Delta \mu_{it} \quad (5)$$

$$\Delta DER_{it} = \Delta DER_{i,t-1} + \beta_1 \Delta TANG_{it} + \beta_2 \Delta ROE_{it} + \beta_3 \Delta CR_{it} + \beta_4 \Delta SIZE_{it} + \beta_5 \Delta NDTS_{it} + \beta_6 \Delta INF_{it} + \beta_7 \Delta GDP_{it} + \Delta \varepsilon_{it} + \Delta \mu_{it} \quad (6)$$

Importantly, this investigation performs Sargan and Autocorrelation, i.e., AR(m) diagnostic tests, which are executed to find out the validity of the raised models. Technically, the Sargan test is executed to find the issue of exogeneity, whereas the Ar(m) test i.e. also known as the autocorrelation test, is used to explore autocorrelation-connected issues among the nominated variables. Exogeneity is a situation in which the independent variable of the regression model is significantly correlated with an error term [49]. Likewise, in an autocorrelation, the variable is connected with its past realizations [50]. Both tests are connected with GMM estimation and used by following the practices of earlier researchers (see [1, 8, 14,51]). Notably, the GMM estimator increases the model efficiency and offers a degree of freedom among the explanatory variables. Besides, it also controls and decreases the problem of multicollinearity. The problem of multicollinearity exists in a regression model when its variables are correlated with each other [52].

Additionally, this study also executes the Pearson Correlation test, which is used to find out any sort of statistical relation among all nominated variables (see Ghani, et al. [2]). Technically, this test explains the significant relationship level among the inspected variables. Statistically, the ‘r’ i.e., coefficient of the Pearson test lies between ‘-1’ to ‘+1’. The ‘+1’ identifies a positive and perfect relationship; nevertheless, ‘-1’ designates the negative but perfect relationship between the designated variables. Likewise, if the coefficient value is observed at ‘0’, this clarifies the absence of any association (Hernawati, et al. [53]). The statistical model of Pearson correlation is displayed below:

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}} \quad (7)$$

Here, the ‘r’ specifies Pearson correlation. Whereas, $\sum xy$ represents the overall sum figure of the nominated determinants, which is a multiplication of variables ‘x’ and ‘y’, $\sum x$ explains the total sum of the nominated variable ‘x’ and ‘ $\sum y$ ’ clarifies the sum of the variable ‘y’ figures. Likewise, ‘n’ clarifies the total existing variables ‘x’ and ‘y’.

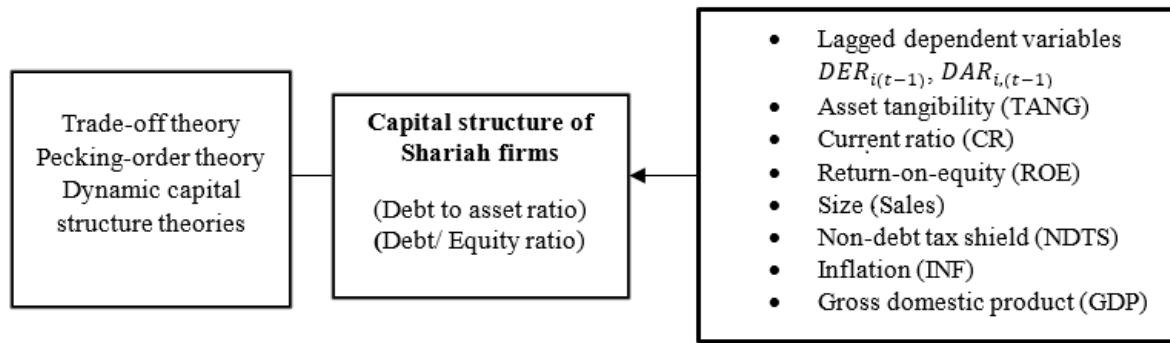


Figure 1. Theoretical framework for Shariah firms' determinants.

Figure 1 explains the theoretical framework created for this investigation. Remarkably, essential capital structure theories such as Trade-off theory, Pecking Order theory, and their recent dynamic forms are used to examine the nominated capital structure determinants (see Table 1).

4. FINDINGS

Notably, this inquiry is conducted to examine the main significant determinants of capital structure for all Shariah-tagged companies that are operational in dissimilar contexts. Therefore, this section comprises the findings attained from Panel Data Dynamic Analysis via GMM estimator. Additionally, the outcomes obtained from diagnostic tests are also explained in this section.

Table 3 displays the descriptive analysis for all nominated dependent and independent variables.

Table 3. Descriptive statistics.

Variables	Max.	Min.	Mean	Median	Std. dev.
DAR	0.561	0.000	0.159	0.135	0.171
DER	0.941	0.000	0.235	0.158	0.236
TANG	16.643	8.672	11.576	11.260	1.236
ROE	0.891	-0.519	0.051	0.041	0.081
CR	0.963	0.032	0.362	0.368	0.231
SIZE	0.916	0.000	0.231	0.158	0.268
NDTS	0.123	-0.10	0.032	0.027	0.021
INF	21.19	0.676	6.154	4.92	4.523
GDP	5.231	-3.18	2.448	3.179	1.820

Table 3 explains the mean figures of both dependent variables, DAR and DER, which are at 0.15 and 0.23, respectively, whereas their median figures stand at levels of 0.135 and 0.158. Likewise, the maximum tangibility of assets (TANG) value is about 16.643, though its mean figure is a minor, i.e., 11.576, compared to its maximum figure, i.e., 16.643 million. Moreover, ROE, CA, SIZE, and NDTS mean figures are observed at 0.051, 0.362, 0.231, and 0.032, respectively. The mean INF stands at 6.154, which is followed by the mean figure of GDP, i.e., 2.448.

Table 4 reveals the findings attained from the Pearson Correlation test. Remarkably, all seven selected variables and both measures of capital structure—debt-to-asset and debt-to-equity ratios—were used to execute this test analysis. Evidently, the coefficients of the studied variables range between -0.2139 and 0.6571. Statistically, the maximum coefficient value is observed in DAR and CR, i.e., 0.6571. Notably, the initial results that were attained from this test investigation explain that TANG, ROE, CR, SIZE, NDTS, INF, and GDP are sufficient to influence DAR and DER.

Table 4. Pearson's correlation test.

Variables	DAR	DER	TANG	ROE	CR	SIZE	NDTS	INF	GDP
DAR [p value]	1	0.2113 (0.2111)	0.2341 (0.0001)	-0.2139 (0.0321)	0.6571 (0.0166)	0.3622 (0.0001)	0.3121 (0.0121)	0.6121 (0.0001)	0.6334 (0.0001)
DER [p value]	0.2113 (0.2111)	1	0.2119 (0.2681)	-0.2234 (0.0331)	0.5214 (0.0432)	0.3112 (0.0212)	0.2114 (0.0211)	0.2516 (0.0221)	0.2236 (0.0211)
TANG [p value]	-0.2341 *** (0.0001)	0.2119 (0.2681)	1	0.5164 (0.1303)	0.6521 (0.1121)	0.2142 (0.1102)	0.6123 (0.3112)	0.6531 (0.3121)	0.5123 (0.1521)
ROE [p value]	-0.2139 (0.0321)	-0.2234 (0.0331)	0.5164 (0.1303)	1	0.6215 (0.1311)	0.41163 (0.2291)	0.3212 (0.2121)	0.6142 (0.1110)	0.6211 (0.1221)
CR [p value]	0.6571 (0.0166)	0.5214 (0.0432)	0.6521 (0.1121)	0.6215 (0.1311)	1	0.2212 (0.0111)	0.3113 (0.0642)	0.2112 (0.0632)	0.3341 (0.0613)
SIZE [p value]	0.3622*** (0.0001)	0.3112 (0.0212)	0.2142 (0.1102)	0.41163 (0.2291)	0.2212 (0.0111)	1	0.3530 (0.0122)	0.2121 (0.0211)	0.3321 (0.0111)
NDTS [p value]	0.3121 (0.0121)	0.2114 (0.0211)	0.6123 (0.3112)	0.3212 (0.2121)	0.3113 (0.0642)	0.3530 (0.0122)	1	0.2211 (0.0132)	0.3323 (0.0001)
INF [p value]	0.6121*** (0.0001)	0.2516 (0.0221)	0.6531 (0.3121)	0.6142 (0.1110)	0.2112 (0.0632)	0.2121 (0.0211)	0.2211 (0.0132)	1	0.2212 (0.0110)
GDP [p value]	0.6334*** (0.0001)	0.2236 (0.0211)	0.5123 (0.1521)	0.6211 (0.1221)	0.3341 (0.0613)	0.3321 (0.0111)	0.3323 (0.0001)	0.2212 (0.0110)	1

Note: *** Significant at 1%.

Moreover, to check for other analytical issues with the data set, the AR(m) and Sargan tests are performed. Technically, these two tests are connected with the GMM investigation and executed to test the soundness of the created Panel Data Dynamic models. Surprisingly, the Sargan test is used to find problems with exogeneity in both models, DAR and DER(see Equation 5 and 6).

The Sargan test findings are displayed below. Table 5 which designates that both constructed Panel Data models for GMM estimation are free from the issue of exogeneity; therefore, the H₀ specifies that the all-selected instruments are effective and not rejected for both econometric models.

Table 5. Sargantests for exogeneity analyses.

H ₀ : The selected instruments are effective		
H ₁ : The selective instruments are not effective		
DAR/ DER models	Debt to assets (DAR) model	Debt to equity (DER) model
(Prob>chi sq.)	0.1921	0.1636
Statistics	39.02	40.13
Number of cross-sections	321	321

Subsequently, the AR(m) test findings are presented in Table 6, which is accomplished to find the autocorrelation-related issues in both models (see Equation 5 and 6). The outcomes postulate that the alternative hypothesis for both models is not accepted and explain that the designated determinants are not in relation to their residuals.

Table 6. AR(m) Tests for autocorrelation analyses.

H ₀ : Non-existence of autocorrelation			
H ₁ : Existence of autocorrelation			
Models	Lags	Statistics	Prob. > Chisq.
Debt to assets (DAR)	1	-4.14	0.921
Debt to equity (DER)	1	-3.12	0.834
Number of cross-sections	-	321	321

After confirming that both constructed models are free from any sort of diagnostic problem, the GMM estimation for both models is performed separately. The outcomes obtained for both models from GMM

investigations are exposed below in Table 7 separately.

Table 7. Dynamic models GMM analyses.

Variables	DAR model (Lagged dependent variable = DAR_1)				DER model (Lagged dependent variable = DER_1)			
	Estimate	Standard error	t-value	Pr. > t	Estimate	Standard error	t-Value	Pr. > t
Intercept	-0.0131	0.0233	-0.5622	0.574	-0.0112	0.0211	-0.5308	0.5956
DAR_1 / DER_1	0.2661	0.0622	4.2781	0.0001**	0.2992	0.0692	4.3237	0.0001**
TANG	0.2751	0.0624	4.4087	0.0001**	0.2463	0.0532	4.6297	0.0001**
ROE	-0.2628	0.0594	-4.4242	0.0001**	-0.2352	0.0553	-4.2532	0.0001**
CR	0.2361	0.2614	0.9032	0.3664	0.2241	0.2201	1.0182	0.3086
SIZE	0.1321	0.1197	1.1036	0.2698	0.1321	0.1957	0.6750	0.4997
NDTS	-0.2352	0.0313	-7.5144	0.0001**	-0.2241	0.0312	-7.1827	0.0001**
INF	0.2323	0.0323	7.1920	0.0001**	0.2343	0.0321	7.2991	0.0001**
GDP	0.2252	0.05651	3.9851	0.0001**	0.3112	0.3512	0.8861	0.3756

Note: ** significant at 5% level.

Table 7 describes the results obtained by executing the GMM assessor for both constructed models, which use debt-to-assets (DAR) and debt-to-equity (DER) as measures of capital structure for Shariah-tagged firms. The outcomes attained by the separate analyses of the DAR and DER models suggest that tangibility (TANG) and inflation (INF) are positive and significant determinants. Also, it is confirmed by both models' (DAR and DER) estimations that taxation shield (NDTS) and profitability (ROE) are negative but important determinants of Shariah-tagged firms that are functioning in Saudi Arabia, Pakistan, the UAE, and Indonesia. Whereas, the GMM estimation for debt-to-asset (DAR) also postulates that gross domestic product (GDP) is also holding a positive and significant impact on capital structure for the firms tagged as Shariah. Interestingly, the significant and positive attained values of both lagged dependent variables (DAR_1 and DER_1) confirm the presence of SOA for Shariah firms.

Technically, the positive and significant values of the dependent variables coefficients, which are 0.2661 for DAR and 0.2992 for DER, confirm the survival of SOA. Hence, the Shariah-tagged firms that use the debt-to-asset (DAR) ratio for capital structure measurement hold a SOA of 73% ($1 - 0.2661 = 0.7339$). Thus, these firms return to their optimal or targeted level in one year and three months ($100 \div 73 = 1.36$). Similarly, the Shariah firms that use DER are involved in debt-related matters but not more than the allowed limit and possess a low SOA, i.e., 70% ($1 - 0.2992 = 0.7008$); hence, it takes one year and four months ($100 \div 73 = 1.42$) to move towards the selected optimal level. In short, the significant lagged variables, tangibility, profitability, gross domestic products, and the presence of SOA confirm that the dynamic trade-off theory is more appropriate for clarifying the capital structure-preserving practices of all Shariah-tagged firms.

5. DISCUSSION

The determinants of capital structure for Shariah firms that are operational in dissimilar contexts are still not recognized and are considered an unsettled issue. Undoubtedly, the Shariah firms that are operational in different countries follow similar rules and regulations that are imposed on them by their local and international regulatory bodies. For instance, Shariah-tagged firms are not allowed to avail interest-based financing up to the allowed threshold. Therefore, it is supposed that the determinants of capital structure for these firms, which are operating in dissimilar republics, are almost comparable. Because there is a gap, this study looked at capital structure-related factors that are the same for all Shariah-compliant businesses that are studied in different countries. Thus, to perform empirical analysis, 321 Shariah-tagged firms that were operational in Saudi Arabia, Pakistan, the UAE, and

Indonesia from 2011 to 2021 are scrutinized. The two different models of debt-to-equity and debt-to-asset ratio are constructed to perform robust GMM analyses (see Equation 5 and 6).

The outcomes attained by using both measures of capital structure, DAR and DER, clarify that tangibility, inflation, and gross domestic product, i.e., GDP, and are positively significant, whereas NDTs and profitability are observed as negative but significant determinants for all Shariah-tagged firms. Nevertheless, the GDP is also observed as a positive and significant capital structure determinant of DAR for Shariah-tagged firms. Typically, Shariah firms are measured as firms that are tangible in nature, as they concentrate more on preserving the tangibility of assets than adopting external finance. [Harc \[54\]](#) describes that stockholders consider their investment secure in the existence of tangible assets as they offer safety to them against the business' bankruptcy. Also, the numerous limitations imposed by regulatory bodies on Shariah firms for availing debt facilities force these firms to avail tangible assets for producing extra internal amounts; however, their insignificant size, i.e., sales and liquidity, explains why these firms use tangible assets to avail external finance. Moreover, insignificant sales and negative but significant profitability also postulate that these firms' sales are not enough to generate significant revenue, and to finance their assets, they are focusing on external finance. Nonetheless, the Shariah-tagged firms are allowed to use outside debt up to the allowed limit but not as a main source of finance. The results identify that tangibility of assets and profitability have importance in explaining Shariah-tagged firms' capital structure. The results are consistent with the inferences of [Rehan and Abdul Hadi \[6\]](#), [Thabet, et al. \[55\]](#) and [Thabet and Hanefah \[32\]](#) who explain the significant association between asset tangibility and firms' profitability with leverage for Shariah-based firms.

Interestingly, GDP and inflation are also detected as the main significant determinants for investigated Shariah-followed firms. Technically, an upsurge in inflation and GDP both decline firms' debt [\[34\]](#). Visibly, Shariah-tagged firms were considered safe and less effective during the last financial crisis, the recent pandemic, and during different inflation and economic regimes (see [\[13, 31\]](#)). Moreover, these firms have more diversification options because they have less systematic risk and are thus able to maintain their earnings during financial crises [\[56\]](#). Therefore, it has a significant impact on countries' financial growth and GDP. Also, these firms can generate the utmost returns during dissimilar inflation regimes [\[57\]](#). Thus, GDP and inflation are found to be significant determinants for Shariah-tagged firms. The discoveries are consistent with the outcomes of [Bugshan and Bakry \[21\]](#) and [Akbar, et al. \[16\]](#) who specify GDP as important determinant of Shariah-followed firms. The outcomes are not matched with the conclusions of [Bugshan and Bakry \[21\]](#) who designate inflation as an insignificant determinant of capital structure for Shariah-tagged firms. In addition, the presence of SOA and the targeted capital structure for Shariah-followed firms are shown by the significant and positive lagged dependent variables of both measures. Evidently, the significant and positive lagged variables of dependent variables, tangibility, and SOA postulate that, among others, the dynamic version of Trade-Off theory is dominant in describing Shariah-tagged firms' capital structure. The discoveries are consistent with the outcomes of [Sukor, et al. \[58\]](#) and [Abdeljawad, et al. \[59\]](#) who specify the occurrence of SOA for the Shariah-tagged firms.

6. CONCLUSION

The capital structure determinants for whole Shariah-tagged firms that are operational in dissimilar nations are still not identified. Thus, this empirical inquiry is an effort to recognize core capital structure determinants that are identical for whole Shariah-tagged firms that are operational in dissimilar contexts. For this purpose, 321 firms that are operational in Saudi Arabia, Pakistan, the UAE, and Indonesia's financial data are evaluated by executing a robust estimator, i.e., GMM. The results from two different capital structure measures show that the most important factors for all Shariah firms are their tangible assets, their ability to make money, their GDP, and inflation. Besides, the positively significant lagged variables of dependent variables designate the presence of adjustment speed and targeted capital structure. Precisely, the positive significant tangibility and the presence of

adjustment speed elucidate the existence of the Dynamic Trade-Off theory. The results clarify fresh knowledge for whole Shariah-tagged firms and policymakers that assist them in developing an ideal strategy for the formulation of an optimum capital structure.

The main constraint of capital structure-related investigations is the approachability of financial data [60]. Also, due to the unapproachability of required data for several nominated determinants, this investigation is restricted to 321 firm sample sets and seven independent variables. Therefore, future investigators may include more countries' Shariah-tagged firms in the data sample set. Likewise, some other core capital structure measures such as market-to-book leverage and other explanatory variables like return on assets should be added to this study-constructed framework to identify more significant determinants.

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