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Leverage and Corporate Performance: Fresh Insights into the Role of Firm Size and Threshold Effects in Saudi Arabia

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Abstract

This study explores the leverage-company performance relationship, focusing on company size as a potential threshold variable. Using the Hansen threshold model, a sample of 126 Saudi companies listed on the stock exchange from 2010 to 2022 was analyzed to investigate whether company size influences the leverage-performance relationship. Contrary to initial expectations, the findings reveal no threshold impact of company size on this relationship. Across large as well as small companies, leverage consistently has a negative effect on performance, measured through return on assets (ROA) and return on equity (ROE). These results suggest that company size does not alter the negative impacts of leverage on performance. The study provides valuable insights for company managers, emphasizing the need for cautious use of debt across companies of all sizes. Additionally, it highlights the broader implications for policymakers, particularly in fostering a supportive economic environment with lower interest rates and more developed capital markets to mitigate the adverse impacts of leverage on company growth.

Keywords

Corporate Performance, Leverage, Firm Size, Threshold Effects, Nonlinearity Model

1. Introduction

The company leverage-company performance relationship has long been a contentious issue in empirical research, with scholars presenting divergent views and evidence. On one side, proponents of leverage argue that it plays a crucial role in enhancing company performance. They emphasize that debt can provide

companies with tax shields, discipline managers, and signal confidence to the market, ultimately leading to better financial outcomes (Hakimi et al., 2023; Omri et al., 2024). These studies suggest that the judicious use of debt can align managerial incentives with shareholder interests, reduce agency costs, and capitalize on growth opportunities.

However, other researchers highlight the potential drawbacks of high leverage, arguing that excessive debt levels can lead to financial distress, increased bankruptcy risk, and ultimately deteriorate company performance (Hakimi et al., 2023; Omri et al., 2024). These findings are consistent with the notion that while debt can be beneficial up to a certain point, beyond that threshold, the costs of financial distress and loss of flexibility outweigh the benefits.

Theories of capital structure provide a theoretical framework for understanding these conflicting empirical results. The trade off theory posits that companies balance the tax advantages of debt against the potential costs of financial distress, leading to an optimal capital structure that varies across companies. The pecking order theory suggests that companies prefer internal financing and will only resort to debt when necessary, with equity being a last resort due to information asymmetry concerns. Signaling theory, on the other hand, argues that companies use leverage as a signal of their quality to external investors, thereby influencing their financing choices and performance outcomes.

Amid these varying perspectives, Robb and Robinson (2014) provide a nuanced view, contending that while leverage can indeed enhance company performance, this is con-tingent on its prudent use. They argue that companies that carefully manage their debt levels can harness the benefits of leverage without succumbing to its potential risks, thereby achieving superior performance. This suggests that the effect of leverage on company performance is not uniform but depends on how well companies manage their capital structure in light of their specific circumstances.

The ongoing debate surrounding the use of company leverage highlights the need for a deeper exploration of how company size influences the leverage-company performance relationship. Previous research has often neglected to consider the condition effect of company size on this relation, which may explain the inconsistent findings (Hakimi et al., 2023; Omri et al., 2024). To fill this gap, our research seeks to examine the company size effect on the conflicting findings in the leverage-performance relationship.

To achieve this objective, we adopt Hansen's (1999) threshold analysis, a sophisticated statistical method designed to uncover potential non-linearities in the leverage-company performance relationship. This technique allows us to explore whether the effect of leverage on performance changes significantly when companies reach a certain size. By using a split-sample approach, where company size is adopted as the threshold variable, we can assess whether different size categories of companies exhibit divergent outcomes. Such differences would provide strong evidence of non-linear dynamics in the leverage-performance relationship,

suggesting that company size is not just a contextual factor but a critical determinant that may alter the nature of this relationship. The analysis aims to identify a specific size threshold at which the leverage-performance effect fundamentally changes, offering deeper insights into the complex interplay between these variables. This approach not only refines our understanding of how company size influences company performance but also emphasizes the key role of considering non-linear effects in financial research.

In this framework, our research offers a new analysis for policy makers that it is necessary to take into account company size when evaluating the effect of company leverage on company performance. Using Hansen's threshold model, our research adheres to established methodologies while also aiming to uncover potential non-linearities in the leverage-performance relationship. This method tackles a notable deficiency in empirical research, particularly in the context of Saudi Arabia.

The financial environment in Saudi Arabia, characterized by its unique financing structures and relatively conservative approach to debt usage, further emphasizes the key role of investigating how leverage affects company performance. Given the specific challenges and opportunities within the Saudi market, including regulatory constraints and varying access to capital, a comprehensive analysis of leverage—especially short-term leverage—is crucial for understanding its effect on performance.

Our research seeks to bridge this void in the current body of literature by providing a detailed examination of how company size influences the leverage-company performance relationship in Saudi Arabia. By doing so, it offers valuable insights that can guide managerial decisions and financial strategies. The findings from this research not only contribute to the academic understanding of leverage dynamics but also have practical implications for improving managerial practices, especially in leveraging decisions where company size plays a critical role. Thus, this research not only enriches the current literature but also holds the potential to guide more informed and strategic financial management practices within the Saudi Arabian context.

2. Literature Review

Since Modigliani and Miller's (1958), the capital structure and performance relation has been a major area of study. Although decades have passed, the complexities of capital structure remain unresolved. Initially, Modigliani and Miller's (1963) argued that a company's financing—whether through debt or equity—did not impact its value. However, they later revised this in 1963, acknowledging the influence of company taxes on capital structure and company value.

Historically, this field has witnessed the emergence of several theories to explain this dynamic, divided into two main categories. The first one proposes the pecking order theory (POT) and signalling theory. POT, proposed by Myers and Majluf (1984), suggests that companies prefer internal financing, using debt only when

necessary, implying a negative leverage-company performance relationship. In contrast, Ross's (1977) signalling theory argues that companies can use leverage to signal confidence in future performance, which can boost company value (Alofaysan et al., 2024; Ezzeddine and Jarboui, 2017; Guetat et al., 2015). Both theories predict opposite outcomes despite assuming a linear leverage-performance relationship.

The second category of theories includes the trade off theory and agency theory. Trade off theory, developed by Kraus and Litzenberger (1973), proposes that companies can achieve an optimal capital structure by balancing the benefits of debt, such as tax shields, with the costs of financial distress and agency issues. Agency theory complements this by emphasizing the potential conflict between managers and shareholders, which can be reduced through an ideal mix of debt and equity (Ezzeddine and Jarboui, 2017; Jarboui, 2016).

Both theories highlight that while leveraging offers advantages, exceeding the optimal debt level can lead to drawbacks, such as higher agency costs and bankruptcy risks. Consequently, companies must manage their capital structure carefully, as excessive leverage can harm performance. These theories position capital structure as a strategic tool that, when properly managed, can maximize shareholder wealth. Despite progress, the complexity of the capital structure debate shows that a definitive solution remains elusive.

Empirical research on the effect of company leverage on company performance has produced various results, often due to differences in estimation methods, time periods, and company- or country-specific factors. The evidence is generally divided into three main categories.

The first one identifies a linear leverage-company performance relationship. Studies like those by Detthamrong et al. (2017), and Ramli et al. (2019) find that leverage can positively impact performance, suggesting benefits such as tax shields, improved managerial discipline, and signaling strength to the market. However, other studies, including Zeitun and Tian (2014), and Zhang et al. (2017), report a negative relation-ship, where higher debt levels are linked to poor performance due to financial distress, bankruptcy risks, and reduced financial flexibility. Rahman et al. (2020) and Ngo et al. (2020) support this negative view, highlighting the complexity of leveraging decisions and the need to consider company-specific circumstances.

The second category identifies a nonlinear leverage-company performance relationship, with studies by Margaritis and Psillaki (2010), Ezzeddine and Jarboui (2017), Dalci (2018), and Akhtar et al. (2021) confirming a curvilinear relationship, typically U-shaped or inverted U-shaped. This suggests that while lower levels of leverage may enhance performance, excessive borrowing can harm it, emphasizing the importance of maintaining an optimal capital structure.

The third category explores the role of company size in the leverage-performance relationship. Using Hansen's (1999) threshold model, Ibhagui and Olokoyo (2018) found that as company size increases, the leverage-performance effect

turns positive, while it tends to be negative for smaller companies. This threshold effect is supported by studies like Jaisinghani and Kanjilal (2017) and Khemiri and Noubbigh (2020), showing that company size plays a crucial role. Jaisinghani and Kanjilal (2017) and Bolarinwa et al. (2022) similarly concluded that leverage is more beneficial for larger companies, reinforcing the importance of size in this dynamic.

Empirical studies on the interaction between company size, leverage, and company performance add layers of complexity. Some research shows that the negative effect of leverage on performance is stronger for smaller companies and lessens as company size grows (Jarboui et al., 2015; Ibhagui & Olokoyo, 2018; Bolarinwa et al., 2022). In order to emphasize the situational nature of the relationship, Chen and Chen (2011) further broadened the research by adding further variables, such as industry and firm size as moderators and performance as a mediator. All things considered, these studies highlight the necessity of taking into account a variety of variables in order to completely understand the intricate relationships between firm size, leverage, and performance. Overall, these studies emphasize the need to consider multiple factors to fully grasp the complex dynamics between company size, leverage, and performance.

An important focus of empirical research lies in identifying the optimal leverage thresholds that maximize company performance. Studies by Berger & di Patti (2006), Vithessonthi and Tongurai (2015) and Bae et al. (2017) have consistently demonstrated that the leverage-performance relationship is non-linear. Specifically, performance improves with leverage up to a certain point but declines sharply once this optimal threshold is exceeded. This finding highlights the critical need for firms to determine and maintain their leverage within an ideal range to achieve sustainable performance.

Hansen's (1999) threshold analysis has been widely employed to investigate the leverage-performance nexus across diverse industries. For example, studies by Ruland & Zhou (2005), Salawu & Awolowo (2009), Chao et al. (2017) identified an inverted U-shaped relationship, often accompanied by a double-threshold effect, influenced by factors such as CEO power. More recently, Horvathova et al. (2022) applied this method to analyze the management consulting and construction industries, confirming that the optimal leverage thresholds are highly contingent on industry-specific characteristics.

These findings underscore the importance of considering sectoral contexts when evaluating the leverage-performance effect. By tailoring leverage strategies to align with sector-specific thresholds, companies can better position themselves to optimize financial outcomes while mitigating the risks associated with excessive debt levels.

In conclusion, the existing literature underscores the extensive application of Hansen's threshold approach in unraveling the complex relationships among leverage, company performance, and company size. These studies consistently emphasize the critical role of optimal leverage levels, sector-specific characteristics,

and company size in shaping performance outcomes. However, a notable gap persists in the exploration of these dynamics within the context of Saudi Arabia, particularly concerning the influence of company size on the leverage-performance relationship.

This study seeks to bridge this gap by delving into the interplay between company size and leverage in Saudi Arabia's unique economic landscape. The Saudi financial system is characterized by underdeveloped capital markets, where long-term debt instruments are scarce, and businesses predominantly rely on short-term loans and internal funding sources. Consequently, this research places a particular focus on short-term leverage, examining its implications for company performance within this context.

Furthermore, the analysis gains relevance as it considers the structural challenges in Saudi Arabia's equity and bond markets, which often compel businesses to prioritize bank loans as their primary source of external funding. By addressing these distinctive financial and market conditions, this study contributes to the broader understanding of leverage dynamics in emerging economies and provides valuable insights for policymakers, financial institutions, and corporate decision-makers operating within similar contexts.

Based on the above literature review, this research presents a set of hypotheses as follows:

*H*1: *The effect of short-term debt on ROA differs across company sizes when company size is used as a threshold variable.*

*H*2: *The effect of long-term debt on ROA varies across company sizes when company size is considered as a threshold variable.*

*H*3: *The relationship between total debt and ROA is distinct across company sizes, with company size acting as a threshold variable.*

*H*4: *The influence of short-term debt on ROE differs across company sizes when company size is used as a threshold variable.*

*H*5: *The effect of long-term debt on ROE varies across company sizes when company size is considered as a threshold variable.*

*H*6: *The impact of total debt on ROE is distinct across company sizes, with company size serving as a threshold variable.*

3. Method and Data

3.1. Method

In this section, we begin by explaining the importance of conducting a threshold analysis, highlighting its relevance to our study. Following this, we offer a concise overview of the threshold regression model developed by Hansen (1999), which serves as the foundation for the empirical analysis presented in this paper.

3.1.1. Threshold Analysis

A limitation of existing empirical analyses, and a possible explanation for the sometimes-ambiguous findings regarding the effects of leverage on company

performance, is the reliance on the assumption of complete linearity in the regression models underlying these findings. To clarify, most current empirical approaches (as seen in the literature) presuppose that the relationship between leverage and company performance is either consistently increasing or decreasing in a linear fashion with respect to the regressors in the model. This implies that if high leverage leads to either a decrease or an increase in company performance, this pattern is expected to hold across all values of C (a component or subset of the vector of other regressors) and c1 (a real number representing a value of C at a specific time). However, this assumption is not always empirically valid. There are instances where leverage may only negatively impact company performance for certain values of C—either for C c < 1 or C c > 1, but not both—meaning that high leverage might coincide with reduced company performance for C c < 1, but not necessarily for C c > 1. Alternatively, different combinations of leverage and company performance may emerge, suggesting a more complex relationship that varies across different values of C. These scenarios, which challenge the assumption of linearity, have often been overlooked in previous studies on the leverage-performance relationship. To address this issue, we utilize the threshold regression model (Hakimi et al., 2023; Omri et al., 2024).

The threshold regression model is a nonlinear method that enables the examination of varying relationships between two variables, such as leverage and company performance, across different sections of the data. In this approach, the sample is divided into regimes based on whether C c > 1 or C c < 1 for all leverage values. This division allows for a comprehensive analysis of how leverage impacts company performance under various conditions. The variable C, which belongs to the vector V of all potential regressors in the model, serves as the threshold variable, determining how the sample is split into different regimes. The threshold value, c1, which is typically estimated from the data, is a specific point within the range of C that dictates this division. This empirical framework offers a more general and flexible specification, accommodating diverse relationships among leverage and company performance across different threshold levels. By allowing for the exploration of these relationships in a more nuanced manner, it provides a holistic view of how leverage affects company performance. In our study, we use company size as the threshold variable to investigate how leverage influences company performance across companies of different sizes (Ibhagui & Olokoyo, 2018).

3.1.2. Threshold Model

The model consists of a dependent variable, a focus regressor, threshold variables, and control variables. In this study, the focus regressor, which is the primary variable of interest, is the debt ratio (leverage), measured as total debt-to-total assets (TDTA), long-term debt-to-total assets (LTDTA), and short-term debt-to-total assets (STDTA). Various forms of the model can be employed; however, in this paper, we adopt the approach outlined by Hansen (1999), where the focus regressor, threshold, and control variables are treated as exogenous. The structural threshold regression model is defined as follows:

$$y_{it} = \beta_1' x_{it} I\left(q_{it} \le \gamma\right) + \beta_2' x_{it} I\left(q_{it} > \gamma\right) + \varepsilon_{it} \quad (1)$$

where $\varepsilon_{it} = \mu_i + \upsilon_{it}$.

The data samples are taken from a panel denoted as $\left\{y_{it}, q_{it}, x_{it} : 1 \le i \le n, 1 \le t \le T\right\}$, where i and t represent the firm and time indices, respectively. Here, x_{it} is a set of regressors that includes the focus regressor, while q_{it} serves as the threshold variable, which may be part of x_{it} and is assumed to follow a continuous distribution. The term μ_i captures the firms' unobserved, time-invariant fixed effects. The structural equation can then be expressed as follows:

$$y_{it} = \mu_i + \beta_1' x_{it} I\left(q_{it} \le \gamma\right) + \beta_2' x_{it} I\left(q_{it} > \gamma\right) + \upsilon_{it} \quad (2)$$

where y_{it} is a real-valued scalar variable, x_{it} is an $m \times 1$ vector of regressors, q_{it} is a scalar threshold variable, with Dim(y_{it}) = Dim(q_{it}), γ is the unobserved threshold value which needs to be estimated, β_1' and β_2' are vectors of slope parameters associated with the different regimes $A = \left\{q_{it} \middle| q_{it} \le \gamma\right\}$ and $B = \left\{q_{it} \middle| q_{it} > \gamma\right\}$ and $I(.)$ is the indicator function defined for an arbitrary element d in a set $A \cup B$ as

$$I\left(d\right) = \begin{pmatrix} 1 & d \in A \cup B \\ 0 & \text{otherwise} \end{pmatrix} \quad (3)$$

where $A = \left\{q_{it} \middle| q_{it} \le \gamma\right\}$ and $B = \left\{q_{it} \middle| q_{it} > \gamma\right\}$ and $A \cap B = \varnothing$ since A and B are disjoint. The vector of regressors x_{it} contains both the focus regressor and control variables, both of which are assumed exogenous.

3.1.3. Empirical Specification

The purpose of our empirical analysis is to examine whether the leverage-company performance relationship is dependent on company size. Our threshold model has a vector of debt ratios LEV = (TD, LTD, STD)′ as the focus regressors, a vector of performance measures PER = (ROA, ROE)′ and control variables. There is one threshold variable, company size, selected from the set of control variables, so we have a panel threshold regression model which will be estimated to determine the effect of leverage on company performance for different company sizes. Following the methodology of Ibhagui and Olokoyo (2018), this research estimates the regression of the threshold model presented below.

$$FP_{it} = \mu_i + \beta_1^s LEV_{it} I\left(C_{it} \le c_1\right) + \beta_2^s LEV_{it} I\left(C_{it} > c_1\right) + \phi^s Contr._{it} + \varepsilon_{it}^s \quad (4)$$

where i = 1, …, n = 126 represents individual companies t = 2010, …, T = 2022, represents time period, μ_i is the time invariant company-specific fixed effect, FP_{it} represents company performance defined above, ε_{it}^s is the error term associated with the threshold regression model generated by threshold variable α, where α is company size and $I(.)$ is the indicator function.

3.2. Data Samples

To examine the leverage-company performance relationship using the threshold

approach, we employ panel data regression techniques. This methodology allows us to account for variations over time and between different companies. Our analysis is based on the financial data of 126 companies listed on the Saudi Stock Exchange for only 3 key sectors (energy, materials, and industrials), due to data limitations. All data are drawn from the Saudi Stock Exchange (Tadawul) database and the annual reports of Saudi companies listed on the exchange, covering the period from 2010 to 2022.

The study focuses on companies within three pivotal sectors: energy, materials, and industrials. We selected companies from these sectors because they are fundamental to the Saudi economy and provide a diverse perspective on leverage and performance dynamics. To ensure the reliability and consistency of our analysis, we included only those companies that remained listed throughout the entire study period and for which comprehensive data was available. Consequently, our final sample consists of 126 companies, providing a robust dataset for evaluating the effect of leverage on company performance within these critical sectors. The selected variables and data are described in Table 1.

Table 1. Variables description.

Variable	Description
Return on Assets	The ratio of PBIT to Total Assets
Return on Equity	The ratio of Profit after Tax to Equity
Short-term debt	The ratio of Short-Term Debt to Total Assets
Long-term debt	The ratio of Long-Term Debt to Total Assets
Total debt	The ratio of Total Debt to Total Assets
Firm Size	The ratio of Total Debt to Total Assets

Descriptive Statistics

Table 2 presents the descriptive statistics of the used data in this study. With a mean ROA of 0.054, businesses typically get a 5.4% return. Likewise, the average return of 8.3% is represented by the mean ROE, which is 0.083. According to the mean total debt ratio, companies are typically financed with 47.6% debt and the remaining portion through equity financing. Businesses tend to rely more on short-term debt than long-term debt, as seen by the average Long-Term Debt (LTD) of 12.4% and the average Short-Term Debt (STD) of 26.5%.

Table 2. Descriptive statistics.

Variables	Mean	Std. Dev.	Min	Max
ROA	0.054	0.089	−0.159	0.356
ROE	0.083	0.168	−0.245	0.512
Total Debt (TD)	0.476	0.226	0.096	1.207
Long-Term Debt (LTD)	0.124	0.131	0.000	0.442
Short-Term Debt (STD)	0.265	0.186	0.021	0.634
Company Size (CS)	15.678	1.187	12.750	19.862

4. Results

We estimate the threshold regression model in Equation (4) by applying it to the data following the approach outlined in Hansen (1999). The results are displayed in the tables below. In this analysis, company size, denoted as "C", is utilized as the threshold variable. The threshold divides the sample into two distinct regimes: the lower regime, where $C_{it} < C$, and the upper regime, where $C_{it} > C$. Companies that fall below the threshold are classified under "smaller", representing smaller companies, while those above the threshold are labeled as "larger", representing larger companies.

Referring to Table 3, we find that the estimated threshold value is 12.73 (in logarithmic scale), with confidence intervals ranging between 12.60 and 12.75. A threshold value of 12.73 indicates that companies with a size below this value are categorized as small, whereas those with a size above this threshold are considered large. This classification allows us to examine how company size influences the leverage-company performance relationship within these distinct groups.

Table 3. Threshold value estimates—95% confidence intervals.

Model	Variable	Threshold	Lower	Upper
Model 1	TD	12.73	12.60	12.75
Model 2	LTD	13.28	13.21	13.29
Model 3	STD	12.75	12.61	12.76

Table 4 highlights a significant negative effect of leverage on ROA in Model 1. As leverage increases, company performance declines due to higher fixed costs, particularly interest expenses, which strain performance. This finding aligns with the Pecking Order Theory, which posits that profitable companies tend to rely on internally generated funds rather than seeking external financing. Our results, consistent with those of Rahman et al. (2020), reveal a negative and statistically insignificant effect of leverage on performance for large as well as small companies, indicating that company size does not alter the leverage-ROA relationship. This supports the view of Ibhagui and Olokoyo (2018), who argued that leverage's impact on performance varies across companies, particularly noting its lack of significant effect in larger companies.

Interestingly, our findings challenge the initial hypothesis of a threshold effect, which suggested that the influence of leverage on performance would differ depending on company size. A possible explanation for the observed lack of significance might be the persistently high interest rates in Saudi Arabia in recent years. These elevated rates may have deterred companies from borrowing, thereby exacerbating the fixed costs associated with leverage. As a result, the anticipated variation in leverage's impact across different company sizes may not have materialized.

Table 4. Threshold regression results for dependent variable ROA.

Variables	Model 1		Model 2		Model 3	
	Coef.	t-value	Coef.	t-value	Coef.	t-value
LEV	−0.188***	−12.62	−0.168***	−3.94	−0.154***	−5.94
$C_{it} \leq c_1$	−0.022	−0.34	−0.019***	−3.62	0.017	1.02
$C_{it} > C$	−0.031	−0.65	−0.016***	−3.05	−0.003	−1.04
Constant	0.204**	1.98	0.297***	3.84	0.053	1.06
F-Stat	48.65		12.45		22.72	
Prob (F-Stat)	0.000		0.000		0.000	

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

According to the results in **Table 3**, the threshold value is determined to be 13.28, with a confidence interval ranging from 13.21 to 13.29. The analysis reveals that long-term debt has a significant and negative impact on ROA overall. Notably, large as well as small companies exhibit significant coefficients, indicating that company size does not create a threshold effect in this context. This suggests that the adverse effects of long-term debt on performance are consistent across companies of different sizes, with no variation attributable to company size.

In **Table 3**, Model 3, the threshold value is identified as 12.75, with lower and upper limits of 12.71 and 12.76. Referring to **Table 4**, the coefficient for leverage highlights a strong negative impact on ROA, reinforcing the detrimental influence of higher leverage on company performance. However, when analyzing the results separately for small and large companies, the coefficients, though negative, are statistically insignificant. This finding implies that company size does not significantly alter the leverage-company performance relationship. Contrary to expectations of a threshold effect, the results suggest that the negative effect of leverage on ROA is consistent across different company sizes, with no meaningful difference between small and large companies.

Table 5. Threshold value estimates—95% confidence intervals.

Model	Variable	Threshold	Lower	Upper
Model 4	TD	12.62	12.61	12.65
Model 5	LTD	13.16	13.12	13.21
Model 6	STD	12.75	12.61	12.76

Referring to the Model 4, the estimated threshold value is 12.62, with a confidence interval ranging from 12.61 to 12.65. The results show that the effect of Total Debt on ROE is significantly negative. This finding supports the Pecking Order Theory, as the observed negative leverage-company performance relationship suggests that profitable companies prefer using internally generated funds over external debt.

Despite this overall negative impact, the coefficients for large as well as small companies are statistically insignificant. This indicates that company size does not significantly influence the leverage-ROE relationship (See Table 6). The results imply that the detrimental effects of total debt on ROE are consistent across companies of different sizes, with no significant variation in how leverage affects performance based on company size.

Table 6. Threshold regression results for dependent variable ROE.

Variables	Model 4		Model 5		Model 6	
	Coef.	t-value	Coef.	t-value	Coef.	t-value
LEV	−0.184***	−4.02	−0.104	−0.91	−0.195***	−3.42
$C_{it} \leq c_1$	0.004	1.05	−0.007	−1.04	0.012	1.12
$C_{it} > C$	−0.008	−1.07	−0.008	−1.06	−0.001	−1.14
Constant	0.203	1.21	0.122	1.12	0.105	1.04
F-Stat	12.024		4.125		14.264	
Prob (F-Stat)	0.000		0.014		0.000	

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Based on the analysis in Table 5, Model 5, the threshold value is identified as 13.16, with a narrow range between the lower and upper limits of 13.12 and 13.21. Consistent with previous models, leverage (LTD) continues to have a significantly negative impact on ROE. Turning to Table 6, the coefficients for large as well as small companies are found to be insignificant, indicating that company size does not influence the leverage-performance relationship, and there are no threshold effects related to size.

Similarly, in Table 5, Model 6, the threshold value is determined to be 12.75, with lower and upper limits of 12.61 and 12.76, respectively. As observed in the earlier models, leverage (LTD) maintains its significantly negative effect on ROE. Table 6 further supports the finding that the coefficients for large as well as small companies remain insignificant, reinforcing the conclusion that company size does not have a threshold effect on the leverage-company performance relationship.

5. Summary of Results and Discussion

The empirical findings from this study highlight the threshold effects of company size on the leverage-company performance relationship among Saudi listed companies. Across the various models analyzed, leverage—especially in the form of long-term debt (LTD)—is consistently shown to have a significantly negative impact on both ROA and ROE. This suggests that higher levels of leverage are detrimental to the performance of these companies. Interestingly, the study reveals that company size, regardless of whether a firm is small or large, does not significantly influence the examined relationship, as evidenced by the insignificant coefficients

for company size across all models. This finding challenges the existence of a threshold effect for company size, which has been reported in prior studies such as Arcand et al. (2015), Ibhagui and Olokoyo (2018), Akhtar et al. (2021), and Bolarinwa et al. (2022). The divergence from earlier research suggests that the interplay between performance, company size, and leverage may be more context-specific than previously recognized. Such variability underscores the importance of considering unique economic, institutional, and sectoral factors when analyzing the role of company size in financial performance and leverage dynamics.

The study suggests that the lack of significant influence from company size in the Saudi context can be attributed to the prevailing economic conditions in the country. In recent years, Saudi Arabia has experienced rising interest rates, global inflation, and has been impacted by major global crises, including the COVID-19 pandemic and the war in Ukraine. These challenging conditions may discourage companies from making favorable long-term financing decisions, as the economic environment may not support such strategies. The consistently negative effect of leverage on performance underlines the importance of cautious and strategic financial management, particularly in unstable economic climates. Companies are strongly advised to manage their debts with care and efficiency, especially in environments characterized by high interest rates (Horvathova et al., 2022).

Moreover, the role of policymakers is crucial in this context. It is essential for them to create a supportive environment that enables companies to make sound long-term financial decisions. Improving macroeconomic indicators can have a positive effect on companies' ability to pursue long-term strategies. If policymakers can successfully manage these challenges, this could foster a more conducive environment for corporate growth and performance.

The findings of this study, particularly when compared with studies like those by Ibhagui and Olokoyo (2018), suggest that the relationships between leverage, company size, and performance are influenced by specific contextual factors. This highlights the need for further research in diverse settings to better understand the complex interactions between these variables. By exploring these relationships in different economic contexts, future studies can provide deeper insights into how leverage, company size, and performance are interconnected.

6. Conclusion

This study aimed to provide a fresh perspective on the leverage-performance relationship, addressing the inconsistencies in prior research by introducing company size as a key threshold variable. The primary hypothesis was that company size, often overlooked in earlier empirical work, could explain the inconclusive results regarding the leverage-performance relationship. To explore this, the Hansen threshold model was employed, using company size as a potential determinant of differing impacts of leverage on performance.

However, the findings challenge the initial assumption. Contrary to expectations, the results demonstrate that company size does not produce threshold

effects on the leverage-performance relationship. Whether companies are small or large, their size does not significantly alter the effect of leverage on company performance. Across all models, leverage is shown to have a consistently negative effect on both ROA and ROE, suggesting a generally adverse influence on company performance.

These findings have important implications for company managers and policymakers. For managers, the results provide clarity by indicating that leverage tends to harm performance regardless of company size, prompting a more cautious approach to debt financing. For policymakers, the study suggests the need for measures that can create a more favorable economic environment, such as lowering interest rates, which may help companies expand without adversely affecting performance through increased borrowing costs. Additionally, fostering the development of capital markets can enhance companies' financial options.

As with any research, this study has its limitations. The scope is restricted to Saudi Arabia and only three industrial sectors (energy, materials, and industrials), due to data limitations. Future studies can build on these findings by examining other countries and industries to further explore the complex dynamics between leverage, company size, and company performance. Additionally, future research might benefit from incorporating other control variables as potential threshold factors, deepening the understanding of how leverage interacts with company performance across different contexts.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

Akhtar, M., Yusheng, K., Haris, M., Ain, Q. U., & Javaid, H. M. (2021). Impact of Financial Leverage on Sustainable Growth, Market Performance, and Profitability. *Economic Change and Restructuring, 55,* 737-774. https://doi.org/10.1007/s10644-021-09321-z

Alofaysan, H., Jarboui, S., & Binsuwadan, J. (2024). Corporate Sustainability, Sustainable Governance, and Firm Value Efficiency: Evidence from Saudi Listed Companies. *Sustainability, 16,* Article 5436. https://doi.org/10.3390/su16135436

Arcand, J. L., Berkes, E., & Panizza, U. (2015). Too Much Finance? *Journal of Economic Growth, 20,* 105-148. https://doi.org/10.1007/s10887-015-9115-2

Bae, J., Kim, S., & Oh, H. (2017). Taming Polysemous Signals: The Role of Marketing Intensity on the Relationship between Financial Leverage and Firm Performance. *Review of Financial Economics, 33,* 29-40. https://doi.org/10.1016/j.rfe.2016.12.002

Berger, A. N., & di Patti, E. B. (2006). Capital Structure and Firm Performance: A New Approach to Testing Agency Theory and an Application to the Banking Industry. *Journal of Banking & Finance, 30,* 1065-1102. https://doi.org/10.1016/j.jbankfin.2005.05.015

Bolarinwa, S. T., Onyekwelu, U. L., Ojiakor, I., Orga, J. I., Nwakaego, D. A., & Ekwutosi, O. C. (2022). Leverage and Firm Performance: Threshold Evidence from the Role of Firm Size. *Global Business Review.* https://doi.org/10.1177/09721509221109571

Chao, C. C., Hu, M., Munir, Q., & Li, T. (2017). The Impact of CEO Power on Corporate

Capital Structure: New Evidence from Dynamic Panel Threshold Analysis. *International Review of Economics & Finance, 51,* 107-120. https://doi.org/10.1016/j.iref.2017.05.010

Chen, L. J., & Chen, S. Y. (2011). The Influence of Profitability on Firm Value with Capital Structure as the Mediator and Firm Size and Industry as Moderators. *Investment Management and Financial Innovations, 8,* 121-129.

Dalci, I. (2018). Impact of Financial Leverage on Profitability of Listed Manufacturing Firms in China. *Pacific Accounting Review, 30,* 410-432. https://doi.org/10.1108/par-01-2018-0008

Detthamrong, U., Chancharat, N., & Vithessonthi, C. (2017). Corporate Governance, Capital Structure and Firm Performance: Evidence from Thailand. *Research in International Business and Finance, 42,* 689-709. https://doi.org/10.1016/j.ribaf.2017.07.011

Ezzeddine, B. M., & Jarboui, S. (2017). Do Corporate Governance Mechanisms Affect Public Transport Firm Value? *Journal of the Knowledge Economy, 8,* 916-928. https://doi.org/10.1007/s13132-015-0302-3

Guetat, H., Jarboui, S., & Boujelbene, Y. (2015). Evaluation of Hotel Industry Performance and Corporate Governance: A Stochastic Frontier Analysis. *Tourism Management Perspectives, 15,* 128-136. https://doi.org/10.1016/j.tmp.2015.05.004

Hakimi, A., Boussaada, R., Karmani, M. (2023). Corporate Social Responsibility and Firm Performance: A Threshold Analysis of European Firms. *European Journal of Management and Business Economics*. https://doi.org/10.1108/EJMBE-07-2022-0224

Hansen, B. E. (1999). Threshold Effects in Non-Dynamic Panels: Estimation, Testing, and Inference. *Journal of Econometrics, 93,* 345-368. https://doi.org/10.1016/s0304-4076(99)00025-1

Horvathova, J., Mokrisova, M., & Petruška, I. (2022). Indebtedness and Profitability—A Threshold Model Approach. *Investment Management and Financial Innovations, 19,* 13-27. https://doi.org/10.21511/imfi.19(3).2022.02

Ibhagui, O. W., & Olokoyo, F. O. (2018). Leverage and Firm Performance: New Evidence on the Role of Firm Size. *The North American Journal of Economics and Finance, 45,* 57-82. https://doi.org/10.1016/j.najef.2018.02.002

Jaisinghani, D., & Kanjilal, K. (2017). Non-linear Dynamics of Size, Capital Structure and Profitability: Empirical Evidence from Indian Manufacturing Sector. *Asia Pacific Management Review, 22,* 159-165. https://doi.org/10.1016/j.apmrv.2016.12.003

Jarboui, S. (2016). Managerial Psychology and Transport Firms Efficiency: A Stochastic Frontier Analysis. *Review of Managerial Science, 10,* 365-379. https://doi.org/10.1007/s11846-014-0149-1

Jarboui, S., Guetat, H., & Boujelbène, Y. (2015). Evaluation of Hotels Performance and Corporate Governance Mechanisms: Empirical Evidence from the Tunisian Context. *Journal of Hospitality and Tourism Management, 25,* 30-37. https://doi.org/10.1016/j.jhtm.2015.08.002

Khemiri, W., & Noubbigh, H. (2020). Does Sub-Saharan Africa Overinvest? Evidence from a Panel of Non-Financial Firms. *The Quarterly Review of Economics and Finance, 77,* 118-130. https://doi.org/10.1016/j.qref.2019.11.005

Kraus, A., & Litzenberger, R. H. (1973). A State-Preference Model of Optimal Financial Leverage. *The Journal of Finance, 28,* 911-922. https://doi.org/10.1111/j.1540-6261.1973.tb01415.x

Margaritis, D., & Psillaki, M. (2010). Capital Structure, Equity Ownership and Firm Performance. *Journal of Banking & Finance, 34,* 621-632. https://doi.org/10.1016/j.jbankfin.2009.08.023

Modigliani, F., & Miller, M. H. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *The American Economic Review, 48,* 261-297.

Modigliani, F., & Miller, M. H. (1963). Corporation Income Taxes and the Cost of Capital: A Correction. *American Economic Review, 53,* 433-443.

Myers, S. C., & Majluf, N. S. (1984). Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have. *Journal of Financial Economics, 13,* 187-221. https://doi.org/10.1016/0304-405x(84)90023-0

Ngo, V. T., Tram, T. X. H., & Vu, B. T. (2020). The Impact of Debt on Corporate Profitability: Evidence from Vietnam. *The Journal of Asian Finance, Economics and Business, 7,* 835-842. https://doi.org/10.13106/jafeb.2020.vol7.no11.835

Omri, N. A.-E., Neffati, N., & Guenichi, H. (2024). Modeling the Relationship between Leverage and Firm Performance: A Threshold Analysis Using the PSTR Model. *Managerial Finance*. https://doi.org/10.1108/MF-07-2024-0500

Rahman, M. M., Saima, F. N., & Jahan, K. (2020). The Impact of Financial Leverage on Firm's Profitability: An Empirical Evidence from Listed Textile Firms of Bangladesh. *Journal of Business Economics and Environmental Studies, 10,* 23-31. https://doi.org/10.13106/jbees.2020.vol10.no2.23

Ramli, N. A., Latan, H., & Solovida, G. T. (2019). Determinants of Capital Structure and Firm Financial Performance—A PLS-SEM Approach: Evidence from Malaysia and Indonesia. *The Quarterly Review of Economics and Finance, 71,* 148-160. https://doi.org/10.1016/j.qref.2018.07.001

Robb, A. M., & Robinson, D. T. (2014). The Capital Structure Decisions of New Firms. *Review of Financial Studies, 27,* 153-179. https://doi.org/10.1093/rfs/hhs072

Ross, S. A. (1977). The Determination of Financial Structure: The Incentive-Signalling Approach. *The Bell Journal of Economics, 8,* 23-40. https://doi.org/10.2307/3003485

Ruland, W., & Zhou, P. (2005). Debt, Diversification, and Valuation. *Review of Quantitative Finance and Accounting, 25,* 277-291. https://doi.org/10.1007/s11156-005-4768-0

Salawu, R. O., & Awolowo, O. (2009). The Effect of Capital Structure on Profitability: An Empirical Analysis of Listed Firms in Nigeria. *The International Journal of Business and Finance Research, 3,* 121-129.

Vithessonthi, C., & Tongurai, J. (2015). The Effect of Firm Size on the Leverage-Performance Relationship during the Financial Crisis of 2007-2009. *Journal of Multinational Financial Management, 29,* 1-29. https://doi.org/10.1016/j.mulfin.2014.11.001

Zeitun, R., & Tian, G. G. (2014). Capital Structure and Corporate Performance: Evidence from Jordan. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2496174

Zhang, H., Li, L., & Chen, J. (2017). Empirical Study on Influence Factors of Capital Structure of Chinese Real Estate Listed Companies. In *Proceedings of the 20th International Symposium on Advancement of Construction Management and Real Estate* (pp. 687-696). Springer. https://doi.org/10.1007/978-981-10-0855-9_60