Journal of Asian Business and Economic Studies

Does corporate sustainability matter for the capital structure puzzle in OIC countries? Evidence from the COVID-19 pandemic

Hasan Tekin
Department of Finance and Banking, Karabuk University, Karabük, Turkiye, and
Ali Yavuz Polat
Gulf University for Science and Technology, Hawally, Kuwait

Received 27 January 2024
Revised 9 April 2024
10 June 2024
3 September 2024
28 October 2024
Accepted 29 October 2024

Abstract

Purpose – This study assesses the impact of environmental, social and governance (ESG) certification on capital structure decisions considering the COVID-19 pandemic.

Design/methodology/approach – The study utilizes the annual Asset-4 and Datastream data of Thomson Reuters Eikon for non-financial firms in member states of the Organization of Islamic Cooperation (OIC). Firm-fixed effects are used to avoid unobserved heterogeneity.

Findings – Firms with higher corporate sustainability have a higher leverage ratio. The positive impact of ESG scores on book leverage became more significant during the COVID-19 pandemic. These findings imply that ESG activities might serve as a signalling tool, especially considering the pandemic: ESG activities mitigate financial constraints when they are most pronounced and impactful.

Practical implications – Firms should invest in ESG activities to alleviate financial constraints. Researchers and practitioners are encouraged to explore how ESG and macro-specific factors jointly affect debt financing. Policymakers should incentivize ESG investment to reduce agency conflicts. Regulators in OIC countries should support firms that are encountering obstacles in obtaining ESG certification.

Originality/value – To date, the role of ESG investing in capital structure policy by considering the recent pandemic has not been assessed in OIC countries.

Keywords COVID-19, ESG, Financial constraint, Leverage

Paper type Research paper

1. Introduction

In recent years, firms, consumers and investors have shown growing concern for environmental, social and governance (ESG) issues, driven partly by regulatory pressures from developed countries (Huang and Ye, 2021). Firms, particularly those in advanced economies, actively engage in and publicize their ESG efforts to meet investor concerns and receive potential incentives (Bassen *et al.*, 2006). ESG practices are seen as positive signals by investors for reducing perceived risks (Lee and Kim, 2016; Sassen *et al.*, 2016; Benlemlih *et al.*, 2018) and enhancing firm value (Lins *et al.*, 2017). Moreover, ESG initiatives foster trust with stakeholders, help firms navigate crises (Albuquerque *et al.*, 2020; Ding *et al.*, 2021) and act as an insurance mechanism (Bae *et al.*, 2019). ESG activities are also linked with improved firm performance by easing financial constraints and lowering the cost of capital (El Ghoul *et al.*, 2011; Goss and Roberts, 2011; Cheng *et al.*, 2014).

JEL Classification — G01, L25, Q01

Journal of Asian Business and Economic Studies
Emerald Publishing Limited
2515-964X
DOI 10.1108/JABES-01-2024-0029

Lins *et al.* (2017) show that during the global financial crisis, firms with strong corporate social responsibility (CSR) activities benefited from higher profitability and growth owing to the trust they built with stakeholders. This suggests that investors value high-CSR firms during trust crises. While ESG investments may not always seem profitable, they can provide crucial protection during market downturns (Huang and Ye, 2021).

Investment in ESG activities is not limited to financial expenditure. It also encompasses dedicating time and effort to improve management practices, corporate governance and operational processes (Eccles *et al.*, 2014). Enhanced corporate governance (Michelon and Parbonetti, 2012) and transparency are critical components of ESG that can significantly reduce perceived risks (Ioannou and Serafeim, 2019) and improve access to financing.

This study adopts the following conceptual framework. While the relationship between ESG initiatives and corporate debt structures requires empirical validation, the fact that ESG engagement relaxes financial constraints holds a theoretical basis (Tang, 2022). In agency theory, external financing challenges are exacerbated by information asymmetry, thereby making external finance more expensive. Firms, therefore, employ strategies to mitigate this asymmetry and signal their quality to potential investors.

ESG commitments, characterized by enhanced information disclosure, suggest improved transparency, which potentially elevates a firm's reputation. Such enhancements could lower perceived risk among investors, which then improves the firm's creditworthiness. This improvement could expand access to financial markets and secure favourable borrowing terms (Zhang and Liu, 2022). Especially during periods of economic downturn, ESG activities might serve as a signalling tool, mitigating financial constraints when they are most pronounced and impactful (Zhang *et al.*, 2023).

The Organization of Islamic Cooperation (OIC) plays a vital role in emerging markets. As a multinational entity consisting of 57 member nations spanning four continents, the OIC fosters economic, political, and social collaboration among its member states, a significant portion of which are categorized as emerging markets. Especially, most of the largest countries in the OIC have introduced ESG disclosure guidelines for companies listed on their stock exchanges and encouraged firms to adopt good governance practices (Billah *et al.*, 2024).

This study examines the relationship between ESG and capital structure for firms in 20 OIC countries from 2003 to 2021, using the COVID-19 pandemic as a natural experiment. As an unprecedented exogenous shock, the COVID-19 pandemic exacerbated challenges for financially constrained firms and increased default risk. Therefore, its impact on ESG activities and capital structure merit investigation. Focusing on OIC countries may offer additional insights (Tekin, 2024).

Our results show that firms with higher ESG scores have a higher leverage ratio, which is in line with prior findings (El Ghoul *et al.*, 2011; Cheng *et al.*, 2014). Moreover, firms in Oman and Saudi Arabia with lower ESG scores have higher leverage during the pandemic, whereas firms in Malaysia with higher ESG have lower leverage. Consumer discretionary and energy firms with higher ESG also have higher leverage. Nevertheless, industrial firms with higher ESG scores decrease their leverage during the pandemic.

Our study offers several contributions. First, unlike previous studies that focused only on ESG-certified firms in developed countries (Hamrouni *et al.*, 2019; Nguyen *et al.*, 2020; Ho *et al.*, 2021; Bai and Ho, 2022), we examine the impact of ESG certification on capital structure across both ESG- and non-ESG-certified firms. Second, ESG certification may serve as a signal to reduce information asymmetry among stakeholders (Wu *et al.*, 2022) and indicate a firm's commitment to ESG activities, potentially easing financial constraints (Wong *et al.*, 2021; Lai and Zhang, 2022). Lastly, given that previous samples are dominated by developed countries, potentially biasing results, this study explores ESG's relevance to capital structure in developing countries.

Our results have several implications. For one, companies should contemplate allocating resources to ESG initiatives, which can alleviate financial constraints. Future research and practitioners could explore the combined influence of ESG and macro-specific factors on debt

financing. In terms of policymaking, promoting ESG investment can mitigate agency conflicts. Thus, policymakers should encourage firms to prioritize ESG-related activities. Moreover, regulators in OIC countries should assist companies that are encountering challenges in obtaining ESG certification.

The rest of the paper is organized as follows: Section 2 reviews the literature and introduces relevant theoretical and empirical frameworks. Section 3 presents the data and methodology. Section 4 gives the empirical findings. Section 5 concludes the paper.

2. Literature review

2.1 Theoretical framework

After Modigliani and Miller (1958) presented their irrelevance theorems, a vast and growing body of literature has focused on the deviation from the Modigliani and Miller world. Three main capital structure theories aim to explain firms' choice of capital structure: agency, trade-off and pecking order theories (Jensen, 1986; Myers, 2001). Of these, trade-off theory focuses on the costs and benefits of debt. Debt brings tax advantages compared with equity finance (Modigliani and Miller, 1963); however, higher debt levels imply greater risks and financial distress.

Firms determine optimal debt levels by balancing the benefits and costs, where the marginal gain from additional debt is offset by its marginal cost (Myers, 2001). According to the pecking order theory by Myers and Majluf (1984), firms prioritize financing options by first using internal funds, then debt and finally equity when faced with information asymmetry in external finance. Retained earnings are preferred because they pose the least risk of adverse selection, whereas equity is the least preferred owing to its higher adverse selection costs (Myers and Majluf, 1984; Brealey *et al.*, 2014). This theory mainly applies to small firms with limited external funding access.

In the context of ESG, the literature often focuses on agency theory, suggesting that ESG disclosure can discipline managers to prevent inefficient resource allocation. Agency theory claims that in a firm, stakeholders have an inherent conflict of interest. As a tool to mitigate agency costs, firms choose their debt ratio strategically. Higher leverage implies less free cash flow for opportunistic managers (Jensen, 1986). That is, managers cannot divert funds for their own benefit if the firm has a high debt ratio. A natural implication of this argument is that leverage can serve as a disciplinary tool (La Porta *et al.*, 2000; Tekin and Polat, 2021, 2023).

Agency cost literature argues that if managers are left with free cash flow, they have an incentive to use it for their own interests rather than investing in value-adding projects, thereby creating a conflict of interest for shareholders (Jensen, 1986). ESG activities can play an essential role in addressing agency problems. The available empirical evidence shows that ESG activities can discipline managers by reducing information asymmetries (Bénabou and Tirole, 2010; Martínez-Ferrero *et al.*, 2018) because ESG requires a higher level of information disclosure (Dhaliwal *et al.*, 2012).

Considering that contracts between shareholders and managers are typically implicit or incomplete in nature, shareholders need to trust the managers and believe that the institutional environment is fair (Guiso *et al.*, 2008). The role of trust has become more important during unprecedented times, such as the global financial crisis and pandemic-induced crisis in recent years (Lins *et al.*, 2017).

2.2 Related literature

A large body of research focuses on the relationship between ESG practices and firm performance. Although some studies offer contradictory evidence, most empirical evidence shows that ESG positively impacts the financial performance of firms (Van Beurden and Gossling, 2008). Earlier studies also provide evidence of the positive relationship between ESG and firm value (Servaes and Tamayo, 2013), especially when customers are more aware of the ESG activities of the firms. Albuquerque *et al.* (2019) mention that ESG contributes to firm performance by decreasing the systemic risk of high-ESG-rated firms.

During the COVID-19 pandemic [1], the insurance role of ESG activities is strengthened – ESG activities limit the significant decline in values, which can be considered an immunity to risk during unprecedented times (Albuquerque *et al.*, 2020; Ding *et al.*, 2020). Thus, the present research on the impact of the pandemic on ESG activities and capital structure decisions is timely and interesting, given that the pandemic created a different type of crisis in modern history.

Studies on ESG and capital structure (Ould Daoud Ellili, 2020; Al Amosh *et al.*, 2022; Al-Hiyari and Kolsi, 2021) have tended to focus on either a single country or a region with a small sample. As such, their sample is not big enough to generalize their results. The present study uses a sample of 20 OIC countries with 26,805 firm years.

To date, evidence on the role of ESG in corporate debt remains limited. Yang *et al.* (2018) analyse the effect of CSR on the capital structure of Chinese listed firms. Hamrouni *et al.* (2019) examine whether ESG positively affects access to debt financing among French firms. In the context of the COVID-19 pandemic, Bai and Ho (2022) assess the relation between corporate social performance and firm debt levels using international evidence. Notably, the impact of ESG certification and ESG scores on capital structure decisions has yet to be investigated in developing countries with a large sample. Therefore, our study fills the gap by examining whether ESG matters in OIC countries' capital structure puzzle in the context of the COVID-19 pandemic.

ESG activities require higher information disclosure, implying improved transparency, which may improve a firm's reputation. This may lead to reduced perceived risk by investors and improve the firm's credit rating, which broadens financial channels and helps the firm borrow at better terms. Zhang *et al.* (2023) examine the impact of COVID-19 on the financial constraints of listed Chinese firms and investigate how adherence to sustainable development goals (SDGs) contributes to economic resilience. Analysing data from 2019 to 2021, including firm-level accounting, ESG scores and COVID-19 case numbers, Zhang *et al.* (2023) reveal that firms committed to SDGs and with high ESG scores experience fewer financial constraints and navigate shocks better.

Moreover, Tang (2022) examines the relationship between ESG performance and corporate innovation, particularly in China's A-share listed companies. Using panel data and linear regressions, Tang (2022) finds that ESG performance significantly enhances both the quantity and quality of corporate innovation, mediated by mitigating financial constraints and agency costs. Zhang and Liu (2022) investigate how ESG performance affects financial flexibility for Chinese listed firms. They find a significant enhancement, with financing constraints mediating the relation. Additionally, they suggest that environmental uncertainty and market attention positively moderate these effects, supporting instrumental stakeholder theory, signalling and the social impact hypothesis.

Financial constraints indeed imply limitations on both debt and equity financing. However, firms with higher ESG scores might exhibit different behaviours in their capital structure decisions for several reasons. Firstly, higher ESG performance can serve as a positive signal to debt markets. Firms with strong ESG performance are perceived to have lower operational risks, better management practices and more sustainable long-term strategies. These perceptions can reduce the cost of debt and make debt financing more attractive (Oikonomou *et al.*, 2014).

Apergis *et al.* (2022) analyse the relation between the ESG scores and the cost of debt in firms. The study finds that firms with higher ESG scores benefit from lower bond spreads and better bond ratings, leading to a lower cost of unsecured debt. The research, conducted on S&P 500 firms from 2010 to 2019, demonstrates that strong ESG performance reduces perceived risk and supports calls for greater transparency in ESG reporting.

Then, although higher ESG performance also sends positive signals to equity markets, which could support equity financing, firms may still prefer debt for several reasons, such as tax benefits and agency costs. Specifically, debt financing provides tax benefits through the interest tax shield, which is not available with equity financing. This case can be a significant consideration for firms looking to optimize their capital structure (Graham, 2000). Sharfman and Fernando (2008) investigate how improved environmental performance can reduce the cost of equity capital, encourage a shift from equity to debt financing and engender higher tax

benefits owing to increased debt capacity. They conclude that better environmental performance reduces perceived risk, thus lowering the cost of capital and making debt financing more attractive for firms.

Houqe *et al.* (2020) examine how ESG performance influences firms' cost of debt across different countries. They found that firms with higher ESG scores benefit from lower debt costs, indicating that strong ESG performance reduces perceived risk among lenders and improves access to debt financing. They underscore the financial advantages of adopting robust ESG practices in a global context. Ioannou and Serafeim (2019) explore the impact of sustainability disclosure regulations on firms' governance processes and valuations. Their study highlights how mandatory sustainability reporting can improve internal governance mechanisms and organizational transparency, thus enhancing a firm's reputation and reducing perceived risk.

Third, debt can mitigate agency problems between managers and shareholders. Higher leverage forces managers to commit to more disciplined cash flow management and can align their interests with those of debt holders (Jensen, 1986; Abbassi *et al.*, 2024). Michelon and Parbonetti (2012) investigate the impact of board composition, leadership and structure on sustainability disclosure, drawing on stakeholder theory. They argue that good corporate governance and sustainability disclosure are complementary mechanisms that companies use to communicate with stakeholders. They found that the effect of board composition on sustainability disclosure is influenced by the specific characteristics of each director rather than simply by the traditional distinction between insider and independent directors.

Lastly, empirical evidence points to the role of ESG during financial crises and the COVID-19 pandemic. During periods of financial instability, such as the global financial crisis and COVID-19 pandemic, firms with better ESG scores could access debt markets more easily and at lower costs, supporting higher leverage ratios (Broadstock, 2021). Abbassi *et al.* (2024) show that firms with strong CSR performance opt for bond debt during crisis periods because it allows them to leverage their enhanced reputation for better access to capital markets, leading to lowered borrowing costs. Additionally, bond debt provides tax benefits through interest deductions and mitigates agency costs by imposing discipline on managerial actions.

2.3 Hypothesis development

Agency theory claims that information asymmetry makes external financing costly (Myers, 2001). As such, firms try to find tools to signal their quality to investors in an attempt to alleviate the information asymmetry problem. ESG activities require a higher level of information disclosure, implying improved transparency, which may improve a firm's reputation. This may lead to reduced perceived risk by the investors and the firm's improved credit rating, which may broaden financial channels and make the firm borrow with better terms (Zhang and Liu, 2022). Considering the mechanism mentioned above, ESG activities may act as a signalling device for firms, especially during significant downturns, when financial constraints become more relevant and tighter (Yang *et al.*, 2018). Thus, we hypothesize that a positive relationship exists between the ESG score and leverage ratio for firms.

H1. Firms with higher ESG scores are likely to have a higher leverage ratio.

3. Data and methodology

3.1 Sample composition

We collect firm-level data from the Thomson Reuters Datastream database for firms in 20 OIC countries (Bahrain, Bangladesh, Bosnia, Egypt, Indonesia, Iraq, Jordan, Kazakhstan, Kuwait, Lebanon, Malaysia, Morocco, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Tunisia, Türkiye and the United Arab Emirates). We exclude financial and utility firms, which have different accounting structures (Tekin, 2021). The sample consists of 2,219 firms in 20 OIC countries between 2003 and 2021, equivalent to 26,805 firm years (see Table A8 [2]).

3.2 ESG sample

We retrieve corporate sustainability data from the Thomson Reuters ESG database. When we include the ESG score, nine countries are eliminated from the sample. Thus, 11 countries (Bahrain, Egypt, Indonesia, Kuwait, Malaysia, Morocco, Oman, Qatar, Saudi Arabia, Türkiye and the United Arab Emirates) comprise the ESG subsample. Table A1 [2] demonstrates the composition of the ESG sample; it reports the means of ESG scores and number of observations (N) and firms by country. Morocco (0.559) and Türkiye (0.482) have the highest ESG scores, whereas Bahrain (0.276) and Qatar (0.316) have the lowest ESG scores.

3.3 Variable definitions

To measure the capital structure of firms, we employ market leverage (MLEV), defined as the total debt scaled by the sum of total debt and market capitalization (Frank and Goyal, 2009). To ensure robustness in our analysis, we also use the book leverage (BLEV), including short- (short-term book leverage (SLEV)) and long-term (long-term book leverage (LLEV)) book leverages (e.g. Köksal and Orman, 2015).

We separate the ESG-certified and non-ESG-certified firms using a dummy variable, ESG certified (ESGCER), that takes 1 for firms with an ESG score and 0 otherwise (Wong *et al.*, 2021; Lai and Zhang, 2022; Wu *et al.*, 2022). Next, we employ ESG score (ESGS) to capture the ESG disclosure of ESG-certified firms. We utilize a dummy variable to evaluate how capital structure decisions differed during the COVID-19 pandemic (COV) period.

Regarding the control variables, we employ firm size (SIZE), tangibility (TAN), market-to-book ratio (MBR) and profitability (EBIT) (Rajan and Zingales, 1995). Following Frank and Goyal (2009), we include the industry median of market leverage (IM-MLEV) to control for industry impact. As more recent research (Tekin, 2021) includes cash holdings (CASH) and dividends (DIV), and we also add both variables to our models. Table A2 [2] presents the variable definitions.

3.4 Methodology

We use the sample of *Thomson Reuters Datastream* for firms in 20 OIC countries. Given that the entire sample includes big *i* (group) and small *t* (time), firm-fixed effects may overcome the unobserved heterogeneity. Thus, we include firm-fixed effects. The baseline model is as follows:

$$MLEV_{i,t} = \beta_0 + \beta_1 COV_t + \beta_2 SIZE_{i,t} + \beta_3 TAN_{i,t} + \beta_4 MBR_{i,t} + \beta_5 EBIT_{i,t} + \beta_6 CASH_{i,t} + \beta_7 DIV_{i,t} + \beta_8 IM\_MLEV_{i,t} + \alpha_i \mathrm{F}_i + \varepsilon_{i,t} \quad (1)$$

where $\mathrm{MLEV}_{i,t}$ refers to market leverage for firm i at time t; COV_t, COV being 1 for years 2020–2021 and 0 otherwise; $\mathrm{SIZE}_{i,t}$, firm size for firm i at time t; $\mathrm{TAN}_{i,t}$, tangibility for firm i at time t; $\mathrm{MBR}_{i,t}$, market-to-book ratio for firm i at time t; $\mathrm{EBIT}_{i,t}$, profitability for firm i at time t; $\mathrm{CASH}_{i,t}$, cash holdings for firm i at time t; $\mathrm{DIV}_{i,t}$, dividends for firm i at time t; $\mathrm{IM\_MLEV}_{i,t}$, industry median of market leverage for firm i at time t; F_i, firm-fixed effects and $\varepsilon_{i,t}$, the error term.

To elucidate how ESG certification affects the determinants of capital structure, we utilize an ESGCER dummy and its interactions with other factors:

$$MLEV_{i,t} = \beta_0 + \beta_1 ESGCER_i + \beta_2 COV_t + \beta_3 SIZE_{i,t} + \beta_4 TAN_{i,t} + \beta_5 MBR_{i,t} + \beta_6 EBIT_{i,t} + \beta_7 CASH_{i,t} + \beta_8 DIV_{i,t} + \beta_9 IM\_MLEV_{i,t} + \alpha_i \mathrm{F}_i + \varepsilon_{i,t} \quad (2)$$

$$MLEV_{i,t} = \beta_0 + \beta_1 (ESGCER_i x COV_t) + \beta_2 ESGCER_i + \beta_3 COV_t + \beta_4 SIZE_{i,t} + \beta_5 TAN_{i,t} + \beta_6 MBR_{i,t} + \beta_7 EBIT_{i,t} + \beta_8 CASH_{i,t} + \beta_9 DIV_{i,t} + \beta_{10} IM\_MLEV_{i,t} + \alpha_i \mathrm{F}_i + \varepsilon_{i,t} \quad (3)$$

where $ESGCER_i$ indicates the ESG certification for firm I and $ESGCER_i$ x COV_t refers to the interactions between ESGCER and COV.

Next, we employ the sample of Thomson Reuters Asset-4 for firms in 11 [3] OIC countries to assess how ESG scores influence capital structure choices during the health crisis (COV). We use the following models:

$$MLEV_{i,t} = \beta_0 + \beta_1 ESGS_{i,t} + \beta_2 COV_t + \beta_3 SIZE_{i,t} + \beta_4 TAN_{i,t} + \beta_5 MBR_{i,t} + \beta_6 EBIT_{i,t} + \beta_7 CASH_{i,t} + \beta_8 DIV_{i,t} + \beta_9 IM\_MLEV_{i,t} + \alpha_i F_i + \varepsilon_{i,t} \quad (4)$$

$$MLEV_{i,t} = \beta_0 + \beta_1 \left(ESGS_{i,t} \times COV_t\right) + \beta_2 ESGS_{i,t} + \beta_3 COV_t + \beta_4 SIZE_{i,t} + \beta_5 TAN_{i,t} + \beta_6 MBR_{i,t} + \beta_7 EBIT_{i,t} + \beta_8 CASH_{i,t} + \beta_9 DIV_{i,t} + \beta_{10} IM\_MLEV_{i,t} + \alpha_i F_i + \varepsilon_{i,t} \quad (5)$$

where $ESGS_{i,t}$ refers to the ESG score for firm i at time t and $ESGS_{i,t}$ x COV_t represents the interactions between ESGS and COV.

4. Empirical findings

Figure A1 [2] presents the trend in MLEV across non-ESG and ESG-certified firms from 2003 to 2021. In non-ESG-certified firms, MLEV decreased between 2003 and 2007 but sharply increased in 2008. They also showed a decline in MLEV during the COVID-19 pandemic. Meanwhile, in ESG-certified firms, MLEV shows an increasing trend until 2018 but then decreases during the pandemic.

4.1 Univariate analyses

Table A3 [2] shows how MLEV and its firm-level determinants differ from the pre-pandemic to the pandemic periods across ESG- and non-ESG-certified firms. In the pre-COVID-19 pandemic period, ESG-certified firms were larger and had higher growth opportunities, profitability, CASH, dividends and lower leverage. ESG-certified firms remain larger and have higher profitability and dividends during the pandemic. In comparison, non-ESG-certified firms have lower tangibility, profitability and dividends and higher firm size, growth opportunities and CASH from the pre-pandemic to the pandemic periods.

4.2 Multivariate analyses

Table A4 [2] shows the determinants of capital structure for all firms in our sample, non-ESG and ESG-certified firms. As shown in column 1, firms with higher size, tangibility and industry median have higher leverage, whereas firms with lower growth opportunities, profitability, CASH and dividends have lower leverage. The results in column 2 are qualitatively similar to those in column 1. However, the results are different for ESG-certified firms (column 3) – COV is insignificant. This implies that the COVID-19 pandemic has no significant impact on the leverage choice of ESG-certified firms. Furthermore, larger firms and firms with higher tangibility, lower profitability and lower CASH have higher leverage over the period 2003–2021.

Instead of splitting the sample across non-ESG and ESG firms, we employ a dummy variable (ESGCER) to differentiate the two subsamples. As shown in column 1 in Table A5 [2], ESGCER is negative with a significance of −0.018 at 1%. That is, non-ESG-certified firms have higher leverage. This result aligns with previous research (Lai and Zhang, 2022). However, when we interact ESGCER with COV in column 2, the sign and significance of ESGCER remain. The interaction term ESGCER x COV is positive, with a significance of 0.024 at 1%. In other words, firms with ESG certification increased their leverage during the COVID-19 pandemic.

To investigate whether ESG scores impact the capital structure, we regress the ESG score and its interactions with COV on MLEV. Table 1 shows that ESG score (ESGS) is positively

Table 1. Does ESG score matter on capital structure puzzle?

	Dependent variable: MLEV Interaction with COV (1)		(2)	
ESGS x COV			−0.007	(0.012)
ESGS	0.051***	(0.017)	0.056***	(0.017)
COV	0.023***	(0.008)	0.007	(0.019)
SIZE	0.058***	(0.007)	0.015***	(0.007)
TAN	0.151***	(0.033)	0.120***	(0.033)
MBR	−0.006**	(0.003)	−0.011**	(0.003)
EBIT	−0.344***	(0.045)	−0.359***	(0.045)
CASH	−0.188***	(0.046)	−0.198***	(0.046)
DIV	−0.111	(0.079)	−0.130*	(0.079)
IM_MLEV	0.409***	(0.082)	0.562***	(0.082)
Constant	−0.830***	(0.123)	−0.103*	(0.123)
R^2	0.828		0.829	
Hausman test	73.47***		66.20***	
Firms	205		205	
Observations	1,528		1,528	

Note(s): This table reports the regression results examining the determinants of market leverage (MLEV) for ESG-certified firms. Firm FE included in all models. Variables are defined in Table A2. *** and ** signify significance at 1 and 5%

related to MLEV, which suggests that firms with higher ESG scores have higher MLEV. This result also confirms previous research (Yang *et al.*, 2018; Hamrouni *et al.*, 2019; Bai and Ho, 2022). However, the influence of ESG scores remains consistent even during the COVID-19 pandemic, as indicated by insignificant coefficients for the interaction between ESG scores and the pandemic. We also obtain qualitatively similar results by employing the BLEV, excluding the interaction term. ESGS x COV is positive with a significance of 0.067 at 5%. That is, the positive impact of ESGS on leverage becomes more significant during the COVID-19 pandemic. Therefore, we generalize that the positive association between corporate sustainability and capital structure in OIC countries does not depend on the measurement of the capital structure. However, this positive impact of sustainability loses its significance on SLEV and LLEV, which are reported in Table A9 [2].

4.3 Additional analyses

We rerun Model 2 in Table 1 using 11 countries and 8 industries, as shown in Table A6 [2] and Table A7 [2], respectively. Regarding the country-based analysis in Table A6 [2], firms with higher ESG scores have higher leverage in Indonesia, Malaysia and Saudi Arabia. Firms in Oman and Saudi Arabia with lower ESG scores have higher leverage during the pandemic, whereas firms with higher ESG scores in Malaysia have lower leverage. The significance of control variables varies depending on the country, but their signs differ slightly. Specifically, SIZE, TAN and IM_MLEV are positively associated with leverage, whereas MBR, EBIT, CASH and DIV are negatively associated with leverage. Considering the sign of control variables, trade-off theory better explains the behaviour of ESG-certified firms in OIC countries.

In Table A7 [2], the positive relationship between ESGS and MLEV is slightly significant for consumer discretionary firms and highly significant for energy firms. ESGS x COV is only significant for industrial firms, with a coefficient of 0.066 at 1%. That is, during the COVID-19 pandemic, industrial firms with higher ESG scores decreased their leverage more. The significance of control variables [4] changes depending on the firms' industry. EBIT, CASH and DIV are negative and significant, whereas SIZE, TAN and IM_MLEV are positive

and significant. However, contrary to the claims of trade-off theory, consumer discretionary and telecommunication firms have higher leverage. This result supports the pecking order theory. Similarly, trade-off theory generally explains firms' capital structure policy across industries in OIC countries.

5. Concluding remarks

Employing 26,805 firm years from 20 OIC countries, this study assesses whether the ESG figures are a piece in the capital structure puzzle, considering the COVID-19 pandemic as a natural experiment. Exogenous shocks boost the default risk of the companies and erode the level of trust in financial markets. Nevertheless, the pandemic itself did not start as a financial sector crisis but rather emerged as a health crisis. Thus, our work is timely and relevant to elucidate the impact of the pandemic, as a different type of crisis in modern history, on ESG activities and capital structure.

Our findings indicate that firms with higher ESG scores have a higher leverage ratio, in line with claims in earlier literature. Regarding the country-specific analysis, firms with higher ESG scores have higher leverage levels in Indonesia, Malaysia and Saudi Arabia. Firms in Oman and Saudi Arabia with lower ESG scores have higher leverage during the pandemic, whereas firms with higher ESG in Malaysia have lower leverage. Consumer discretionary and energy firms with higher ESG have higher leverage. Meanwhile, industrial firms with higher ESG scores decreased their leverage during the pandemic.

The results have several implications. First, firms should consider investing in ESG activities, which may help to relax financial constraints. Researchers and practitioners may extend the literature by investigating the joint impact of ESG and macro-specific factors on debt financing. Regarding policymaking, ESG investment helps to mitigate agency conflicts; therefore, policymakers should incentivize firms to focus on ESG-related activities. Furthermore, OIC countries' regulators should support firms that face obstacles in *obtaining* ESG certification.

This study has successfully demonstrated the link between corporate sustainability and capital structure, but it has certain limitations in terms of the sample construction. Of the 57 OIC countries, only 20 countries have accessible data in *Datastream*. Future research may raise the number of OIC countries in the sample by checking other databases, such as *Bloomberg* and *Compustat*.

Notes

1. The COVID-19 pandemic sharply affected the financial markets (Mugaloglu *et al.*, 2022; Aysan *et al.*, 2023).
2. Please see it on the Online Appendix.
3. The ESG data of Thomson Reuters Asset-4 exists for eleven countries, as shown in Table A1.
4. Following reviewers' comment, we also assess the impact of the corporate tax on leverage in Table A10 (in the Online Appendix), and we find that corporate tax has no effect on leverage.

References

Abbassi, W., Boubaker, S. and Louhichi, W. (2024), "Why do corporate social responsibility-oriented companies opt for bond debt? Evidence from crisis periods", *International Journal of Finance and Economics*, Vol. 29 No. 2, pp. 1534-1568, doi: 10.1002/ijfe.274.

Al Amosh, H., Khatib, S.F., Alkurdi, A. and Bazhair, A.H. (2022), "Capital structure decisions and environmental, social and governance performance: insights from Jordan", *Journal of Financial Reporting and Accounting*, Vol. 22 No. 4, pp. 972-989, doi: 10.1108/JFRA-12-2021-0453.

Al-Hiyari, A. and Kolsi, M.C. (2021), "How do stock market participants value ESG performance? Evidence from Middle Eastern and North African Countries", *Global Business Review*, Vol. 25 No. 4, pp. 934-956, doi: 10.1177/09721509211001511.

Albuquerque, R., Koskinen, Y. and Zhang, C. (2019), "Corporate social responsibility and firm risk: theory and empirical evidence", *Management Science*, Vol. 65 No. 10, pp. 4451-4469, doi: 10.1287/mnsc.2018.3043.

Albuquerque, R., Koskinen, Y., Yang, S. and Zhang, C. (2020), "Resiliency of environmental and social stocks: an analysis of the exogenous Covid-19 market crash", *The Review of Corporate Finance Studies*, Vol. 9 No. 3, pp. 593-621, doi: 10.1093/rcfs/cfaa011.

Apergis, N., Poufinas, T. and Antonopoulos, A. (2022), "ESG scores and cost of debt", *Energy Economics*, Vol. 112, 106186, doi: 10.1016/j.eneco.2022.106186.

Aysan, A.F., Muğaloglu, E., Polat, A.Y. and Tekin, H. (2023), "Whether and when did bitcoin sentiment matter for investors? Before and during the COVID-19 pandemic", *Financial Innovation*, Vol. 9 No. 1, 124, doi: 10.1186/s40854-023-00536-9.

Bae, K.H., El Ghoul, S., Guedhami, O., Kwok, C.C. and Zheng, Y. (2019), "Does corporate social responsibility reduce the costs of high leverage? Evidence from capital structure and product market interactions", *Journal of Banking and Finance*, Vol. 100, pp. 135-150, doi: 10.1016/j.jbankfin.2018.11.007.

Bai, M. and Ho, L. (2022), "Corporate social performance and firm debt levels: impacts of the Covid-19 pandemic and institutional environments", *Finance Research Letters*, Vol. 47 Part: B, 102968, doi: 10.1016/j.frl.2022.102968.

Bassen, A., Meyer, K. and Schlange, J. (2006), "The influence of corporate responsibility on the cost of capital", SSRN: 984406.

Bénabou, R. and Tirole, J. (2010), "Individual and corporate social responsibility", *Economica*, Vol. 77 No. 305, pp. 1-19, doi: 10.1111/j.1468-0335.2009.00843.x.

Benlemlih, M., Shaukat, A., Qiu, Y. and Trojanowski, G. (2018), "Environmental and social disclosures and firm risk", *Journal of Business Ethics*, Vol. 152 No. 3, pp. 613-626, doi: 10.1007/S10551-016-3285-5.

Billah, M.M., Hassan, R., Haron, R. and Zain, N.R.M. (Eds) (2024), *Islamic Sustainable Finance: Policy, Risk and Regulation*, 1st ed., Routledge, doi: 10.4324/9781003395447.

Brealey, R.A., Myers, S.C. and Allen, F. (2014), *Principles of Corporate Finance*, 11th ed., McGraw-Hill Education, Berkshire.

Broadstock, D.C., Chan, K., Cheng, L.T.W. and Wang, X. (2021), "The role of ESG performance during times of financial crisis: evidence from COVID-19 in China", *Finance Research Letters*, Vol. 38, 101716, doi: 10.1016/j.frl.2020.101716.

Cheng, B., Ioannou, I. and Serafeim, G. (2014), "Corporate social responsibility and access to finance", *Strategic Management Journal*, Vol. 35 No. 1, pp. 1-23, doi: 10.1002/smj.2131.

Dhaliwal, D.S., Radhakrishnan, S., Tsang, A. and Yang, Y.G. (2012), "Nonfinancial disclosure and analyst forecast accuracy: international evidence on corporate social responsibility disclosure", *The Accounting Review*, Vol. 87 No. 3, pp. 723-759, doi: 10.2308/accr-10218.

Ding, N., Bhat, K. and Jebran, K. (2020), "Debt choice, growth opportunities and corporate investment: evidence from China", *Financial Innovation*, Vol. 6 No. 31, pp. 1-22, doi: 10.1186/s40854-020-00194-1.

Ding, W., Levine, R., Lin, C. and Xie, W. (2021), "Corporate immunity to the Covid-19 pandemic", *Journal of Financial Economics*, Vol. 141 No. 2, pp. 802-830, doi: 10.1016/j.jfineco.2021.03.005.

Eccles, R.G., Ioannou, I. and Serafeim, G. (2014), "The impact of corporate sustainability on organizational processes and performance", *Management Science*, Vol. 60 No. 11, pp. 2835-2857, doi: 10.1287/mnsc.2014.1984.

El Ghoul, S., Guedhami, O., Kwok, C.C. and Mishra, D.R. (2011), "Does corporate social responsibility affect the cost of capital?", *Journal of Banking and Finance*, Vol. 35 No. 9, pp. 2388-2406, doi: 10.1016/j.jbankfin.2011.02.007.

Frank, M.Z. and Goyal, V.K. (2009), "Capital structure decisions: which factors are reliably important?", *Financial Management*, Vol. 38 No. 1, pp. 1-37, doi: 10.1111/j.1755-053X.2009.01026.x.

Goss, A. and Roberts, G.S. (2011), "The impact of corporate social responsibility on the cost of bank loans", *Journal of Banking and Finance*, Vol. 35 No. 7, pp. 1794-1810, doi: 10.1016/j.jbankfin.2010.12.002.

Graham, J.R. (2000), "How big are the tax benefits of debt?", *The Journal of Finance*, Vol. 55 No. 5, pp. 1901-1941, doi: 10.1111/0022-1082.00277.

Guiso, L., Sapienza, P. and Zingales, L. (2008), "Trusting the stock market", *The Journal of Finance*, Vol. 63 No. 6, pp. 2557-2600, doi: 10.1111/j.1540-6261.2008.01408.x.

Hamrouni, A., Boussaada, R. and Toumi, N.B.F. (2019), "Corporate social responsibility disclosure and debt financing", *Journal of Applied Accounting Research*, Vol. 20 No. 4, pp. 394-415, doi: 10.1108/JAAR-01-2018-0020.

Ho, L., Bai, M., Lu, Y. and Qin, Y. (2021), "The effect of corporate sustainability performance on leverage adjustments", *The British Accounting Review*, Vol. 53 No. 5, 100989, doi: 10.1016/j.bar.2021.100989.

Houqe, M.N., Ahmed, K. and Richardson, G. (2020), "'The effect of environmental, social and governance performance factors on firms' cost of debt: international evidence", *The International Journal of Accounting*, Vol. 55 No. 03, 2050014, doi: 10.1142/S1094406020500146.

Huang, H. and Ye, Y. (2021), "Rethinking capital structure decision and corporate social responsibility in response to Covid-19", *Accounting and Finance*, Vol. 61 No. 3, pp. 4757-4788, doi: 10.1111/acfi.12740.

Ioannou, I. and Serafeim, G. (2019), "The consequences of mandatory corporate sustainability reporting", in McWilliams, A., Rupp, D.E., Siegel, D.S., Stahl, G.K. and Waldman, D.A. (Eds), *The Oxford Handbook of Corporate Social Responsibility: Psychological and Organizational Perspectives*, Oxford University Press, pp. 452-489, available at: https://www.hbs.edu/faculty/Pages/item.aspx?num=54148

Jensen, M.C. (1986), "Agency costs of free cash flow, corporate finance and takeovers", *The American Economic Review*, Vol. 76 No. 2, pp. 323-329.

Köksal, B. and Orman, C. (2015), "Determinants of capital structure: evidence from a major developing economy", *Small Business Economics*, Vol. 44 No. 2, pp. 255-282, doi: 10.1007/s11187-014-9597-x.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R.W. (2000), "Agency problems and dividend policies around the world", *The Journal of Finance*, Vol. 55 No. 1, pp. 1-33, doi: 10.1111/0022-1082.00199.

Lai, X. and Zhang, F. (2022), "Can ESG certification help company get out of over-indebtedness? Evidence from China", *Pacific-Basin Finance Journal*, Vol. 76, 101878, doi: 10.1016/j.pacfin.2022.101878.

Lee, J. and Kim, H. (2016), "Do employee relation responsibility and culture matter for firm value? International evidence", *Pacific-Basin Finance Journal*, Vol. 40 Part: A, pp. 191-209, doi: 10.1016/j.pacfin.2016.10.006.

Lins, K.V., Servaes, H. and Tamayo, A. (2017), "Social capital, trust and firm performance: the value of corporate social responsibility during the financial crisis", *The Journal of Finance*, Vol. 72 No. 4, pp. 1785-1824, doi: 10.1111/jofi.12505.

Martínez-Ferrero, J., Rodríguez-Ariza, L., García-Sánchez, I.M. and Cuadrado-Ballesteros, B. (2018), "Corporate social responsibility disclosure and information asymmetry: the role of family ownership", *Review of Managerial Science*, Vol. 12 No. 4, pp. 885-916, doi: 10.1007/s11846-017-0232-5.

Michelon, G. and Parbonetti, A. (2012), "The effect of corporate governance on sustainability disclosure", *Journal of Management and Governance*, Vol. 16 No. 3, pp. 477-509, doi: 10.1007/s10997-010-9160-3.

Modigliani, F. and Miller, M.H. (1958), "The cost of capital, corporation finance and the theory of investment", *The American Economic Review*, Vol. 48 No. 3, pp. 261-297.

Modigliani, F. and Miller, M.H. (1963), "Corporate income taxes and the cost of capital: a correction", *The American Economic Review*, Vol. 53 No. 3, pp. 433-443.

Mugaloglu, E., Polat, A.Y., Tekin, H. and Kılıç, E. (2022), "Assessing the impact of Covid-19 pandemic in Turkey with a novel economic uncertainty index", *Journal of Economic Studies*, Vol. 49 No. 5, pp. 821-832, doi: 10.1108/JES-02-2021-0081.

Myers, S.C. (2001), "Capital structure", *The Journal of Economic Perspectives*, Vol. 15 No. 2, pp. 81-102, doi: 10.1257/jep.15.2.81.

Myers, S.C. and Majluf, N.S. (1984), "Corporate financing and investment decisions when firms have information that investors do not have", *Journal of Financial Economics*, Vol. 13 No. 2, pp. 187-221, doi: 10.1016/0304-405x(84)90023-0.

Nguyen, V.H., Choi, B. and Agbola, F.W. (2020), "Corporate social responsibility and debt maturity: Australian evidence", *Pacific-Basin Finance Journal*, Vol. 62, 101374, doi: 10.1016/j.pacfin.2020.101374.

Oikonomou, I., Brooks, C. and Pavelin, S. (2014), "The effects of corporate social performance on the cost of corporate debt and credit ratings", *Financial Review*, Vol. 49 No. 1, pp. 49-75, doi: 10.1111/fire.12025.

Ould Daoud Ellili, N. (2020), "Environmental, social and governance disclosure, ownership structure and cost of capital: evidence from the UAE", *Sustainability*, Vol. 12 No. 18, p. 7706, doi: 10.3390/su12187706.

Rajan, R.G. and Zingales, L. (1995), "What do we know about capital structure? Some evidence from international data", *The Journal of Finance*, Vol. 50 No. 5, pp. 1421-1460, doi: 10.2307/2329322.

Sassen, R., Hinze, A.-K. and Hardeck, I. (2016), "Impact of ESG factors on firm risk in Europe", *Journal of Business Economics*, Vol. 86 No. 8, pp. 867-904, doi: 10.1007/s11573-016-0819-3.

Servaes, H. and Tamayo, A. (2013), "The impact of corporate social responsibility on firm value: the role of customer awareness", *Management Science*, Vol. 59 No. 5, pp. 1045-1061, doi: 10.1287/mnsc.1120.1630.

Sharfman, M.P. and Fernando, C.S. (2008), "Environmental risk management and the cost of capital", *Strategic Management Journal*, Vol. 29 No. 6, pp. 569-592, doi: 10.1002/smj.678.

Tang, H. (2022), "The effect of ESG performance on corporate innovation in China: the mediating role of financial constraints and agency cost", *Sustainability*, Vol. 14 No. 7, p. 3769, doi: 10.3390/su14073769.

Tekin, H. (2021), "Market differences and adjustment speed of debt, equity and debt maturity", *Australian Journal of Management*, Vol. 46 No. 4, pp. 629-651, doi: 10.1177/0312896220968266.

Tekin, H. (2024), "Financial inclusion and sustainable development of banks: the place of Organization of Islamic Cooperation (OIC) in emerging markets", *Journal of Economic Studies*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/JES-10-2023-0555.

Tekin, H. and Polat, A.Y. (2021), "Do market differences matter on dividend policy?", *Borsa Istanbul Review*, Vol. 24 No. 2, pp. 197-208, doi: 10.1016/j.bir.2020.10.009.

Tekin, H. and Polat, A.Y. (2023), "Is leverage a substitute or outcome for governance? Evidence from financial crises", *International Journal of Emerging Markets*, Vol. 18 No. 4, pp. 1007-1030, doi: 10.1108/IJOEM-03-2020-0297.

Van Beurden, P. and Gossling, T. (2008), "The worth of values: a literature review on the relation between corporate social and financial performance", *Journal of Business Ethics*, Vol. 82 No. 2, pp. 407-424, doi: 10.1007/s10551-008-9894-x.

Wong, W.C., Batten, J.A., Mohamed-Arshad, S.B., Nordin, S. and Adzis, A.A. (2021), "Does ESG certification add firm value?", *Finance Research Letters*, Vol. 39, 101593, doi: 10.1007/s10551-008-9894-x.

Wu, C., Xiong, X. and Gao, Y. (2022), "Does ESG certification improve price efficiency in the Chinese stock market?", *Asia-Pacific Financial Markets*, Vol. 29 No. 1, pp. 97-122, doi: 10.1007/s10690-021-09346-4.

Yang, S., He, F., Zhu, Q. and Li, S. (2018), "How does corporate social responsibility change capital structure?", *Asia-Pacific Journal of Accounting and Economics*, Vol. 25 Nos 3-4, pp. 352-387, doi: 10.1080/16081625.2017.1354710.

Zhang, D. and Liu, L. (2022), "Does ESG performance enhance financial flexibility? Evidence from China", *Sustainability*, Vol. 14 No. 18, 11324, doi: 10.3390/su141811324.

Zhang, D., Wang, C. and Dong, Y. (2023), "How does firm ESG performance impact financial constraints? An experimental exploration of the COVID-19 pandemic", *European Journal of Development Research*, Vol. 35 No. 1, pp. 219-239, doi: 10.1057/s41287-021-00499-6.

Supplementary material
The supplementary material for this article can be found online.

Corresponding author
Hasan Tekin can be contacted at: hasantekin@karabuk.edu.tr