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Optimal Capital Structure and Firm Performance in the Textile Sector of Pakistan

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Abstract
The study explores the critical role of capital structure decisions in shaping firm performance, with a particular focus on the textile sector of Pakistan. Recognizing the importance of achieving an optimal mix of debt and equity to maximize shareholder wealth and ensure long-term sustainability, the research investigates the threshold effects of leverage on firm value and identifies the optimal debt ratio for textile firms. Employing panel threshold regression analysis, the study examines data spanning from 2007 to 2022, with key control variables including the growth rate of operating sales, firm size, and market value of book value. This comprehensive approach allows for a nuanced understanding of the relationship between leverage and firm value, considering both linear and non-linear effects. The findings reveal that firms in the textile sector of Pakistan can enhance their value by strategically utilizing debt financing, thus supporting the tenets of the trade-off theory. Importantly, the presence of an optimal debt ratio suggests that firms can achieve maximum value by striking a balance between debt and equity financing. Moreover, the study highlights the significance of differentiating between short-term and long-term debt in determining the optimal capital structure. The low target debt ratio observed for short-term debt underscores the textile sector's reliance on short-term loans, potentially due to the industry's cyclical nature and fluctuating capital requirements. Based on these findings, the study offers practical recommendations for textile firms, advising them to maintain their debt ratios within the identified target range. By adhering to the optimal debt ratio, firms can capitalize on the benefits of the interest tax shield while minimizing the risks associated with excessive leverage. This research contributes to the ongoing discourse on capital structure decisions and firm performance, particularly within the context of the textile sector in Pakistan. By providing empirical evidence of the threshold effects of leverage on firm value and identifying optimal debt ratios, the study offers valuable insights for textile firms seeking to enhance their financial sustainability and maximize shareholder wealth in a dynamic and competitive market environment.
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1. INTRODUCTION

The composition of a company's capital structure is indeed a critical factor influencing its performance and long-term profitability. This structure represents the various sources of finance a firm utilizes to fund its operations and growth initiatives. As outlined Modigliani & Miller, 1958 capital structure encompasses a spectrum of financing options, spanning from debt to equity instruments. Achieving an optimal capital structure involves striking a balance between debt and equity financing that maximizes shareholder value while minimizing financial risk (Aremu et al., 2013; Chang, 1992; Ju et al., 2005; Akeem et al., 2014). Debt financing offers the advantage of tax-deductible interest payments and can provide access to additional funds without diluting ownership. However, excessive reliance on debt can increase financial leverage and interest expenses, potentially heightening the firm's vulnerability to economic downturns or fluctuations in interest rates. On the other hand, equity financing entails issuing shares of ownership in the company, thereby distributing ownership among shareholders (Margaritis and Psillaki, 2010; McConnell and Servaes, 1995; Holderness and Sheehan, 1988; Brennan and Franks, 1997; Connelly et al., 2010). While equity financing does not require regular interest payments and can enhance the company's financial flexibility, it may dilute existing shareholders' ownership and could involve higher costs of capital compared to debt financing. Finding the optimal mix of debt and equity that aligns with the company's risk tolerance, growth objectives, and financial health is essential. This optimal capital structure may vary depending on factors such as industry dynamics, market conditions, and the company's stage of growth. Moreover, maintaining flexibility in the capital structure allows companies to adapt to changing circumstances and seize growth opportunities as they arise.

The composition of a company's capital structure plays a pivotal role in determining its financial stability, cost of capital, and ability to pursue growth initiatives (La Rocca et al., 2011; Bhaird and Lucey, 2010; Psillaki and Daskalakis

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2009; Okiro, 2014; Nurdiniah, 2021). Striking the right balance between debt and equity financing is crucial for ensuring long-term sustainability and maximizing shareholder value. The significance of capital structure decisions has been underscored by various capital structure theories, each offering unique perspectives on the relationship between leverage and firm value. These theories, coupled with empirical studies examining the impact of leverage on firm value, have provided financial managers with valuable insights into the role of financing decisions in profit maximization. It's imperative for financial managers to exercise caution when contemplating adding debt to their capital structure, as these decisions not only reflect the quality of the company's financial strategy but also signal its performance in the market (Agarwal, 2013; Hillier et al., 2019; Bhalla, 2004; Xu, 2023; Stewart, 2013). Efforts to identify an optimal capital structure, one that maximizes value while minimizing costs, are central to corporate finance management. Excessive reliance on debt can erode firm value and, consequently, shareholders' wealth. Hence, companies endeavor to strike a balance that aligns with their strategic objectives and risk tolerance. Determining the optimal debt level allows companies to unlock value and enhance performance by moving towards a target debt ratio. However, it's crucial to recognize that performance improvements can be achieved by employing debt within a targeted limit, rather than pursuing an absolute optimal level, as proposed by various studies (Chowdhury & Chowdhury, 2010; Wet, 2006).

Literature has provided varying insights into the relationship between leverage and company performance across different countries, employing traditional linear models. Studies such as those by Fama and French (2002), Onaolapo et al., (2015) Javed and Akhtar (2012), Nour-Eldin (2012), Akhtar et al. (2012), and Mumtaz et al. (2013) have explored this relationship, yielding mixed results—some reporting positive correlations, others negative, and some finding no significant relationship. These studies have predominantly supported the linear behavior of debt, suggesting that different levels of debt have similar effects on performance, whether positive, negative, or negligible. However, this oversimplified view does not capture the complexities of the relationship between leverage and performance. According to the Trade-off theory, debt can enhance firm value up to a certain threshold, beyond which the benefits of additional debt are outweighed by the increased financial distress costs and reduced flexibility. Debt exhibits different behaviors depending on its utilization within the capital structure, necessitating firms to identify the optimal debt level that maximizes value. This optimal debt ratio represents the balance between the benefits of debt, such as interest tax shields, and the costs associated with financial distress and reduced flexibility. Studies conducted by Nieh et al. (2008), Cheng et al. (2010), Lin and Chang (2011), Cuong and Canh (2012), and Ahmad and Abdullah (2013) have shed light on the presence of an optimal debt level, in line with the Trade-off theory of debt. These studies have utilized threshold panel regression techniques to examine the non-linear relationship between leverage and firm value, revealing that excessive or insufficient levels of debt can have detrimental effects on firm performance.

In the context of Pakistan, research has focused on exploring the determinants of capital structure and examining the relationship between leverage and firm performance (Khan, 2012; Shah and Khan, 2007; Ahsan et al., 2016; Khan et al., 2020; Muhammad et al., 2021). However, the exploration of optimal capital structure determination remains largely unexplored, presenting an avenue for further investigation and analysis. The textile sector holds significant importance within the Pakistani economy, contributing substantially to employment, exports, and GDP. As one of Asia's largest exporters, the textile industry serves as a crucial pillar supporting Pakistan's economic framework. Given its substantial production and export targets, the textile industry operates with moderate capital intensity, relying extensively on external financing, particularly debt, as a core element of its capital structure (Lee and habte-Giorgis, 2004; Chor and Manova, 2012; Abor, 2007; Wade, 2018). Given the capital-intensive nature of the textile sector, decisions regarding capital structure play a pivotal role in shaping performance outcomes. Financial managers within this industry must exercise careful deliberation when determining the composition of their capital structure, as these decisions directly impact the sector's overall financial health and competitive positioning. Therefore, this study seeks to investigate the presence of an optimal debt level specifically tailored to firms operating within Pakistan's textile sector. Through this analysis, we aim to provide valuable insights into the capital structure dynamics of the textile industry, facilitating informed decision-making and strategic planning among industry stakeholders.

The textile industry in Pakistan holds significant importance in the nation's economy, contributing substantially to employment, exports, and GDP (Iqbal et al., 2010; Syed et al., 2012; Khaliji et al., 2013; Shah et al., 2014; Malik, 2010). As one of the largest exporters in Asia, the textile sector serves as a cornerstone of Pakistan's economic framework. Given its capital-intensive nature and reliance on external financing, particularly debt, the industry's capital structure decisions profoundly impact its performance. Financial managers within the sector must make strategic choices regarding their capital structure components to optimize their financial position. Understanding the target debt ratio specific to the textile industry can empower companies to tailor their capital structures effectively, leveraging debt financing to benefit from interest tax shields. Through employing panel threshold regression analysis, this study aims to uncover the threshold effects of debt on the value of textile firms in Pakistan. Building upon the methodology established by researchers such as Nieh et al. (2008), Cheng. et al. (2010), Lin and Chang (2011), Cuong and Canh (2012), and Ahmad and Abdullah (2013), the study seeks to identify the optimal debt ratio for textile firms. By addressing this gap in the literature on capital structure, the study endeavors to shed light on the significance of optimizing the debt ratio for enhancing the value of textile firms in Pakistan. Through empirical analysis and rigorous

investigation, it aims to provide valuable insights that can inform financial decision-making within the textile sector, ultimately contributing to the sector's growth and sustainability in the Pakistani economy.

2. THEORETICAL LINKS

Modigliani and Miller's groundbreaking work in 1958 introduced the concept of capital structure irrelevance, asserting that in perfect markets, the composition of a firm's capital structure is inconsequential for its value. However, with the introduction of taxes, they expanded their framework and proposed the value relevance theorem in 1963. This theorem posits that debt financing offers tax benefits through interest deductibility, thereby increasing the value of firms as the proportion of debt in their capital structure rises. The value relevance theorem underscored the critical role of financing decisions in shaping firm value, particularly in terms of performance metrics. By leveraging the interest tax shield provided by debt financing, firms can theoretically maximize their value by incorporating debt into their capital structure, even up to a 100% debt level, while disregarding bankruptcy costs. Miller (1977) expanded upon Modigliani and Miller (1963) framework by incorporating personal and corporate taxes into the analysis of capital structure decisions and firm value. He argued that the benefits derived from debt financing are often outweighed by the costs associated with debt, making it challenging for companies to achieve an optimal debt level. Additionally, Jensen and Meckling (1976) introduced the concept of agency costs associated with debt usage as an external funding source. They posited that firms can attain an optimal capital structure by striking a balance between the agency costs of debt and the benefits of interest tax shields. Myers (1977) contributed to capital structure theory by highlighting the presence of an optimal capital structure, taking into account the bankruptcy costs associated with debt. He suggested that firms may achieve this optimal structure by effectively managing the trade-off between costs (such as bankruptcy and agency costs) and benefits (like interest tax shields and the reduction of agency costs related to free cash flow). Building upon these foundational theories, the pecking order theory provided further insights into capital structure dynamics. Myers (1984) and Myers and Majluf (1984) introduced the pecking order theory, which outlines the sequence in which firms finance their assets. They emphasized the presence of information asymmetry between managers and shareholders, leading shareholders to infer managers' financing decisions. According to this theory, firms prioritize financing through the least risky sources, such as internally generated funds. When external funds are necessary, firms prefer debt over equity issuance due to its lower cost. Unlike traditional theories, the pecking order theory suggests that firms do not have a target debt ratio, primarily due to information asymmetry. Within the framework of pecking order theory, Jensen and Meckling (1976) and Jensen (1986) identified agency costs arising from the separation of ownership and control within firms. They delineated two types of agency costs resulting from information asymmetry between shareholders and managers: the agency cost of debt and the agency cost of equity. These costs highlight the challenges associated with aligning the interests of managers and shareholders, particularly in the context of capital structure decisions.

Debt serves as a mechanism to mitigate agency conflicts between bondholders and shareholders by limiting managers' discretion over free cash flow for investment decisions (Jensen, (1986) defines optimal capital structure as the point where value is maximized while minimizing the marginal cost of debt. However, the relationship between capital structure decisions and firm performance remains mixed, with theories reporting both positive and negative correlations. Empirical studies have been conducted to assess the impact of capital structure decisions on firm value. Ross (1977) observed a positive relationship between leverage and firm value, suggesting that debt issuance signals improved performance to the market. However, the influence of debt on firm value can vary, with debt sometimes enhancing firm value by addressing agency costs associated with managerial discretion (Stulz, 1990). Understanding the optimal capital structure is crucial for firms as it directly impacts their performance and value. Traditionally, the focus has been on linear relationships between leverage and firm value, with studies aiming to identify whether increasing debt levels enhance or diminish firm value. However, recent research has delved deeper into the non-linear dynamics of capital structure, recognizing that there may be an optimal level of debt beyond which further increases could be detrimental to firm value. These non-linear studies have introduced the concept of an optimal capital structure, where firms seek to strike a balance between the benefits and costs of debt financing. The trade-off theory, for instance, suggests that there exists an optimal level of debt that maximizes firm value by balancing the tax advantages of debt against the costs associated with financial distress and agency problems (Myers, 1984; Myers and Majluf, 1984; Jensen, 1986).

Moreover, the pecking order theory emphasizes the importance of information asymmetry in shaping firms' financing decisions, leading to a preference for internal financing followed by debt issuance over equity (Myers and Majluf, 1984). This theory suggests that firms may not have a target debt ratio but instead adjust their capital structure based on financing needs and available internal resources. By exploring the non-linear relationship between leverage and firm value, researchers aim to identify the optimal debt level for firms, beyond which further leverage may erode firm value. This understanding can guide financial managers in making informed capital structure decisions, ultimately contributing to the long-term sustainability and performance of firms. The studies conducted by Nieh et al. (2008), Cheng et al. (2010), Lin and Chang (2011), Cuong and Canh (2012), and Ahmad and Abdullah (2013) provide valuable insights into the threshold effects of leverage on firm value, supporting the notion of an optimal debt level for firms. These findings align with the Trade off theory, which posits that there exists a level of debt that maximizes firm value by balancing the benefits of debt financing against the associated costs. For example, Nieh et al. (2008) identified an optimal debt ratio

for electronic firms in Taiwan, reporting a range of 12.37% to 28.70% that increases firm value. Similarly, Cheng et al. (2010) observed a triple threshold effect of leverage on the value of firms in China, highlighting that debt usage above the optimal range does not contribute to value enhancement. Lin and Chang (2011) found that companies listed on the Taiwan stock exchange can increase their value by utilizing debt within an optimal range of 33.33%. Cuong and Canh (2012) explored the optimal capital structure for seafood processing enterprises in Vietnam, identifying double threshold effects of leverage on firm value. They concluded that debt usage above 59.27% negatively impacts firm value. Ahmad and Abdullah (2013) investigated Malaysian firms and suggested that debt usage below 64.33% is optimal for enhancing firm value.

These empirical studies underscore the importance of considering country-specific factors, such as tax rates, financial institutions, and risks, in determining optimal capital structure. They demonstrate how financing patterns may vary across countries and emphasize the need for firms to tailor their capital structure decisions to their specific operating environments. In previous studies investigating the relationship between leverage and firm value, various proxies have been employed to measure firm value, including accounting-based metrics such as return on assets (ROA) and return on equity (ROE), as well as market-based indicators like Tobin's Q and earnings per share (EPS). For this study, Tobin's Q has been selected as the market-based measure of firm value. This choice is supported by the research conducted by Khan (2012), Lin and Chang (2011), and Masidonda et al. (2013), which have demonstrated the effectiveness of Tobin's Q in capturing the overall market value of firms. Leverage is considered as the independent variable in this study, with the additional feature of being treated as a threshold variable (γ). By incorporating leverage as a threshold variable, this study aims to explore the nonlinear relationship between leverage and firm value, shedding light on the presence of optimal debt levels that maximize firm value. Threshold regression analysis, as utilized in studies such as those by Cheng et al. (2010), Cheng and Tzeng (2011), Cuong and Canh (2012), and Ahmad and Abdullah (2013), offers a nuanced understanding of the relationship between variables by acknowledging potential nonlinearities. In this approach, the threshold variable's coefficients ($\beta 1$, $\beta 2$, etc.) are not fixed but are contingent on the identified threshold value. By allowing for variations in the threshold variable based on the threshold value, researchers can capture complex relationships that may not be adequately represented by linear models. This flexibility enables the identification of critical thresholds where changes in the relationship between variables occur, providing valuable insights into the underlying dynamics. Threshold regression analysis is particularly useful in exploring phenomena where the relationship between variables exhibits nonlinear behavior or threshold effects. By accounting for these nuances, researchers can better understand the drivers of outcomes and make more informed decisions based on their findings.

Extensive literature within the field has emphasized the significance of employing diverse metrics to evaluate leverage, with notable measures including the total debt to total assets ratio, long-term debt to total asset ratio, short-term debt to total asset ratio, and total liabilities to total asset ratio. These metrics provide valuable insights into the financial structure and risk management strategies adopted by firms. In the context of this study, the assessment of leverage primarily focuses on two key ratios: the total debt to total assets ratio and the total liabilities to total debt ratio. These specific ratios have been chosen based on their relevance and applicability to the research objectives. The decision to utilize these ratios finds robust support in the literature. Works by Wet (2006), Kila and Mahmood (2008), Onaolapo and Kajola (2010), Lin and Chang (2011), Cuong and Canh (2012), Khan (2012), and Ahmad and Abdullah (2013) have all advocated for the use of similar metrics in assessing leverage within various contexts. Their findings underscore the importance of these ratios in understanding the capital structure and financial health of firms, thereby providing a solid foundation for their inclusion in this study. In the calculation of total debt, the book value of debt is utilized in lieu of market value, primarily due to its unavailability. This approach is particularly relevant in the context of Pakistan, where a substantial number of firms rely heavily on short-term financing mechanisms to facilitate their asset acquisitions and capitalize on investment opportunities. This prevalent reliance on short-term debt can be attributed to several factors, including the elevated financial costs associated with long-term borrowing and the cautious stance adopted by banks towards extending such loans.

The decision-making landscape for firms in Pakistan is heavily influenced by these financial dynamics, with strategic choices often dictated by the need to navigate the constraints posed by high financial costs and limited access to long-term financing. The studies conducted by Booth et al. (2001) and Shah and Hijazi (2004) provide valuable insights into the interplay between financial structures and firm behaviors within the Pakistani context, shedding light on the rationale behind the prevalent use of short-term debt despite its associated risks. The control variables considered in this study play a pivotal role in capturing the nuanced dynamics of firm performance and financial behavior. Among these variables are the growth rate, firm size, and market-to-book value of equity. Each of these factors offers valuable insights into the operational and strategic aspects of firms under examination. Firm size, a fundamental determinant of organizational structure and capacity, is often measured using the natural logarithm of total assets. This approach, as advocated by Cheng et al. (2010), Khan (2012), Cuong and Canh (2012), and Mumtaz et al. (2013), provides a standardized means of assessing the scale and scope of firms, thus enabling comparative analysis across diverse contexts. Moreover, the assessment of growth rate is essential for understanding the trajectory and evolution of firms over time. Previous studies have explored various metrics to gauge growth, including the percentage change in total assets and annual sales. In line with the findings of Chowdhury and Chowdhury (2010), Cheng et al. (2010), Javed and

Akhtar (2012), Cuong and Canh (2012), and Ahmad and Abdullah (2013), this study opts for the percentage change in annual sales as a robust indicator of sales growth rate. This choice is grounded in its ability to capture shifts in revenue generation, market positioning, and competitive performance, thereby offering valuable insights into the underlying drivers of firm expansion.

Additionally, the market-to-book value of equity serves as a key metric for evaluating the relative valuation of firms in the marketplace. While not explicitly discussed in the provided text, this ratio reflects investor perceptions of a firm's intrinsic worth compared to its accounting value, thereby shedding light on market sentiment and expectations regarding future performance. By incorporating these control variables into the analysis, this study aims to provide a comprehensive understanding of the factors shaping firm leverage and financial decision-making, thereby contributing to the existing body of literature on corporate finance and strategy. The market-to-book value of equity is a crucial metric in evaluating the market's perception of a company's worth relative to its accounting value. This ratio is calculated by dividing the market value of equity by the book value of equity. As highlighted by Ahmad and Abdullah (2013), this measure offers valuable insights into investor sentiments and market expectations regarding the company's future performance. In essence, the market-to-book value of equity reflects how investors assess the firm's potential for growth, profitability, and overall value creation. A ratio greater than 1 indicates that the market values the company higher than its book value, suggesting optimistic expectations for future earnings and growth prospects. Conversely, a ratio below 1 implies that the market values the company lower than its book value, potentially indicating concerns about future performance or market conditions. By incorporating the market-to-book value of equity into the analysis, researchers gain a deeper understanding of how market forces influence firm valuation and investment decisions. This metric serves as a key component in assessing the relationship between market perceptions, financial performance, and strategic decision-making within the corporate landscape.

3. SELECTION OF THE VARIABLES

Table 1 offers a comprehensive explanation of the variables used in the analysis, each crucial for understanding the financial attributes and performance of firms. Firm value, denoted by Tobin's Q, is a pivotal metric indicating the market valuation of a firm relative to its asset base. It is computed as the ratio of the market value of equity plus the book value of debt to the book value of total assets. Leverage is assessed through two measures:

- Total debt to total assets ratio (TDTA), representing the proportion of total debt relative to total assets.
- Total liabilities to total assets ratio (TLTA), indicating the ratio of total liabilities to total assets. Both measures shed light on the extent to which a firm relies on debt financing.

Firm size, captured by the variable SIZE, is represented by the natural logarithm of total assets. This variable acts as a proxy for the size or scale of the firm. The growth rate of sales, denoted by GR, measures the percentage change in annual revenue from year t-1 to year t relative to the revenue in year t-1. This metric provides insights into the rate at which a firm's sales are expanding over time. Market to book value of equity (MVBV) is another critical metric, calculated as the ratio of the market value of equity to the book value of equity. MVBV offers valuable insights into how the market values a firm's equity relative to its book value. Understanding these variables and their respective measures is indispensable for analyzing the financial performance and characteristics of firms across various contexts.

Table 1

Variables	Measure
Firm value	Tobin's Q = (Market value of equity + Book value of debt) / Book value of total asset
Levearge	TDTA = Total debt / Total asset TLTA = Total Liabilities / Total asset
Firm Size	SIZE = Natural log of Total assets
Growth rate of sales	GR = (Annual revenue (t) – Annual revenue (t-1)) / Annual revenue (t-1)
Market to book value of equity	MVBV = Market value of equity / Book value of equity

4. EMPIRICAL RESULTS

In Table 1, the descriptive statistics offer a comprehensive overview of the dataset, shedding light on the characteristics and distribution of key variables. Understanding these statistics is crucial for assessing the central tendency, variability, and range of each variable, providing insights into their behavior within the dataset. Firstly, Tobin's Q serves as a fundamental measure of firm value, reflecting the market's valuation relative to its book value. The mean value of 0.8547 suggests that, on average, firms are valued at approximately 85% of their book value. However, the wide range from 0.0247 to 10.6102 indicates substantial variability in firm valuation across the sample, with some outliers potentially exerting significant influence on the average. Moving on to leverage metrics, both TDTA and TLTA ratios offer insights into a firm's debt levels relative to its total assets. The mean values of 0.4269 and 0.6042 for TDTA and TLTA, respectively, indicate moderate levels of leverage across the sample. However, the considerable standard

deviations of 0.3758 and 0.3718 underscore the heterogeneity in leverage structures among firms. Firm size, represented by the natural logarithm of total assets (SIZE), exhibits a mean value of 14.9831, reflecting the logarithmic scale of asset size. The wide range from 10.8506 to 17.8519 indicates substantial variation in firm size within the dataset, with some firms significantly larger or smaller than the average. The growth rate of sales (GR) provides insights into the pace of revenue expansion over time. With a mean growth rate of 17.4561%, the dataset reflects dynamic sales performance across firms. However, the large standard deviation of 21.1658 suggests considerable dispersion in growth rates, with some firms experiencing substantial fluctuations in revenue. Lastly, the market to book value of equity (MVBV) ratio offers a glimpse into the market's perception of a firm's equity relative to its book value. The mean value of 0.8827 suggests that, on average, the market values equity at approximately 88% of its book value. However, the wide range from -2.9380 to 18.4355 highlights significant variability in market perceptions across the sample. These descriptive statistics provide a rich understanding of the dataset, enabling researchers to grasp the key characteristics and trends of the variables under study.

Table 1: Descriptive statistics

	Tobin's Q	TDTA	TLTA	SIZE	GR	MVBV
Mean	0.8547	0.4269	0.6042	14.9831	17.4561	0.8827
Maximum	10.6102	4.2731	4.8783	17.8519	74.6896	18.4355
Minimum	0.0247	0.0000	0.0265	10.8506	-35.3067	-2.9380
Std. Dev.	1.0760	0.3758	0.3718	1.1132	21.1658	1.6990
Observations	430	430	430	430	430	430

Table 2 presents the results of panel unit root tests using the LLC and ADF-Fisher methodologies for each variable in the dataset. For Tobin's Q, both tests indicate statistically significant results, with extremely low test statistics of -27.6882 for LLC and 177.367 for ADF-Fisher, all denoted by three asterisks (***). These results suggest strong evidence against the null hypothesis of a unit root, indicating that Tobin's Q is stationary over time. Similarly, for TDTA (Total Debt to Total Assets ratio), both panel unit root tests yield highly significant results. The LLC test statistic is -48.2308, while the ADF-Fisher statistic is 115.834, both indicating stationarity with high confidence. For TLTA (Total Liabilities to Total Assets ratio), the results are also highly significant. The LLC test statistic is -14.5968, while the ADF-Fisher statistic is 88.7521, once again demonstrating strong evidence against the presence of a unit root. Moving on to SIZE (Natural Log of Total Assets), both panel unit root tests indicate significant results, albeit with smaller test statistics compared to the previous variables. The LLC test statistic is -4.36070, and the ADF-Fisher statistic is 60.2329, confirming stationarity. For GR (Growth Rate of Sales), both tests yield highly significant results. The LLC test statistic is -10.2565, while the ADF-Fisher statistic is 120.626, indicating strong evidence against the null hypothesis of a unit root and suggesting stationarity. Lastly, for MVBV (Market to Book Value of Equity), both panel unit root tests produce extremely significant results. The LLC test statistic is -27.8963, while the ADF-Fisher statistic is 266.932, emphasizing the stationarity of the variable. Overall, the panel unit root tests provide robust evidence of stationarity for all variables included in the analysis, indicating that these variables exhibit stable behaviors over time within the panel dataset.

Table 2: Panel unit root test

	LLC	ADF-Fisher
Tobin's Q	-27.6882***	177.367***
TDTA	-48.2308***	115.834**
TLTA	-14.5968***	88.7521***
SIZE	-4.36070***	60.2329***
GR	-10.2565***	120.626**
MVBV	-27.8963***	266.932***

Table 3 presents a comprehensive analysis of Tobin's Q, a key indicator of firm value, through various threshold effect tests. These tests are instrumental in understanding potential nonlinear relationships between Tobin's Q and other variables, shedding light on critical threshold values where significant effects may arise. Starting with the Single Threshold Effect Test, which utilizes a threshold value of 0.3125, the resulting F-statistic of 10.79 yields a p-value of 0.540. This indicates that at this threshold, there is no statistically significant effect observed. The critical values at the 1%, 5%, and 10% levels provide reference points for assessing the significance of the F-statistic. Moving to the Double Threshold Effect Test, employing a threshold value of 0.1936, the obtained F-statistic is 3.25, accompanied by a p-value of 0.958. Similar to the Single Threshold Test, this suggests no statistically significant effect at the specified threshold. In contrast, the Triple Threshold Effect Test reveals intriguing findings. With threshold values of 0.1936 and 0.2972, the

resulting F-statistic of 70.18 yields a remarkably low p-value of 0.002 (indicated by three asterisks). This indicates a highly significant effect at these threshold values, suggesting potential nonlinear relationships between Tobin's Q and the variables under consideration. Overall, these tests offer valuable insights into the dynamics of Tobin's Q, allowing for a nuanced understanding of its relationship with other variables. They highlight specific threshold values where significant effects occur, informing strategic decision-making and further research in the field of firm valuation and financial analysis.

Table 3: Tests for Tobin's Q

Firm Value (Tobin's Q)	Threshold Value	F-statistics		Critical Values		
		F	P-value	1%	5%	10%
Single Threshold Effect Test	0.3125	10.79	0.540	43.62	29.89	23.19
Double Threshold Effect Test	0.1936	3.25	0.958	32.94	22.04	17.59
	0.3125					
Triple Threshold Effect Test	0.1936	70.18	0.002***	39.28	24.34	17.22
	0.2972					
	0.3125					

Table 4 provides the estimated outcomes along with their standard errors (SE) and t-values for both OLS and White standard errors. These outcomes are crucial for evaluating the statistical significance and reliability of the estimated coefficients in the regression model. The estimated values for each variable are presented in the first column. Following this, the OLS standard errors (SE) and corresponding t-values (tOLS) are provided. Similarly, the White standard errors and their corresponding t-values (tWhite) are also presented for comparison. For the first variable, the estimated value is 3.1738. The OLS standard error associated with this estimate is 2.6498, resulting in a t-value of 1.1977. In comparison, the White standard error for the same variable is 2.2949, leading to a t-value of 1.383. Moving to the second variable, the estimated value is 0.0875, with an OLS standard error of 0.7091, resulting in a t-value of 0.1233. The White standard error for this variable is 0.5057, leading to a t-value of 0.173. For the third variable, the estimated value is 14.789. The OLS standard error associated with this estimate is 2.0840, resulting in a t-value of 7.0964. In comparison, the White standard error for the same variable is 3.8061, leading to a t-value of 3.885. Lastly, the fourth variable has an estimated value of -0.1037, with an OLS standard error of 0.1339, resulting in a t-value of -0.7740. The White standard error for this variable is 0.0768, leading to a t-value of -1.3501. These outcomes provide critical insights into the reliability and significance of the estimated coefficients in the regression model, facilitating informed decision-making and interpretation of the model's results.

Table 4: Estimated Outcomes

Estimated value	OLS SE	t_{OLS}	White SE	t_{White}
3.1738	2.6498	1.1977	2.2949	1.383
0.0875	0.7091	0.1233	0.5057	0.173
14.789	2.0840	7.0964***	3.8061	3.885***
-0.1037	0.1339	-0.7740	0.0768	-1.3501

Table 5 presents the estimated coefficients of the control variables along with their standard errors (SE) and t-values for both OLS and White standard errors. These coefficients are essential for understanding the impact of control variables on the dependent variable in the regression model. The first column displays the estimated values of the coefficients for each control variable. Following this, the OLS standard errors (SE) and corresponding t-values (tOLS) are provided. Additionally, the White standard errors and their corresponding t-values (tWhite) are presented for comparison. For the first control variable, the estimated coefficient is -0.4461. The OLS standard error associated with this estimate is 0.2470, resulting in a t-value of -1.8063. In comparison, the White standard error for the same variable is 0.3600, leading to a t-value of -1.2393. Moving to the second control variable, the estimated coefficient is -0.0010, with an OLS standard error of 0.0023, resulting in a t-value of -0.4395. The White standard error for this variable is 0.0028, leading to a t-value of -0.3587. For the third control variable, the estimated coefficient is 0.3486. The OLS standard error associated with this estimate is 0.0431, resulting in a t-value of 8.0903. In comparison, the White standard error for the same variable is 0.0755, leading to a t-value of 4.6175. These estimated coefficients provide valuable insights into the relationships between the control variables and the dependent variable in the regression model. They help assess the significance and strength of the effects of these control variables on the outcome variable, contributing to a comprehensive understanding of the model's results.

Table 5: Estimated coefficients of control variables

Estimated value	OLS SE	t_{OLS}	White SE	t_{White}
-0.4461	0.2470	-1.8063	0.3600	-1.2393
-0.0010	0.0023	-0.4395	0.0028	-0.3587
0.3486	0.0431	8.0903***	0.0755	4.6175***

5. CONCLUSIONS

Capital structure decisions indeed hold significant sway over the performance and trajectory of firms. These decisions directly shape how companies fund their operations, investments, and growth initiatives. Striking the right balance between equity and debt financing is paramount, as it directly impacts a firm's cost of capital and overall financial health. Firms must navigate a delicate balance, aiming to employ an optimal level of debt in their capital structure that maximizes value while minimizing costs. This entails determining a target debt level that aligns with the organization's strategic objectives, risk tolerance, and financial capabilities. The process of determining the optimal debt level involves careful consideration of various factors, including the firm's industry dynamics, market conditions, growth prospects, and existing financial obligations. By striking the right balance, firms can harness the benefits of debt financing, such as tax advantages and leverage, while mitigating associated risks. Ultimately, the goal is to achieve an optimal capital structure that enhances shareholder value and supports sustainable growth. This underscores the critical importance of capital structure decisions in shaping the long-term performance and competitiveness of firms in today's dynamic business environment. This study delves into investigating the presence of an optimal debt level for companies operating within Pakistan's textile sector. Employing panel threshold regression analysis spanning the years 2007 to 2022, the research aims to shed light on the nuanced relationship between leverage and firm value. Utilizing debt ratio and Tobin's Q as proxies for leverage and firm value respectively, the study seeks to uncover potential threshold effects. By examining how changes in leverage influence firm value across different levels, the research endeavors to identify critical thresholds beyond which the impact of debt on firm value may vary.

This analytical approach allows for a nuanced exploration of the dynamic interplay between debt levels and firm performance within the textile sector of Pakistan. By uncovering potential threshold effects, the study contributes to a deeper understanding of the optimal capital structure for firms in this industry, thereby providing valuable insights for strategic decision-making and financial management practices. In the analysis of control variables, intriguing patterns emerge regarding their influence on firm value under varying proxies of leverage within the textile sector of Pakistan. Notably, the findings reveal nuanced relationships between firm size, growth rate, market-to-book value of equity, and firm value across different measures of leverage. When total debt to total assets serves as the proxy for leverage, the market-to-book value of equity emerges as a significant driver of firm value, exhibiting a positive effect. This underscores the importance of market perceptions and investor sentiment in shaping firm valuation when debt levels are considered. Conversely, firm size and growth rate appear to have no discernible impact on firm value under this leverage proxy, suggesting that other factors may play a more dominant role in determining firm value within this context. On the other hand, when total liabilities to total assets are utilized as the proxy for leverage, a contrasting picture emerges. Firm size demonstrates a significant negative effect on firm value, implying that larger firms may face challenges in creating value when leveraging their assets. Meanwhile, the relationship between growth rate and firm value remains inconclusive, suggesting a need for further investigation into the dynamics at play. Notably, the market-to-book value of equity retains its significant positive effect on firm value, mirroring the findings observed with the debt ratio as the leverage proxy. These findings underscore the complex interplay between leverage, firm characteristics, and market dynamics in influencing firm value within the textile sector of Pakistan. By teasing apart these relationships, the study provides valuable insights for practitioners and policymakers seeking to optimize capital structure decisions and enhance firm performance in this industry.

The implications drawn from this study highlight the importance of strategic financial decision-making, particularly concerning the utilization of debt financing within the textile sector of Pakistan. The findings suggest that firms may benefit from leveraging their internal sources of finance more efficiently, rather than solely relying on debt to fund their operations and investments. A key takeaway is the recognition that excessive reliance on debt can potentially erode firm value and, consequently, shareholder wealth. Therefore, financial managers are urged to exercise prudence and caution when considering debt financing options. By carefully balancing the use of debt with internal resources, firms can strive to optimize their capital structure and enhance long-term sustainability. Furthermore, the study underscores the significance of establishing and adhering to target leverage ratios. By setting clear benchmarks for debt levels, financial managers can mitigate the risks associated with excessive leverage while still enjoying the benefits of interest tax shields. This underscores the importance of maintaining a disciplined approach to capital structure management, wherein the potential advantages of debt financing are weighed against the inherent risks. Overall, the findings suggest that a balanced approach to financing, one that incorporates both internal and external sources of funds while mindful of target leverage ratios, is essential for maximizing firm value and safeguarding shareholder wealth. Financial managers

play a crucial role in navigating these complexities, ensuring that capital structure decisions align with the overarching goals and interests of the firm and its stakeholders.

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