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## Article

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# Are the firms' capital structure and performance related? Evidence from GCC economies

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## ABSTRACT

This study examines the empirical relationship between the different leverage levels as a proxy of financing mix on the financial performance of the non-financial firms listed on capital markets in GCC economies. The study uses the pooled ordinary least squares regression (OLS), fixed and random effects regression, and feasible generalised least square (FGLS) regression to explore the relationship among variables on the data of GCC firms listed from 2011 to 2021. The results suggest that the capital structure considerably affects firms' performance. Findings refute the theoretical assumptions of Modigliani and Miller's debt irrelevance and debt-supporting theorem. The findings also contradict the debt-supporting benefits the agency and trade-off theory suggest. Empirically, short-term, long-term, and total debt adversely affect the return on assets, equity, and earnings per share. Control variables, growth opportunities, and size of the firm positively and asset tangibility negatively contribute to the performance. The results will support the managers in making performance-improving financing decisions. Lenders should improve *ex-ante* screening and *ex-post* monitoring to avoid possible defaults. Local and foreign investors should carefully examine the firms' debt levels before making investment decisions. Policymakers should focus on the flourishing of the bond markets to support privatisation and economic diversification. Our study is the first to use the recent data of GCC-listed firms to examine the impact of capital structure on firms' performance. Contributing to the literature gap will also lay a foundation for a more comparative study on corporate financing with alternative financial instruments.

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## 1. Introduction

One of the primary objectives of a business organisation is to maximise its profit; hence, financial decisions have significant importance, like operational and strategic decisions (Boateng et al., 2022). Berle and Means (1932) proposed the separation of control and ownership in modern corporations, where shareholders (owners) provide capital and managers (professionals) control and run the corporations. The professionals are assigned to protect the interest of capital providers and put efforts into maximising their wealth. For firms, the cost-bearing external sources of financing are debt and equity. In the corporate finance literature, capital/financial structure is defined as the mix of these two sources of financing. The debate on the impact of financing structure on firms' performance starts with the pioneering work of Modigliani and Miller (1958), which concluded that in perfect capital markets, there is no association between the financing mix and firms' value. Modigliani and Miller (1963) amended their earlier proposition, and advocated the use of debt for its tax-related benefits, which contributes to the firm value by reducing the cost of capital.

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Since then, the capital structure puzzle has deviated from the assumptions of the perfect market to imperfect markets, with the introduction of several market frictions in terms of costs, like information asymmetry, agency costs, and conflict of interest. Plenty of research (empirical and theoretical) was conducted to find the association between the financing mix and firm value. Theoretically, trade-off theory supports using debt to swap the cost of debt with tax benefits and pecking order theory advocates using retained earnings followed by debt and equity to minimise information asymmetry. Jensen and Meckling (1976) agency theory highlighted the conflict of interest between principal (owners) and agents (managers) with various agency costs arising from this conflict of interest. They suggested equity ownership for managers to minimise managerial opportunism and debt to control the availability of free cash flow for managerial disposal.

According to Qureshi (2007), the firm's value results from its investment, dividend, and financing policies. The financing policies mainly refers to the use of debt, i.e. short and long-term debt, high and low levels of debt in financing, and its impact on a firm's performance. Studies like Myers (2001), Berger and Di Patti (2006), Margaritis and Psillaki (2010), Khan et al. (2021), and Khan et al. (2023) suggest that long-term debt and high debt in firm's financing contribute to its performance, but Qureshi (2007) reported that low-level debt, in the long run, contributes to the firm's performance. The debate in the literature on the role of financing choices on performance is conflicting and inconclusive. Most empirical evidence on financing structure and the companies' performance uses data from developed countries. Such as Berger and Di Patti's (2006) study on banking, Chathoth and Olsen's (2007) study on hospitality, Jermias's (2008) on manufacturing and industries in the US, Margaritis and Psillaki's (2010) study of French firms; Nasimi (2016) study on UK firms; Li et al. (2019) study on European SMEs reported the inconsistent results. In contrast, few studies like El-Sayed Ebaid (2009); Lin and Chang (2011); Salim and Yadav (2012); Sheikh and Wang (2013); Dawar (2014) and Nassar (2016) examined the performance effects of financing structure in some developing economies, but their findings are also indecisive.

Therefore, the inconclusive and contradictory empirical findings urge the need for this empirical study. Hence, the first objective is to find out whether leverage (a proxy of capital structure) significantly influences the performance of firms operating in the Gulf Cooperation Council (GCC) countries or not? Second, as Lagoarde-Segot (2016), suggested that any model's results could be changed by changing the fundamental assumptions of the model and considering the significant and specific circumstances/environment (Le and Phan, 2017). So, the second objective of the study is to explore the applicability of the capital structure theories or models to understand the performance of firms operating in the specific environment of GCC. These objectives differentiate this study from the earlier studies as well.

The study is unique in terms of providing comprehensive empirical evidence by using the longer period of data for majority of the firms in the region. Particularly, it includes the firms during the transition period. During this transition period, the GCC economies are targeting market liberalisation, economic diversification, and privatisation. Hence, financial institutions and markets are vital when private sector rather than state enterprises are taking the lead in economic growth. So, understanding financing choices and business performance could meet the capital demand from the increasing role of the private sector in the economy. Compared to other regions GCC has several advantages compared to other emerging markets, for instance, Standard and Poor global for 2024 forecasted broad stability in the banking and economic sectors of the GCC region and predicted that the region could overcome the post-pandemic economic slowdown compared to its global counterparts. Similarly, the IMF staff country report (2023) reported that the equity market in GCC performed better than the equity markets in emerging markets. Also, the currencies of most of the GCC countries are pegged against the dollar, which reduces the foreign exchange risk in the region. Likewise, Khan et al. (2023) reported that the GCC economies are more competitive and innovative in terms of global ranking. Hence, it can be inferred that the economies in the GCC region are relatively stable, and understanding the factors contributing to the performance of the firms along with the mentioned factors will further increase foreign investment in these markets.

Hence, examining the implication of capital structure on firms' performance in these distinctive economies is significant and unique. The study examines the significance of the association between firms' capital structure and performance, using the level of debt, i.e. short or long-term debt, and find which

level significantly impacts performance. It is more relevant at the time when demand for capital increases in these economies due to market reforms, targeting economic diversification and promoting privatisation to reduce the dependence on sizeable income and rent from oil and related products.

The existing equivocal empirical findings and the gap in the literature highlighted above encourage the presentation of this empirical evidence. This study investigates the impact of short-term, long-term, and total debt, the proxies of capital structure, on the performance of non-financial firms listed on GCC countries' stock markets. The study adopted two accounting-based performance measures, i.e. returns on assets (ROA) and returns on equity (ROE), and one market-based performance measure, earnings per share (EPS). Empirically, leverage adversely impacts firms' performance, negating the debt-supporting role for performance highlighted by the main debt supporting theories.

The findings of the study have following theoretical and practical contributions. First, the study adds the empirical evidence of non-financial firms of GCC to the literature. The empirical evidence is quite significant, as it can help to make informed decisions, as suggested by He et al. (2021). Second theoretically, the findings of the study refute the applicability of the assumption of Modigliani and Miller's debt irrelevance and debt-supporting theorem, trade-off and agency theory in the GCC region. Third, the results will also help local and foreign investors to understand the evolving dynamics of the GCC capital markets and will support them in making their investment decisions based on the firms' performance. Fourth, on practical sides, the results will assist corporate managers in choosing value-enhancing financing structures to achieve profit maximisation goals. Fifth, for policymakers, these findings will help understand the dynamics of capital markets and the performance of firms. It will help them to recognise the progress factors through which they can formulate pro-development policies to achieve economic objectives. The remaining paper presents a literature review and the research design section. The results and discussion are followed by the final section, which concludes the study.

## 2. Background

The GCC, comprising Bahrain, KSA, Kuwait, Oman, Qatar, and the UAE, was established in 1981 with the aim of fostering unified economic integration and progressing towards a common market and currency (Ariss et al., 2007). These nations share numerous commonalities, such as geographical proximity, shared religion, language, and culture, as well as similarities in legal systems, economic and societal conditions, and the challenges they face, which unite them under a collective umbrella (Al-Khoury, 2011; Martinez-Garcia et al., 2020). Consequently, prior research has often treated the GCC countries as a singular entity or akin to a single nation (Arayssi & Jizi, 2023; Guizani & Abdalkrim, 2022).

The economic structure of the GCC nations exhibit shared characteristics. These countries, with a combined population of 56.4 million and a GDP totaling US\$ 1.7 trillion in 2021 (GCC Statistics, 2021), hold a significant position in the global economy, representing over 0.22% of the world's GDP (World Bank, 2019). Additionally, they contribute 61.4% to the GDP of the Middle East Region, as of 2017 (PWC, 2018). The GCC economies heavily rely on their substantial reserves of oil and gas, with a significant portion of their GDP contingent upon favorable oil export opportunities (Bugshan et al., 2021). Given their control over approximately 21% of global natural gas reserves and 34% of oil reserves, these nations play a crucial role in maintaining stability in the oil market (Alhassan, 2019; Bugshan et al., 2021). Moreover, their economic activities are profoundly influenced by oil prices, with oil revenues constituting more than half of their GDP and about 80% of their total revenue (El-Katiri, 2016). Consequently, fluctuations in oil prices are poised to impact the budgeting, expenditure, and profitability of GCC countries, thereby influencing firms' financing strategies.

The swift economic expansion experienced in these nations, coupled with heightened regulatory pressures and growing demands from foreign institutional investors for enhanced transparency and accountability, have instigated transformations across the GCC countries, contributing to the advancement of their stock markets (Eulaiwi et al., 2016; Martinez-Garcia et al., 2020) and fostering an increase in foreign direct investment (Qasem et al., 2022, 2023). The informal institutional dynamics within GCC countries are characterised by tribal, communal, and familial orientations, with ruling families often intertwined with local or regional business entities (Al-Hadi et al., 2016), potentially influencing the capital structure of companies.

### 3. Theoretical literature review

Since the debt irrelevance proposition of Modigliani and Miller (1958) and the debt-related tax advantage proposition of Modigliani and Miller (1963), contemporary corporate finance researchers examine the role of choice between debt and equity on firm value, particularly in terms of the cost related to each source of financing. The optimal mix of debt and equity with the minimum possible cost of capital and maximum benefit is known as optimal capital structure. Managers aspire to have this optimal financing structure, to enhance the firms' value. Several conditional theories exist in literature to achieve the optimal capital structure. A summary of the relationship between leverage and firm value based on the theoretical predictions is given in Table 1.

Kraus and Litzenberger (1973) put forward the trade-off theory, which assumes that managers choose debt of a certain level to balance between tax advantage and debt-related bankruptcy costs. The agency theory of Jensen and Meckling (1976) highlighted the various agency costs that arise from the conflict of interest between principal and agent, i.e. providers of capital as principal (shareholders and creditors) and managers as agents. It postulates that various agency costs arise due to the selection of different financing sources, which could be influenced by the managers' interest rather than the owners. To minimise information asymmetry, Myers and Majluf (1984) proposed an order, i.e. using internally available funds, followed by debt and equity at last, naming it the pecking order theory. In contrast to internal factors dominating the firm's capital structure, Baker and Wurgler's (2002) market timing theory highlighted the external factor, i.e. managers choose the debt or issue the equity, based on external market conditions.

Ironically, the theoretical literature on capital structure contributing to the firm's value is mixed (Pham et al., 2022). Trade-off theory and agency theory support using debt to attain tax benefits and extra monitoring by creditors, respectively, to minimise conflicts. On the other hand, a pecking order suggests that using internal capital, i.e. retained earnings for profitable firms, could enhance the firm's value rather than debt. Finally, market timing theory suggests that debt and equity could be value-contributing, depending on the market conditions. In contrast, there is a consensus that inappropriate selection of capital structure could lead to financial distress, and an optimal financing mix is a prerequisite to attain operational efficiency and enhance the firm's performance.

### 4. Empirical literature review and hypotheses development

Several studies have examined the conditional theories of capital structure, and studies have studied the impact of leverage on firms' performance, yet they have reported mixed findings. The existing literature examined the different dimensions of capital structure. For instance, Wahba (2014), Shoab and Yasushi (2015, 2016) examine the role of capital structure on ownership structure and firms' performance. Studies like, Gropp and Heider (2010), Sheikh and Wang (2011), and Khan et al. (2021) explored the determinants of capital structure. Following studies examined the impact of financing decisions on the firms' performance using the data of various economies, Berger and Di Patti (2006), Chathoth and Olsen (2007), Jermias (2008), Margaritis and Psillaki (2010), Nasimi (2016) and Li et al. (2019) study on developed economies reported the inconsistent results. In contrast, few studies like El-Sayed Ebaid (2009), Lin and Chang

**Table 1.** Summary of capital structure theories prediction on leverage and firm value.

Researcher	Theory	Theoretical prediction
Modigliani and Miller (1958)	MM debt irrelevance theorem	No impact of debt on firm value/performance
Modigliani and Miller (1963)	MM debt relevance theorem	Tax advantage on debt could positively contribute to firm value
Jensen and Meckling (1976)	Agency theory	Debt could minimise the conflict of interest and improve a firm's efficiency.
Kraus and Litzenberger (1973)	Trade-off theory	Up to optimal level of debt can contribute to the value of the firm positively.
Myers and Majluf (1984)	Pecking-order theory	Debt is a secondary choice for financing after internal financing, assuming the negative impact of debt on firm value under the assumption of information asymmetry.
Baker and Wurgler (2002)	Market timing theory	Choosing debt or equity based on the market situation can enhance the firm value.

Source: Authors' based on existing literature.

(2011), Khan (2012), Sheikh and Wang (2013), Sheikh et al. (2013), Dawar (2014), Nassar (2016), and Shoaib and Siddiqui (2022) also reported inconclusive results on developing economies data. A summary of the empirical studies' findings is given in Table 2.

The empirical evidence summarised in Table 2 shows inconsistent and mixed findings by the existing studies on financial and non-financial firms operating in developing and developed economies. The positive association between leverage and firms' performance supports the prophecies of trade-off and agency theories, which support the use of debt for tax benefits and debt-related covenants to control managerial entrenchment or opportunism (Grossman & Hart, 1982; Jensen & Meckling, 1976). According to Margaritis and Psillaki (2010), banks will only issue debt to the firm if they predict a positive outcome from the project and ensure the *ex-post* monitoring to get their money back. Likewise, Jensen (1986) introduced the "control hypothesis," which supports using debt to improve organisational efficiency because managers oblige them to pay the interest on new debt. The proponents of leverage for firms' performance suggest that apart from achieving the benefits from debt, firms must show better performance and efficiency to receive the credit.

Contrary to this, several empirical studies found a negative association of financing mixed with firm performance, as reported in Table 2, where most studies on developing economies reported a negative association. This negative association contradicts the prophecy of agency theory and trade-off theory; these theories support the use of leverage to minimize agency conflict and tap into the tax-related benefit of debt. However, the reported negative relationship by Khan (2012), Sheikh and Wang (2013), Dawar (2014), Nassar (2016), and Shoaib and Siddiqui (2022) points out the weak monitoring by the institutions and information asymmetry problems. According to Yoshitomi and Shirai (2001), developed capital markets provide access to individual investors to invest in securities directly taking the risk; therefore, they demand more standardised information and mitigate the information asymmetry problems. Similarly, firms can achieve higher growth by reducing their cost of capital by accessing advanced capital markets (Rajan & Zingales, 1998); also, the capital markets can take and diversify more long-term risk than banks (Yoshitomi & Shirai, 2001), paving the access of capital to the firms for long term (risky) investments. From the mentioned argument, it can be concluded that information asymmetry, weak monitoring, and institutions, along with the less developed capital markets, also impact the effective use of leverage in developing economies.

In such cases, firms must rely on banks for financing, where most of their revenue is consumed in interest payments, resulting in lower or negative profits. Hence, the financing decisions result in the inefficient use of debt rather than choosing financing mixed with objectivity. In the case of developing countries, Diantimala et al. (2021) stated long-term debt is preferred when internal funds are limited.

**Table 2.** Capital structure and firms' performance, empirical evidence summary.

Studies on developed economies			
Studies	Country	Nature of the firms	Findings
Berger and Di Patti (2006)	US	Financial (Banks)	Positive
Jermias (2008)	US	Non-financial	Negative
Margaritis and Psillaki (2010)	France	Non-financial	Positive
Nasimi (2016)	UK	Non-financial	Positive
Li et al. (2019)	European countries	Non-financial	Negative
Abdullah and Tursoy (2021)	Germany	Non-financial	Positive
<i>Studies on developing economies</i>			
El-Sayed Ebaid (2009)	Egypt	Non-financial	No or weak
Abor (2007)	Ghana	Non-financial	Negative
Khan (2012)	India	Non-financial	Positive
Salim and Yadav (2012)	Malaysia	Non-financial	Negative
Soumadi and Hayajneh (2012)	Jordan	Non-financial	Negative
Olokoyo (2013)	Nigeria	Non-financial	Positive
Sheikh and Wang (2013)	Pakistan	Non-financial	Negative
Dawar (2014)	India	Non-financial	Negative
Nassar (2016)	Turkey	Non-financial	Negative
Ayaz et al. (2021)	Malaysia	Non-financial	Positive
Danso et al. (2021)	Indian	Non-financial	Negative
Khan (2022)	GCC countries	Financial (banks)	Positive
Das et al. (2022)	Bangladesh	Non-financial	Negative
Ghardallou (2023)	Saudi Arabia	Non-financial	Negative

Source: Authors' based on existing studies.

Similarly, Sheikh and Wang (2013) stated that overleveraging results from less developed capital markets where lenders may influence managerial efficiency.

It could be observed through the review of the theoretical and empirical literature that existing literature is unclear and indecisive about the impact of financing mix on firm value or performance. Hence, the failure of existing literature to provide conclusive and systemic association has encouraged the need for a current study. Based on the existing theoretical predictions and empirical literature, this study proposes the following hypothesis:

*H1: Short-term debt is adversely related to the firms' performance.*

*H2: Long-term debt is adversely related to the firms' performance.*

*H3: Total debt is adversely related to the firms' performance.*

## 5. Research design

### 5.1. Data and sample

To comprehensively explore the impact of the financing mix on the performance of non-financial firms listed in the GCC capital markets, the primary source for the financial data on the study variables was obtained from Thomson Reuters Eikon (<https://eikon.refinitiv.com/>). Thomson Reuters offers up-to-date and historical economic and financial data for all publicly traded companies on the main global stock markets (Sardo & Serrasqueiro, 2017; Sarhan et al., 2019). Thomson Reuters Eikon is extensively used in the fields of management and financial research (Akbas et al., 2018). The dataset collected by the authors from Thomson Reuters Eikon was then analysed and utilised for research study.

Our primary sample consists of non-financial publicly listed firms operating within the UAE, KSA, Oman, Qatar, Bahrain, and Kuwait, with available data spanning from 2011 to 2021. Several vital considerations underpin the selection of these specific years and countries. First, the chosen timeframe enables a comprehensive analysis period, facilitating a robust examination of long-term trends and patterns. Additionally, the year 2011 was selected as the starting point due to its positioning as a two-year post-global financial crisis period in 2008, marking the beginning of the recovery in the stock market (Alghemary et al., 2023; Guizani & Abdalkrim, 2022). Furthermore, the sample concludes in 2021, representing the most recent year for which data were available.

Moreover, the focus on GCC countries is based on their unique economic structures. All six countries are classified as high-income countries, indicative of developed economies. They share numerous similarities, including geographical proximity, common religion, language, and culture, as well as similarities in their legal systems, economic and societal conditions, and the nature of challenges faced (Al-Khoury, 2011; Al-Muharrami & Matthews, 2009; Martinez-Garcia et al., 2020). These economies boast complex financial systems attributed to higher government ownership and nuanced direct and indirect financing, as suggested by Booth et al. (2001). Additionally, the region maintains a lower corporate tax rate (see Table 13) compared to other economies, so the debt-related tax benefits mentioned by (Kraus & Litzenberger, 1973; Modigliani & Miller, 1963) may not have significance for financing decisions in the region.

To mitigate potential biases in this study dataset, we implemented various strategies to enhance the robustness and credibility of our analysis. One crucial step involved excluding companies with insufficient data, which aimed to minimize the impact of incomplete or unreliable information on our findings, thereby preserving the integrity of our study. Consequently, our final sample consisted of 3682 firm-year observations from 364 firms, covering ten industries based on the Industry Classification Benchmark (ICB), ensuring a diverse representation across sectors. Additionally, to address potential biases arising from outliers in the data, we applied winsorisation techniques, which involved adjusting all continuous variables at the 1st and 99th percentiles to mitigate the influence of extreme values on regression analysis. For further clarity on our sampling procedure, Table 3 offers a comprehensive summary.

Table 4 displays the final sample distribution for the current study, distributed by years and GCC countries (Panel A) and industry and GCC countries (Panel B). According to the data in Table 4, Panel A, the KSA has the most observations with 1428 observations, followed by Kuwait with 938 observations, the UAE with 526 observations, Oman with 387 observations, Qatar with 281 observations, and Bahrain

with 122 observations. Table 4 Panel B displays the GCC non-financial firms' distribution by industry. The figures in the table show that the industrial sector has the most observations, with 1111 observations, while the technology sector has the lowest, with 46 observations.

## 5.2. Explanation of variables

The variables are adopted from the existing literature for a meaningful comparison with the existing evidence (Elmagrhi et al., 2018; Khan, 2022; Ngatno et al., 2021; Olokoyo, 2013; Sheikh & Wang, 2013; Yakubu & Oumarou, 2023). The literature highlights long-term debt as a proxy of capital structure; however, the study uses short-term, long-term, and total debt as explanatory variables to see the different leverage levels. Return on assets (ROA), return on equity (ROE), and earnings per share (EPS) are performance measures used as dependent variables (Ogunode et al., 2022; Sukirman & Dianawati, 2023). To control for firm-specific characteristics, tangibility, size, growth, and earnings volatility are control variables. Annual growth (GDP growth rate) and inflation rate are macroeconomic variables. Table 5 presents the details of the variables.

## 5.3. Model specification

Panel data techniques were used for this study analysis since the sample includes data from various firms across a period. Four-panel econometric techniques, namely pooled ordinary least squares (OLS), the random-effects (REs) model, the fixed-effects (FEs) model, and the feasible generalised least squares

**Table 3.** Sampling procedures.

Description	No. of company years
Total number of listed firms in GCC markets during the study period (2011–2021)	9,168
Less: Banks and insurance firms	2,460
Less: Non-financial firms with missing data in DataStream	3,026
<b>Final Sample available for study analysis</b>	<b>3,682</b>

Source: Authors' compilation.

**Table 4.** Study sample distribution.

Panel A: by years and GCC countries							
Year	KSA	Kuwait	UAE	Oman	Qatar	Bahrain	Total
2011	107	81	43	28	25	10	294
2012	112	83	44	29	25	10	303
2013	116	83	45	33	25	10	312
2014	118	84	46	36	25	10	319
2015	122	85	47	37	26	10	327
2016	124	85	49	37	26	12	333
2017	133	87	50	38	26	12	346
2018	149	88	51	38	26	12	364
2019	149	88	51	38	26	12	364
2020	149	88	51	38	26	12	364
2021	149	86	49	35	25	12	356
<b>Total</b>	<b>1,428</b>	<b>938</b>	<b>526</b>	<b>387</b>	<b>281</b>	<b>122</b>	<b>3,682</b>

Panel B: By Industry and GCC countries.

Industry	KSA	Kuwait	UAE	Oman	Qatar	Bahrain	Total
Industrials	414	271	204	117	94	11	1,111
Real Estate	128	311	106	0	55	11	611
Consumer Discretionary	258	88	58	21	22	44	491
Consumer Staples	186	51	65	44	22	28	396
Basic Materials	211	44	0	44	11	11	321
Telecommunications	55	53	54	22	22	17	223
Energy	38	66	17	55	22	0	198
Utilities	31	16	11	84	11	0	153
Health Care	83	16	11	0	22	0	132
Technology	24	22	0	0	0	0	46
<b>Total</b>	<b>1,428</b>	<b>938</b>	<b>526</b>	<b>387</b>	<b>281</b>	<b>122</b>	<b>3,682</b>

Source: Authors' compilation.

(FGLS) model employed in this study to examine the association between key independent variables and firm performance measurements. The Breusch-Pagan Lagrange Multiplier (BPLM) test is used to choose between pooled OLS and REs regression models. The BPLM assesses the null hypothesis that no REs exists. The test rejects the null hypothesis, indicating that the pooled OLS method is inappropriate. The Hausman specification test then examines the null hypothesis that REs consistently and effectively selects the REs and FE models. Similarly, rejecting this hypothesis suggests that the FE model's estimated findings will be more robust.

The FGLS method demonstrates resilience against initial autoregressive disturbances in unbalanced panel data and accommodates cross-sectional correlation and/or heteroscedasticity across the panels (Baltagi, 2011; Qasem et al., 2020). Wooldridge (2009) contends that the FGLS model is preferable as it considers inherent data issues such as normality and homoscedasticity. In addition, it should be noted that while FGLS is a transformed form of OLS, it is more suitable for handling non-normal data (Gujarati, 2003). Bolt et al. (2012) further assert that FGLS enables the accommodation of panel-specific autocorrelation in error terms, along with heteroscedasticity across panels. They also demonstrate that FGLS estimates are adept at handling datasets exhibiting serial correlation and/or heteroscedasticity. Claeys and Vennet (2008) contend that the FGLS estimator exhibits greater efficiency compared to both FE and RE estimators. Therefore, the basic regression equation is expressed as follows:

$$\gamma_{it} = \varphi + Y_{it}\beta + \varepsilon_{it}$$

where  $\gamma$  represents the dependent variables (i.e. firms' performance measurements) of  $i$ th firm for period  $t$ ,  $\varphi$  denotes the  $y$ -intercept,  $Y_{it}$  is the  $1 \times K$  vector of  $K$  explanatory variables of  $i$ th firms,  $\beta$  represents the factors of vector  $1 \times K$ , and the given equation calculates the error term.

$$\mu_{it} = \mu_i + v_{it}$$

The four regression model equations (i.e. pooled OLS, REs, FE, and FGLS) are denoted as 1, 2, 3, and 4, respectively. Where " $PERF_{it}$ " represents performance measures, ROA, ROE, and EPS for the firm  $i$ , for period  $t$ . " $LEV_{it}$ " stands for three different measures of leverage (i.e.,  $TD$ ,  $LTD$ , and  $STD$ ). As the current study employs unbalanced panel data, REs, and FE models are applied to estimate the results accurately. These models are chosen because they are thought to be more appropriate for panel data in order to determine the link between the variables (Berlin et al., 2009; Greene, 2003). Furthermore, the OLS estimate approach is also used to confirm the correlations of chosen variables (Ahmed & Afza, 2019). Moreover, through the utilisation of the FGLS regression model, this study can effectively address potential issues arising from heterogeneity and autocorrelation (Al-Duais et al., 2022; Ghaleb et al., 2022; Wan Mohammad et al., 2018).

$$PERF_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 GRW_{it} + \beta_3 EVL_{it} + \beta_4 TAN_{it} + \beta_5 SIZ_{it} + \beta_6 EG_t + \beta_7 INF_t + Fixed\ effects + \varepsilon_i + \mu_{it} \quad (1)$$

**Table 5.** Definition of variables.

<i>Dependent variables</i>	
Return on Asset (ROA)	The ratio of firms' net income to total assets
Return on Equity (ROE)	The ratio of firms' net income to total equities
Earnings per Share (EPS)	The ratio of firms' net income to total shares outstanding
<i>Explanatory variables</i>	
Short-term debt (STD)	The proportion of short-term debt to total assets
Long-term debt (LTD)	The proportion of long-term debt to total assets
Total debt (TD)	The proportion of total debt to total assets
<i>Control variables</i>	
Assets growth (GRW)	$(Total\ assets_t - Total\ assets_{t-1})/Total\ assets_{t-1}$
Tangibility (TAN)	Fixed assets/Total assets
Earnings volatility (EVL)	$(Operating\ income_t - Operating\ income_{t-1})/Operating\ income_{t-1}$
Size	Natural logarithm of total assets
<i>Macroeconomic variables</i>	
Annual economic growth (EG)	Annual GDP growth rate
Annual inflation (INF)	Annual inflation rate

$$PERF_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 GRW_{it} + \beta_3 EVL_{it} + \beta_4 TAN_{it} + \beta_5 SIZ_{it} + \beta_6 EG_t + \beta_7 INF_t + Fixed\ effects + \varepsilon_i + \mu_{it} \quad (2)$$

$$PERF_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 GRW_{it} + \beta_3 EVL_{it} + \beta_4 TAN_{it} + \beta_5 SIZ_{it} + \beta_6 EG_t + \beta_7 INF_t + Fixed\ effects + \varepsilon_i + \mu_{it} \quad (3)$$

$$PERF_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 GRW_{it} + \beta_3 EVL_{it} + \beta_4 TAN_{it} + \beta_5 SIZ_{it} + \beta_6 EG_t + \beta_7 INF_t + Fixed\ effects + \varepsilon_i + \mu_{it} \quad (4)$$

## 6. Empirical results

### 6.1. Descriptive summary/statistics and correlation of variables

The summary statistics of the variables used in the study are shown in Table 6; the mean of two performance measures, ROA and ROE, is 5.95 and 7.02, which depicts the utilisation of companies' assets and equity capital for revenue generation. The country-level mean of ROA and ROE is highest for Oman and lowest for Kuwaiti firms. The ROA mean of non-financial firms is higher, and the ROE is lower than that of financial firms in GCC reported by Khan (2022). Mean of EPS is 0.53 of the sample data. The mean EPS at the country level is highest for Saudi firms. The total debt mean is 23%, which means, on average, 23% of firms' assets are financed with total debt, 14% (mean) is long-term, and 9% (mean) is short-term debt. The total debt mean at the country level is almost the same for all countries, whereas Qatari firms have higher long-term debt among all the countries.

The mean of all the debt levels reveals that firms in GCC countries do not rely heavily on debt for their financing choices. The total debt proportion for non-financial firms is deficient compared to financial firms operating in GCC, i.e. 84%, as Khan (2022) reported. It is also low compared to the study of Sheikh and Wang (2013) on Pakistan, which reported that the mean total debt is 45%. Moreover, the total debt mean of GCC firms is close to that of G-7 countries, i.e. in the range of 20% to 30%, as Rajan and Zingales (1995) reported.

Pair-wise correlation is estimated to check the multicollinearity among the variables, and results are presented in Table 7. The pair-wise correlation values are almost below 50%, suggesting that multicollinearity is not an issue among the selected variables. Gujarati and Porter (2009) state that there is a multicollinearity issue if a correlation between the explanatory variables is more than 0.8.

### 6.2. Regression results

To examine the impact of TD, LTD, and STD, measures of leverage, on the performance of non-financial firms listed on GCC stock markets, pooled ordinary least squares (OLS), random effects (RE), fixed effects (FE), and feasible generalised least squares (FGLS) estimations are employed. In order to ascertain the presence of multicollinearity among the independent variables, the variance inflation factor (VIF) was computed. The results of the VIF tests, as reported in Table 8, it reveals that all VIF values are less than 10. This

**Table 6.** Descriptive statistics.

Variable	Descriptive statistics of the whole sample (N=3,682)				Descriptive statistics (means) by country (N=3,682)					
	Mean	Median	Min	Max	Bahrain	KSA	Kuwait	Oman	Qatar	UAE
ROA	5.95	5.27	-48.50	39.32	7.44	7.07	3.43	8.17	7.56	4.57
ROE	7.02	7.14	-188.45	95.92	7.73	8.18	3.27	11.03	10.56	5.57
EPS	0.53	0.06	-45.90	42.81	0.04	1.19	0.02	0.04	0.41	0.21
TD	0.23	0.20	0.00	0.96	0.11	0.24	0.23	0.24	0.24	0.21
LTD	0.14	0.08	0.00	0.95	0.06	0.14	0.14	0.16	0.19	0.13
STD	0.09	0.05	0.00	0.71	0.06	0.10	0.09	0.09	0.06	0.08
GRW	0.05	0.02	-0.95	2.70	0.04	0.07	0.02	0.05	0.04	0.04
EVL	-0.01	-0.03	-26.81	39.62	-0.05	-0.10	0.02	0.26	-0.06	0.04
TAN	0.42	0.42	0.00	1.00	0.44	0.48	0.36	0.47	0.38	0.35
SIZ	13.46	13.56	7.67	21.49	11.57	14.68	11.45	11.14	15.39	14.84
EG	2.15	2.51	-8.86	13.38	2.40	2.33	0.91	2.64	3.15	2.92
INF	1.88	2.24	-2.54	5.83	1.26	2.05	2.66	1.12	1.28	1.05

Source: Authors' calculation; Note: All variables are defined in Table 5.

result indicates the absence of multicollinearity among the research variables (Kline, 2011). Moreover, additional diagnostic examinations were carried out to address further estimation concerns, including issues related to heteroscedasticity and autocorrelation. The Breusch–Pagan/Cook–Weisberg (BPCW) test was employed to investigate whether there was evidence of heteroscedasticity within the study data. The findings presented in Table 9 revealed a significance level ( $p \leq .00$ ), indicating the presence of heteroscedasticity (Qasem et al., 2023). Additionally, Wooldridge’s test for panel data was utilised to detect any signs of autocorrelation. The results displayed in Table 9 pointed out the presence of autocorrelation ( $p \leq .00$ ).

Tables 10, 11, and 12 display the regression results for all regression models used in this study. The BPLM test findings, however, rejected the null hypothesis and suggested that the REs model is preferable to pooled OLS (Breusch & Pagan, 1980; Ghaleb et al., 2022; Qasem et al., 2023). Furthermore, Hausman’s (1978) specification test supports interpreting RE results (Danso et al., 2021). Finally, FGLS regression models are employed to further control for autocorrelation and heteroscedasticity issues. In general, the regression models across all columns presented in Tables 10, 11, and 12 demonstrate strong fit and statistical significance. The R-squared values for all models fall within the range of 0.100 to 0.289, aligning with findings from prior research (Ayaz et al., 2021; Danso et al., 2021). The results of all the estimations are the same, suggesting the estimation results of the variables used are robust. The regression results of TD with performance and control variables are given in Table 10. The results indicate that TD has a significant and negative relationship with all the performance measures. Growth and a firm’s size positively and significantly affect all performance measures. At the same time, earnings volatility has a negative significant relation with ROA and EPS and a positive relationship with ROE. Tangible assets are adversely and significantly related to all the performance measures.

Table 11 shows the estimation results of LTD with various performance measures (dependent variables) and control variables. LTD as an explanatory variable is negatively and significantly related to ROA, ROE, and EPS. At the same time, control variables firm size and growth opportunities have positive and significant relations with ROA, ROE, and EPS. Assets tangibility has a negative and significant association with performance proxies.

The estimation findings of STD as an explanatory variable with dependent variables, i.e., proxies of performance, are presented in Table 12. STD is negatively and significantly associated with ROA, ROE, and

**Table 7.** Correlation analysis.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) ROA	1.00											
(2) ROE	0.72***	1.00										
(3) EPS	0.56***	0.62***	1.00									
(4) TD	-0.23***	-0.16***	-0.15***	1.00								
(5) LTD	-0.18***	-0.08***	-0.10***	0.82***	1.00							
(6) STD	-0.15***	-0.17***	-0.11***	0.53***	-0.05***	1.00						
(7) GRW	0.26***	0.36***	0.22***	0.05***	0.07***	-0.01	1.00					
(8) EVL	0.03*	0.07***	0.06***	0.00	0.02	-0.03*	0.07***	1.00				
(9) TAN	-0.01	-0.03**	0.03*	0.30***	0.40***	-0.06***	0.04***	0.03*	1.00			
(10) SIZ	0.13***	0.13***	0.25***	0.26***	0.31***	0.00	0.10***	0.01	0.16***	1.00		
(11) EG	0.12***	0.16***	0.09***	-0.05***	-0.05***	0.00	0.09***	0.02	0.01	0.09***	1.00	
(12) INF	0.00	0.05***	0.07***	-0.03*	-0.04**	0.01	0.01	-0.01	-0.02	-0.09***	0.37***	1.00

Source: Authors’ calculation; Note: asterisks denote statistical significance level (\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .1$ ); All variables are defined in Table 5.

**Table 8.** Results of variance inflation factor (VIF) tests.

	TD	LTD	STD
TD	1.35		
LTD		1.64	
STD			1.04
GROW	1.06	1.07	1.07
EVOL	1.02	1.02	1.02
TAN	1.20	1.31	1.14
SIZE	3.15	3.28	2.83
EG	6.61	6.61	6.61
INF	2.24	2.24	2.25

Source: Authors’ calculation; Note: asterisks denote statistical significance level (\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .1$ ); All variables are defined in Table 5.

**Table 9.** Results of heteroscedasticity and autocorrelation tests.

	TD			LTD			STD		
	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS
Heteroscedasticity test $Ch^2$	150.16***	24.76***	798.78***	102.77***	8.78***	1112.87***	138.46***	8.80***	917.90***
Wooldridge test F	145.847***	48.398***	29.080***	154.770***	49.081***	27.343***	151.272***	51.340***	28.174***

Source: Authors' calculation; Note: asterisks denote statistical significance level (\*\*\*) $p < .01$ , (\*\*) $p < .05$ , (\*) $p < .1$ ; All variables are defined in Table 5.

EPS. At the same time, performance measures have a positive and significant relationship with growth opportunities and the firm's size. The tangible assets in this model are also negatively and significantly related to firms' performance. In sum, all the estimation models show a similar effect of STD, LTD, and TD on ROA, ROE, and EPS, i.e. different levels of debt adversely affect the performance of non-financial listed firms on GCC capital markets during the study period. In summary, the results support the study's proposed hypothesis, i.e. all debt levels substantially and adversely influence the firms' performance.

## 7. Discussion

Empirically, all three proxies of capital structure, i.e., STD, LTD, and TD, show a negative and significant relationship with the performance proxies, ROA, ROE, and EPS. The results are in line with the findings of Sheikh and Wang (2013), Olokoyo (2013), Dawar (2014), Nassar (2016), Ayaz et al. (2021), Danso et al. (2021), Das et al. (2022), Sdiq and Abdullah (2022), Ghardallou (2023), where the relationship is examined for non-financial firms in developing or emerging markets. Hence, the study's findings support the stylised facts reported in the existing literature. The results further endorse the argument of Lagoarde-Segot (2016) and Le and Phan (2017) that the results could be different in different specific economic conditions and selected models. On the contrary, the empirical results of non-financial firms are different from the findings of financial firms (banks) as reported by Berger and Di Patti (2006) and Khan (2022) studies on the US and the GCC, respectively. This difference justifies the different nature of financial and non-financial firms' businesses, where the performance of each industry is the outcome of different regulatory frameworks. Theoretically, the findings negate the agency and trade-off theory's prophecy, where leverage enhances the firms' performance. It is commonly observed in emerging and developing economies, contrary to findings of developed economies, as summarised in Table 2.

The observed empirical evidence significantly contributes to the finance literature, managerial practices, and policymaking. Theoretically, it rejects Modigliani and Miller (1958) assumption that financing mix has no impact on firm value while supporting the significant impact of financing structure on firms' performance. Likewise, the findings oppose Modigliani and Miller (1963) positive impact of leverage on firm value, suggesting the negative impact of debt on the performance of non-financial firms in GCC. This means that the tax shield benefits of debt are less than its relevant costs, such as financial distress, or instead, a significant portion of firms' earnings is used to make interest payments. Thus, companies operating in the GCC region could not avail of the tax shield advantage on debt, resulting in the rejection of trade-off theory assumptions.

Furthermore, results suggest that the performance of the firms deteriorates with an increase in debt, i.e. an adverse relationship between leverage and performance; this also is incongruent with the propositions of agency theory, where the use of more debt could minimize the agency's problems. The findings contradict Jensen's (1986) statement that debt should minimize conflicts between shareholders and managers. However, negative association predicts an increase in shareholders and debtholders conflict, where debtholders demand higher compensation in the form of high interest on their credit, as reported by Myers (1977) and Le and Phan (2017).

The findings of this study also support the argument that capital/bond markets in the GCC region behave like other developing and emerging economies and need more diversification and development. As all GCC economies are transitioning, focusing on diversifying economic sectors and promoting the privatisation for which the development of the capital markets is inevitable. As developed capital markets provide access to more investors and can diversify the long-term risk more than banks (Yoshitomi & Shirai, 2001), also it reduces the cost of capital, which can contribute to the growth of the firm as well

**Table 10.** (TD) Regression results of the influence of capital structure on firms' performance in GCC countries over the period 2011–2021.

	OLS						Random effects						Fixed effects						FGLS					
	ROA		ROE		EPS		ROA		ROE		EPS		ROA		ROE		EPS		ROA		ROE		EPS	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
TD	-11.06***	(0.60)	-20.70***	(1.66)	-2.20***	(0.18)	-9.65***	(1.12)	-24.55***	(3.31)	-1.81***	(0.40)	-9.94***	(1.26)	-27.84***	(4.28)	-1.92***	(0.52)	-5.50***	(0.36)	-16.40***	(1.11)	-0.45***	(0.06)
GROW	9.00***	(0.86)	31.10***	(2.32)	1.67***	(0.20)	2.68***	(0.56)	20.73***	(2.16)	1.10***	(0.18)	1.96***	(0.59)	17.86***	(2.15)	0.88***	(0.16)	0.79***	(0.16)	12.89***	(0.73)	0.23***	(0.03)
EVOL	0.01	(0.05)	0.34**	(0.15)	0.04***	(0.01)	-0.06*	(0.04)	0.19	(0.15)	0.03**	(0.01)	-0.07*	(0.04)	0.16	(0.15)	0.03**	(0.01)	-0.01	(0.01)	0.27***	(0.05)	0.00**	(0.00)
TAN	0.06	(0.40)	-1.42	(0.95)	-0.00	(0.10)	-1.57*	(0.89)	-4.71**	(1.92)	-0.39**	(0.19)	-2.00*	(1.09)	-8.12***	(2.90)	-0.59**	(0.27)	-0.36	(0.27)	-0.50	(0.71)	-0.05	(0.04)
SIZE	1.14***	(0.08)	2.44***	(0.19)	0.25***	(0.02)	1.48***	(0.28)	2.57***	(0.50)	0.31***	(0.06)	2.18***	(0.57)	2.97**	(1.44)	0.60***	(0.17)	0.78***	(0.07)	1.92***	(0.15)	0.07***	(0.01)
EG	-0.17***	(0.06)	-0.04	(0.14)	-0.01	(0.01)	-0.17***	(0.03)	-0.05	(0.10)	-0.02	(0.00)	-0.18***	(0.03)	-0.06	(0.10)	-0.02	(0.00)	-0.02*	(0.01)	0.08	(0.05)	-0.00	(0.00)
INF	-0.07	(0.08)	0.06	(0.18)	0.01	(0.02)	-0.05	(0.04)	0.06	(0.13)	0.00	(0.01)	-0.05	(0.04)	0.04	(0.13)	0.00	(0.01)	-0.01	(0.02)	0.08	(0.07)	-0.00	(0.00)
_cons	-1.96	(1.21)	-17.50***	(2.86)	-2.46***	(0.28)	-5.30	(3.50)	-16.02***	(6.07)	-2.97***	(0.75)	-16.48**	(7.44)	-20.61	(18.74)	-6.38***	(2.25)	0.69	(0.92)	-11.64***	(2.11)	-0.61***	(0.13)
Obs.	3682		3682		3682		3682		3682		3682		3682		3682		3682		3682		3682		3682	
R <sup>2</sup>	0.289		0.268		0.257		0.258		0.247		0.245		0.259		0.242		0.115		148.21		128.19		720.99	
Chi2	<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>	
Year Dummies	<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>	
Country Dummies	<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>	
Sector Dummies	<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>		<b>Yes</b>	

Source: Authors' calculation; Note: asterisks denote statistical significance level (\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .1$ ); All variables are defined in Table 5.

Table 11. (LTD) Regression results of the influence of capital structure on firms' performance in GCC countries over the period 2011–2021.

	OLS			Random effects			Fixed effects			FGLS		
	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS
LTD	-10.97*** (0.75)	-16.11*** (2.06)	-2.00*** (0.19)	-7.25*** (1.24)	-15.27*** (3.72)	-1.18*** (0.38)	-7.02*** (1.33)	-14.87*** (4.48)	-1.09** (0.44)	-2.88*** (0.37)	-9.46*** (1.29)	-0.29*** (0.06)
GROW	9.22*** (0.87)	31.37*** (2.34)	1.71*** (0.20)	2.79*** (0.57)	20.83*** (2.15)	1.12*** (0.18)	2.19*** (0.61)	18.49*** (2.15)	0.92*** (0.16)	0.54*** (0.17)	12.47*** (0.74)	0.22*** (0.03)
EVOL	0.03 (0.05)	0.37** (0.16)	0.05*** (0.01)	-0.06 (0.04)	0.20 (0.16)	0.03** (0.01)	-0.07* (0.04)	0.16 (0.16)	0.03** (0.01)	-0.01 (0.01)	0.27*** (0.05)	0.00** (0.00)
TAN	0.43 (0.43)	-1.60 (1.01)	0.03 (0.10)	-2.18** (0.90)	-6.46*** (1.94)	-0.52*** (0.18)	-2.88*** (1.10)	-11.65*** (2.93)	-0.82*** (0.25)	-0.78*** (0.28)	-1.16* (0.70)	-0.05 (0.04)
SIZE	1.10*** (0.08)	2.20*** (0.19)	0.24*** (0.02)	1.18*** (0.29)	1.94*** (0.48)	0.26*** (0.06)	1.54*** (0.57)	0.79 (1.32)	0.45*** (0.15)	0.63*** (0.06)	1.56*** (0.14)	0.06*** (0.01)
EG	-0.18*** (0.06)	-0.06 (0.14)	-0.01 (0.01)	-0.18*** (0.03)	-0.07 (0.11)	-0.02*** (0.00)	-0.18*** (0.03)	-0.07 (0.11)	-0.02*** (0.00)	-0.02 (0.01)	0.06 (0.05)	-0.00 (0.00)
INF	-0.06 (0.08)	0.09 (0.19)	0.01 (0.02)	-0.04 (0.04)	0.09 (0.14)	0.01 (0.01)	-0.04 (0.04)	0.06 (0.14)	0.01 (0.01)	-0.01 (0.02)	0.09 (0.07)	-0.00 (0.00)
_cons	-2.22* (1.27)	-15.92*** (2.92)	-2.43*** (0.28)	-2.03 (3.59)	-9.57 (5.87)	-2.44*** (0.69)	-8.92 (7.47)	5.70 (17.29)	-4.64** (1.95)	2.22** (0.90)	-8.05*** (2.03)	-0.52*** (0.12)
Obs.	3682	3682	3682	3682	3682	3682	3682	3682	3682	3682	3682	3682
R <sup>2</sup>	0.261	0.239	0.233	0.226	0.216	0.318	0.231	0.213	0.100	0.231	0.213	0.100
Chi2										1334.08	1122.04	815.41
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Authors' calculation; Note: asterisks denote statistical significance level (\*\*\*)  $p < 0.01$ , (\*\*)  $p < 0.05$ , (\*)  $p < 0.1$ ; All variables are defined in Table 5.



**Table 13.** Market capitalisation and corporate tax in GCC.

Country Code	Market capitalisation (% of GDP)	Market capitalisation USD	Corporate tax rate
Bahrain	71%	24.61 bill	0%*
Kuwait	100%	105.99 b	15%
Oman	21%	16.8 b	15%
Qatar	114.5%	165.39 b	10%
Saudi Arabia	330.8%	2.43 trillion USD	20%
UAE	84.36%	294.83 bill	0%**

\*Only oil exploration companies are charged 46%, \*\*Oil exploration companies are to pay 55% tax, banks 20%, and other sectors 0%. (Data based on World Bank and KPMG report for the year ended-2020).

(Rajan & Zingales, 1998). Moreover, the negative impact of leverage on performance also suggests weak disciplinary monitoring by banks, particularly in GCC, where most of the banks are owned by the state. This could be due to low competition, a relaxed working environment, and lower incentives for bank managers to monitor the borrowers' performance ex-ante and ex-post.

Empirical results further indicate that factors like firm size and future growth opportunities positively and asset tangibility negatively contribute to the firms' performance. The positive impact of size on performance supports the prediction of trade-off theory, where large firms with more risk diversification tend to use debt for financing, which ultimately contributes to their profitability. At the same time, growth opportunities' positive and asset tangibility's negative association contradicts the trade-off theory, where growth opportunities as non-tangible assets cannot be used as collateral, while tangible assets can. Earnings volatility has no clear or weak impact, further verifying the assumption that the monitoring and screening by state-owned banks are not rigorous in the region.

The empirical results also support the facts reported in Table 13. As shown in the table, the corporate tax rate in the region is relatively low compared to the other world economies, which means that tax shield incentives on debt are not encouraging for corporate managers in the GCC region. Therefore, the total debt percentage is also very low. Market capitalisation to GDP ratio suggests pretty valued to over-valued; this also depicts investors and companies prefer stocks/equity and avoid debt due to interest, which is prohibited as per religious belief.

## 8. Robustness test

### 8.1. 2SLS estimation

The panel data techniques applied in this study (i.e. pooled OLS, REs, FEs, and GLS) address the issue of time-constant omitted variables but do not fully resolve the problem of time-varying omitted variables that may be associated with the explanatory variables (Saif-Alyousfi et al., 2020). Additionally, we expect to encounter heteroscedasticity at the firm level in our model estimations. Furthermore, in line with previous research (Katmon et al., 2019; Qasem et al., 2023; Tingbani et al., 2024), we run Durbin-Wu-Hausman (DWH) tests (Durbin, 1954; Hausman, 1978) to investigate potential endogeneity. The DWH test results, detailed in Table 14, suggest that our capital structure variables (TD, LTD, and STD) are susceptible to endogeneity issues, given their DWH test p-values below the 5% significance threshold.

Hence, we re-examine our models using two-stage least squares (2SLS) instrumental variable estimation to overcome these issues (Al-Qadasi et al., 2022; Qasem et al., 2021; Ye et al., 2023). The 2SLS technique eliminates the unit-root process and the constant unobserved effect. The instrumental variables used in this study are firm size and market-to-book ratio; previous research has consistently highlighted firm size and market-to-book ratio as a significant determinant of firms' capital structure (Moradi & Paulet, 2019; Ramli et al., 2019; Saif-Alyousfi et al., 2020). The results of the 2SLS regressions are displayed in Table 15 and show that most of the coefficients are statistically significant at or above the 5% significance level. These results suggest that endogeneity is not a concern in the study's main findings.

### 8.2. Sub-sample analysis

To validate the primary findings concerning the relationship between capital structure and firm performance, we reanalysed all models on a country-specific basis rather than aggregating data across the GCC

**Table 14.** Durbin-Wu–Hausman tests for endogeneity.

	TD			LTD			STD		
	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS
Durbin $Ch^2$	618.25***	608.184***	173.867***	635.96***	626.813***	210.637***	811.314***	727.674***	269.183***
Wu-Hausman $F$	736.351***	721.989***	180.848***	761.847***	748.642***	221.416***	1031.28***	898.778***	287.812***

Source: Authors' calculation; Note: asterisks denote statistical significance level (\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .1$ ); All variables are defined in Table 5.

**Table 15.** 2SLS Regression results of the influence of capital structure on firms' performance in GCC countries.

	TD			LTD			STD		
	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS
TD	-44.78*** (6.02)	-127.81*** (14.96)	-8.41*** (1.28)						
LTD				-75.03*** (15.62)	-222.44*** (41.80)	-15.00*** (3.03)			
STD							-102.06*** (16.52)	-270.41*** (36.54)	-17.35*** (3.00)
GROW	2.59*** (0.77)	21.09*** (2.80)	1.16*** (0.21)	3.70*** (1.11)	24.44*** (3.79)	1.42*** (0.27)	1.47 (0.92)	17.68*** (2.91)	0.93*** (0.22)
EVOL	-0.07 (0.05)	0.14 (0.16)	0.03** (0.01)	-0.07 (0.07)	0.16 (0.22)	0.03** (0.01)	-0.10 (0.07)	0.06 (0.19)	0.02 (0.01)
TAN	6.37*** (1.89)	15.92*** (4.61)	1.00*** (0.36)	12.52*** (4.02)	36.45*** (10.39)	2.42*** (0.74)	-2.94* (1.59)	-11.82*** (3.78)	-0.80*** (0.29)
SIZE	4.14*** (0.63)	8.28*** (1.13)	0.69*** (0.10)	5.04*** (1.06)	11.54*** (2.22)	0.89*** (0.16)	2.35*** (0.46)	3.50*** (0.83)	0.36*** (0.07)
EG	-0.16*** (0.04)	0.00 (0.13)	-0.01 (0.01)	-0.22*** (0.06)	-0.18 (0.19)	-0.02* (0.01)	-0.07 (0.07)	0.23 (0.19)	0.00 (0.01)
INF	-0.06 (0.05)	0.02 (0.17)	0.00 (0.01)	0.03 (0.08)	0.27 (0.25)	0.02 (0.02)	-0.18** (0.08)	-0.29 (0.24)	-0.02 (0.02)
_cons	-36.29*** (7.69)	-80.74*** (14.26)	-7.25*** (1.24)	-49.43*** (13.30)	-127.22*** (28.21)	-10.21*** (2.08)	-11.90** (5.96)	-14.96 (12.13)	-2.78*** (0.91)
Obs.	3682	3682	3682	3682	3682	3682	3682	3682	3682
Chi2	295.84	332.19	168.62	188.04	169.15	147.05	146.87	201.69	118.55
Year Dummies							<b>Included</b>		
Country Dummies							<b>Included</b>		
Sector Dummies							<b>Included</b>		

Source: Authors' calculation; Note: asterisks denote statistical significance level (\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .1$ ); All variables are defined in Table 5.

region. This approach allowed us to evaluate whether the results vary between individual countries and to derive potential policy implications tailored to each country (Saif-Alyousfi, 2020). The outcomes, as presented in Tables 16, 17, and 18, broadly corroborate the findings observed at the aggregate level, albeit with some variations. Notably, in Table 16, the coefficients of TD are not statistically significant in association with ROA and EPS for Bahrain, and they are also insignificant to ROE for Qatar. However, these coefficients are negative and significant across all firm performance metrics for other GCC countries.

Similarly, in Table 17, LTD exhibits no significance in its association with ROA and EPS for Bahrain and the UAE, and it is also not significant with ROE for Oman and Qatar. However, it demonstrates negative and significant associations with all firm performance variables in other GCC countries. Furthermore, the results in Table 18 reveal that STD lacks significance in its associations with ROA, ROE, and EPS for Bahrain and Qatar. Nevertheless, it demonstrates negative and significant associations with all firm performance variables in other GCC countries. These variations could be attributed to differences in sample sizes across the GCC countries.

## 9. Summary and conclusion

The study's objective is to investigate the impact of the financing mix on the financial performance of the non-financial firms listed on GCC capital markets during 2011–2021. Explanatory variables, such as short-term, long-term, and total debt, are used as leverage measures to explore the relationship with the three performance measures, i.e. ROA, ROE, and EPS. Pooled OLS, FE, and RE estimations were employed to explore the relationship among dependent, explanatory, and control variables. Estimation results show that all the leverage measures have a negative and significant relation with all the performance

Table 16. (TD) FGLs regression results of the influence of capital structure on firms' performance in GCC countries (individual country).

	Bahrain			KSA			Kuwait			Oman			Qatar			UAE		
	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS
TD	-5.34 (3.51)	-17.41 <sup>2</sup> (8.00)	0.00 (0.07)	-7.80 <sup>3</sup> (0.68)	-21.50 <sup>3</sup> (2.03)	-3.17 <sup>3</sup> (0.29)	-4.70 <sup>3</sup> (0.63)	-22.01 <sup>3</sup> (2.13)	-0.05 <sup>3</sup> (0.01)	-6.84 <sup>3</sup> (1.04)	-12.24 <sup>3</sup> (3.23)	-0.06 <sup>3</sup> (0.01)	-3.45 <sup>3</sup> (1.00)	4.00 (3.09)	-0.31 <sup>3</sup> (0.10)	-3.44 <sup>3</sup> (0.99)	-9.05 <sup>3</sup> (3.41)	-0.19 <sup>2</sup> (0.08)
GROW	3.89 <sup>3</sup> (1.33)	27.16 <sup>3</sup> (4.53)	0.17 <sup>3</sup> (0.04)	1.34 <sup>3</sup> (0.30)	14.00 <sup>3</sup> (1.33)	1.38 <sup>3</sup> (0.16)	1.02 <sup>3</sup> (0.34)	17.15 <sup>3</sup> (1.59)	0.04 <sup>3</sup> (0.00)	0.19 (0.52)	5.89 <sup>3</sup> (2.04)	0.02 <sup>3</sup> (0.01)	0.67 <sup>1</sup> (0.39)	2.14 (1.70)	0.09 <sup>1</sup> (0.05)	0.06 (0.40)	12.62 <sup>3</sup> (1.87)	0.26 <sup>3</sup> (0.05)
EVOL	-0.02 (0.08)	0.16 (0.26)	0.00 (0.00)	0.00 (0.02)	0.38 <sup>3</sup> (0.10)	0.04 <sup>3</sup> (0.01)	-0.00 (0.02)	0.07 (0.08)	0.00 <sup>1</sup> (0.00)	-0.04 (0.03)	0.61 <sup>3</sup> (0.17)	0.00 <sup>3</sup> (0.00)	-0.09 <sup>1</sup> (0.05)	0.28 (0.19)	0.01 (0.00)	-0.02 (0.03)	0.17 (0.13)	0.01 <sup>2</sup> (0.00)
TAN	-4.92 <sup>2</sup> (2.20)	-11.38 <sup>3</sup> (3.64)	-0.04 (0.03)	0.20 (0.54)	-1.91 (1.42)	-0.59 <sup>3</sup> (0.20)	0.07 (0.46)	2.72 <sup>2</sup> (1.31)	0.00 (0.00)	-1.93 <sup>2</sup> (0.82)	-2.27 (2.39)	-0.02 <sup>3</sup> (0.01)	1.25 (0.78)	3.56 (2.34)	0.02 (0.09)	-0.51 (0.70)	-2.54 (2.00)	0.01 (0.05)
SIZE	0.97 (0.90)	2.71 <sup>1</sup> (1.50)	-0.01 (0.01)	0.63 <sup>3</sup> (0.12)	2.22 <sup>3</sup> (0.30)	0.39 <sup>3</sup> (0.05)	1.46 <sup>3</sup> (0.14)	3.10 <sup>3</sup> (0.34)	0.01 <sup>3</sup> (0.00)	0.23 (0.29)	0.45 (0.70)	0.01 <sup>3</sup> (0.00)	0.08 (0.21)	0.50 (0.60)	0.06 <sup>3</sup> (0.02)	0.99 <sup>3</sup> (0.16)	1.72 <sup>3</sup> (0.31)	0.08 <sup>3</sup> (0.01)
EG	-6.12 <sup>3</sup> (0.72)	-6.14 <sup>3</sup> (1.75)	-0.01 (0.01)	0.04 <sup>2</sup> (0.02)	0.22 <sup>3</sup> (0.07)	0.03 <sup>3</sup> (0.01)	-0.96 <sup>3</sup> (0.15)	1.63 <sup>3</sup> (0.56)	0.00 <sup>3</sup> (0.00)	-0.65 <sup>3</sup> (0.05)	-1.01 <sup>3</sup> (0.18)	-0.00 <sup>3</sup> (0.00)	0.40 <sup>3</sup> (0.05)	0.94 <sup>3</sup> (0.14)	-0.00 (0.00)	32.35 <sup>3</sup> (3.60)	15.93 (10.79)	-0.15 (0.28)
INF	25.23 <sup>3</sup> (2.95)	26.48 <sup>3</sup> (6.88)	0.05 (0.06)	1.58 <sup>3</sup> (0.12)	1.82 <sup>3</sup> (0.40)	-0.01 (0.06)	7.08 <sup>3</sup> (1.07)	-9.69 <sup>2</sup> (3.90)	-0.03 <sup>3</sup> (0.01)	2.03 <sup>3</sup> (0.15)	3.35 <sup>3</sup> (0.46)	0.00 <sup>3</sup> (0.00)	-0.52 <sup>3</sup> (0.08)	-0.75 <sup>3</sup> (0.29)	0.02 <sup>2</sup> (0.01)	-141.83 <sup>3</sup> (15.77)	-69.05 (47.39)	0.69 (1.25)
_cons	26.01 <sup>2</sup> (12.35)	10.94 (20.51)	0.22 (0.19)	-10.10 <sup>3</sup> (2.04)	-27.54 <sup>3</sup> (4.81)	-3.43 <sup>3</sup> (0.73)	-34.93 <sup>3</sup> (4.16)	2.90 (13.96)	0.01 (0.03)	7.00 <sup>2</sup> (2.81)	2.60 (6.85)	-0.06 <sup>3</sup> (0.02)	14.16 <sup>3</sup> (4.27)	4.77 (10.74)	0.01 (0.42)	-103.94 <sup>3</sup> (11.28)	-59.65 <sup>1</sup> (32.84)	-0.31 (0.86)
Obs.	122	122	122	1428	1428	1428	938	938	938	387	387	387	281	281	281	526	526	526
Chi <sup>2</sup>	190.09	116.11	46.35	621.75	476.88	394.73	391.31	472.51	454.86	466.30	237.47	280.39	198.62	141.30	276.01	192.96	243.61	348.14
Year/Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Authors' calculation; Note: superscripts numbers denote statistical significance level (<sup>1</sup>p < .01, <sup>2</sup>p < .05, <sup>3</sup>p < .1); All variables are defined in Table 5.

Table 17. (LTD) FGLs regression results of the influence of capital structure on firms' performance in GCC countries (individual country).

	Bahrain			KSA			Kuwait			Oman			Qatar			UAE		
	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS
LTD	-4.09 (3.87)	-20.42 <sup>1</sup> (10.86)	-0.04 (0.09)	-5.25 <sup>3</sup> (0.81)	-17.49 <sup>3</sup> (2.44)	-2.37 <sup>3</sup> (0.35)	-1.97 <sup>3</sup> (0.57)	-11.42 <sup>3</sup> (2.50)	-0.03 <sup>3</sup> (0.01)	-5.29 <sup>3</sup> (1.26)	-5.11 (3.55)	-0.04 <sup>3</sup> (0.01)	-3.12 <sup>3</sup> (1.00)	3.09 (3.35)	-0.35 <sup>3</sup> (0.10)	-0.39 (1.08)	6.11 <sup>1</sup> (3.48)	0.04 (0.08)
GROW	3.92 <sup>3</sup> (1.36)	28.17 <sup>3</sup> (4.75)	0.17 <sup>3</sup> (0.04)	1.03 <sup>3</sup> (0.35)	13.83 <sup>3</sup> (1.36)	1.25 <sup>3</sup> (0.16)	0.79 <sup>2</sup> (0.34)	16.23 <sup>3</sup> (1.69)	0.04 <sup>3</sup> (0.00)	-0.29 (0.48)	5.01 <sup>3</sup> (1.93)	0.02 <sup>3</sup> (0.01)	0.57 (0.38)	2.17 (1.70)	0.08 <sup>1</sup> (0.05)	0.14 (0.41)	12.79 <sup>3</sup> (1.93)	0.27 <sup>3</sup> (0.05)
EVOL	-0.03 (0.08)	0.13 (0.26)	0.00 (0.00)	0.01 (0.02)	0.40 <sup>3</sup> (0.09)	0.05 <sup>3</sup> (0.01)	-0.00 (0.02)	0.11 (0.09)	0.00 <sup>2</sup> (0.00)	-0.02 (0.03)	0.66 <sup>3</sup> (0.16)	0.00 <sup>3</sup> (0.00)	-0.08 (0.05)	0.28 (0.19)	0.01 <sup>1</sup> (0.00)	-0.03 (0.03)	0.18 (0.12)	0.01 <sup>2</sup> (0.00)
TAN	-5.71 <sup>3</sup> (2.16)	-11.48 <sup>3</sup> (3.53)	-0.03 (0.03)	-0.00 (0.57)	-1.55 (1.40)	-0.70 <sup>3</sup> (0.20)	-0.46 (0.45)	1.09 (1.37)	-0.00 (0.00)	-1.61 <sup>1</sup> (0.88)	-1.44 (2.52)	-0.01 <sup>1</sup> (0.01)	1.10 (0.79)	3.62 (2.35)	0.02 (0.09)	-0.48 (0.68)	-3.20 <sup>1</sup> (1.78)	-0.02 (0.04)
SIZE	0.61 (0.81)	2.46 <sup>1</sup> (1.39)	0.00 (0.01)	0.47 <sup>3</sup> (0.12)	1.86 <sup>3</sup> (0.28)	0.32 <sup>3</sup> (0.05)	1.22 <sup>3</sup> (0.14)	2.11 <sup>3</sup> (0.32)	0.01 <sup>3</sup> (0.00)	0.01 (0.30)	-0.54 (0.66)	0.01 <sup>3</sup> (0.00)	0.09 (0.21)	0.56 (0.60)	0.06 <sup>3</sup> (0.02)	0.86 <sup>3</sup> (0.14)	1.57 <sup>3</sup> (0.29)	0.07 <sup>3</sup> (0.01)
EG	-6.14 <sup>3</sup> (0.73)	-5.57 <sup>3</sup> (1.75)	-0.01 (0.01)	0.04 <sup>2</sup> (0.02)	0.23 <sup>3</sup> (0.07)	0.03 <sup>3</sup> (0.01)	-0.93 <sup>3</sup> (0.15)	1.67 <sup>3</sup> (0.58)	0.01 <sup>3</sup> (0.00)	-0.72 <sup>3</sup> (0.05)	-1.13 <sup>3</sup> (0.17)	-0.00 <sup>3</sup> (0.00)	0.40 <sup>3</sup> (0.05)	0.95 <sup>3</sup> (0.14)	0.00 (0.00)	32.09 <sup>3</sup> (3.62)	17.83 <sup>1</sup> (10.59)	-0.04 (0.25)
INF	25.36 <sup>3</sup> (2.96)	24.04 <sup>3</sup> (6.91)	0.05 (0.06)	1.59 <sup>3</sup> (0.13)	1.75 <sup>3</sup> (0.39)	0.01 (0.06)	6.93 <sup>3</sup> (1.10)	-9.85 <sup>2</sup> (4.07)	-0.03 <sup>3</sup> (0.01)	2.18 <sup>3</sup> (0.15)	3.60 <sup>3</sup> (0.43)	0.01 <sup>3</sup> (0.00)	-0.52 <sup>3</sup> (0.09)	-0.76 <sup>3</sup> (0.29)	0.02 <sup>1</sup> (0.01)	-140.66 <sup>3</sup> (15.87)	-77.14 <sup>1</sup> (46.55)	0.18 (1.09)
_cons	31.29 <sup>3</sup> (11.26)	11.20 (19.91)	0.13 (0.16)	-8.60 <sup>3</sup> (1.99)	-24.35 <sup>3</sup> (4.63)	-2.74 <sup>3</sup> (0.73)	-32.20 <sup>3</sup> (4.20)	12.82 (14.41)	0.05 (0.03)	8.23 <sup>3</sup> (2.99)	10.09 (6.61)	-0.05 <sup>2</sup> (0.02)	13.82 <sup>3</sup> (4.26)	3.65 (10.77)	-0.05 (0.42)	-101.61 <sup>3</sup> (11.25)	-65.47 <sup>2</sup> (32.08)	-0.56 (0.76)
Obs.	122	122	122	1428	1428	1428	938	938	938	387	387	387	281	281	281	526	526	526
Chi <sup>2</sup>	195.94	109.80	48.30	472.00	413.90	311.95	346.47	324.84	417.19	446.83	240.43	241.66	186.27	142.81	291.23	195.73	254.63	376.31
Year/Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Authors' calculation; Note: superscripts numbers denote statistical significance level ( $\hat{p} < 0.01$ ,  $^2p < 0.05$ ,  $^3p < 0.1$ ); All variables are defined in Table 5.

Table 18. (STD) FGLS regression results of the influence of capital structure on firms' performance in GCC countries (individual country).

	Bahrain			KSA			Kuwait			Oman			Qatar			UAE		
	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS	ROA	ROE	EPS
STD	-0.95 (3.94)	-5.26 (11.29)	0.06 (0.08)	-4.37 <sup>3</sup> (0.75)	-19.83 <sup>3</sup> (2.91)	-2.88 <sup>3</sup> (0.40)	-2.80 <sup>3</sup> (0.81)	-24.17 <sup>3</sup> (3.01)	-0.04 <sup>3</sup> (0.01)	-5.56 <sup>3</sup> (1.28)	-17.65 <sup>3</sup> (4.31)	-0.06 <sup>3</sup> (0.01)	-0.90 (1.69)	6.41 (7.57)	0.10 (0.20)	-3.04 <sup>2</sup> (1.26)	-25.92 <sup>3</sup> (5.49)	-0.34 <sup>3</sup> (0.11)
GROW	3.97 <sup>3</sup> (1.40)	26.16 <sup>3</sup> (4.72)	0.17 <sup>3</sup> (0.04)	0.43 (0.28)	11.81 <sup>3</sup> (1.30)	1.05 <sup>3</sup> (0.15)	0.96 <sup>3</sup> (0.34)	17.22 <sup>3</sup> (1.68)	0.04 <sup>3</sup> (0.00)	0.29 (0.50)	5.44 <sup>3</sup> (1.96)	0.02 <sup>3</sup> (0.01)	0.39 (0.38)	2.13 (1.69)	0.08 (0.05)	0.24 (0.43)	13.21 <sup>3</sup> (1.86)	0.25 <sup>3</sup> (0.05)
EVOL	-0.03 (0.09)	0.10 (0.25)	0.00 (0.00)	0.02 (0.02)	0.46 <sup>3</sup> (0.09)	0.05 <sup>3</sup> (0.01)	-0.01 (0.02)	0.09 (0.08)	0.00 (0.00)	-0.03 (0.03)	0.66 <sup>3</sup> (0.18)	0.00 <sup>3</sup> (0.00)	-0.08 (0.05)	0.27 (0.19)	0.01 <sup>1</sup> (0.00)	-0.02 (0.03)	0.21 <sup>1</sup> (0.13)	0.01 <sup>2</sup> (0.00)
TAN	-6.24 <sup>3</sup> (1.98)	-13.36 <sup>3</sup> (3.35)	-0.04 (0.02)	-1.18 <sup>2</sup> (0.54)	-6.33 <sup>3</sup> (1.42)	-1.15 <sup>3</sup> (0.19)	-0.49 (0.45)	-1.14 (1.35)	-0.00 (0.00)	-3.26 <sup>3</sup> (0.92)	-5.49 <sup>2</sup> (2.45)	-0.03 <sup>3</sup> (0.01)	0.39 (0.77)	4.23 <sup>1</sup> (2.34)	-0.02 (0.09)	-0.79 (0.68)	-2.90 (1.81)	-0.02 (0.04)
SIZE	0.16 (0.69)	0.92 (1.32)	-0.01 (0.01)	0.30 <sup>2</sup> (0.12)	1.19 <sup>3</sup> (0.25)	0.23 <sup>3</sup> (0.04)	1.12 <sup>3</sup> (0.13)	1.91 <sup>3</sup> (0.30)	0.01 <sup>3</sup> (0.00)	-0.55 <sup>2</sup> (0.25)	-0.38 (0.63)	0.01 <sup>3</sup> (0.00)	0.19 (0.20)	0.63 (0.59)	0.04 <sup>2</sup> (0.02)	0.86 <sup>3</sup> (0.14)	1.68 <sup>3</sup> (0.28)	0.07 <sup>3</sup> (0.01)
EG	-6.17 <sup>3</sup> (0.72)	-5.48 <sup>3</sup> (1.80)	-0.01 (0.01)	0.05 <sup>3</sup> (0.02)	0.27 <sup>3</sup> (0.07)	0.04 <sup>3</sup> (0.01)	-1.00 <sup>3</sup> (0.16)	0.98 <sup>*</sup> (0.57)	0.00 <sup>3</sup> (0.00)	-0.64 <sup>3</sup> (0.05)	-0.97 <sup>3</sup> (0.18)	-0.00 <sup>3</sup> (0.00)	0.45 <sup>3</sup> (0.05)	0.94 <sup>3</sup> (0.14)	0.00 (0.01)	33.34 <sup>3</sup> (3.70)	20.72 <sup>2</sup> (10.13)	-0.05 (0.27)
INF	25.49 <sup>3</sup> (2.91)	23.82 <sup>3</sup> (7.09)	0.04 (0.06)	1.68 <sup>3</sup> (0.12)	1.80 <sup>3</sup> (0.39)	0.02 (0.06)	7.43 <sup>3</sup> (1.14)	-4.86 (3.95)	-0.02 <sup>2</sup> (0.01)	1.96 <sup>3</sup> (0.15)	3.29 <sup>3</sup> (0.44)	0.00 <sup>3</sup> (0.00)	-0.55 <sup>3</sup> (0.08)	-0.72 <sup>2</sup> (0.29)	0.01 (0.01)	-146.16 <sup>3</sup> (16.24)	-89.97 <sup>2</sup> (44.52)	0.24 (1.18)
_cons	37.34 <sup>3</sup> (9.44)	30.92 <sup>1</sup> (18.53)	0.23 (0.17)	-6.51 <sup>3</sup> (2.08)	-13.49 <sup>3</sup> (4.38)	-1.41 <sup>3</sup> (0.71)	-32.92 <sup>3</sup> (4.34)	-2.38 (14.11)	0.02 (0.03)	14.20 <sup>3</sup> (2.60)	11.20 <sup>1</sup> (6.25)	-0.03 (0.02)	12.19 <sup>3</sup> (4.04)	2.40 (10.55)	0.20 (0.42)	-105.00 <sup>3</sup> (11.49)	-74.31 <sup>2</sup> (30.92)	-0.48 (0.82)
Obs.	122	122	122	1428	1428	1428	938	938	938	387	387	387	281	281	281	526	526	526
Chi <sup>2</sup>	212.26	106.44	51.06	508.58	426.67	329.03	328.81	425.96	383.95	401.63	258.39	218.66	194.69	141.66	238.96	202.40	292.44	345.95
Year/Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Authors' calculation; Note: superscripts numbers denote statistical significance level (<sup>2</sup>p < 0.01, <sup>3</sup>p < 0.05, <sup>1</sup>p < 0.1). All variables are defined in Table 5.

measures in all estimations. Hausman specification test recommends using RE results for interpretation. To further check the robustness of these results, the study employs the 2SLS estimation, and the results are the same.

The negative association between leverage and performance measures suggests the significant impact of capital structure on firms' performance. Theoretically, results negate the assumption of main capital structure theories, such as Modigliani and Miller's (1958) debt irrelevance assumption, which suggests no effect of debt on firm value. Similarly, Modigliani and Miller's (1963) debt relevance, agency, and trade-off theories' assumptions of positive influence of leverage on firm performance.

Empirically, STD, LTD, and TD have a negative and significant relation with ROA, ROE, and EPS. It suggests that all level of debt adversely affects the performance of non-financial firms in the GCC countries. The mean of debt levels in Table 3 suggests that the mean debt level of GCC countries is low compared to other emerging economies. It could be due to the less developed corporate bond market, no tax shield advantage due to low or no tax on corporate income (see Table 13) discouraging the managers from using more debt due to its related cost. The religious belief in the prohibition of interest-related transactions could be another reason for a lower level of leverage. Firm size and growth opportunities show a positive and significant impact on debt, which suggests that these factors could enhance the firms' performance.

The findings of the study are helpful for various stakeholders. Corporate managers should consider the adverse effect of debt on firm performance and aspire for the optimal level of value-enhancing debt. Investors should carefully examine the firms' debt level and its impact on their performance to avoid possible losses to their investments, particularly foreign investors; they must consider that leverage does not contribute to performance in the GCC like other economies. Lenders should perform *ex-ante* screening and *ex-post* monitoring to avoid possible defaults. As most economies promote economic diversification and privatisation, policymakers should formulate policies that flourish corporate bonds and capital markets to attract and protect local and foreign investors to achieve economic objectives.

In conclusion, the study's results suggest that the choice of financing mix has a resultant effect on the performance of the non-financial firms listed on GCC capital markets. Therefore, capital mobilisation to firms through financial markets and institutions could enhance their performance, ultimately contributing to achieving desired economic objectives. The findings are similar to earlier studies on various developing and emerging economies. However, this is contradictory to the studies of financial companies. Keeping this as a foundation study, examining various aspects of financial development in the region to explore the development of corporate bond markets and the availability of alternative financing, i.e., Islamic financing instruments for corporate finance, is suggested.

The study's limitations are the following: It primarily focuses on non-financial firms within GCC countries, potentially limiting the generalizability of findings beyond this context. The unique economic and regulatory environment of the GCC, alongside factors like religious beliefs and tax regulations, may influence financing decisions differently compared to other regions. Future research should include a more diverse range of firms to enhance the generalizability.

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## Data

**Source of Data:** The data used on this study was obtained from Thomson Reuters Eikon Database.

**Nature of the Data:** Historical archival data from the Thomson Reuters Eikon Database.

**Size of the Data:** The study sample consists of non-financial publicly listed firms operating within the UAE, KSA, Oman, Qatar, Bahrain, and Kuwait, with available data spanning from 2011 to 2021, comprising 3,682 firm-year observations from 364 firms.

**Accessibility of the Data:** The data supporting the findings of this study are openly accessible via the Thomson Reuters Eikon database (<https://eikon.refinitiv.com/>).

**Availability Statement:** The data used to support the findings of this study are available on request from the corresponding author.

## Authors contribution

Dr. Shoaib Khan: Conceptualisation and write-up the manuscript. Dr. Ameen Qasem: Data collection, formal analysis and estimation, interpretation of results, and writing—review and editing.

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