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Article

Capital structure and performance nexus: Insights from fixed-effects and quantile analysis

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Abstract: The research utilizes a comprehensive dataset from MENA-listed companies, capturing data from 2013 to 2022 to scrutinize the influence of capital structure (CapSt) level on corporate performance across 11 distinct countries. This study analyzed 6870 firm-year observations using a quantitative research method through static and dynamic panel data analysis. The primary analysis reveals a positive correlation between the CapSt ratio and company performance using fixed effects (FE) techniques. Hence, the preliminary results were re-examined and affirmed using a two-step system generalized method of moment (GMM) estimator to address potential endogeneity concerns. This finding aligns with most studies conducted in advanced countries, indicating a positive correlation between CapSt and corporate performance. Furthermore, it is also consistent with some research conducted in less-developed markets. This research argues that, in the MENA region, the advantages of debt, such as tax saving, may outweigh the potential financial distress cost. Furthermore, it offers insights into the monitoring role of CapSt in MENA-listed companies. We strengthen our research results by employing various methodologies and using alternative measures of accounting performance and controlling size, notably panel quantile regression analysis.

Keywords: capital structure; accounting performance; fixed-effects analysis; system GMM; quantile regression; MENA

1. Introduction

Shareholders, investors, and the economy are concerned about a corporation's performance (HongXing et al., 2024; Mansour et al., 2024b; Marei, 2024; Xu et al., 2022). It effectively distributes and manages resources while evaluating financial health. Effective resource acquisition and management are crucial for establishing a competitive advantage and improving company performance (Gallegos Mardones and Ruiz Cuneo, 2020). Ramli et al. (2019) identified additional factors that impact performance, such as growth, industry characteristics, corporate governance (Alshehadeh et al., 2024), company age, size, liquidity, and capital structure. CapSt is a critical factor in financial decisions (Bajaj et al., 2021). It increases investment prospects (Bajaj et al., 2021), improves business performance, and ensures firm survival (Pathak and Chandani, 2023). Senior executives recognized CapSt importance in company development and profitability (Attia et al., 2023; Mansour et al., 2020; Nikhil et al., 2024). Thus, the CapSt-Performance nexus has long been the

subject of theoretical and empirical dispute (Oanh et al., 2023). The firm is concerned with balancing debt and equity funding sources (Mansour et al., 2023a). The pressing issue in corporate finance is the existence of an optimal CapSt. A company's CapSt influences its future source of funding, risk profile, cost of debt (Mansour et al., 2023c), liquidity position (Brendea et al., 2022), and firm value (Dao et al., 2020). This topic has been investigated extensively and contributes significantly to the study of CapSt through theoretical frameworks.

Most prior research on the CapSt-Performance link focuses on industrialized nations. Conflicting hypotheses affect prior studies (Habibniya et al., 2022). Diverse viewpoints are found in the literature. Modigliani and Miller (1958) proposed a perfect market framework that establishes irrelevance theory (Hamouda et al., 2023). CapSt propositions only apply in ideal markets, not in real-world conditions. Other theories, like agency (Jensen and Meckling, 1976), trade-off (Kraus and Litzenberger, 1973), signaling (Ross, 1977), and pecking order (Myers and Majluf, 1984), assume imperfect capital markets (Mansour et al., 2023b). CapSt is essential for profitability, performance, and corporate value, regardless of irrelevant arguments. There is no consensus among empirical studies (Ahmed et al., 2023; Chauhan et al., 2024; Dao et al., 2020; Essel, 2023; Heckenbergerová and Honková 2023; Nikhil et al., 2024; Tesema, 2024). Several empirical studies, including Abdullah and Tursoy (2021), Ahmed and Bhuyan (2020), Chauhan et al. (2024), and Ibhagui and Olokoyo (2018), have demonstrated a positive correlation between capital structure, corporate financial decisions, and financial performance across various nations, emphasizing the significance of this relationship. Conversely, a negative association between them was observed by Ahmed et al. (2023), Essel (2023), Fosu et al. (2016), Kalash (2023), Li et al. (2019), Nikhil et al. (2024), Tesema (2024) and Yazdanfar and Öhman (2015). Attia et al. (2023) find a linear relationship, while Le and Nguyen (2020) find a nonlinear link. Inconsistent findings from recent studies suggest that the association between CapSt-Performance depends on the context. Thus, Akhtar et al. (2022) have validated the existence of an inverted U-shaped correlation between financial leverage and performance.

Methodological problems, sample size, timeframe, performance indicators, and institutional inequalities are plausible explanations for this uncertainty (Brendea et al., 2022; Fekadu Agmas, 2020; Khalaf et al., 2024). Prior research focused on CapSt effects on developed nations (Yazdanfar and Öhman, 2015), but scholars have found differences in CapSt for companies in developing countries (Bajaj et al., 2021). The financial literature fails to address the specific CapSt needs of companies, sectors, environments, and economic cycles. The lack of unanimity is the primary motivation for this study. Firms in less developed economies have distinct characteristics compared to those in developed economies (Bajaj et al., 2021; Hamouda et al., 2023). Understanding financing disparities requires studying emerging economies and conducting cross-country studies.

The main objective of this research is to evaluate how CapSt affects the performance of MENA-listed companies in thriving capital markets, as it provides a fascinating case study. Considering inconsistent findings, the current study aimed to delve deeper into the CapSt-performance relationship in 11 MENA countries by studying static and dynamic panel data of 687 companies (2013–2022), unlike past

investigations, which were limited in scope (single country). MENA region's transition to a market-oriented economy necessitates firms to focus on financing strategies. The market's environment can cause financing decisions to be incomplete and irregular. Understanding the effect of corporate CapSt levels on accounting performance is vital for MENA-listed companies. Corporations should align actions to maximize value. It is worth exploring if their financing decisions affect accounting performance similarly to value-maximizing economies like the US, UK, and Western Europe (Al-Zoubi and Sha'ban, 2023). The region's financial markets are becoming part of the global economic system.

This paper contributes valuable insights to existing corporate financial literature. First, previous research on the CapSt-performance relationship has primarily focused on one country (Ayaz et al., 2021) or advanced countries (Fosu et al., 2016). This study explores the relationship using a panel dataset from 11 MENA countries. Compared to developed economies, this research focuses on an overlooked area of understanding MENA-listed companies' financing mechanisms. This paper provides fresh insights into corporate financial decisions. Second, it highlights the economic practices of MENA-listed companies, an area often overlooked compared to developed countries. Third, using fixed-effects analysis, two-step system GMM estimators, and panel quantile regression, we investigate the correlation between CapSt and ROA, addressing the methodological limitations of previous studies.

Our study finds a favorable association between CapSt level and accounting performance in MENA-listed companies. Our research provides valuable insights into a crucial factor that impacts the accounting performance of companies in MENA countries: CapSt. From a methodological standpoint, we reveal that conditional mean regression obscures crucial quantitative influences of the predictor variable on the predicted variable. The findings hold several significant implications for policymakers, investors, management, researchers, and regulatory bodies.

The study is divided into the following sections. In section 2, the theoretical background is explored. The focus of section 3 is on the literature review and hypothesis development. In section 4, the focus is on the data and research methodology. We discuss the empirical results and data analyses in section 5. Finally, section 6 offers conclusions and outlines the future directions for this research topic.

2. Theoretical background

The intricate nature of corporate financing decisions demands a comprehensive understanding, as existing theories can only offer limited explanations for certain aspects of the diverse and complex financing choices. Numerous scholars have pursued the lead and various theories have emerged to solve the CapSt puzzle (Bajaj et al., 2021). Theories aim to create an optimal "capital structure" for companies, improving performance by selecting the right mix of "debt & equity" financing (Mansour et al., 2023b). According to Modigliani and Miller's (1958) research, the value of a business is not influenced by its CapSt, as they sought to define the relationship between CapSt and company value "performance"; known as the irrelevance theorem (Ibhagui and Olokoyo, 2018). A considerable body of proof indicates that a corporation's CapSt affects its value (Jensen and Meckling, 1976),

implying that a company may modify its value and performance by adjusting the desired debt-to-equity ratio. According to Miller and Modigliani's (1963) research, using tax-deductible expenses can help lower a company's tax payments and thus improve its overall cash flow. They also found a positive correlation between a company's debt levels and value. Companies can increase their value by increasing debt levels (Berger and di Patti, 2006). This argument is supported by many studies (Ahmed and Bhuyan, 2020). After this endeavor, several theories were developed. Based on asymmetric information and signaling theories, some authors suggested that asymmetric information amongst owners, managers, and lenders results in imperfect loan pricing and debt. In this scenario, the level of debt a firm carries can be seen as a positive signal of its good-quality performance. This is congruent with Ross (1977) signaling theory, in which the choice of debt-to-equity ratio is independent of the optimal notion and instead represents a company's desire to convey particular messages to investors (Dao et al., 2020). Some argue that corporate debt and company performance positively correlate (Attia et al., 2023).

Other scholars who have examined agency theory (Jensen and Meckling, 1976) also support the positive correlation between corporate debt and its performance (Singh and Bagga, 2019). This assertion suggests that corporate debt is a powerful tool for controlling free cash flow and avoiding the corporate costs of bankruptcy, as stated by Jensen (1986). Contrarily, some researchers (Al-Haddad et al., 2023; Das et al., 2022; Yazdanfar and Öhman, 2015) have suggested that debt policy hurts a company's performance because of conflicting interests between shareholders and creditors. The agency theory elucidates how conflicts of interest among managers, owners, and creditors can affect a company's financing choices. When managers prioritize their interests over the objectives of the business owners, decisions may not maximize company value (Neves et al., 2020). Additionally, creditors may be reluctant to extend credit to high-risk projects without sufficient guarantees, given that shareholders or managers might invest in projects with a negative net present value. Thus, if the project fails, creditors may suffer losses.

According to Myers and Majluf (1984) pecking order theory, firms prefer debt over equity when seeking additional financing. Even in today's market with less information asymmetry (Das et al., 2022), supporters of the theory believe that using equity sends an undesirable signal to the company (Vo and Ellis, 2017). Besides a company's desire to secure the least expensive funding source (Bajaj et al., 2021), the supply of funds is influenced by other factors, for instance, the company's development stage, whether it is a start-up or a mature organization (Ahmed and Bhuyan, 2020).

As per trade-off theory, the capital choice of a business involves balancing the advantages of debt-related tax savings against the burdens of financial distress. Corporations using the trade-off approach determine their ideal debt-to-equity ratio and strive to reach the predicted optimal ratio, which differs based on their characteristics (Dao et al., 2020). Baker and Wurgler (2002) introduced the market timing theory based on capital market imperfections. Decisions made by companies take into consideration stock market value and timing. Corporations prefer issuing high-value shares and repurchasing when undervalued (Singh and Bagga, 2019). This approach relies on the current state of debt and stock markets. Corporations issue

equity when it seems most helpful based on market timing theory.

Opposing arguments exist in the theoretical literature about the relationship between CapSt and corporate performance. However, determining the appropriate CapSt for companies in different industries and economic conditions remains a subject of ongoing research (Pathak and Chandani, 2023). The lack of agreement drives this study.

3. Literature review and hypothesis development

Corporate firms focus on maximizing shareholder value through profit generation. Decreasing capital costs and boosting share prices are key to maximizing shareholder value. The ideal combination of debt and equity lowers capital costs. Companies use debt or equity to fund their operations (Al-Nohood et al., 2024a; Khalaf et al., 2023; Oanh et al., 2023). Ahmed and Bhuyan (2020) and Hamouda et al. (2023) have found CapSt link to corporate performance crucial in various countries.

Determining the optimal levels of debt and equity to maximize shareholder wealth is a crucial aspect of CapSt management (Habibniya et al., 2022). However, several theories in contemporary corporate finance have evolved over the last sixty years to assist in solving the CapSt dilemma (Attia et al., 2023). These theories explain how a company may create an optimal "capital structure," which improves business performance by selecting the appropriate debt financing and equity mix. Depending on the theoretical arguments, many studies focus on the applicability of theories of CapSt in various environments (Al-Nohood et al., 2024b; Kalash, 2023; Singh and Bagga, 2019). Nonetheless, the majority of studies focused on corporations in industrialized countries (Neves et al., 2020).

Recent empirical research has revealed inconsistent results, indicating that this association is subject to certain situations. Margaritis and Psillaki (2010) found a positive link between financial leverage and firm performance in New Zealand, supporting agency theory. Based on agency theory, Berger and di Patti (2006) found a positive correlation between CapSt and corporate performance in the US banking industry. Utilizing data from 272 American-listed companies (2005–2007). Gill et al. (2011) found a positive correlation between CapSt measures and ROE in the same setting. Habibniya et al. (2022) found a negative relationship between CapSt and corporate performance in the US telecom industry (2012–2020), contradicting the agency hypothesis. Recent evidence by Ahmed and Bhuyan (2020) suggests a positive correlation between the CapSt-Performance of Australian service firms (2009–2019). Hence, Margaritis and Psillaki (2010), there was a significant and positive correlation between CapSt and French corporate performance (2002–2005). Another evidence from a European country by Abdullah and Tursoy (2021). They confirmed a positive relationship between CapSt and non-financial German-listed company performance (1993–2016). The results are being explained by the advantages of the tax shield and inferior costs of debt issuance as compared to equity.

In a different vein, Ibhagui and Olokoyo (2018) found evidence supporting the signaling theory, showing a positive influence of leverage level on Tobin's Q, a market-based performance measure, in Nigeria's non-financial sector. Consistent with agency cost, trade-off theory, and signaling theories, the study conducted by

Bandyopadhyay and Barua (2016) supports the notion that debt financing positively influences companies operating profitability in the Indian market, based on dynamic panel data regression (1998–2011).

In contrast, in a study of UK firms, Fosu et al. (2016) found that CapSt had a negative influence on firm value, based on agency cost and pecking order theories. Similarly to previous research, Yazdanfar and Öhman (2015) observed a negative correlation between CapSt measures and the performance of Swedish firms. Also, based on data from 15 European countries, Li et al. (2019) observed a negative association between the debt ratio and firm performance in 2012. Furthermore, the findings of Brendea et al. (2022) based on data from 8 Central and Eastern European countries demonstrate a negative relationship between debt ratio and corporate performance, undermining the agency costs premise. Mansour et al. (2023b) demonstrated a strong positive relationship between the two variables, employing rigorous controls to address endogeneity concerns and utilizing alternative metrics for capital structure. The study by Singh and Bagga (2019) finds that debt ratios have a significant positive effect on the profitability of Indian companies, using ROA and ROE as indicators. Additionally, Gallegos Mardones and Ruiz Cuneo (2020) found a negative correlation between debt measures and corporate performance measures in Latin American companies, specifically those in Brazil, Mexico, and Peru. Despite this, Chilean companies are experiencing positive results.

In developing contexts, Shubita (2020) and Shubita and Alsawalhah (2012) discovered a notable inverse correlation between debt and industrial sector profitability in Jordan. Recent evidence by Essel (2023) uncovered a negative correlation between CapSt indicators and corporate performance for firms listed on the Ghana Stock Exchange (2010–2020). The study conducted by Heckenbergerová and Honková (2023) found that the data and analysis from Czech companies do not align with the debt financing suggested by specific CapSt theories. According to Tesema (2024) findings, both measures of CapSt negatively and significantly impact company performance in Ethiopia, thereby supporting the pecking order theory. Similarly, the empirical findings from the Tehran Stock Exchange data from 2011 to 2019 uncovered a negative correlation between CapSt and firm performance. In contrast, Chauhan et al. (2024) demonstrate that Indian MFIs exhibit significant leverage and a reciprocal relationship between CapSt and financial and social performance indicators. Akhtar et al. (2022) have also validated the existence of an inverted U-shaped correlation between financial leverage and the performance of Pakistani non-financial listed firms.

Bajaj et al. (2021) highlight the need for studying underdeveloped economies and conducting cross-country analyses. There is a lack of studies on how CapSt affects accounting performance of MENA firms, especially using quantile regression in this region. Investigating companies' CapSt in MENA is crucial. Observing CapSt impact on accounting performance in these countries is important for companies and investors in these regions. Institutional structures vary in developing and developed countries. Findings from previous research cannot be generalized to different contexts like MENA countries with diverse funding methods.

Previous cross-country analyses have often excluded MENA countries from the analysis of the CapSt-Performance connection (Brendea et al., 2022; Gallegos

Mardones and Ruiz Cuneo, 2020; Li et al., 2019). Consequently, this work strives to address the crucial void in the current literature. The results suggest a possible link between CapSt and corporate performance. This matter is still the subject of ongoing debate. Few studies have explored this topic in the MENA region, despite the uncertain connection between CapSt-Performance. Hence, the study suggests the following hypothesis:

H1: There is a positive association between CapSt and corporate performance.

4. Methodology

4.1. Data collection

Most of the data for this research came from the Thomson Reuters database, a firm-specific variable source. We also used the World Bank's World Development Indicators (WDI) database to collect macroeconomic country statistics. We employed a variety of filtering parameters to ensure the sample's appropriateness. To achieve credible estimations, we first chose only companies with at least 10 years of data. Resultantly, our sample covers all publicly traded corporations in MENA nations that submitted the required data. Algeria, Libya, and Yemen were excluded from the study as these countries had no data for ten consecutive years and a few observed companies. Bahrain, Qatar, Palestine, Morocco, Egypt, the United Arab Emirates (UAE), Tunisia, Saudi Arabia, Jordan, Oman, and Kuwait comprise the final sample. The initial sample comprised 763 companies from these 11 countries. Seventy-six companies were excluded because data covering the complete ten years were absent. Variables with extreme values were winsorized at the 1st and 99th percentiles to restrict the power of outliers. Thus, the MENA region is of great interest for this study, as it comprises several emerging market economies that employ varied corporate financing strategies in different sectors. There are 687 businesses and 6870 firm-year observations in all. Consequently, the data gathered during the study years was deemed adequate for the study's objectives and has led to a balanced panel dataset.

From 2013 to 2022, the MENA region went through major economic shifts, such as oil price changes, political instability, regulatory adjustments, and economic reforms (Albaity et al., 2023; Attia et al., 2023). Examining the factors impacting a company's CapSt decisions and performance during this time is valuable. This time also encompasses the aftermath of the 2008 global financial crisis, which has had long-term effects on the worldwide economy (Hamouda et al., 2023). By understanding how MENA companies adapted their capital structure, we can learn valuable lessons for future economic crises. In addition, when collecting data for this study, the most recent year for which data was available was 2022.

Reforms can upgrade MENA region's stock markets from frontier to emerging markets. Despite progress, MENA enterprises still face weak institutions with limited investor protection, bankruptcy legislation, and property rights insecurity. This will affect their access to capital and optimal CapSt. **Table 1** shows CapSt variance across enterprises and countries. MENA enterprises prefer equity due to limited access to finance.

Table 1. The study sample (Source: Authors' calculation).

	Country	No. of firms	Obs.	%	CapSt
1	Bahrain	11	110	1.601%	22.239%
2	Qatar	24	240	3.493%	28.212%
3	Palestine	11	110	1.601%	15.217%
4	Morocco	58	580	8.443%	21.861%
5	Egypt	142	1420	20.669%	22.601%
6	UAE	43	430	6.261%	17.549%
7	Tunis	26	260	3.785%	36.729%
8	Saudi Arabia	109	1090	15.866%	29.539%
9	Jordan	96	960	13.973%	21.291%
10	Oman	80	800	11.645%	41.362%
11	Kuwait	87	870	12.663%	28.783%
Total		687	6870	100%	26.71%

4.2. Econometric specification of study model

In a study sample of MENA-listed companies, this regression model examines the relationship between CapSt and corporate performance for balanced panel data:

$$ROA_{i,t} = \beta_0 + \beta_1 CapSt_{i,t} + \beta_2 CSIZE_{i,t} + \beta_3 CAGE_{i,t} + \beta_4 LIQ_{i,t} + \beta_5 CPI_{i,t} + \beta_6 INF_{i,t} + \beta_7 GDP_{i,t} + \beta_8 Year + \beta_9 Industry + \epsilon_{i,t}$$

'*i*' represents companies 1–687, and '*t*' represents the study period 2013–2022. **Table 2** has variable definitions for this study. Initially, we used panel data regressions with fixed effects to evaluate our prediction. Panel data was used to address multicollinearity (Geng et al., 2023; Saleh and Islam, 2020), leading to more accurate results (Abdullah and Tursoy, 2021). Longitudinal data controls heterogeneity and minimizes bias. Unobserved heterogeneity reduction can alleviate endogeneity problems. Thus, this study used the two-step system GMM for dynamic panel data estimation besides the robust fixed-effects model. To prevent biased estimates (Neves et al., 2020; Saleh et al., 2021), this approach incorporates orthogonal conditions on the variance-covariance matrix, accounting for correlated errors, heteroscedasticity, simultaneity, and measurement errors (Akhtar et al., 2024; Xu et al., 2022). By internally manipulating the data and incorporating lagged values of the dependent variable, this technique effectively addressed any potential reverse causality in the estimated relationship (Saleh and Maigoshi, 2024). Two-step system GMM estimators enable the inclusion of lagged dependent variable (ROA_{t-1}) and lagged endogenous variables in both levels and differences (Le and Phan, 2017). Moreover, it allows the measurement of strictly exogenous factors at both levels and in differences (Akhtar et al., 2022; Kalash, 2023).

We employ the quantile regression method, based on prior literature (Margaritis and Psillaki, 2010), which proves advantageous (Le and Nguyen, 2020). Our approach involves panel quantile regression to study the CapSt-ROA correlation at different quantiles. Utilizing this approach provides a notable benefit as it considers all potential outcomes (Saleh et al., 2020), leading to a comprehensive understanding of the relationship between the variables of concern (Koenker and Bassett, 1978). This

technique estimates variables at the median and other quantiles of ROA. Panel quantile regression analysis is more reliable than OLS for parameter estimation because it does not assume the error term distribution. The quantile technique allows researchers to choose any desired quantile for parameter estimation, customizing the model to their specific parameters (Margaritis and Psillaki, 2010). Koenker and Bassett (1978) introduced this technique to overcome OLS limitations. It is stronger than OLS with non-normal error terms. Additionally, it controls for individual heterogeneity (Koenker and Hallock, 2001; Saleh and Mansour, 2024).

Table 2. Operational variables of analysis.

Variable	Acronym	Measurement
Explained variable		
Company performance	ROA	Measured as: Net income/total assets
Explanatory variable		
Capital structure level	CapSt	Measured as the ratio of total debt to total assets
Covariate variables:		
Country-specific variable		
Corruption perceptions index	CPI	An index to measure corruption in countries
Gross domestic product growth (annual %)	GDP	This metric provides a broad assessment of the overall productivity of a country.
Inflation, consumer prices (annual %)	INF	As appeared by the consumer price index
Company-specific variable		
Company size	CSIZE	Measured by the natural logarithm of total firm assets
Company age	CAGE	Natural logarithm of the number of years since company establishment.
Liquidity	LIQ	Measured as the ratio of current assets to current liabilities.

4.2.1. Accounting performance (ROA)

Corporate performance indicates how well resources are managed to gain a competitive edge, while good performance signifies efficient management of investment and financing choices (Alodat et al., 2023; HongXing et al., 2024; Mansour et al., 2023a; Marei, 2023; Saleh et al., 2021; Saleh et al., 2022). The dependent variables in the aforementioned equation are Return on Assets (ROA). The accounting and finance literature uses this popular ratio to measure corporate performance (Al-Zoubi and Sha'ban, 2023; Mansour et al., 2022a; Mansour et al., 2022b). Researchers often turn to accounting-based ROA to obtain a more holistic view of company performance (Mansour et al., 2024a; Mansour et al., 2024b; Xu et al., 2022).

4.2.2. Capital structure (CapSt)

The utilization of financial CapSt will cause both advantages and drawbacks, ultimately affecting the value and performance of the company (Hamouda et al., 2023). Consequently, there is a growing need for businesses worldwide to acknowledge the significance of financial CapSt (Bajaj et al., 2021). Examining CapSt theory and its correlation with corporate performance has been a significant topic in the literature on corporate finance (Attia et al., 2023). Given the objective of this study, CapSt has been designated as an independent variable to investigate its correlation with financial performance. The CapSt refers to the combination of debt and equity in

corporate financing (Mansour et al., 2023b). Various financial leverage ratios are used in the literature to evaluate the CapSt, including total debt to total assets, total debt to total equity, as well as long and short-term debt ratios (Ahmed et al., 2023; Chauhan et al., 2024). Therefore, this study adopted the "total debt to total assets" ratio to evaluate the company's CapSt (Oanh et al., 2023; Mansour et al., 2024a; Saleh and Mansour, 2024).

4.2.3. Control variables

To establish a credible correlation between ROA and CapSt, it is vital to incorporate control variables. In this study, various control variables were incorporated (Al-Zoubi and Sha'ban, 2023; Mansour et al., 2023d; Geng et al., 2023; Neves et al., 2020; Oanh et al., 2023), including country-specific factors (CPI, INF, and GDP) and company-specific characteristics (CSIZE, CAGE, and LIQ), to consider additional influencing factors (Al-Qaisi and Shubita, 2013). By effectively isolating the influence of CapSt on ROA, addressing potential biases (Mansour et al., 2024b; Tran et al., 2023), and deriving more precise conclusions, incorporating control variables becomes crucial. By using multiple control variables, we can obtain accurate results and draw reliable conclusions.

Country-specific control variable

The legal, cultural, and institutional contexts of different countries can influence the relationship between CapSt and a company's performance. Rules, social norms, and legal obligations can influence financing decisions made by businesses. Researchers can examine country-specific characteristics as control variables to gain a better understanding of CapSt role in a company's overall operations. This will aid in distinguishing the distinctive effects of CapSt in a particular business setting. Akhtar et al. (2022), Le and Nguyen (2020), Neves et al. (2020), Ramli et al. (2019), and HongXing et al. (2024) emphasized the significance of both firm-specific and macro factors in relation to corporate performance. Several country-specific factors, like CPI, GDP, and the INF rate, were controlled in this study.

The influence of distinct legal, cultural, and institutional contexts on the connection between CapSt and accounting performance should be considered. Rules, societal conventions, and legal obligations influence corporate financing choices (Ramli et al., 2019). Scholars can distinguish the specific impacts of CapSt in the broader operational context of businesses by considering country-specific characteristics as control variables. Akhtar et al. (2022) and Attia et al. (2023) explained that firm-specific factors and broader macroeconomic factors influence the performance of corporations. This paper uses the Corruption Perceptions Index (CPI), which is compiled and provided by Transparency International, among macroeconomic variables. The CPI measures the perception of corruption among politicians and public officials in an economy. Compared to other corruption indices, the CPI shows maximum time series and cross-sectional variation. Corruption is expected to have a negative impact on firms' accounting performance (Van Vu et al., 2018). We also use the GDP growth rate to control the country's economic conditions (Attia et al., 2023). In addition, we used the inflation rate to control the economic environment's instability (Akhtar et al., 2022).

Firm-specific control variables

By accounting for multiple firm attributes, the study determined the influence of CapSt on accounting performance (Pathak and Chandani, 2023). In a similar manner to the relevant literature (Akhtar et al., 2022; Attia et al., 2023; Mansour et al., 2024a; Mansour et al., 2023b; Tran et al., 2023), this study employed company-specific attributes, such as company size, age, liquidity. Akhtar et al. (2022) and Mansour et al. (2024b) identified helpful firm-specific characteristics in examining corporate performance. The inclusion of these attributes as control variables allows for a more accurate assessment of the direct impact of CapSt on accounting performance (Ramli et al., 2019). The size of a company can influence differences in the operating environment (Mansour et al., 2024a), business diversification, market access, and information asymmetry, which in turn affects its performance (Akhtar et al., 2022; Al-Haddad et al., 2023; HongXing et al., 2024; Mansour et al., 2024b). Previous studies indicate that age and total debt have a negative relationship (Akhtar et al., 2022; Chauhan et al., 2024), as older companies rely more on earnings and less on external debt (Alodat et al., 2023). Debt is crucial for younger companies since they don't have a history of revenue from previous investments (Neves et al., 2020). According to Le and Phan (2017), liquidity indicates accounting performance and prospects. Companies with high levels of liquidity are anticipated to show strong performance and enjoy more excellent investment prospects. Furthermore, companies with a significant cash reserve can provide financial backing for new initiatives, distribute dividends, or ease financial difficulties. Hence, a positive association between liquidity and accounting performance is predicted. In order to consider the potential influence of macro shocks on a company's performance (Mansour et al., 2024a), this paper incorporates year and industry dummies in our analysis.

5. Results and discussion

5.1. Descriptive statistics

Within **Table 3**, you can find the descriptive statistics and outcomes of the normality test conducted on the variables of 6870 MENA-listed companies. Specifically, the ROA values range from −31.7% to 83.1%, with a mean value (standard deviation) of 11.9% (0.203), which is higher than the study conducted by Attia et al. (2023). The ROA statistic closely aligns with Latin American companies (Gallegos Mardones and Ruiz Cuneo, 2020). The CapSt ranges from 1.7% to 98.7% with a mean value and standard deviation of 26.71% and 2.864, respectively. These values are slightly higher than the Attia et al. (2023) study, but very close to the Hamouda et al. (2023) study, indicating heterogeneity in CapSt among companies. This suggests that companies in the MENA region still prefer equity over debt due to limited credit access (Attia et al., 2023). **Table 3** presents descriptive statistics for the company-specific control variables. The study found variations in company size, age, and liquidity. Company size ranged from 12.34 to 25.586, with an average value (standard deviation) of 19.038 (1.855). Company age varied from 1 to 118 years, with an average of 31.23 years and a standard deviation of 18.194. Company liquidity ranged from 0.5% to 92.5%, with an average of 1.725% and a standard deviation of

3.253. Additionally, the average values for CPI, INF, and GDP were 45.8%, 4.029%, and 2.447%, respectively.

Table 3. Descriptive statistics and normality results.

Variables	Obs.	Mean	Std. Dev.	Min.	Max.	Skewness	Kurtosis
ROA	6870	0.119	0.203	−0.317	0.831	−0.321	2.264
CapSt	6870	0.2671	2.864	0.017	0.987	0.392	1.917
CSIZE	6870	19.038	1.855	12.34	25.586	0.2344	3.0171
CAGE	6870	31.23	18.194	1	118	−0.395	3.217
LIQ	6870	0.01725	3.253	0.005	0.925	0.73	2.441
CPI	6870	45.8%	0.0988	30%	71%	0.7684	3.3374
INF	6870	4.029%	5.356	−2.5%	29.5%	1.038	2.842
GDP	6870	2.447%	3.179	−11.3%	8.9%	−0.8657	3.67

Table 3 displays the normality test results for detecting outliers using skewness and kurtosis. Variables are normally distributed if skewness <|3| and kurtosis <|10|. The study sample had a normal distribution, as indicated by the findings.

5.2. Pearson correlation matrix (bivariate correlations)

Table 4 presents the correlation matrix, showcasing the relationships among the continuous variables. Before conducting our formal empirical investigation, we used Pearson's correlations to gain a basic understanding of the relationships between the selected variables. The findings showed that, at a significance level of 5% or higher, there was a positive correlation between capital structure (CapSt), age (CAGE), business size (CSIZE), Gross Domestic Product growth (GDP), and accounting

Table 4. Correlation matrix and multicollinearity test.

Variable	ROA	CapSt	CSIZE	CAGE	LEQ	CPI	INF	GDP
ROA	1.000							
CapSt	0.1617* 0.0000	1.000						
CSIZE	0.1656* 0.0000	0.1570* 0.0000	1.0000					
CAGE	0.0605* 0.0000	−0.1273* 0.0000	−0.1078* 0.0000	1.000				
LEQ	−0.1586* 0.0000	−0.3267* 0.0000	−0.1116* 0.0000	0.0216* 0.0739	1.000			
CPI	−0.0349* 0.0038	0.1246* 0.0000	0.2160* 0.0000	−0.2437* 0.0000	−0.0522* 0.0000	1.000		
INF	−0.1082* 0.0000	−0.1035* 0.0000	−0.1251* 0.0000	0.1534* 0.0000	−0.0033 0.7831	−0.5832* 0.0000	1.000	
GDP	0.0561* 0.0000	−0.0305* 0.0114	−0.0217* 0.0722	0.0251* 0.0378	−0.0106 0.3797	−0.1537* 0.0000	0.3618* 0.0000	1.000
VIF	-	1.16	1.08	1.081	1.13	1.63	1.72	1.16

Note: the * $P < 0.05$ (2-tailed).

performance (ROA). In contrast, the data revealed a negative relationship between the

company's liquidity (LIQ), Corruption Perceptions Index (CPI), inflation rate (INF), and ROA. **Table 4** presents the relationship between explanatory factors. Additionally, the VIF ratios were below 10, indicating no significant issues of multicollinearity among the variables (Fekadu Agmas, 2020).

5.3. Multivariate regression analysis

The current study delved into the fundamental question about the underlying model of ROA determination, as described in the equation mentioned earlier. Using multivariate regression analysis, we analyzed the panel dataset of publicly MENA companies from 2013 to 2022, capturing the relationship and magnitude of the association between independent and dependent variables. CapSt stands out as the primary variable for explanation.

As a result, we expected the hypothesis (H1) to be supported by a positive and significant calculated coefficient of β_1. The regression models in this study incorporated diverse control variables, such as country-specific factors and company-specific elements, besides year and industry. The multivariate analysis assumptions were scrutinized in the current study before conducting the primary regression analysis, for the purpose of data preparation and screening. Heteroscedasticity and autocorrelation were among the common issues detected in the raw data through relevant diagnostic tests in this study. Therefore, the Driscoll-Kraay estimator, a robust standard error, was used to validate the results. Furthermore, the present study successfully determined the optimal method to evaluate the regression model by conducting various tests, such as the Breusch and Pagan (LM) and then the Hausman tests, to accomplish the study objective (Akhtar et al., 2022; Akhtar et al., 2024). According to **Table 5**, the LM test results (1305.38, $p < 0.01$) clearly demonstrate that the RE model outperforms the OLS model. In addition, the Hausman test (211.50, $p < 0.01$) provided evidence in favor of using the fixed-effects model instead of the random-effects model. In particular, the fixed-effects model, incorporates time effects, minimizes bias caused by unobservable heterogeneity, and resolves endogeneity problems (Mansour et al., 2023c). Hence, the researchers in the ongoing study utilized a fixed-effects model to examine the connection between CapSt and ROA. **Table 5** presents the FE estimates illustrating the relationship between CapSt and ROA, which have strong explanatory power.

The ROA model's R^2 was 31.3%, showing how explanatory variables explain the change in ROA. The *F*-test value of 112.47 showed statistical significance at the 0.01 level, confirming the validity of the study model. The positive evinced coefficient suggests CapSt enhances corporate performance, showing that leveraging serves as a successful tactic in curbing managerial self-interest, especially helpful for MENA listed-companies in relation to debt cost financing. The CapSt of MENA companies and the ROA were predicted to have a positive association by the efficiency hypothesis (H1). There seems to be a strong correlation between CapSt and companies' ROA in the MENA region. The study has shown a significant positive association ($t = 3.96$, $p < 0.01$) between these two variables. The findings suggest that in MENA-listed companies, the advantages of debt in terms of tax saving may surpass the costs associated with financial distress. It suggests that MENA CapSt with higher debt may

be able to generate more economic benefits for their shareholders by achieving higher ROA. The economic findings show that a one-unit change in MENA companies' CapSt is associated with an 8.1-cent change in ROA in the same direction.

Table 5. The results of fixed-effects analysis for CapSt & ROA Nexus.

Variables	**Coef.**	**Std. Dev.**	***t***	***p*** > |***t***|
Cons.	0.09589	0.0317	3.02*	0.003
CapSt	0.08111	0.0205	3.96*	0.000
CSIZE	0.07032	0.01314	5.35*	0.000
CAGE	−0.0721	0.01976	−3.65*	0.000
LIQ	0.04	0.01	3.99*	0.000
CPI	−0.08635	0.021	−4.09*	0.000
INF	−0.0817	0.0221	−3.70*	0.000
GDP	0.00452	0.00252	1.79***	0.073
Year dummy	√			
Industry dummy	√			
Country dummy	√			
F-test	112.47*			
R^2	0.313			
Breusch & Pagan (LM) test	1305.38*			
Hausman test	211.50*			
Obs.	6870			
No. of companies	687			

Notes: * $p < 0.01$, ** $p < 0.05$, and *** $p < 0.1$; † p is insignificant.

The correlation between the CapSt level and ROA is congruent with agency theory (Ayaz et al., 2021), which posits that firms may use higher debt levels to ease agency issues and improve corporate performance (Mansour et al., 2023b). Moreover, the positive relationship observed between debt and corporate performance supported the predictions of the signaling theory regarding asymmetric information (Margaritis and Psillaki, 2010). The reason behind this debate is that profitable companies can indicate their success by having high levels of gearing (Ramli et al., 2019), leading to a positive connection between CapSt and corporate performance. According to Ibhagui and Olokoyo (2018), researchers argue that the gains from the CapSt level are substantial, and debt utilization enhances corporate performance because the earnings generated exceed the average interest expense at the CapSt level. Furthermore, research conducted in other countries like Malaysia, Ethiopia, South Africa, Nigeria, and Jordan (Ayaz et al., 2021; Fekadu Agmas, 2020; Fosu, 2013; Ibhagui and Olokoyo, 2018; Mansour et al., 2023b; Shubita, 2023) aligns with the current findings. The positive connection between CapSt and MENA companies' performance contradicts with debt irrelevance theory. The theory's assumptions are too restrictive to be applicable in real-world scenarios.

Table 5 shows the regression results for the combination of control variables, namely CSIZE, LIQ and GDP had a positive association with ROA for MENA-listed companies. These results align with fresh evidence (Le and Nguyen, 2020; Mansour

et al., 2023b; Oanh et al., 2023). The relationship between company size and corporate performance highlights that larger firms in the MENA region gain advantages from economies of scale, diversification, and influence in markets. They also have greater access to technology and affordable sources of funding (Fekadu Agmas, 2020). In the ROA equation, the liquidity coefficients demonstrate positive significance at the 1% level, indicating that MENA companies with high liquidity can make more investments and mitigate financial distress problems (Le and Phan, 2017), ultimately enhancing business performance. The GDP growth positively affects ROA in MENA-listed companies, suggesting reduced reliance on external funds and decreased CapSt during economic expansion, per the pecking order theory. Sufficient funds are available internally during such periods. Investment opportunities often correlate with the state of the economy, showing a potential link between corporate performance and economic growth (Ramli et al., 2019). Economic growth leads to increased debt usage by companies.

The existing study also found a negative impact of CAGE, CPI, and INF on ROA; however, like the earlier research. The negative and significant relationship between company age and ROA suggests that newer companies are more capable of adapting to changing market dynamics (Neves et al., 2020). The significant negative coefficients of corruption and ROA demonstrate the substantial costs of increased corruption, including its adverse impact on sales growth, investment, and employment. The negative and statistically significant estimated coefficients of inflation rate and ROA demonstrate that increased inflation rates can jeopardize borrowers' budgets, impeding their ability to repay debt and threatening their liquidity (Neves et al., 2020; Ramli et al., 2019). The possibility of loan repayment becoming more risky increases with higher interest rates (Attia et al., 2023).

5.4. Additional analysis: Alternative measure of accounting performance

The obtained results so far rely on ROA as our accounting performance measure. We evaluate how our results are affected by a different measure of corporate performance (Return on Equity (ROE) which is calculated as Net income/shareholders' equity) in this section. The presentation of the results can be found in **Table 6**. The signs of the coefficients for our explanatory variable (CapSt) remain consistent based on the results. The estimated coefficients of the explanatory variables in the regression model continue to be negative and significant. These findings align with those from **Table 5**, where ROA was utilized as the outcome variable.

Table 6. The results of fixed-effects analysis for CapSt & ROE Nexus.

Variable	Coef.	Std. Err.	*t*	$p > \|t\|$
Cons.	0.0959	0.0356	2.70**	0.025
CapSt	0.01114	0.00599	1.86***	0.096
CSIZE	0.07032	0.0133	5.27*	0.001
CAGE	−0.03404	0.0195	−1.75***	0.081
LIQ	0.004	0.0113	3.54*	0.006
CPI	−0.099	0.0162	6.14*	0.000

Table 6. (*Continued*).

Variable	Coef.	Std. Err.	*t*	$p > \|t\|$
INF	−0.0817	0.01612	−5.07*	0.001
GDP	0.0136	0.00674	2.01***	0.075
Year dummy	√			
Industry dummy	√			
Country dummy	√			
F-test (16)	456.65*			
R^2	0.304			
Breusch & Pagan LM test	1119.193*			
Hausman test	132.850*			
Obs.	6870			
No. of companies	687			

Notes: * $p < 0.01$, ** $p < 0.05$, and *** $p < 0.1$; † p is insignificant.

5.5. Sensitivity analysis

We will expand on the existing ROA model presented in part 5.3 in this section. We aim to re-examine the relationship between CapSt and ROA and how it is affected by a company's size. To achieve this, we will rely on the extensive study conducted by Abdullah and Tursoy (2019), Mansour et al. (2023b) and Saleh and Maigoshi (2024), as their research offers valuable insights into the issue. Thus, we can calculate its size by applying the natural logarithm to the company's total assets, as recommended by Ibhagui and Olokoyo (2018). We separated the sample into two groups based on a mean value threshold of 19.038. The MENA-listed companies with total assets less than the mean are classified as smaller, while those with total assets greater than the mean are classified as larger (Danso et al., 2020). The findings in **Table 7** corroborate our conclusion that there is a considerable positive association between CapSt and ROA. The coefficient indications show that this association stays true whether the company is small or large in the MENA area.

Table 7. Panel regression analysis by focusing on companies' sizes.

Variable	Small-MENA Companies Coef. (*t*-statistics)	Large- MENA Companies Coef. (*t*-statistics)
Cons.	0.1727** (2.59)	0.0987** (2.58)
CapSt	0.0111*** (2.22)	0.0253* (3.63)
CSIZE	0 .0104* (4.66)	0.0811* (3.55)
CAGE	−0.0493** (−2.46)	−0.0303*** (−2.17)
LIQ	0.0449*** (1.77)	0.0478** (2.4)
CPI	−0.1794**** (1.81)	−0.131* (3.96)
INF	−0.0125** (2.08)	−0.0152** (2.95)
GDP	0.0452** (2.47)	0.0478** (2.3)
F-test	1906.94*	589.08*
R^2	0.471	0.343
Obs.	3349	3521
No. of companies	387	404

Notes: * $p < 0.01$, ** $p < 0.05$, and *** $p < 0.1$; † p is insignificant.

5.6. Endogeneity tests; system generalised method of moments (GMM) estimator

Biased results are likely because of the neglect of endogeneity concerns in most CapSt literature (Akhtar et al., 2022; Mansour et al., 2023b). When the explanatory variable is correlated with the error term, the estimates are messed up, and our conclusions can be totally wrong (Tesema, 2024). Multiple studies have identified measurement error, reverse causality, and omitted variable bias as the primary form of endogeneity concerns (Kalash, 2023; Mansour et al., 2023b). Dynamic panel data estimators like difference GMM and system GMM are employed to address endogeneity in panel data analysis with short time horizons and many cross-sections (Neves et al., 2020; Xu et al., 2022). Many scholars believe that the system GMM estimator is more effective than the difference GMM estimator in dynamic panel models (Le and Phan, 2017), especially in cases with short time horizons and large cross-sections (Akhtar et al., 2022; Akhtar et al., 2024). This approach accounts for correlated errors, heteroscedasticity, simultaneity, and measurement errors by incorporating orthogonal conditions on the variance-covariance matrix, preventing biased estimates (Xu et al., 2022).

Thus, besides the robust fixed-effects model, this study utilized the two-step system GMM for dynamic panel data estimation. This method was employed to remove possible endogeneity (Chauhan et al., 2024). This technique successfully tackled any potential reverse causality in the estimated relationship by internally altering the data and incorporating the lagged values of the dependent variable (Chauhan et al., 2024; Saleh and Maigoshi, 2024).

To verify the legitimacy of our instrumental variables and the correctness of our model, we conducted the first-order autocorrelation AR (1) and second-order autocorrelation AR (2) tests for first- and second-order serial correlation (Akhtar et al., 2022; Mansour et al., 2024a). The GMM method suggests detecting a correlation at the first-order level but not at the second-order level (Akhtar et al., 2024; Kalash, 2023). Additionally, the number of instruments must be smaller than the number of groups (Akhtar et al., 2022; Mansour et al., 2023c). We finally performed the Hansen test to check for over-identification restrictions (Akhtar et al., 2024; Mansour et al., 2023b).

These tests proved the validity of the two-step system GMM estimators (Le and Phan, 2017). According to Mansour et al. (2024a), the number of instruments (266) must be less than the number of companies (687), as shown in **Table 8**. **Table 8** displays the Hansen test results, showing that the ROA had perfect *p*-values (0.390). The results of the Arellano-Bond test revealed valuable insights about the effectiveness of the ROA model. The *p*-value for the AR (1) in the ROA model was 0.006. Moreover, the *p*-value for the same model's AR (2) was 0.725. Both the AR (1) result ($p < 0.01$) and the AR (2) result ($p > 0.1$) fall within the desired range, indicating the absence of serial correlation. This suggests we cannot reject the null hypothesis of no second-order serial correlation. Therefore, these findings provide additional evidence supporting the use of the GMM estimator.

Table 8. Results of dynamic panel data estimators by using two-step GMM estimators.

Variables	**Coefficients (Std. Err.)**	***P > t***
Constant	−0.1384 (0.0475)	0.004*
(ROA_{t-1})*	0.0426 (0.0121)	0.000*
CapSt	0.431 (0.0775)	0.000*
CSIZE	0.954 (0.158)	0.000*
CAGE	−0.2179 (0.093)	0.019**
LIQ	0.0689 (0.0184)	0.000*
CPI	−0.137 (0.0164)	0.000*
INF	−0.417 (0.0636)	0.000*
GDP	0.1933 (0.086)	0.028**
Year dummy	Yes	
Industry dummy	Yes	
Country dummy	Yes	
F	23.91	
Prob > *f*	0.0000	
Hansen J.	0.390	
AR (1)	0.006	
AR (2)	0.725	
Obs.	6870	
No. of companies	687	
No. of instrument	266	

* ($t - 1$) is the past explained variable (lagged of ROA). *** $P < 0.1$, ** $P < 0.05$, and * $P < 0.01$.

The lagged ROA coefficient in **Table 8** was statistically significant and positively related at the 1% level. The lagged ROA values influenced the current ROA values. Similarly, CapSt's positive impact on the ROA model remains consistently significant. While this finding contradicts some previous research (Akhtar et al., 2022; Nikhil et al., 2024; Tesema, 2024), it aligns with Chauhan et al. (2024), Abdullah and Tursoy (2021), and Ahmed and Bhuyan (2020) results. In addition, **Table 8** provides evidence that the outcomes from the system GMM estimator closely align with those from the FE regression model presented in **Table 5**, validating the reliability of our findings. The robustness analysis leads to the conclusion that H1 is supported. Thus, the sample companies we studied do not exhibit any signs of endogeneity problems.

5.7. Supplementary analysis; quantile regressions

To examine the primary relationship across different performance levels, a panel quantile regression analysis is utilized to explore the results in greater detail. We followed previous studies in reporting nine quantiles (0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, and 0.9) to examine the explanatory effect on MENA companies' performance across the conditional distribution (Le and Nguyen, 2020). The utilization of a novel research technique, allows us to examine the correlation between CapSt and the performance of MENA companies across different levels of accounting performance

(Nikhil et al., 2024). The outcomes of the impact of CapSt on corporate performance in MENA are documented in **Table 9** as follows. However, the primary emphasis of this study lies on the CapSt variable. CapSt and ROA exhibit a strong positive correlation, with a significant relationship observed except at the 10th and 20th quantiles in **Table 9**, showing that CapSt benefits high-performing companies but not low-performing ones. The variables CSIZE, CAGE, LIQ, and GDP exhibit a positive correlation with ROA, whereas CPI and INF display a negative correlation with ROA. These results are in agreement with the fixed-effects results presented in **Tables 5** and **6**. The signs of these relationships remain consistent across quantiles. CSIZE has a positive correlation with ROA, but the correlation is more pronounced in the lower quantiles and significantly stronger in the higher quantiles. For CAGE, there is a positive correlation between the coefficients and quantiles, as evidenced by the results reported in **Table 8**. LIQ and ROA have a positive relationship, which is significant at all quantiles in **Table 8** except the 10th and 20th percentile. Also, except for the 10th and 20th percentile, there is a significant negative relationship between CPI and ROA at all quantiles in **Table 8**. Overall, the relationship between LIQ and CPI with ROA is heterogeneous to some extent. At higher quantiles, the negative relationship between INF and ROA is much stronger. Finally, the coefficients of the GDP have a positive connection with ROA at all quantiles. In general, these findings validate the primary result, in agreement with the fixed-effects results shown in **Tables 5** and **6**, where the estimator predicts the average effect.

Table 9. Panel quantile regression analysis.

Variables / Quantile	10th Q	20th Q	30th Q	40th Q	50th Q	60th Q	70th Q	80th Q	90th Q
CapSt	0.1211 (0.0858)†	0.011 (0.0392)†	0.037 (0.0136)*	0.0341 (0.0153)**	0.025 (0.012)**	0.0609 (0.0141)*	0.084 (0.0147)*	0.0372 (0.0115)*	0.041 (0.00787)*
CSIZE	0.162 (0.0089)*	0.1341 (0.0084)*	0.108 (0.00715)*	0.0734 (0.0058)*	0.0643 (0.00594)**	0.425 (0.0532)*	0.3689 (0.0581)*	0.3723 (0.0638)*	0.314 (0.096)*
CAGE	0.347 (0.0852)*	0.374 (0.083)*	0.457 (0.071)*	0.476 (0.0613)*	0.4529 (0 .0569)*	0.447 (0.0488)*	0.564 (0.07)*	0.6069 (0.0576)*	0.564 (0.089)*
LIQ	0.0257 (0.0204)†	0.0262 (0.0257)†	0.0316 (0.018)***	0.2889 (0.103)*	0.3279 (0.191)***	0.0625 (0.0152)*	0.0848 (0.0132)*	0.0101 (0.00173)*	0.1589 (0.0203)*
CPI	−0.0599 (0.071)†	−0.0935 (0.0588)†	−0.0344 (0.0147)**	−0.0341 (0.0102)*	−0.0333 (0.1058)*	−0.023 (0.0097)**	−0.083 (0.0455)***	−0.01235 (0.062)**	−0.046 (0.016)*
INF	−0.1199 (0.038)*	−0.115 (0.033)*	−0.1435 (0.0323)*	−0.1352 (0.0276)*	− 0.136 (0.02761)*	−0.1834 (0.023)*	−0.192 (0.0282)*	−0.287 (0.043)*	−0.41 (0.068)*
GDP	0.0156 (0.064)**	0.0941 (0.058)***	0.101 (0.0515)**	0.1402 (0.0433)*	0.0699 (0.0374)***	0.08265 (0.039)**	0.0115 (0.00475)**	0.0157 (0.0561)*	0.01736 (0.0102)***
Constant	−0.377 (0.021)*	−0.311 (0.0198)*	−0.2667 (0.0166)*	−0.1854 (0.0145)*	−0.1599 (0.0151)*	−0.09714 (0.0128)*	−0.07574 (0.01336)*	−0.04972 (0.0153)*	0.0253 (0.0181)†
R^2	0.0185	0.0188	0.0175	0.0146	0.0135	0.0743	0.0586	0.0606	0.061

Notes: * $p < 0.01$, ** $p < 0.05$, and *** $p < 0.1$, † p is insignificant. Robust standard errors are in parentheses.

6. Conclusion and discussion

This study showed a positive relationship between CapSt and corporate performance in MENA countries. More specifically, the findings from the fixed-effects analysis and two-step system GMM estimators suggest a positive correlation

between CapSt and ROA. The uniqueness of this finding is apparent as it continues to thrive in different analyses and alternative measures of corporate performance. Moreover, by employing an innovative research approach, namely panel quantile regression analysis, the correlation between CapSt and ROA shows a strong, statistically significant positive relationship. These findings follow agency theory, which suggests that the financial distress costs may outweigh the benefits of debt from tax savings. Additionally, they contribute to signaling theory, offering valuable insights into the existence of asymmetric information. The results are under agency theory, implying that the benefits derived from tax savings through debt may exceed the costs related to financial distress besides restraining managerial self-interest. Also, despite the divergence in institutional contexts between developed and developing countries, the evidence of the present study proves that the agency theory is applicable to developing economies, particularly in the MENA region. Furthermore, they support signaling theory, which offers insights into the monitoring role of CapSt in MENA-listed companies. This study's findings align with the analysis conducted by Ayaz et al. (2021); Fosu (2013); Ibhagui and Olokoyo (2018); Singh and Bagga (2019) in emerging markets. This paper makes significant contributions to the existing literature on corporate financial decisions. First, it expands the understanding of financing in MENA regions, which exhibit diverse cultural, legal, and institutional contexts, along with varying financing strategies and corporate governance frameworks. Second, we employed fixed-effects analysis, two-step system GMM estimators, and panel quantile regression techniques to overcome methodological limitations and investigate the relationship between CapSt and ROA. Last, the policy implications presented in this paper are significant to financial managers, investors, and lenders. For example, research findings show investors should weigh a company's debt level before making investment choices. Lenders must be cautious when implementing debt agreements because of their impact on financial performance. Deliberation on CapSt influences is necessary for financial managers to make informed decisions about adjusting debt levels and corporate performance. The present findings provided new insights and opened up many possibilities for future research. To further explore the underlying reasons and mechanisms behind this connection, researchers could replicate these investigations in developing nations or different countries, utilizing the same approach. To further examine this relationship, future studies could incorporate variables such as company size and cost of debt, which might act as mediators or moderators.

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