# The Role of Financial Constraints in Shaping Capital Structure Decisions: Evidence from GCC Firms

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## Abstract:

This paper analyzes the dynamics of capital structure decisions across GCC-listed non-financial firms using a non-linear framework from 2012 to 2020. This research uses a dynamic non-linear model, and the two-step system generalized method of moments technique (SYS-GMM) to analyze the financing decisions of financially constrained firms in comparison to those of non-financially constrained firms. Our findings indicate that firms experiencing financial constraints embrace a different approach to capital structure compared to unconstrained firms. Financial constraints significantly affect the dynamics of capital structure, particularly in relation to profitability and growth opportunities. Specifically, less financially constrained firms—

specifically those with low growth opportunities—experience lower financing costs compared to firms with contrasting characteristics. In contrast, regarding profitability as a moderator variable, it is observed that low profitable firms, characterized by significant financial constraints, incur lower financing costs than their more profitable counterparts.

**Keywords:** Capital structure, Financial Constraints, Emerging market, Dynamic panel non-linear model

## 1. Introduction

In accordance with Modigliani and Miller's (1958) irrelevance proposition, extensive research has examined firms' capital structure from both theoretical and empirical perspectives. Various factors, including taxes, asymmetric information, bankruptcy costs, and transaction costs, influence financing decisions, thereby undermining the irrelevance proposition**.** However, the dynamic nature and non-linearity of capital structure decisions have been examined in a limited number of studies thus far.

In a dynamic framework, the appropriate financing decision typically depends on the financing margin that the firm expects for the following period. Some firms plan to disburse funds, whereas others expect to raise funds; furthermore, companies may undertake a combination of these activities (Frank and Goyal, 2007).

Additionally, the selection of capital structure differs over time and among different firms (Korajczyk and Levy, 2003).

This study aims to investigate the role of financial constraints in a dynamic framework in shaping capital structure decisions. It focuses on emerging economies, particularly the Gulf Cooperation Council (GCC) countries, as these constraints can lead to cross-sectional variation in firm behavior. Firms experiencing financial constraints select their capital structure differently than those without such limitations (Korajczyk and Levy, 2003; Dang et al., 2012,2014).

More specifically, it explores the impact of firm-specific variables, particularly the degree to which firms are financially constrained, on the relationship between capital structure decisions and their determinants in GCC countries. Does this influence manifest similarly to that observed in developed countries? This study analyzes the determinants of capital structure across two stages. The initial phase of the study investigates the impact of firm-specific and macroeconomic factors on capital structure. It subsequently analyzes the moderating effect of the degree of financial constraints on these factors.

This study utilizes a sample of six countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates to examine the moderating effect of financial constraints on the capital structure determinants. The sample

includes 244 publicly listed non-financial firms from six countries, spanning the years 2012 to 2020, yielding a total of 2,196 annual observations.

The rest of the paper is organized as follows: Section 2 offers a comprehensive review of the literature and the development of hypotheses. Section 3 outlines the methodology. Then, the study presents the test results in Section 4 and the conclusion in Section 5.

## 2. Literature review and hypotheses development

Numerous theories have developed in recent years to elucidate the factors influencing a firm's capital structure. These theories suggest that firms establish capital structure patterns by evaluating the costs and benefits of debt and equity financing (Sofat and Singh, 2017). The modern capital structure theory was proposed by Modigliani and Miller in 1958, highlighting that a firm's value remains unaffected by its capital structure and that the average cost of capital is not influenced by it.

Following the Modigliani and Miller proposition, several theories and models of corporate capital structure have developed, including trade-off theory, pecking order theory, agency theory, market timing theory, and signaling theory, to examine the factors influencing corporate capital structure (Byoun, 2008; Eldomiaty and Azim, 2008; Faulkender et al., 2012; Sofat and Singh, 2017; Fernando et al., 2021).

The trade-off theory, as articulated by Kraus and Litzenberger (1973) and Myers (1984), asserts that a corporation determines its optimal capital structure by balancing the tax benefits of debt with the associated bankruptcy costs, a claim substantiated by empirical research (Frank and Goyal, 2007; Baker and Martin, 2011; Dang et al., 2012, 2014).

The pecking order theory, as proposed by Myers (1977, 1984) and further developed with Majluf (1984), is based on the premise of asymmetric information between managers and investors. The pecking order theory posits that firms prioritize internal financing, followed by debt, and regard external equity as a last option (Frank and Goyal, 2007).

Agency costs occur when managerial decisions diverge from shareholder interests, potentially resulting in the disregard of creditor interests (Frank and Goyal, 2007). Certain agency theories suggest that decreasing debt levels can mitigate agency costs between debt providers and shareholders. In instances where an investment generates substantial returns, equity holders receive the majority of the benefits. In the event of investment failure, the repercussions are incurred by debt holders. Jensen and Meckling (1976) termed this phenomenon the "asset substitution effect." Debt holders can accurately predict the future decisions of equity holders. This results in a decrease in debt value and diminishes the motivation to issue debt.

Myers (1977) noted that firms facing bankruptcy risk due to elevated debt levels may discourage equity holders from investing in projects that enhance value. The investors will incur the full cost of the investment, while the returns may predominantly benefit the debt holders. Myers (1977) defines this phenomenon as the "debt overhang effect." This reduces the motivation to issue debt as well.

Conversely, the incorporation of debt financing may diminish agency costs between managers and shareholders, prompting certain agency theories to support higher levels of debt. Jensen (1986) posited that debt enhances managerial accountability in the presence of entrenched interests. Research indicates that companies utilize debt issuance as a mechanism to regulate managerial behavior by limiting the access to free cash for personal expenditures.

Baker and Wurgler (2002) posited that a firm's capital structure indicates its capacity to sell equity shares that are overvalued. It was observed that share prices vary in relation to their "true" values, with managers exhibiting a higher propensity to issue shares when the firm's market value is high. The signaling model posits that corporate financing decisions are primarily intended to convey managers' confidence in the firm's future prospects, in contrast to market timing (Barclay and Smith, 2005). Ross (1977) argued that firms with higher levels of debt

are perceived as being of greater quality than those with lower levels of debt. Companies with consistent earnings can effectively meet their interest obligations on time

### *2.1 Hypotheses development*

This research extends recent studies examining the role of financial constraints on the dynamics of capital structure (e.g., Dang, 2011; Elsas and Florysiak, 2011; Dang et al., 2012, 2014). Firms with financial constraints encounter elevated costs in meeting their financing requirements, resulting in infrequent access to external capital markets (Dang et al., 2012). Therefore, building on the work of Dang et al. (2012, 2014) and Belkhir et al. (2016), this study investigates the degree to which financial constraints influence the determinants of capital structure. Hence, this study hypothesizes that:

H1: Financially unconstrainted firms strengthen the relationship between capital structure decisions and their determinants.

Dang et al. (2014) identified that financially constrained firms are characterized by small size, low profitability, substantial growth opportunities, high earnings volatility, and significant investment. The study utilized firm size, profitability, growth opportunities, investment, and earnings volatility as proxies for the financial constraints' moderator variable.

### 2.1.1 Size

Large firms generally have better access to external financing sources than small firms, as they face asymmetric information and agency problems to a lesser degree (Drobetz et al., 2006). Such entities generally demonstrate higher maturity, marked by increased asset tangibility and profitability, leading to lower costs related to capital structure decisions (Dang, 2011). This study hypothesizes a stronger relationship between capital structure and its determinants among large firms.

*H1.1: Large firms strengthen the relationship between capital structure decisions and their determinants.*

### 2.1.2 Profitability

Profitable firms generally maintain retained earnings, thereby decreasing the probability of encountering substantial internal financial constraints. This situation often results in enhanced financial flexibility, allowing them to issue securities at a reduced cost. Additionally, these firms have a motivation to employ debt interest tax shields and mitigate the asset substitution effect, especially when they are under-levered (Dang et al., 2012, 2014). This study hypothesizes a stronger relationship between capital structure and its determinants among profitable firms.

*H1.2: Profitable firms strengthen the relationship between capital structure decisions and their determinants.*

### 2.1.3 Growth opportunities

Companies with substantial growth potential are often in their growing phases, characterized by low profitability and limited retained earnings. This requires them to rely on external financing, which incurs higher costs for investment activities (Drobetz et al., 2006; Dang et al., 2014). This study hypothesizes a stronger relationship between capital structure and its determinants among firms with low growth opportunities.

*H1.3: Low growth firms strengthen the relationship between capital structure decisions and their determinants.*

### 2.1.4 Earnings volatility

Firms with significant earnings volatility frequently face borrowing constraints due to the risk of inadequate earnings to meet debt obligations (Antoniou et al., 2008; Dang et al., 2012). Restricted access to external capital markets is anticipated to result in increased costs for these firms in fulfilling their financing needs.

This study hypothesizes a stronger relationship between capital structure and its determinants among firms with low earnings volatility.

*H1.4: Low earnings volatility firms strengthen the relationship between capital structure decisions and their determinants.*

### 2.1.5 Investment

Corporate capital expenditures significantly influence financing decisions (Lang et al., 1996) and are primarily financed through internally generated cash flow (Myers, 1984). Their dependence on internal funds for investment purposes results in limited access to external capital markets, and when they do access these markets, they incur high financing costs because of their infrequent visits (Dang et al., 2012, 2014). This study hypothesizes a stronger relationship between capital structure and its determinants among firms with low investments.

*H1.5: Low investment firms strengthen the relationship between capital structure decisions and their determinants.*

## 3. Methodology

### *3.1 Data*

This research employs secondary data for firm-specific factors. Table 1 summarizes the research variables and Figure 1 presents the theoretical framework of this study. The firm-specific attributes are sourced from the Thompson Reuters Datastream financial database, focusing on non-financial corporations listed on the stock exchanges of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. macroeconomic variables are sourced from the International

Monetary Fund. Data for the research variables were collected from 2012 to 2020.

**Table 1:** Variables definition

| Variable | Description | Source |
|---|---|---|
| Total leverage ratio (LEV) | Total liabilities to total assets | Datastream |
| Size (SIZ) | Logarithm of total assets | Datastream |
| Profitability (PRF) | Operating income to total assets | Datastream |
| Growth opportunities (GTH) | Market capitalization to total assets | Datastream |
| Investment (INV) | net capital expenditures to fixed assets | Datastream |
| Earnings Volatility (EAV) | the standard deviation of historical earnings before interest, taxes, depreciation, and amortization over a three-year period, scaled by the total book value of assets | Datastream, authors' calcutions |
| Asset tangibility (TNG) | Net fixed assets to total assets | Datastream |
| Liquidity (LQ) | Current assets to current liabilities | Datastream |
| Inflation (IN) | Annual percentage change in consumer price index | International Monetary Fund |
| GDP per capita (GDP) | Growth rate of real GDP | International Monetary Fund |

**Figure 1:** Theoretical Framework

### *3.2 Model specifications*

This section presents the econometric model specifications designed to test the predictions of the dynamic capital structure model.

#### 3.2.1 Linear dynamic capital structure model

The study adheres to recent empirical literature (e.g. Belkhir et al., 2016), and utilizes the dynamic model as follows:

$$LEV_{it} = \beta LEV_{i,t-1} + \alpha X_{i,t} + \nu_{i,t}, \ \nu_{i,t} = \mu_i + e_{it} \quad (1)$$

$LEV_{it}$ and $LEV_{it-1}$ denote actual total leverage ratios for firm i at time t and t-1, respectively. Where $x_{it}$ is a vector of the firm-specific and macro-economic determinants of capital structure decisions, β and α are vectors of the corresponding coefficients. $v_{it}$ is an error component such that $v_{it} = \mu_i + e_{it}$, where $\mu_i$ is the unobserved firm fixed effects, $e_{it}$ is the idiosyncratic error term.

Building on prior studies (Flannery and Rangan, 2006; Byoun, 2008; Faulkender et al., 2012; Belkhir et al., 2016), this research will incorporate the primary determinants of capital structure. These determinants are lagged leverage ratio and ($x_{it}$) that includes asset tangibility, liquidity, inflation rate, and GDP.

#### 3.2.2 Non-linear dynamic capital structure model

The linear dynamic model (1) asserts that capital structure decisions exhibit symmetry. However, this assumption is impractical, as firms do not make financing decisions uniformly. Consequently, consistent with Dang et al. (2012), the study employs the following

threshold dynamic model to address differences in capital structure decisions based on financial constraints argument:

$$LEV_{i,t} = (\beta_1 LEV_{i,t-1} + \alpha_1 X_{i,t})\, 1_{\{kit \le w\}} + (\beta_2 LEV_{i,t-1} + \alpha_2 X_{i,t})\, 1_{\{kit > w\}} + \nu_{i,t},\ \nu_{i,t} = \mu_i + e_{it} \quad (2)$$

Where $1(\cdot)$ is an indicator function used to divide firms into two categories, conditional on the moderator variable, $q_{it}$. Firms are classified into the low category when $k_{it} \le w$ and into the high category when $k_{it} > w$, with w representing the threshold parameter. The threshold value is estimated within the model using Hansen's (2000) approach.

## 4. Empirical results and discussion

### *4.1 Results for the linear dynamic model*

Table 2 presents the regression outcomes for the linear dynamic model of capital structure, as specified in Model (1), for the GCC firms. All coefficient estimates are derived using the two-step SYS-GMM estimator developed by Blundell and Bond (1998). The Sargan test for valid instruments and the AR (2) test for the lack of second-order serial correlation are not rejected at standard significance levels. The findings demonstrate that lagged leverage and liquidity significantly influence capital structure decisions at the 1% significance level, whereas asset tangibility has a significant effect at the 5% significance level. Inflation and GDP per capita do not significantly affect capital structure decisions for firms in the GCC.

A positive relationship exists between asset tangibility and leverage ratio, aligning with trade-off and agency cost models. Firms exhibiting high levels of asset tangibility experience

reduced expected bankruptcy costs, thereby increasing lenders' propensity to provide debt financing (Belkhir et al., 2016). Tangible assets also mitigate agency costs of debt by inhibiting shareholders from replacing low-risk investments with high-risk alternatives (Frank and Goyal, 2009). Additionally, a negative correlation exists between firm liquidity and leverage ratio, aligning with the pecking order model. A higher level of liquid assets indicates reduced information asymmetry, thereby enhancing the willingness to raise equity instead of debt.

**Table 2: Regression result for the dynamic linear model for GCC firms**

| | **GCC** |
|---|---|
| LEV(t-1) | 0.274*** |
| | (0.0277) |
| TNG | 1.268** |
| | (1.061) |
| LQ | -3.823*** |
| | (0.759) |
| IN | -0.0302* |
| | (0.0166) |
| GDP | 0.0180 |
| | (0.0699) |
| Constant | 2.427* |
| | (1.418) |
| Sargan test [p-value] | 438.3[0.986] |
| AR (2) test [p-value] | -1.026[0.305] |
| Observations | 1952 |
| Number of firms | 244 |

All models are estimated using the two-step SYS-GMM method. The Sargan test evaluates the null hypothesis of valid instruments and follows an asymptotic $\chi 2$ distribution under this

null hypothesis. The AR (2) test evaluates second-order serial correlation and is asymptotically distributed as N (0,1) under the null hypothesis of no serial correlation. ***, **, and * denote the significance of the coefficients at the 1%, 5%, and 10% levels, respectively. Values in (·) represent the standard errors of the coefficients, while those in [·] indicate the p-values of the test statistics. All analyses are conducted using Stata 17. Refer to Table 1 for definitions of the variables.

### *4.2 Results for the non-linear dynamic model*

Tables 3 and 4 display the regression results of the dynamic model (2) for the financial constraints moderator variable. This variable is proxied by size, profitability, growth opportunities, investment, and earnings volatility. All coefficient estimates were derived using the two-step SYS-GMM estimator. The empirical analysis presented below indicates that the Sargan and AR (2) tests cannot be rejected at the 5% significance level, implying that all SYS-GMM regressions employ valid instruments.

### 4.2.1 Size

The results indicate that companies in both categories exhibit a significant influence of the leverage ratio from year t-1 on the capital structure decision in year t, with coefficients exceeding those derived from the linear model (refer to Table 2). This illustrates the significance of considering that the relationship between capital structure and its determinants is non-linear. Firms in the lowest category demonstrate a markedly higher coefficient than those with differing characteristics, thereby supporting the research hypothesis and existing empirical evidence (Dang et al., 2014; Belkhir et al., 2016). On the contrary, there is no statistically significant difference between the two categories.

**Table 3: Regression results for the dynamic model conditional on financial constraints for GCC firms**

| Book Leverage | Size | | | Profitability | | | Growth opportunities | | |
|---|---|---|---|---|---|---|---|---|---|
| | Low | High | Difference | Low | High | Difference | Low | High | Difference |
| | | | | | | | | | |
| LEV(t-1) | 0.422** | 0.396*** | 0.026 | 0.460*** | 0.436*** | 0.024*** | 0.223*** | 0.214*** | 0.009*** |
| | (0.22652) | (0.01836) | | (0.01846) | (0.02394) | | (0.05116) | (0.01758) | |
| TNG | -0.019 | 0.012 | -0.031 | -0.01 | -0.062*** | 0.052** | 0.033 | -0.004*** | 0.033** |
| | (0.09465) | (0.01833) | | (0.01799) | (0.02337) | | (0.05659) | (0.01796) | |
| LQ | 0.027 | 0.030** | -0.003 | 0.021 | 0.074*** | -0.053** | -0.009 | 0.042*** | -0.052** |
| | (0.12111) | (0.01733) | | (0.01763) | (0.01999) | | (0.03608) | (0.01732) | |
| IN | 0.0159 | 0.0153 | 0.0006 | 0.0164 | 0.0119 | 0.005 | 0.0159 | 0.0162 | -0.003 |
| | (0.0175) | (0.0167) | | (0.0167) | (0.01682) | | (0.01696) | (0.01669) | |
| GDP | 0.017 | 0.015 | 0.002 | 0.016 | 0.012 | 0.004 | 0.027 | 0.017 | 0.010 |
| | (0.01949) | (0.01676) | | (0.01676) | (0.01705) | | (0.01802) | (0.01676) | |
| Constant | 0.102 | 0.004 | | 0.094*** | -0.038 | | 0.094*** | -0.038 | |
| | (0.09654) | (0.01932) | | (0.01966) | (0.02744) | | (0.01966) | (0.02744) | |
| Threshold value (coverage) | 8.912(5.8%) | | | 0.185 (87.7%) | | | 0.115(7.3%) | | |
| 95% confidence interval | [8.89,12.156] | | | [0.178, 0.205] | | | [0.0965,0.1298] | | |
| threshold Test | 20.34[0.112] | | | 22.90(0.0130) | | | 165.8[0.001] | | |
| Sargan test [p-value] | 11.32[0.9] | | | 97.57[0.91] | | | 348.64[0.27] | | |
| AR2 test [p-value] | 0.26[0.75] | | | 1.41[0.13] | | | 1.12[0.22] | | |
| Observations | 116 | 1,836 | | 1,696 | 256 | | 260 | 1692 | |

All models are calculated using the two-step SYS-GMM estimator. The threshold value is determined via a grid search within the range of the 5th to 95th percentiles of the moderator variable. The threshold parameter estimate's confidence interval is derived using Hansen's (1999) methodology. The threshold test operates under the null hypothesis of no threshold effect, with its p-value assessed through a bootstrap-based procedure. The Sargan test evaluates the null hypothesis of valid instruments and follows an asymptotic $\chi 2$ distribution under this null hypothesis. The AR (2) test assesses second-order serial correlation and is

asymptotically distributed as N (0,1) under the null hypothesis of no serial correlation. The Column Difference denotes the Wald test statistics, with its p-value assessed through the bootstrap method, assuming no statistical difference exists between the two categories. ***, **, and * denote the significance of the coefficients at the 1%, 5%, and 10% levels, respectively. Values in (·) represent the standard errors of the coefficients, while those in [·] indicate the p-values of the statistics.

Regarding the remaining determinants, contingent upon size, they don't have a significant effect on the capital structure decision, except for liquidity in the high regime. Further, there is no statistically significant difference between the two categories for all the determinants.

Overall, the bootstrap-based threshold test does not reject the null hypothesis of no threshold effect at the 5% significance level. The firm size variable does not moderate the relationship between the factors influencing capital structure decisions and the decisions made. Consequently, H1.1 is rejected.

**4.2.2 Profitability**

The findings demonstrate that firms in both classifications show a substantial impact of the leverage ratio from year t-1 on the capital structure decision in year t, with coefficients surpassing those obtained from the linear model (see Table 2). Further, a statistical difference appears to exist between the two groups. However, this contradicts the financial constraints

hypothesis and empirical findings (e.g., Dang et al., 2011; Faulkender et al., 2012; Dang et al., 2012, 2014), as more constrained firms (i.e., low-profit firms) exhibit higher coefficients than their profitable counterparts. These findings may stem from the fact that low-profit firms, typically marked by greater potential opportunities for growth and significant investment needs, necessitate increased external finance.

Regarding the remaining determinants, contingent upon profitability, it seems that there exists just a significant effect of asset tangibility and liquidity determinants on the capital structure decisions in the high category. Further, a statistical difference appears to exist between the two groups for asset tangibility and liquidity determinants. Overall, the bootstrap-based threshold test indicates that the null hypothesis of linear behavior across two categories of firms with varying profitability levels is rejected at the 5% significance level, suggesting the existence of a threshold effect contingent on firms' profitability. In other words, a firm's level of profitability moderates the relationship between the factors influencing capital structure decisions and the decisions made. Therefore, H1.2 is accepted.

**4.2.3 Growth opportunities**

The results indicate that companies in both categories exhibit a significant influence of the leverage ratio from year t-1 on the capital structure decision in year t, with coefficients surprisingly lower

than those derived from the linear model (see Table 2). Further, a statistical difference appears to exist between the two groups.

This finding aligns with the argument regarding financial constraints, indicating that less constrained firms, specifically those with low-growth opportunities, demonstrate higher coefficients compared to firms with high-growth opportunities.

Conversely, these findings contradict the assertion that firms with substantial growth potential are generally in their growing phases, marked by low profitability and limited retained earnings, which require dependence on external financing for investment activities, as evidenced by Faulkender et al. (2012) and Dang et al. (2012, 2014). Concerning the remaining determinants, dependent on growth opportunities, there appears to be a significant influence of asset tangibility and liquidity on capital structure decisions in the high category. Moreover, a statistical difference exists between the two groups regarding asset tangibility and liquidity determinants.

Taken altogether, the bootstrap-based threshold test reveals that the null hypothesis of uniform behavior between two categories of firms with differing growth opportunities levels is rejected at the 1% significance level, indicating a threshold effect dependent on firms' growth opportunities. In other words, the growth opportunities level of a firm influences the relationship between the factors affecting capital structure decisions and the resulting decisions themselves. Consequently, H1.3 is accepted.

### 4.2.4 Earnings volatility

The results indicate that companies in both categories exhibit a significant influence of the leverage ratio from year t-1 on the capital structure decision in year t, with coefficients exceeding those derived from the linear model (see Table 2). This emphasizes the importance of analyzing the non-linear relationship between capital structure decisions and their determinants. A statistical difference exists between the two groups.

Firms classified as having low earnings volatility exhibit a significantly higher coefficient compared to those with high earnings volatility, thereby confirming the financial constraints hypothesis and proving the empirical findings of Dang et al. (2012, 2014).

**Table 4: Regression results for the dynamic model conditional on financial constraints for GCC firms**

| Book Leverage | Earnings Volatility | | | Investment | | |
|---|---|---|---|---|---|---|
| | Low | High | Difference | Low | High | Difference |
| | | | | | | |
| LEV(t-1) | 0.435*** | 0.374*** | 0.061*** | 0.448*** | 0.351*** | 0.098*** |
| | (0.0194) | (0.01736) | | (0.01769) | (0.01817) | |
| TNG | 0.033** | -0.0431*** | 0.076*** | -0.036** | 0.0092 | -0.045** |
| | (0.01777) | (0.01776) | | (0.01819) | (0.01839) | |
| LQ | 0.031** | 0.047*** | -0.016 | 0.026 | 0.041*** | -0.016 |
| | (0.01768) | (0.01702) | | (0.01753) | (0.01735) | |
| IN | 0.0165 | 0.0148 | 0.0017 | 0.0169 | 0.0152 | 0.0017 |
| | (0.0167) | (0.01668) | | (0.01668) | (0.0167) | |
| GDP | 0.016 | 0.012 | 0.004 | 0.015 | 0.014 | 0.001 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (0.01675) | (0.01672) | | (0.01672) | (0.01677) | |
| Constant | 0.039*** | 0.103*** | | 0.017 | 0.121*** | |
| | (0.01351) | (0.01193) | | (0.01853) | (0.01951) | |
| Threshold value (coverage) | 0.0218(65.9%) | | | -0.0771 (19.1%) | | |
| 95% confidence interval | [0.0205,0.0225] | | | [-0.0798, -0.0758] | | |
| threshold Test | 2.77[0.95] | | | 0.062 [0.761] | | |
| Sargan test [p-value] | 350.69[0.3] | | | 368.92[0.12] | | |
| AR2 test [p-value] | 1.6[0.1] | | | 1.21[0.24] | | |
| Observations | 1,274 | 678 | | 358 | 1594 | |

All models are calculated using the two-step SYS-GMM estimator. The threshold value is determined via a grid search within the range of the 5th to 95th percentiles of the moderator variable. The threshold parameter estimate's confidence interval is derived using Hansen's (1999) methodology. The threshold test operates under the null hypothesis of no threshold effect, with its p-value assessed through a bootstrap-based procedure. The Sargan test evaluates the null hypothesis of valid instruments and follows an asymptotic $\chi 2$ distribution under this null hypothesis. The AR (2) test assesses second-order serial correlation and is asymptotically distributed as N (0,1) under the null hypothesis of no serial correlation. The Column Difference denotes the Wald test statistics, with its p-value assessed through the bootstrap method, assuming no statistical difference exists between the two categories. ***, **, and * denote the significance of the coefficients at the 1%, 5%, and 10% levels, respectively. Values

in (·) represent the standard errors of the coefficients, while those in [·] indicate the p-values of the statistics.

Concerning the remaining determinants, dependent on earnings volatility, there appears to be a significant influence of asset tangibility and liquidity on capital structure decisions in both categories. A statistical difference exists between the two groups regarding asset tangibility. Overall, the bootstrap-based threshold test fails to reject the null hypothesis of no threshold effect at the 5% significance level. Accordingly, the variable of earning volatility does not moderate the relationship between the factors that influence capital structure decisions, and the corresponding decisions made. As a result, H1.4 is rejected.

**4.2.5 Investment**

The findings demonstrate that firms in both categories show a notable impact of the leverage ratio from year t-1 on the capital structure decision in year t, with coefficients exceeding those obtained from the linear model (refer to Table 2). A statistical difference exists between the two groups. This emphasizes the importance of analyzing the non-linear relationship between capital structure decisions and their determinants. This finding supports the argument concerning financial constraints, suggesting that firms with fewer constraints, particularly those with low investments, exhibit higher coefficients than firms with high investments. On the contrary, this finding contradicts empirical evidence provided by Dang et al. (2014).

The remaining determinants, dependent on investment, indicate that asset tangibility significantly affects capital structure decisions in the low category, while liquidity has a crucial role in the high category. A statistical difference is present between the two groups concerning asset tangibility. Overall, the bootstrap-based threshold test does not reject the null hypothesis of no threshold effect at the 5% significance level. Thus, the investment variable does not moderate the relationship between the factors influencing capital structure decisions and the decisions made. Consequently, H1.5 is rejected.

## 5. Conclusion

This study investigates the role of firm-specific variables, specifically financial constraints, in shaping the relationship between capital structure decisions and their determinants. Initially, we examined the relationship between firm-specific determinants—such as asset tangibility and liquidity—and macro-specific determinants, including inflation and GDP per capita, in relation to leverage, as suggested by prominent capital structure theories. Then, we examine the significance of the extent to which firms are financially constrained in capital structure decisions.

The research identified strong correlations between lagged leverage ratio, asset tangibility, and liquidity with capital structure decisions, aligning with trade-off, agency costs, and pecking order theories, as well as previous studies conducted on firms in various countries and regions. In analyzing the non-linearity of capital

structure decisions via firm-specific variables, it appears that profitability and growth opportunities are the only variables that moderate the relationship between capital structure and its determinants, while financial constraints are represented by size, profitability, growth opportunities, earnings volatility, and investment.

Numerous opportunities exist for further research. For example, it would be pertinent to examine how the extent to which firms are financially constrained affects both the magnitude of debt within the capital structure and the maturity profile of the debt selected by firms. Moreover, it would be interesting to examine the dynamics of firms' capital structure selection based on institutional quality and financing needs. Furthermore, future research may employ the same tested variables across two separate time periods, such as an event study analyzing the intervals preceding and following the global financial crisis (2007-2008).

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