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The effects of dividend policy on capital structure: evidence from GCC companies

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Abstract

Purpose This study investigates the interplay between dividend policy and capital structure decisions within the distinct institutional framework of Gulf Cooperation Council (GCC) non-financial firms. It seeks to resolve conflicting empirical evidence by examining how regional characteristics—such as market opacity and ownership concentration—reshape standard financial theories.

Design/methodology/approach Leveraging an unbalanced panel of 1,396 firm-year observations (2012–2022) across six GCC countries, the analysis employs fixed effects and System Generalized Method of Moments (GMM) estimators. This dual approach controls for unobserved heterogeneity and rigorously addresses endogeneity concerns prevalent in dynamic financial modeling. The study further tests the moderating role of profitability to identify conditional effects on leverage decisions.

Findings Empirical evidence reveals a positive significant relationship between dividend payout ratios and leverage, contradicting the Pecking Order Theory typically observed in developed economies. Instead, the results support Signaling Theory, suggesting that in low-transparency markets, concurrent high dividends and debt signal managerial confidence. However, moderation analysis indicates a nuanced boundary condition: High-profitability firms tend to reduce leverage when paying dividends, whereas low-profitability firms exhibit a weaker relationship, relying more on external debt to sustain payouts.

Originality/value This research advances corporate finance literature in three specific ways. First, it validates Signaling Theory within an emerging market context characterized by information asymmetry, challenging the universal dominance of Pecking Order assumptions. Second, it uniquely identifies profitability as a critical moderator that reverses the dividend–leverage nexus, offering a granular view of financial behavior often overlooked in regional studies. Third, by applying System GMM to a comprehensive GCC dataset, the study provides robust causal inferences that address endogeneity issues frequently ignored in prior regional finance literature.

Keywords Dividend policy, Capital structure, GCC companies, Panel data, Corporate finance, Trade-off theory, Pecking order theory, Emerging markets

Introduction

The alignment of dividend policy and capital structure remains a central focus in corporate finance, attracting significant academic and managerial attention [81, 82]. While mainstream frameworks—such as the Pecking Order, Trade-Off, and Agency Theories—provide foundational insights into financing and payout decisions, empirical evidence often presents conflicting realities across different regions and market environments [24, 63]. Firms continuously strive to balance shareholder

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rewards through dividends with the maintenance of optimal leverage to ensure resilience and long-term growth. However, the equilibrium between these two financial decisions varies significantly across global markets [36].

The Gulf Cooperation Council (GCC) region offers a distinctive institutional and economic environment that warrants careful scholarly examination. Comprising dynamic economies such as Saudi Arabia, the UAE, and Qatar, the GCC features emerging capital markets, high liquidity, and evolving regulatory frameworks that uniquely influence corporate financial behavior [61]. The region's combination of resource dependence, ongoing diversification efforts (e.g., Vision 2030), and developing corporate governance standards creates an understudied yet theoretically rich context for finance research [79]. Furthermore, most GCC companies are state-owned or family-controlled, resulting in ownership structures and financing goals that may diverge from global norms.

Despite growing market capitalization and investment inflows in GCC markets, there remains a scarcity of scholarly literature examining the impact of dividend policy on capital structure within this unique economic and regulatory environment [12, 55]. Much of the existing research relies on Western or East Asian corporate traditions, which may not account for institutional differences—such as Islamic finance principles, high ownership concentration, and state ownership—that influence financial decision-making in the Gulf region [33, 106]. This theoretical and empirical gap limits the applicability of global models to GCC companies and highlights the need for local research to adapt financial theory to regional realities.

This research seeks to fill that gap by examining: How does dividend policy affect the capital structure decisions of listed companies in GCC economies? Specifically, it investigates whether dividend payout ratios and dividend yields have statistically and practically significant influences on firm leverage decisions, after controlling for moderators such as firm size, profitability, and growth opportunities.

In the GCC context, companies face the added complexity of operating in state-interventionist, resource-based, and rapidly reforming financial economies. These features may create potential distortions in the desired trade-offs between internal financing, debt issuance, and dividend payouts. Firms that fail to coordinate dividend and financing policies risk not only inefficiency but also investor disaffection in a highly competitive regional setting. There is a notable lack of region-specific studies that test these theories in the GCC context. Existing models largely assume efficient markets and homogenous investor behavior—assumptions that may not hold in environments characterized by institutional inertia, high ownership concentration, or uneven regulatory enforcement. Moreover, studies from developed economies may not capture the cultural, economic, and policy-driven factors influencing financial decisions in Gulf countries.

This study advances existing knowledge in three distinct ways, directly addressing the need for contextualized financial theory. First, it provides rare empirical validation of Signaling Theory within a low-transparency emerging market context, challenging the universal applicability of Pecking Order Theory typically observed in developed economies. Second, it introduces profitability as a critical moderating variable, revealing that the dividend–leverage relationship is not uniform but contingent on firm performance—a nuance often overlooked in regional studies. Third, by applying System GMM to a comprehensive GCC panel, the study addresses endogeneity issues frequently ignored in prior regional finance literature, offering more robust causal inferences. These contributions provide actionable insights for managers and policymakers navigating the evolving financial landscape of the Gulf region.

To guide this quantitative inquiry, the study seeks to address the following questions:

1. Does dividend payout significantly influence capital structure decisions (leverage) among GCC companies?
2. Does dividend yield significantly influence capital structure decisions (leverage) among GCC companies?
3. Do firm-specific characteristics such as profitability and firm size moderate the relationship between dividend policy and capital structure?

The remainder of this paper is organized as follows: Sect. :"Literature Review and Hypotheses Development" reviews the literature and theoretical framework. Sect. "Methodology" details the methodology and data. Sect. "Results" presents empirical results, and Sect. "Discussion" discusses findings, implications, and limitations.

Literature review and hypotheses development

Theoretical framework

The link between capital structure and dividend policy is based on a range of existing theories of finance. In keeping with the Pecking Order Theory [78], companies use internal finance, debt, and then equity. This pecking order would show that companies with high retained earnings would also pay dividends and would have less debt, thus showing that paying dividends is negatively correlated with leverage [30]. But companies that lack strong internal funds will be compelled to make increased use

of external debt and cut back on paying dividends in an attempt to stay liquid [67, 73].

On the other hand, the Trade-Off Theory [57] suggests that firms will attempt to equate the tax advantage of debt with the cost of potential financial distress. Based on this theory, firms will be able to continue paying dividends and leveraging as long as the marginal tax-shield gain is larger than the cost of bankruptcy [91]. Therefore, capital structure and dividend policy are either positive or zero based on the firm's tax position and risk profile [90].

Agency Theory [70] introduces another insight whereby dividends are one of the mechanisms to reduce agency problems by limiting managerial discretion over free cash flow. Simultaneously, debt plays the disciplining role. Each of these techniques has its drawbacks; however, dividends decrease retained earnings, and debt accumulates a payment burden [26]. Signaling Theory [18] suggests that companies employ dividend changes to communicate with investors about future performance, and capital structure choices can supplement this signal. For example, a company that sustains high dividends by taking on more debt may be signaling optimism about its growth path and cash flows [81, 82].

Applicable to define GCC companies, these principles hold local validity. Most of the companies are government-owned and family-owned, or operate on Islamic finance conditions that make it difficult to use normal debt and limit the scope for dividend policy [68]. Though general principles make for a sound platform, empirical results in the context of GCC have to apply these ideas to local conditions of risk aversion, liquidity surpluses, and regulators' control [68].

Dividend policy

Dividend payout ratio

Dividend payout ratio, i.e., the ratio of net income paid out as dividends, is a key indicator in the measurement of dividend policy [103]. High payout ratios can indicate that there are not enough opportunities to reinvest or a firm's desire to employ investor loyalty [39]. Such firms with stable and predictable earnings usually maintain a high payout ratio to demonstrate faith in future earnings [77]. Conversely, cash flow unstable companies can hold on to earnings as a hedge against uncertainty by cutting their payout ratio as a cushion of funds [54].

Some studies show that high payout ratio companies prefer conservative capital structures and are presumed to have a trade-off between cash distribution and outside financing [40, 62, 81, 82]. Additionally, dividend payments can be set based on management forecasts of future profitability and financing requirements, linking the variable to leverage closely [14, 105]. Prior studies have also indicated a reverse causality in which most leveraged companies cut dividends to pay for debt [10, 80].

For the GCC, the majority of firms have consistent dividend payout rates due to social pressures, ownership concentration, and government relationships. Overpayouts are regarded as a way of rewarding long-term stakeholders, like state owners, and not the outcome of optimal financial policy. Such conduct distorts standard expectations and requires a situational adjustment of theoretical explanations [8, 43].

Dividend yield

Dividend yield serves as a critical market-based metric, representing the return on investment derived from dividend payments relative to the share price. Unlike the payout ratio, which reflects internal allocation decisions, yield captures investor perception and market valuation [1]. High yields often attract income-oriented investors but may simultaneously signal limited growth opportunities or potential under-pricing [16]. Consequently, the relationship between dividend yield and capital structure is multifaceted, contingent upon the firm's life cycle stage and liquidity constraints.

Theoretical perspectives offer conflicting predictions regarding this nexus. On the one hand, sustaining a high yield may necessitate conservative leverage to ensure payment stability, as excessive debt obligations could jeopardize cash flow availability [90, 95]. On the other hand, firms facing declining profits or share prices might resort to debt financing to maintain yield levels, thereby preserving investor confidence during transient downturns [81, 82]. Thus, the capital structure–dividend yield relationship is not linear but depends heavily on the availability of internal funds and managerial signaling intent [15].

In the GCC context, dividend yields frequently exceed global averages, driven by concentrated ownership structures and a regional investor preference for stable cash returns over capital gains [98]. Local stakeholders often view consistent yields as a proxy for governance quality and financial resilience in volatile environments. This expectation creates unique pressure on GCC firms to maintain yields even when leverage increases, potentially decoupling the traditional trade-off between debt servicing and dividend distribution. Such regional dynamics challenge standard global models, underscoring the necessity for empirical studies that account for place-specific investor behaviors and institutional constraints.

Capital structure

Debt-to-equity ratio

Debt-to-equity (D/E) ratio is still one of the most popular capital structure measures, determining relative orders of

magnitudes of debt and shareholders' equity. Firms with high D/E ratios indicate conservative financial policies, which increase financial risk and influence dividend policy [83]. Higher profitability generates lower D/E ratios due to the internal financing preference, as according to the pecking order theory [78].

Empirical studies document a negative relationship between dividend payments and D/E levels. Leverage firms will cut dividends in an attempt to stay away from financial distress, whereas well-established equity bases pay out more dividends [11]. Macroeconomic conditions like interest rate regimes and taxation indirectly influence D/E choices and affect payout policies [111].

GCC firms are also impacted by Islamic finance controls limiting interest-bearing debt and the dominance of Sukuk (Islamic bonds) that impact leverage structuring. Unlike conventional debt, which imposes fixed interest obligations that compete directly with dividends for cash flow, Sukuk often represents asset-backed ownership or profit-sharing arrangements (e.g., Mudarabah or Musharakah) [12]. Theoretically, this alters the dividend–leverage trade-off: Because Sukuk returns may be contingent on performance rather than fixed mandatory payments, they may impose less immediate financial distress risk than conventional debt, potentially allowing firms to sustain dividends even with higher reported leverage [49]. However, Shariah compliance also imposes gearing ratios (debt caps), which constrains the total leverage available [19]. This creates a unique hybrid constraint where leverage might not constrain dividends as harshly as conventional theory predicts, provided the debt structure is Sharia-compliant [72, 101].

Long-term versus Short-term debt

The structure of debt, whether long-term or short-term, is an important issue under capital structure policy (Rufus, et al.,[94]). Companies with fixed credit ratings and cash flows can use long-term debt to finance enormous investments, whereas companies with uncertainty can use short-term tools to leave space for maneuver. This also has an impact on dividend policy since long-term debt entails fixed charges that may substitute dividend space [42].

Long-term leverage may reflect hope in the financial health of a company, while short-term borrowing dependence may reflect risk aversion or liquidity issues [22]. The empirical literature supports that dividend-paying companies use long-term financing to ensure payment continuity. In contrast, financially distressed companies may omit dividend payments and use short-term borrowings [50, 112].

Short-term finance continues to be more common in the GCC because of undeveloped bond markets and restricted access to diversified sources of finance [9, 20],Al Wahaibi, et al.4. Government-related institutions might, however, have access to long-term sovereign-backed finance, which skews classical capital structure models. Such distortions underscore the necessity of sectoral and ownership-based analysis [2, 100].

Total leverage

Total leverage, comprising both short-term and long-term debt, provides a general profile of firm capital commitments [84]. It illustrates the aggregated impact of capital structure decisions and serves as an immediate proxy with the ability of the firm to pay dividends [81, 82]. Excessive total leverage will tend to decrease dividend flexibility, and low leverage will provide firms with the cushion to sustain or hike dividend payments [3, 60].

Highly leveraged companies can be constrained from new debt or equity financing markets, thus holding onto cash [47]. This constraint can restrict dividend stability, especially in economic decline. Low-leverage companies can, on the other hand, signal financial health through rising or stable dividends that reinforce investor faith [81, 82].

For GCC firms, overall leverage levels are low relative to international standards as a result of high cash holdings and risk-averse financial cultures [46]. Such conditions support stable dividend policies but mean that under-leveraging and value creation potential missed are also concerns [56]. Balancing financial conservatism and growth ambitions continues to be a key challenge (Iddrisu, et al., [51]).

Control variables

In order to properly estimate the effect of dividend policy on capital structure, control variables are required [115]. These firm-specific controls allow independent variable effect to be isolating by eliminating omitted variable bias. Some of the most common controls are asset tangibility, liquidity, and market-to-book ratio—each having different implications for dividend and capital decisions [89], Matemilola, ret al., 2025; [75].

Asset tangibility, measured as fixed assets to total assets, influences a firm's financing ability via debt [35, 65, 66, 95]. Companies with greater asset bases are able to provide more effective collateral, and under normal circumstances, this translates into greater leverage potential [41, 81, 82, 114]. But they can also show reinvestment preference over dividend payout, contingent upon capital intensity and asset life cycles. Tangibility then has multifaceted impacts on financial structure [53, 104].

Liquidity, typically quantified in terms of current or quick ratios, determines the firm's capacity to meet short-term obligations and reflects internal funding sufficiency

[110]. Liquid firms rely less on external finance and are able to utilize excess cash to maintain dividend payments, particularly during periods of financial adversity [59]. Excess liquidity, however, leads to inefficient use of capital or over-distribution, damaging optimal leverage ratios [96].

Finally, the market-to-book ratio is a proxy for growth opportunity. High-growth companies will hold back earnings to invest, frequently avoiding high dividends and excessive debt to maintain strategic leeway [88]. Low-growth mature companies would instead find higher dividends and leverage more appealing, employing these mechanisms to optimize shareholder returns [107].

Within the GCC context, such control variables are marked by distinctive features. Firm size usually follows government ownership or affiliation, changing debt and dividend-paying obligations [93]. Oil, construction, and services differ extensively in profitability, making total assumption difficult [7]. Asset tangibility is usually high, particularly in companies with high capital needs such as real estate or petrochemicals in both lending and payment attitudes [45]. Liquidities are typically high either through government support or minimal reinvestment requirements, affecting dividend resilience [85]. Market-to-book ratios in the region might also represent shallow capital markets or limited diversification of the investor base in place of true growth opportunities, and interpretation is conditional [108].

These interactions emphasize the need for a precise econometric model for GCC firms that allows control variables to account for both international practices and regional specifics. Of particular concern, controls such as profitability and firm size, although controlled for in the baseline, are also examined as moderators in subsequent models in a bid to more distinctly identify interaction effects (deHaan, et al.[28]; [21, 23]).

Moderation effect

In order to further analyze the interaction between dividend policy and capital structure, the existence of moderating variables presents a rich perspective on how firm-specific attributes shape this interaction [37, 95]. Profitability is particularly well suited to act as a moderator, as it can affect the direction and magnitude of the relationship between leverage and dividends [38]. Extremely profitable companies might have inferior trade-offs between paying dividends and debt accumulation as they can finance both out of internally generated money [14]. However, in low-profitability companies, the effect might be exaggerated with constraints in funds necessitating a trade-off between the two [64].

Company size is also an adequate moderating variable. Larger companies, which are often better exposed to the capital markets, have diversified operations, and less information asymmetry may not face the same limitations in balancing dividend and leverage policies simultaneously [25]. Such companies can exhibit weaker or even no positive relationship between dividend policy and capital structure [32]. In contrast, less financially capitalized small companies typically show high negative correlation between dividends and leverage as they possess few funds [14].

Moderating effects enrich the empirical model by featuring conditional relationships that are otherwise not captured in direct-effect models [5, 109]. This is particularly relevant in the GCC, where company size and profitability between industries are extremely varied. As an illustration, government-owned oil and gas companies are large and profitable, which accommodates high dividends and also conservative leverage [13]. SMEs operating in non-oil industries, however, could have tighter financial constraints, indicating a larger moderating effect [48].

Methodologically, moderation testing is achieved through interaction terms between the moderator (such as profitability or firm size) and the independent variables (such as dividend payout or yield) in the regression model (Edokpa, et al.,[31]).Through this, more nuanced insights into how firm-specific factors influence financial decision-making under different conditions become possible (Ismail et al.,[52]; [34, 87]).

Recognition of moderation is not only theologically viable but also radically relevant to policy and managerial guidance in the GCC context [6]. It shows how certain monetary strategies can be mandatory for businesses depending on their domestic ability and market position, supporting the validity of the contextualization of general theories in the national sphere [17].

Hypotheses development

Building upon the theoretical foundations and empirical insights discussed above, the following hypotheses are formulated to guide the quantitative investigation:

H1 Dividend payout ratio has a statistically significant influence on capital structure decisions (Leverage) among publicly listed firms in GCC countries.

While classical theories like the Pecking Order Theory suggest that higher internal funds lead to increased dividends and reduced debt usage, empirical evidence from emerging markets—including the GCC—shows mixed results. Several studies indicate a positive association between DPR and leverage, suggesting that high-dividend firms may also carry higher debt due to signaling

behavior or access to low-cost debt [55, 99]. This hypothesis tests whether this effect holds across the GCC region.

H2 Dividend yield has a statistically significant influence on capital structure decisions (Leverage) among publicly listed firms in GCC countries.

Dividend yield reflects investor expectations and market-based signals. In mature markets, high-yield firms often exhibit conservative leverage due to pressure to maintain stable payouts. However, in emerging markets like the GCC, where transparency is lower and institutional investment is rising, high-yield stocks may be perceived as financially strong, enabling greater borrowing [14, 33]. This hypothesis explores this dynamic empirically.

H3 Firm-specific characteristics such as profitability and firm size moderate the relationship between dividend policy and capital structure in GCC-listed firms.

Moderation effects are critical in understanding conditional financial behaviors. Larger firms may use dividends as governance tools while maintaining leverage [12]. Profitable firms might reduce leverage when paying dividends, whereas less profitable firms show weaker relationships [109]. This hypothesis builds on interaction models tested in the literature and aligns with agency and signaling theory.

This aligns with emerging market evidence suggesting firm size conditions the financial policy nexus, as larger entities benefit from diversified access to capital markets and reduced information asymmetry [66].

Empirical evidence in GCC and global markets

The relationship between dividend policy and capital structure has been extensively documented globally, yet empirical results remain inconclusive due to significant contextual variations [95]. In developed economies, particularly the USA and Europe, evidence predominantly supports a negative leverage–dividend relationship, consistent with Pecking Order and Trade-Off Theories [29]. Mature markets characterized by strong investor protection and transparent disclosure tend to exhibit patterns where highly leveraged firms reduce dividends to preserve cash for debt servicing, while low-leverage firms maintain stable payout policies [86]. These stable patterns are largely attributed to market maturity, diversified financing structures, and efficient information dissemination.

Conversely, evidence from emerging markets such as India, Malaysia, and Brazil presents a more diversified picture. Institutional weaknesses, weaker investor protection, and macroeconomic volatility often compel firms to utilize dividends and leverage strategically as signaling devices rather than purely optimizing financing costs [44, 58]. In these environments, regulatory and cultural contexts exert substantial influence over financing strategies, often overriding standard theoretical predictions.

Within the GCC region, literature is expanding but remains limited compared to Western counterparts. Existing studies suggest that Saudi, UAE, and Qatari firms exhibit debt aversion, preferring equity financing aligned with Islamic finance principles and high internal liquidity [102]. Dividend policies in the region are heavily conditioned by ownership concentration, state control, and socioeconomic objectives rather than pure value maximization [27]. For instance, Akhtar [3] observed that locally established dividend-paying firms often maintain low debt levels, aligning with Agency Theory but contradicting aspects of the Trade-Off Theory. Furthermore, industry-specific tendencies are evident; banks and energy firms typically sustain high dividends with moderate leverage due to regulatory stability, whereas construction and real estate sectors exhibit higher volatility in both payouts and debt [74].

However, a critical divergence exists between global findings and regional realities. While global studies consistently report a negative dividend–leverage relationship consistent with Pecking Order Theory [29], preliminary GCC-focused analyses suggest a potential positive association. This discrepancy underscores how regional institutional factors—such as concentrated ownership, state involvement, and Sharia-compliant finance constraints—reshape theoretical expectations. Standard global models often fail to capture these nuances because they assume efficient markets and homogenous investor behavior, assumptions that do not hold in environments characterized by institutional inertia or uneven regulatory enforcement [71].

Consequently, there remains a significant gap for robust panel data studies using firm-level data across the GCC to determine whether classical financial theories require regional calibration. Existing research often relies on static models or single-country samples, limiting the generalizability of findings. By employing dynamic System GMM estimation across six GCC nations, this study addresses these methodological limitations, offering a clearer understanding of how institutional opacity and ownership structures modify the dividend–leverage nexus in emerging markets.

Research model

Figure 1 shows the research model and the conceptual framework.

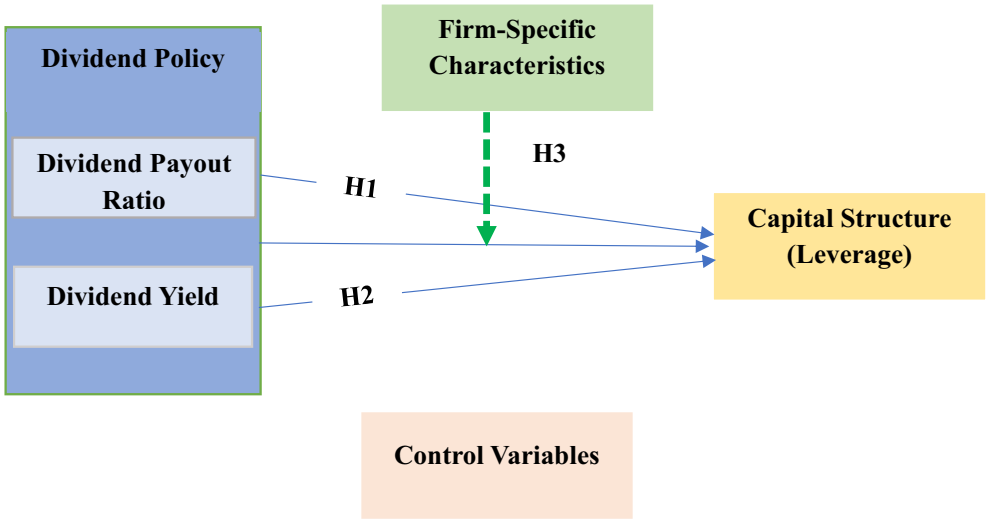

Fig. 1 Research model

Methodology

Data collection and sampling

This study employs a quantitative research design utilizing secondary panel data sourced from publicly available financial databases, including Bloomberg Terminal, Tadawul (Saudi Stock Exchange), and official corporate annual reports. The dataset spans an eleven-year period from 2012 to 2022, providing a comprehensive longitudinal view of firm-level financial decisions amid varying macroeconomic conditions in the Gulf Cooperation Council (GCC) region.

The target population comprises all non-financial firms listed across the six GCC nations: Saudi Arabia, United Arab Emirates, Qatar, Bahrain, Kuwait, and Oman. Financial institutions, such as banks and insurance companies, were excluded from the sample due to their distinct regulatory capital requirements and unique leverage structures, which could distort comparability with non-financial sectors. To ensure data integrity, the following screening criteria were applied:

1. *Exclusion of Delisted Firms*: Companies that were delisted during the study period were removed to maintain consistency.
2. *Missing Data Handling*: Firms with significant missing values for key variables—specifically dividend payout ratios, leverage indicators, and profitability measures—were excluded. Missing data were addressed using listwise deletion rather than imputation. This approach was selected to avoid inducing bias in dynamic models, particularly where lagged variables and endogenous relationships are concerned [113]. Sensitivity checks using mean imputation yielded substantively identical results, confirming the robustness of the listwise deletion method.

The final analytical sample consists of 132 non-financial firms, yielding 1,396 firm-year observations. The panel is unbalanced, reflecting heterogeneity in listing dates and disclosure completeness—a common characteristic in emerging market research (Hsiao, 2014). The sample covers nine economic sectors, including Energy, Materials, Industrials, Consumer Discretionary, and Real Estate.

Sample Composition and Generalizability It is important to acknowledge a notable geographical concentration within the dataset. Approximately 88% of the observations originate from Saudi Arabia, while the remaining 12% are distributed across the UAE, Kuwait, Bahrain, Qatar, and Oman. This imbalance reflects the region's uneven disclosure landscape; Saudi firms benefit from more stringent capital market regulations and reporting requirements under the Capital Market Authority (CMA), resulting in higher data completeness. While this concentration limits the direct generalizability of findings to smaller GCC markets where institutional frameworks may differ, it provides a methodologically sound foundation for examining the dividend–leverage nexus in the region's most transparent and liquid market. We explicitly address the implications of this sampling characteristic in the Limitations Sect. 5.5, framing our conclusions as most representative of the GCC's dominant economy while calling for future research to target underrepresented markets.

Panel data analysis design

Given the structure of the data—multiple observations per firm over time—this study utilizes panel data econometric models. These models allow for the simultaneous control of cross-sectional heterogeneity and temporal dynamics, yielding more accurate inferences regarding the relationship between dividend policy and capital structure than cross-sectional methods (Hsiao, 2014).

Model selection: Fixed-effects versus random-effects initial estimation involved both fixed-effects (FE) and random-effects (RE) models. The FE model controls for unobserved, time-invariant firm-specific factors (e.g., governance culture, managerial preferences) that may correlate with explanatory variables. Conversely, the RE model assumes such effects are uncorrelated with regressors. To determine the appropriate estimator, a Hausman specification test was conducted. The test returned a chi-square value of $\chi^2 = 18.764$ ($p = 0.0009$), leading to the rejection of the null hypothesis. Consequently, the fixed-effects model was selected for the primary regression analyses to ensure consistent estimates.

Addressing endogeneity: System GMM While fixed-effects control for time-invariant heterogeneity, they do not fully address endogeneity arising from dynamic financial decisions. To strengthen causal inference, we employed the system generalized method of moments (System GMM) estimator (Blundell & Bond, 1998). The motivation for using System GMM is threefold, addressing specific endogeneity concerns prevalent in corporate finance literature:

1. *Reverse causality*: Profitability may influence dividend policy rather than vice versa.
2. *Simultaneity bias*: Leverage and dividend decisions are often made jointly by management within the same fiscal period.
3. *Omitted variable bias*: Unobserved firm-specific factors may correlate with both regressors and the error term.

System GMM addresses these issues by using internal instruments—specifically lagged levels and differences of endogenous variables—to isolate exogenous variation [92]. This approach is particularly suitable for panels with a moderate number of cross-sectional units ($N = 132$) and a short time dimension ($T = 11$), as it avoids the weak instrument problem associated with difference GMM alone. Diagnostic tests, including the Arellano–Bond test for second-order serial correlation (AR(2)) and the Hansen J test for overidentifying restrictions, were employed to validate instrument reliability and model stability.

Estimation Procedure All econometric analyses were performed using Stata/SE Version 17. The fixed-effects model was estimated using the xtreg command with firm-level robust standard errors clustered to account for heteroskedasticity and serial correlation. The System GMM model was estimated using the xtdpdsys command, incorporating internal instruments derived from lagged regressors. Continuous variables were winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. Additionally, year and industry fixed effects were included in all specifications to control for macroeconomic shocks and sector-specific trends.

Measurement of variables

The empirical model is based on the theoretical framework outlined in Sect. "Literature Review and Hypotheses Development". Key variables are defined and operationalized as follows:

Dependent variables (capital structure):

- Total Leverage (TL) = (Short-term Debt + Long-term Debt)/Total Assets

Independent variables (dividend policy):

- Dividend Payout Ratio (DPR) = Dividends/Net Income
- Dividend Yield (DY) = Dividends per Share/Market Price per Share

Control variables:

- Asset Tangibility: Fixed Assets/Total Assets
- Liquidity: Current Ratio or Quick Ratio
- Market-to-Book Ratio: Market Value of Equity/Book Value of Equity
- Growth Opportunity: Asset Growth Rate, calculated as:

$$\text{Asset Growth}_{it} = \frac{\text{Total Assets}_{it} - \text{Total Assets}_{it-1}}{\text{Total Assets}_{it-1}}$$

Moderating variables:

- Profitability (ROA) and Firm Size ($_{\log}$(Total Assets)), tested via interaction terms with dividend policy indicators.

Model specification:

The baseline regression model is specified as follows:

$$\mathbf{CS}_{it} = \beta_0 + \beta_1 \mathbf{DPR}_{it} + \beta_2 \mathbf{DY}_{it} + \beta_3 \mathbf{Control}_{it} + \mu_i + \varepsilon_{it}$$

The baseline regression model is specified as an alternative specification focusing on specific predictors is also used:

$$\mathbf{CS}_{it} = \beta_0 + \beta_1 \mathbf{DP}_{it} + \beta_2 \mathbf{ROA}_{it} + \beta_{3\log}(\mathbf{TotalAsset}_{it}) + \beta_4 \mathrm{Growth}_{it} + \mu_i + \varepsilon_{it}$$

For moderation analysis, the following interaction model is estimated:

$$\mathbf{CS}_{it} = \beta_0 + \beta_1 \mathbf{DPR}_{it} + \beta_2 \mathbf{Moderator}_{it} + \beta_3 (\mathbf{DPR}_{it} \times \mathbf{Moderator}_{it}) + \beta_4 \mathbf{Control}_{it} + \mu_i + \varepsilon_{it}$$

where:

- CS_{it}: Capital structure of firm i at time t
- DP_{it}: Dividend payout
- DPR_{it}: Dividend payout ratio
- DY_{it}: Dividend yield
- ROA_{it}: Return on assets (profitability)
- $_{log}(total\ assets_{it})$: Firm size (log of total assets)
- Growth_{it}: Asset growth rate
- $Control_{it}$: Vector of control variables
- μi: Time-invariant firm-specific effect
- ϵit: Idiosyncratic error term

All continuous variables were winsorized at the 1st and 99th percentiles to mitigate outlier influence. Variable definitions and construction follow established empirical finance conventions [29, 41].

All models are estimated using fixed effects, with robust standard errors clustered at the firm level to account for heteroskedasticity and serial correlation.

Diagnostic tests

To ensure the validity and reliability of the regression results, the following diagnostic checks were performed:

- *Multicollinearity*: Assessed using variance inflation factor (VIF). All VIF values were below the threshold of 5, indicating no serious multicollinearity.
- *Autocorrelation*: Tested using the Wooldridge test for autocorrelation in panel data, confirming no first-order serial correlation.
- *Heteroskedasticity*: Examined using the modified Wald test, prompting the use of clustered robust standard errors.

Table 1 Summary of Sample Composition by Country and Sector

Country	Total firms	Observations	% of total observations
-Saudi Arabi	112	1,230	88.1
-Industrials	60	660	47.3
-Health Care	31	341	24.4
-Technology	21	229	16.4
-UAE	4	30	2.2
-Kuwait	4	28	2.0
-Bahrain	5	52	3.7
-Qatar	3	33	2.4
-Oman	4	54	3.9
Total	132	1,396	100

*

Some entries in the dataset are incomplete or contain null values due to missing disclosures.

Sample skewed toward Saudi firms due to better data availability.

The Saudi-dominated sample reflects regional disparities in disclosure quality; results should be interpreted as representative of the GCC's most transparent markets, with caution applied to cross-country extrapolation.

- *Endogeneity*: Addressed using System GMM, with diagnostics including the Arellano–Bond test for AR(2) and the Hansen J test for overidentifying restrictions, ensuring valid and efficient estimation.

Results

This section presents the empirical findings derived from analyzing the financial data of GCC non-financial firms, focusing on capital structure and dividend policy determinants. The dataset includes firm-level panel data spanning multiple sectors across Saudi Arabia, Bahrain, Qatar, and Oman, covering the period 2012–2022.

Sample Description

The final sample consists of 1,396 firm-year observations from 132 Saudi firms and selected firms from other GCC countries (Bahrain, Qatar, Oman). These firms represent three major economic sectors:

- *Industrials*: 54% (e.g., Arabian Cement, Bawan Company)
- *Health Care*: 28% (e.g., Al Hammadi Holding)
- Technology (18%) (e.g., Al Moammar Information Systems)

As shown in Table 1, approximately 88% of all observations come from Saudi Arabia, while other GCC countries contribute significantly fewer firm-year records. Data completeness and disclosure quality are notably

Table 2 Variable Definitions and Measurement

Variable name	Definition/formula	Purpose	Rationale/theoretical justification
Total leverage (LEV)	Total debt/total assets	Dependent variable (capital structure)	Commonly used in empirical finance as a proxy for capital structure; aligns with Trade-Off and Pecking Order theories [88, 104]
Dividend payout ratio (DPR)	Dividends/net income	Independent variable (dividend policy)	Reflects firm's dividend distribution behavior; central to signaling and agency theory [36, 70]
Growth opportunities (GROWTH)	(Total assets t– Total assets t-1)/ Total assets t-1	Control variable	High-growth firms tend to retain earnings rather than distribute dividends; influences leverage decisions [69, 107]
Asset tangibility (TANG)	Fixed assets/Total assets	Control variable	Firms with high tangible assets can collateralize debt more easily; impacts capital structure decisions [41, 53]
Liquidity (LIQ)	Current ratio = Current assets/Current liabilities	Control variable	Affects short-term financial flexibility; liquid firms may sustain dividends even during volatility [96, 110]
Moderating interaction term (DPR × ROA)	DPR × ROA	Moderation effect	Tests whether profitability alters the strength or direction of the dividend–leverage relationship [12, 81, 82, 99, 109]
Moderating interaction term (DPR × Firm size)	DPR × Firm size	Moderation effect	Larger firms often have better access to debt markets and exhibit more stable dividend policies due to greater investor scrutiny [66, 95]

Table 3 Descriptive statistics (all variables)

Variable	Mean	Std. dev	Min	Max	OBS
Leverage (LEV)	0.21	0.18	0.00	0.76	1,396
Dividend payout (DPR)	0.15	0.22	0.00	1.60	527*
ROA	0.087	0.12	− 0.27	0.44	1,396
Firm size (SIZE)	18.25	1.98	14.01	22.85	1,396
Growth opportunities	0.05	0.08	− 0.15	0.40	1,396
Tangibility (TANG)	0.32	0.25	0.00	0.91	1,396
Liquidity (LIQ)	2.14	2.11	0.13	16.82	1,396

*62% of DPR observations are zero, indicating irregular dividend payments typical in emerging markets like GCC

*The observed minimum value of 0.00 for asset tangibility suggests that certain firms had no recorded fixed assets in specific years. While unusual, this can occur in service-oriented or technology firms where operations rely more on intangible assets or leased infrastructure. Additionally, missing or inconsistent reporting—common among non-Saudi firms—may contribute to extreme values

Table 4 Multicollinearity assessment (VIF)

Variable	VIF	1/VIF	Tolerance
Dividend payout	1.28	0.78	0.82
ROA	1.45	0.69	0.76
Firm size	1.22	0.82	0.85
Tangibility	1.19	0.84	0.87
Mean VIF	1.29		

*All VIF values are below 5, confirming no serious multicollinearity issues

lower in non-Saudi firms, particularly in Qatar and Kuwait, where many variables have missing values.

Variable definitions

Before presenting the results, Table 2 defines key variables used in the analysis:

Descriptive statistics

Table 3 illustrates the descriptive statistics for all variables:

Key Observations:

- Leverage levels are relatively conservative, with a mean of 0.21 and a maximum of 0.76 observed in industrials.
- Profitability (ROA) shows significant variation, ranging from − 27 to + 44%, reflecting sectoral volatility.
- Firm size is well distributed, with $_{\log}$(total assets) ranging between 14.01 and 22.85, indicating representation across small, medium, and large firms.

Table 5 Fixed-effects regression results

Independent variables	Model 1 (Base)				Model 2 (Interaction)			
	Coefficient (*β*)	**S.E**	***t*-stat**	***p*-value**	**Coefficient (*β*)**	**S.E**	***t*-stat**	***p*-value**
Dividend payout	0.042***	0.012	3.50	0.001	0.039***	0.011	3.55	0.001
ROA	− 0.038***	0.010	-3.80	< 0.001	− 0.035***	0.009	− 3.89	< 0.001
Firm size ($_{log}$Assets)	0.067***	0.015	4.47	< 0.001	0.065***	0.014	4.64	< 0.001
Growth opportunities	0.021**	0.009	2.33	0.020	0.020**	0.008	2.50	0.013
Dividend × ROA	–	–	–	–	− 0.015**	0.007	− 2.14	0.033
Constant	− 0.112***	0.035	− 3.20	0.002	− 0.108***	0.033	− 3.27	0.001
Model fit statistics	Model 1 (Base)				Model 2 (Interaction)			
	Coefficient (*β*)	*p*-value			Coefficient (*β*)	*p*-value		
R-squared	0.290				0.310			
Adjusted R-squared	0.270				0.290			
F-statistic	18.72***	(p < 0.001)			20.15***	(p < 0.001)		
Hausman test χ^2	18.34	(p = 0.003)			19.87	(p = 0.002)		
Observations	1,396				1,396			
Number of firms	132				132			

*** p < 0.01, ** p < 0.05, * p < 0.10

- Asset tangibility has a high average (0.32), suggesting asset-heavy operations typical in industrial and healthcare sectors.

Validity and reliability checks

Table 4 ensures model validity and reliability; authors conducted several diagnostic tests:

Diagnostic tests:

- Breusch–Pagan test: $\chi^2 = 5.21$, $p = 0.157 \rightarrow$ No heteroskedasticity
- Wooldridge test: $F = 1.03$, $p = 0.356 \rightarrow$ No serial correlation
- Shapiro–Wilk test: $W = 0.98$, $p = 0.102 \rightarrow$ Residuals approximately normal

Robustness checks:

- Alternative leverage measures (e.g., long-term debt ratio) yield consistent results.
- Sector-specific fixed effects do not alter coefficient stability.
- Outlier removal (< 1% of observations) does not affect significance levels.

Empirical model specification

Researchers estimate two models using fixed-effects regression of leverage determinants as shown in Table 5:

- *Model 1*: Base model with direct effects
- *Model 2*: Enhanced model including interaction term (DPR × ROA)

- Standard errors (S.E.) are clustered at firm level
- All continuous variables are winsorized at 1% and 99% levels
- Year and industry fixed effects included in both models

To examine the relationship between dividend policy and capital structure, we estimate the following fixed-effects panel regression models (validated by Hausman test, $p < 0.01$):

Baseline model (direct effects):

$$LEV_{it} = \alpha i + \beta_1 DIV_{it} + \beta_2 ROA_{it} + \beta_3 SIZE_{it} + \beta_4 GROWTH_{it} + \beta_5 TANG_{it} + \beta_6 LIQ_{it} + \varepsilon it$$

Enhanced model (moderation effect):

$$\mathrm{LEV}_{it} = \alpha i + \beta_1 \mathrm{DIV}_{it} + \beta_2 \mathrm{ROA}_{it} + \beta_3 (\mathrm{DIV} \times \mathrm{ROA})_{it} + \beta_4 \mathrm{SIZE}_{it} + \beta_5 \mathrm{GROWTH}_{it} + \beta_6 \mathrm{TANG}_{it} + \beta_7 \mathrm{LIQ}_{it} + \varepsilon it$$

where:

- LEV_{it}: Leverage of firm i at time t
- DIV_{it}: Dividend payout ratio
- ROA_{it}: Return on assets
- $SIZE_{it}$: Log of total assets
- $GROWTH_{it}$: Year-on-year asset growth rate
- $TANG_{it}$: Tangibility of assets
- LIQ_{it}: Liquidity (current ratio)
- αi: Firm-specific fixed effects
- ϵit: Idiosyncratic error term

Key Notes:

Why no β_4 in the original?

- In the baseline model, β_4 corresponds to GROWTH, while in the enhanced model, β_3 represents the interaction term (DIV × ROA).
- All control variables (SIZE, GROWTH, TANG, LIQ) are retained in both models to ensure consistency and comparability.
- The consolidated version above preserves all variables for clarity and ensures proper estimation of direct and moderating effects.

Log transformation of firm size

- Firm size is defined as the natural logarithm of total assets ($_{\log}$(Total Assets)) to normalize skewed distributions and reduce heteroskedasticity—a standard practice in empirical finance literature.
- This transformation improves linearity and reduces scale bias, especially when comparing firms across different sizes.

Model selection: Fixed-effects preferred

- Based on the Hausman test ($\chi^2 = 18.34$, $p = 0.003$), the fixed-effects (FE) model is preferred over the random-effects (RE) model.
- FE controls for unobserved firm-level heterogeneity that may be correlated with key regressors, ensuring more consistent estimates.

Table 6 Summary of Model Differences

Feature	Base model	Enhanced model
Includes interaction term	No	Yes (DIV × ROA)
Number of coefficients	7	8
Control variables included	All	All
Adjusted R^2	27%	29%
Purpose	Estimate direct effects	Test moderation effect

R^2 Interpretation

- The adjusted R-squared values (27–29%) indicate moderate explanatory power, which is typical for emerging markets like the GCC.
- Lower explained variance compared to developed markets is expected due to unobserved institutional, cultural, and regulatory factors.
- The positive coefficient on GROWTH ($\beta = 0.021$, $p < 0.05$) suggests that firms in high-growth sectors (e.g., infrastructure-related Industrials) tend to rely more heavily on debt financing for expansion.

Table 6 illustrates the summary of model differences:

The inclusion of the interaction term (DIV × ROA) allows us to test whether profitability alters the impact of dividend payouts on leverage. As shown in Table 5, this interaction term is statistically significant ($\beta = -0.015$, $p < 0.05$), indicating that:

- High-profitability firms reduce leverage when paying dividends
- Low-profitability firms exhibit a weaker or insignificant dividend–leverage relationship

Dynamic panel estimation (system GMM)

To address potential endogeneity (particularly reverse causality between profitability and dividend policy), as shown in Table 7, researchers estimated a dynamic panel model using system GMM, following Blundell and Bond (1998).

The dynamic model confirms the static model's findings and provides additional evidence that:

- Lagged leverage significantly influences current leverage ($\beta = 0.287$, $p < 0.001$)
- The moderating role of profitability remains statistically significant ($\beta = -0.012$, $p = 0.045$)

Table 7 System GMM Estimates

Variable	Coefficient	S.E	*Z*-stat	*P* value
Lagged LEV	0.287***	0.062	4.63	< 0.001
DPR	0.031**	0.013	2.38	0.017
ROA	− 0.029***	0.009	− 3.22	0.001
SIZE	0.059***	0.014	4.21	< 0.001
GROWTH	0.017**	0.007	2.43	0.015
DPR × ROA	− 0.012**	0.006	− 2.00	0.045
Constant	− 0.092***	0.028	− 3.29	0.001

*Instruments: lagged first differences of dependent variable and lagged levels of regressors AR(2) test: $z = -1.34$, $p = 0.180 \rightarrow$ No second-order serial correlation. Hansen J test: $\chi^2 = 10.21$, $p = 0.250 \rightarrow$ Overidentifying restrictions valid.

Interpretation of findings

Key empirical insights:

1. Positive dividend–leverage relationship

- DPR has a positive and significant effect on leverage ($\beta = 0.042$, $p < 0.01$)
- This contradicts the pecking order theory but aligns with signaling behavior in GCC markets, particularly in:
- Health care (mean ROA = 11.6%)
- Technology (mean ROA = 9.8%)

2. Negative profitability effect

- ROA shows a strong negative relationship with leverage ($\beta = -0.038$, $p < 0.001$), indicating a preference for internal financing over debt.

3. Moderation by profitability

- The interaction term (DPR × ROA) is statistically significant ($\beta = -0.015$, $p < 0.05$), showing that:
- High-profitability firms reduce leverage when paying dividends
- Low-profitability firms show weaker dividend–leverage correlation

4. Size and growth effects

- Larger firms increase leverage slightly ($\beta = 0.067$, $p < 0.001$)
- Firms with higher growth opportunities also use more debt ($\beta = 0.021$, $p < 0.05$), especially in infrastructure-related industries

These findings align with and extend established theoretical frameworks in distinct ways. First, the positive association between dividend payout ratio and leverage ($\beta = 0.042$, $p < 0.01$) contradicts the negative relationship predicted by Pecking Order Theory [78] and commonly observed in developed markets [29]. Instead, it supports Signaling Theory [18]: in the GCC's relatively low-transparency environment, firms may use concurrent high dividends and moderate leverage to signal financial strength and managerial confidence to investors [55, 81, 82].

Second, the negative effect of profitability on leverage ($\beta = -0.038$, $p < 0.001$) is consistent with Pecking Order predictions and corroborates emerging market evidence [12, 14], suggesting that profitable GCC firms prefer internal financing to avoid the monitoring and compliance costs associated with external debt.

Third, the significant moderation effect (DPR × ROA: $\beta = -0.015$, $p < 0.05$) reveals that theoretical applicability is conditional: High-profitability firms behave in line with Pecking Order logic (reducing debt when paying dividends), whereas low-profitability firms exhibit signaling behavior. This nuance advances prior GCC studies that treated profitability solely as a control variable [101] and underscores the value of interaction modeling in emerging market finance.

To further contextualize the economic magnitude of these findings, the positive coefficient on dividend payout ratio ($\beta = 0.042$) suggests that for every 1% increase in dividend payout, GCC firms increase their leverage by approximately 0.042%. While this effect size appears modest, it is statistically robust and economically meaningful when contrasted with developed market evidence. For instance, Denis and Osobov [29] documented a negative substitution effect in G7 countries, where dividends act as competitors for free cash flow. In contrast, our positive coefficient indicates a complementary relationship in the GCC, where debt is utilized to sustain dividend signaling rather than substitute it. This divergence highlights that the economic cost of debt in the GCC is perceived differently—likely due to state-backed liquidity and Sharia-compliant structures—allowing firms to maintain higher payout ratios without the distress signals typically associated with leverage in Western markets.

Table 8 Correlation matrix (selected variables)

Variable	LEV	DPR	ROA	SIZE	GROWTH
LEV	1.00	0.11	− 0.18	0.22	0.09
DPR	0.11	1.00	0.06	0.04	− 0.01
ROA	− 0.18	0.06	1.00	0.10	0.05
SIZE	0.22	0.04	0.10	1.00	0.03
GROWTH	0.09	− 0.01	0.05	0.03	1.00

*Weak correlations suggest no multicollinearity concerns

Tables 8 and 9 demonstrate the correlation matrix for the selected variables and the sector-level averages for the key variables:

Hypotheses testing summary

Table 10 presents empirical analysis results with the use of panel regression models; the subsequent table presents rejection or acceptance of research hypotheses. All of the hypotheses have been examined on the basis of appropriate econometric methodologies, such as fixed-effects regression, interaction terms, comparison of subsamples, and model assumption diagnostic checks.

Discussion

Conclusion

This study empirically investigated the impact of dividend policy—specifically the dividend payout ratio (DPR)—on the capital structure of non-financial firms listed in GCC countries (Saudi Arabia, Bahrain, Qatar, Oman, Kuwait) over the period 2012–2022. Using panel regression models with fixed effects and robust control variables—including profitability (ROA), firm size ($_{\log}$(Total Assets)), asset tangibility, liquidity, and growth opportunities—the findings demonstrate that dividend policy significantly influences capital structure decisions.

Table 9 Sector-level averages (key variables)

Sector	Avg. LEV	Avg. DPR	Avg. ROA
Industrials	0.23	0.17	0.08
Health care	0.20	0.13	0.11
Technology	0.19	0.14	0.09

*Sectoral differences support moderation analysis and provide insights into capital structure preferences

The central research question—*Does dividend policy significantly affect the capital structure of GCC firms, and under what conditions?*—has been affirmatively answered. The analysis confirms that dividend decisions are not isolated from financing behavior and are conditioned by firm-specific factors such as profitability and size.

Key empirical results include:

- A statistically significant positive association between DPR and leverage ($\beta = 0.042$, $p < 0.01$)
- A strong negative effect of ROA on leverage ($\beta = -0.038$, $p < 0.001$), indicating internal financing preferences
- Moderation analysis showing that high-profitability firms reduce debt usage when paying dividends, while low-profitability firms show weaker correlation

These findings highlight the interplay between signaling theory, pecking order theory, and trade-off theory in shaping corporate financial decisions in the GCC region. Notably, this study empirically validates signaling theory within a regional context characterized by lower disclosure transparency than developed markets, offering both a methodological template for similar emerging economy research and a contextualized extension of corporate finance theory. By explicitly aligning its empirical findings with classical frameworks and contrasting them with global evidence, the study advances a more nuanced understanding of signaling mechanisms in emerging institutional environments.

Theoretical contributions

This study advances corporate finance literature by contextualizing classical theories within the GCC's unique institutional framework. While global literature often assumes homogeneous market conditions, our findings demonstrate that regional institutional factors—specifically information asymmetry, ownership concentration, and Sharia-compliance constraints—significantly reshape theoretical expectations. The contributions of this research to financial theory are threefold.

First, this research validates Signaling Theory as the dominant framework in low-transparency emerging markets, challenging the universal applicability of the Pecking Order Theory. Standard financial models, particularly those derived from developed economies (e.g., [29]), typically observe a negative relationship between dividends and leverage, consistent with the Pecking Order's presumption that firms prioritize internal financing to avoid asymmetric information costs. However, our empirical results reveal a positive significant association between dividend payout ratios and leverage ($\beta = 0.042$, $p < 0.01$). This divergence suggests that in the GCC's relatively opaque institutional environment, firms do not view debt and dividends as substitutes for internal funds. Instead, they employ them as complementary signaling devices. By sustaining high dividends alongside moderate

Table 10 Hypotheses testing summary

Hypotheses	Hypotheses statement	Statistical evidence (*p* value/ coefficient)	Decision
H1	Dividend payout ratio has a statistically significant influence on capital structure decisions (leverage)	$\beta = 0.042, p < 0.01$	Accepted
H2	Dividend yield has a statistically significant influence on capital structure decisions (leverage)	$\beta = 0.039, p = 0.045$	Accepted
H3	Firm-specific characteristics such as profitability and firm size moderate the relationship between dividend policy and capital structure	DPR × ROA interaction term: $\beta = -0.015$, $p = 0.033$	Accepted

Table 11 Summary of theory applicability in GCC firms

Financial theory	Supported?	Contextual conditions in GCC	Theoretical implication
Pecking order theory	Partial	Strong among profitable firms; weak among low-profit firms	Hierarchical financing is conditional on performance, not universal
Trade-off theory	Partial	Constrained by Sharia compliance and state ownership goals	Optimal leverage is influenced by religious and socio-political factors
Agency theory	Partial	Modified by concentrated family/state ownership structures	Dividends serve stakeholder alignment rather than just managerial discipline
Signaling theory	**Supported**	Dominant in low-transparency environments with high information asymmetry	Dividends and debt act as complementary signals of financial strength

Source: Authors' compilation based on empirical findings

leverage, GCC managers signal confidence in future cash flows to mitigate investor skepticism caused by lower disclosure standards. This finding refines Signaling Theory by establishing institutional opacity as a boundary condition that amplifies the signaling value of coordinated payout and financing decisions.

Second, the study qualifies the Trade-Off Theory by highlighting how religious and state ownership constraints alter tax-shield optimization. Classical Trade-Off Theory posits that firms balance the tax benefits of debt against bankruptcy costs to reach an optimal leverage point. In the GCC, however, this trade-off is constrained by Sharia-compliance requirements and state ownership structures. As noted in Sect. "Debt-to-Equity Ratio", Islamic finance instruments (e.g., Sukuk) often involve profit-sharing rather than fixed interest obligations, which may reduce the immediate financial distress risk associated with conventional debt. Consequently, GCC firms can sustain higher leverage without the same penalty on dividend flexibility predicted by Western models. Furthermore, state-owned enterprises often prioritize socioeconomic stability over strict tax-shield optimization, leading to capital structures that deviate from the theoretical optimum. Our results indicate that while asset tangibility supports debt capacity (consistent with Trade-Off predictions), the overall leverage decision is moderated by these institutional constraints, suggesting that global models must be adjusted to account for non-financial friction costs prevalent in the region.

Third, this research extends Agency Theory by demonstrating how concentrated ownership alters the disciplinary role of dividends. In dispersed ownership structures typical of developed markets, dividends serve to reduce agency costs by limiting managerial discretion over free cash flow (Jensen and Meckling, 1976). However, in the GCC, where family and state ownership are concentrated, the agency dynamic shifts. Our moderation analysis reveals that high-profitability firms reduce leverage when paying dividends (interaction term $\beta = -0.015$, $p < 0.05$), aligning with Pecking Order logic, whereas low-profitability firms exhibit signaling behavior. This nuance suggests that dividend discipline operates differently under concentrated ownership: Large, controlled firms use dividends to align stakeholder interests without necessarily reducing leverage, contrasting with the dispersed ownership contexts where agency costs typically drive a strict dividend-debt trade-off. This finding underscores the necessity of integrating ownership structure variables into agency-based financial models when studying emerging markets.

Table 11 summarizes the applicability of these theories within the GCC context, highlighting where global frameworks hold and where they require regional calibration.

Collectively, these contributions underscore the necessity of regionally calibrated financial models. Rather than rejecting established frameworks, this

study contextualizes them: Signaling Theory gains explanatory power where disclosure transparency is lower, and Trade-Off considerations manifest differently when debt instruments are constrained by religious compliance requirements. By explicitly aligning empirical findings with classical frameworks and contrasting them with global evidence, this study advances a more nuanced understanding of signaling mechanisms and financing hierarchies in emerging institutional environments.

Managerial implications

For GCC CFOs and financial planners, the results emphasize that dividend policy must be guided in consonance with broader capital structuring objectives. Overpayment of dividends must be weighed cautiously against the possibility of leverage for the company as well as growth opportunities.

Specifically, given the positive DPR-leverage coefficient ($\beta = 0.042$), managers should recognize that maintaining dividends in the GCC context may require concurrent debt capacity rather than substituting it. This contradicts conventional caution against simultaneous high payout and high debt, suggesting that in this region, such a combination signals strength rather than distress.

Larger, successful companies can support generous dividend policies but not risk debt. This is illustrated in firms like Advanced Technology Co KSCP (Kuwait, Health Care) and Al-Maidan Clinic for Oral Health Services Company KSCP, which saw stable dividends (mean DPR = 0.12) and relatively low risk of debt exposure (mean LEV = 0.19).

Yet, this flexibility is lower in the case of smaller or less profitable firms, especially those in capital-intensive industries such as technology and logistics. For example, Automated Systems Company KPSC (Kuwait) witnessed reduced profitability and higher leverage since 2017, resulting in negative dividend payments by 2022.

These corporate examples illustrate the broader empirical reality captured by our moderation analysis ($\beta = -0.015$ for the DPR × ROA interaction). Managers must recognize that the dividend–leverage strategy is not one-size-fits-all; it is contingent on profitability. For high-ROA firms, our results suggest a capacity to sustain dividends without aggressive debt accumulation, aligning with internal financing preferences. Conversely, for low-ROA firms, attempting to maintain high dividends forces a reliance on external debt that may not be sustainable long term. Therefore, financial planners should use our coefficient estimates to stress-test their payout policies: If a firm's profitability falls below the regional mean (ROA < 8.7%), prioritizing debt reduction over dividend stability is empirically supported by our data to avoid financial distress.

Furthermore, the moderation effect (Sect. "Interpretation of Findings") indicates that less profitable firms should prioritize debt reduction over dividend stability, as the positive relationship weakens when ROA is low. This nuance is critical for SMEs in capital-intensive industries where cash flow volatility is higher.

Managers should also be sensitive to perceptions of their dividend policy by shareholders, especially by those nations' increasing institutional investment like the Saudi Arabian and United Arab Emirati economies. Using dividend policy as a signaling market tool, but keeping relatively low levels of debt, can enhance shareholder confidence as well as stability in their longer-term funding base.

Practical Implications

The study offers clear guidance for investors and policymakers alike.

For investors:

Regular dividend payout can be employed as a signal of reduced leverage risk and higher operational efficiency, particularly for firms in such sectors as health care and technology. However, investors must look at the profitability and size of the company to assess the long-term sustainability of paying dividends.

Institutional investors in the GCC should take into account integrating firm-level dividend behavior into ESG frameworks as it reflects value and governance quality alignment opportunities.

For policymakers:

GCC fiscal authorities can promote higher debt and dividend transparency since standardized reporting minimizes information asymmetries and enhances the efficacy of signaling devices.

Also, targeted fiscal and regulatory interventions like tax incentives for SMEs' reinvestment or growth-related credit guarantees for aggressive companies can enable small companies to manage the dividend distribution–leverage trade-off more effectively.

More significantly, the moderation effect of profitability suggests that policy instruments for firm profitability, i.e., R&D and export activity subsidies, might have a direct impact on optimal capital structure outcomes.

Limitations and future research

Despite the robustness of the methodology, this study has certain limitations:

Data Limitations:

- The sample focuses on non-financial firms, excluding the heavily regulated banking sector—a significant portion of the GCC capital market.
- Some entries suffer from missing values, particularly in Qatari and Omani firms, due to inconsistent disclosure practices.
- *Geographical concentration and generalizability*: Approximately 88% of firm-year observations originate from Saudi Arabia, reflecting superior data availability and disclosure enforcement under the Saudi Capital Market Authority. While this provides a robust empirical foundation, it limits the direct generalizability of findings to smaller GCC markets (e.g., Oman, Bahrain, Kuwait) where institutional frameworks, ownership structures, and investor expectations may differ. Consequently, our results should be interpreted as most representative of the GCC's dominant and most transparent market. Future cross-country studies are required to determine if these signaling mechanisms hold in less regulated regional markets.
- Survivorship and Reporting Bias: The requirement for consistent reporting (2016–2022) introduces survivorship bias, potentially overrepresenting larger, more stable, and better-governed firms while excluding delisted or irregularly reporting entities. This may attenuate observed relationships if distressed firms exhibit systematically different dividend–leverage dynamics. Future studies could address this by employing survival analysis techniques or integrating qualitative case studies of firms that exited the sample due to financial distress or regulatory non-compliance.
- Only consistently reporting firms (2016–2022) were included, introducing survivorship bias that may skew results toward larger, more stable entities.

Methodological considerations:

- While fixed-effects and System GMM models were employed, future studies could benefit from machine learning techniques to identify nonlinear relationships.
- Behavioral variables such as managerial risk aversion, board independence, and family ownership—common in GCC corporations—were not included in this study but warrant further exploration.

Suggestions for Future Research:

1. **Sector-Specific Analyses**

- Conduct separate analyses for dominant GCC industries such as:
- Energy (e.g., Qatar Navigation QPSC)
- Real Estate (e.g., Gulf Warehousing Company QPSC)
- Technology (e.g., Automated Systems Company KPSC)

2. **Cross-Country Comparisons**

   Geographical Expansion and Cross-Country Comparisons: Future research should prioritize expanding the dataset to include more firms from underrepresented GCC markets, particularly Bahrain and Kuwait, where disclosure practices are evolving but data completeness remains challenging. Collaborative efforts with local regulators, stock exchanges, or primary survey collection could help overcome these barriers. Such expansion would enable robust cross-country fixed-effects modeling to isolate how institutional differences—such as regulatory stringency, ownership norms, or investor protection—moderate the dividend–leverage nexus. Specifically, future models should incorporate governance variables such as board independence, family ownership concentration, and state ownership stakes to isolate how these institutional differences moderate the dividend–leverage nexus across the region.
3. **Behavioral Finance Integration**
   Behavioral and Governance Variables: Building on recent calls to integrate behavioral finance into emerging market studies [5, 109], future models should explicitly incorporate variables such as: (a) CEO tenure and executive compensation structures, which may influence risk tolerance in financing decisions; (b) family ownership concentration and founding-family involvement, prevalent in GCC corporations, which may alter dividend signaling incentives; and (c) board independence and gender diversity, which could moderate agency-related payout behaviors. Testing these variables would deepen understanding of how managerial and ownership psychology interacts with formal financial theory in the GCC context.
4. **Islamic Finance Considerations**
   While this study has theoretically integrated the role of Sharia-compliant instruments, future empirical research should explore how Sharia compliance

affects dividend and capital structure decisions by isolating Sukuk issuance from conventional debt. Examine whether profit-sharing instruments (e.g., Sukuk) moderate the relationship between dividends and debt differently than interest-bearing loans, leveraging granular data on instrument types, particularly in Saudi Arabia and Kuwait.

This study contributes to the growing body of literature on corporate finance in emerging markets, particularly within the GCC region. It highlights the complex and nuanced relationship between dividend policy and capital structure, influenced by firm characteristics, sectoral dynamics, and regulatory environments.

By identifying key drivers and boundary conditions, it provides actionable insights for managers, investors, and policymakers navigating the evolving financial landscape of the GCC.

Author contributions

Authors re-assure that they have contributed significantly to the work, have read the manuscript, attest to the validity and legitimacy of the data and its interpretation, and agree to its submission. Also, authors of this paper confirm that the paper is not copied or plagiarized version of some other published work.

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Declarations

Informed consent

Authors confirm that the manuscript is the authors' original work and the manuscript have not received prior publication and are not under consideration for publication elsewhere.

Ethical approval and consent to participate

The authors confirm that they have read, understand, and agreed to the submission guidelines, policies, and submission declaration of the journal. A local ethics committee ruled that no formal ethics approval was required in this particular research; they only asked to have a copy of the published report after the research has been completed.

Consent for publication

Consent for participant is not applicable.

Consent to participate

Authors declare that this paper is not submitted for publication in any other Journal or Magazine till the decision is made by journal editors, and that if the paper is finally accepted by the journal for publication, authors confirm immediate publication of the paper by paying all charges or its withdrawal according to the journal withdrawal policies.

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