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Beyond the balance sheet: Assessing corporate governance through the Lens of debtholders

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ABSTRACT

This study investigates the relationships between economic uncertainty (EU), corporate governance (CG), and the cost of debt (COD). Using an index-based measure of CG, this study investigates how CG influences debtholders' perspectives during periods of EU. The study utilizes a dataset of nonfinancial firms listed in European countries from 2013 to 2021. We find that EU and COD are positively associated, indicating that EU increases the COD of European firms. Second, while CG has an insignificant direct impact on COD, it has a significant negative moderating impact on the relationship between EU and COD, suggesting that although a strong CG system may not have a significant direct impact on COD, it has the potential to reduce the uncertainty-induced COD of European firms. The results remain consistent with alternative proxies of COD and CG, as well as before and after the COVID-19 period. The results for CG subindices suggest that shareholder rights and compensation serve as reliable indicators for debtholders during periods of EU, while audit quality and board structure do not play any significant role in reducing uncertainty-induced COD. Our findings emphasize the key role that effective CG plays in mitigating EU's adverse effects on COD. Our results are robust to endogeneity issues such as reverse causality and selection bias, as well as to external factors like time and industry effects.

1. Introduction

Today's economy is ever-changing and characterized by increasing complexity and interconnections; it is therefore vital to understand the dynamics that shape financial markets. A crucial factor that exerts a significant influence on decisions and subsequently impacts the stability of financial markets is economic uncertainty (EU) (Gao, Zhao, & Zhang, 2020; Wu, Zhu, Huang, & Mao, 2023). EU comprises fluctuations in government policies, regulatory changes, and geopolitical events, all of which generate doubts about the economic environment while exerting a considerable impact on financial decisions. As a result, companies must develop strategies that will aid them in navigating EU's adverse impacts on their operations (Cheng & Masron, 2022; Peng, Colak, & Shen, 2023). To do so, they must institute effective corporate boards and governance systems that oversee management and deliver valuable insights and guidance on how to address various external factors, such as uncertainty related to policy, economic conditions, and market participants. It is by scrutinizing different uncertainty scenarios that firms can effectively confront and mitigate the risks and opportunities associated with uncertainty. Moreover, when companies have strong governance structures, they are better able to adapt to changing economic conditions and make well-informed decisions (Ahsan, Mirza, Al-Gamrh, & Bin-Feng, 2021; Ongsakul, Treepongkaruna, Jiraporn, & Uyar, 2021).

Researchers have extensively examined how EU impacts diverse firm-level decisions, such as capital structure (Tabash, Farooq, Ashfaq, & Tiwari, 2022), investment decisions (Gulen & Ion, 2015; Wu, Kong, Wu, & Zhang, 2020), corporate innovation (Mirza, Ahsan, Al-Gamrh, Majeed, & Muhammad, 2024), corporate social responsibility (CSR) (Peng et al., 2023), and corporate ESG and financial performance (Gull, Ahsan, Qureshi, & Mushtaq, 2023; Iqbal, Gan, & Nadeem, 2019). However, the relationship between EU and the cost of capital (Liu & Wang, 2022)—and specifically, the cost of debt (COD)—remains little studied (Tran, 2021). As far as we are aware, no prior empirical research has investigated how corporate governance (CG) quality influences corporate debtholders during periods of EU. Effective CG mechanisms can be vital in diminishing EU's adverse effects on corporate decisions (Ahsan et al., 2021). Recognizing this gap, the present study explores the relationship between EU and COD, taking into consideration the role of CG.

COD reflects the interest paid by a company to its creditors or

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bondholders; it is an essential element of a company's capital structure that plays a vital role in its financial standing and sustainability, particularly for highly leveraged firms. It is a critical financial metric because it directly affects a company's financial health and profitability (Tran, 2021). Many firms choose to borrow to finance various corporate plans, including investments, operations, and growth. Debt has been a preferred source of capital for many companies in the last decade due to low interest rates. Debt also allows companies to maintain control of ownership, as opposed to issuing shares, and it can provide tax advantages (Myers, 1977). However, whether they are banks or other creditors, debtholders demand higher transparency to assess their risk exposure; this was particularly the case after the global financial crisis (GFC). CG is therefore one of the crucial factors that debtholders assess when judging corporate risk and repayment capacity (Al-Dhamari, Alquhaif, & Al-Gamrh, 2022; González, 2015; Rossi & Cebula, 2016).

EU has implications for a firm's COD because it can disrupt the smooth functioning of markets and alter the risk–return relationship, leading to a decrease/increase in lending confidence in banks (Tran, 2021). Due to the high risk of default and information asymmetry, banks either limit lending to the private sector or offer loans at comparatively high financing rates during high-EU eras. Moreover, EU can disrupt overall economic activities and make enterprises more volatile, threatening their long-term sustainability (Alam, Farjana, & Houston, 2023). In this context, banks may hesitate to grant loans to enterprises. However, enterprises with strong CG are perceived as well-managed and enjoy a better market reputation and lower risk; therefore, they are expected to be able to acquire loans at comparatively low rates even during high-EU eras. Strong CG mitigates opportunistic behaviors and information asymmetry, which eventually reduces a company's risk (Ahsan et al., 2021; Caixe, 2022). These factors make enterprises good candidates for meeting the loan criteria set by banks and other financial institutions (Mili & Alaali, 2023).

EU refers to the magnitude of uncertainty or instability in a country's economy. It encompasses a wide range of decisions made by governments, such as fiscal policies (taxation and government expenditure), monetary policies (interest rates and money supply), trade policies, and regulations (Ahir, Bloom, & Furceri, 2022; Baker, Bloom, & Davis, 2016). When great uncertainty surrounds such policies, it can have various effects on the private sector of an economy. Therefore, it is vital to comprehend how EU influences creditors' decisions concerning COD. Moreover, it is equally important to measure the effect of other factors that can help mitigate the adverse effect of EU on firm decisions. In essence, CG structure is an essential reflection of how a company is doing; its interrelated regulations, practices, and mechanisms are those that steer and govern the organization. Relationships between the management, board of directors, and stakeholders are also key. Strong CG ensures that the management of an organization is transparent and accountable while honoring the best interests of stakeholders (Mili & Alaali, 2023; Velte, 2023).

This study seeks to clarify the relationship between EU, COD, and CG. We hypothesize that a strong CG system indicates how well a corporation is managed while also providing insights for debtholders regarding the company's ability to anticipate uncertainty. The CG system is vital in determining the extent to which EU affects COD for individual firms. Stakeholder-oriented boards usually consider broader stakeholder groups including debtholders (Freeman, Harrison, Wicks, Parmar, & De Colle, 2010), which enhances firm solvency during EU and potentially reduces COD. This alignment can mitigate the impact of EU, as debtholders perceive the firm as less risky and more stable. In addition, when conflicts of interest arise among managers and shareholders, debtholders may perceive higher levels of risk if EU is also high. This can be true if managerial actions are not aligned with shareholders' interests (Jensen & Meckling, 1976); which may increase COD as debtholders demand higher rates to compensate for perceived risk (Al-Dhamari et al., 2022). Therefore, well-governed firms are expected to have stronger oversight and ensure that stakeholders' interests are aligned with corporate strategy. Well-structured boards usually oversee managerial decisions while ensuring that firm strategies consider unexpected scenarios and are ready to manage risks during EU.

This study uses a comprehensive index based on four sub-indices—covering board structure, audit risk and oversight, shareholder rights, and compensation—to reflect CG quality in a firm. We tested our hypotheses by utilizing a dataset of nonfinancial firms listed in eight European countries from 2013 to 2021 and employing static and dynamic regression techniques. We find a significant positive association between EU and COD, indicating that EU leads to higher financing costs for enterprises. However, the analysis reveals a significant negative moderating impact of CG on the EU–COD relationship. This negative impact suggests that a stronger governance system leads to better financing during EU, as it mitigates uncertainty-induced increases in COD.

This study makes several contributions. First, it provides a deeper understanding of the implications of EU for corporate financial strategies, specifically in terms of COD financing, i.e., EU intensifies information asymmetry, thereby increasing agency costs and COD. Second, this research confirms that CG is key in alleviating or exacerbating the negative effects of external economic shocks and uncertainty. Boards need to ensure the robustness of corporate fundamentals to effectively manage uncertainty. As far as we are aware, this is the first study to examine how CG influences COD considering periods of economic uncertainty. Third, our results expand the agency and information asymmetry theories by suggesting that enterprises with a strong CG structure have lower agency costs and benefit from an improved ability to mitigate uncertainty-induced information asymmetry and, consequently, uncertainty-induced increases in COD financing. We therefore extend the literature exploring the link between EU and COD by introducing CG as a moderator and providing evidence that strong CG structures strengthen enterprises' ability to weather EU's harmful impacts on their COD. The results add nuance to existing theories of corporate finance by further highlighting that shareholder rights and compensation significantly reduce uncertainty-induced increases in COD, while board structure and audit oversight do not play any significant role in determining COD during EU. Finally, our analysis offers valuable insights for policymakers, who can draw from the empirical results to better understand how EU affects the cost of financing for companies with different CG structures. The results also provide insights into how various CG dimensions help companies tackle uncertainty.

The remaining parts of the paper are arranged as follows. Section 2 covers the theoretical background and develops hypotheses; Section 3 outlines our data and methodology; Section 4 introduces the results; Section 5 discusses the findings; and Section 6 outlines our conclusions and policy implications.

2. Theoretical background and hypothesis development

The theoretical link between EU, CG, and COD can be comprehended through existing theories on CG and EU. For instance, information asymmetry theory, as suggested by George (1970), argues that uncertainty can exacerbate information asymmetry between borrowers and moneylenders, which is expected to increase COD. High EU creates ambiguous economic conditions; this makes lenders more cautious, as they may expect higher levels of risk to be associated with lending. This can prompt lenders to demand higher interest rates as a means of compensating for this increased uncertainty. Information asymmetry theory suggests that high EU may result in higher borrowing costs as a result of increased uncertainty and the imbalance of information between borrowers (companies) and lenders (creditors); this will render lenders' task of accurately evaluating borrowers' creditworthiness additionally challenging. However, CG structure is seen as a valuable indicator of the standing of corporations, as it can enhance transparency and potentially reduce information asymmetry (Hutchinson & Gul, 2004).

Jensen and Meckling (1976)'s agency theory focuses on the relationship between principals (owners) and agents (executives) by exploring how conflicts of interest can arise between them. When it comes to EU and COD, the theory posits that high EU tends to lead to higher perceived risk for lenders and investors, thus creating conflicts. Consequently, borrowers may face higher interest rates or costs when seeking debt financing, as lenders demand compensation for increased uncertainty. Strong CG practices can mitigate EU's impact on COD, as CG ensures greater accountability and lower information asymmetry (Hutchinson & Gul, 2004). Furthermore, strong CG signals to lenders that a company is managed in a way that safeguards their interests. Governance mechanisms, such as a strong board of directors and compensation structures that link executive pay to performance, can help ensure that managerial actions honor shareholders' best interests.

2.1. EU and COD

Several studies in the empirical literature have explored the links between EU and the cost of capital. Tran (2021) hypothesized that there are two key channels through which EU influences COD, namely default risk and information asymmetry. He tested his hypotheses by conducting an empirical analysis on a diverse sample encompassing 17 countries; the results revealed that high EU increases COD financing, with a particularly pronounced effect noted during the 2008 financial crisis. The findings revealed that larger firms are less susceptible to EU's impact on COD, as their COD did not experience a significant increase. In a similar vein, Liu and Wang (2022) investigated how EU impacts the cost of capital. Their analysis showed that elevated EU significantly raises the cost of capital by exacerbating information asymmetry and poor internal control. However, this increase in the cost of capital is primarily due to a rise in the cost of equity rather than COD. Their study further asserted that EU's impact on the cost of capital remains robust, especially among larger state-owned firms. This study differentiates itself by focusing solely on COD and by considering a comprehensive index-based measure of CG, incorporating four subindices, which are expected to improve information asymmetry, agency issues, and transaction costs through better internal control.

Qiu and Zhang (2024) constructed an indicator for social networks and assessed its moderating effect on the EU–COD relationship. Their empirical analysis suggested that high EU does indeed lead to an increase in COD, a phenomenon that is significantly mitigated by the presence of strong social networks. Enterprises with well-established social networks are therefore less likely to experience a rise in COD, even during periods of heightened EU.

According to a study by Tran and Nguyen (2023), EU negatively impacts bank funding costs. Thus, during periods of high EU, banks benefit from an increase in deposits. Investors wishing to keep their funds secure during perceived uncertainty deposit large amounts of money into banks, even when these deposits earn low interest rates. As a result, funding costs for banks decrease. However, banks become more cautious about extending loans during high-EU periods and may subject enterprises to higher financing costs.

Another study conducted by Priya and Sharma (2023) examined the impact of EU on corporate leverage, taking into account both demand and supply factors. Their findings indicated that high EU increases the burden of debt financing for corporations. This leads to higher interest payments and, consequently, an overall increase in COD. Cook and Luo (2023) also suggested that fund flow-induced volatility directly influences COD, implying that volatility has a part to play in increasing debt costs. Based on the empirical findings and the theories mentioned above, we construct our first hypothesis:

H_1. *: EU has a significant positive association with COD.*

2.2. CG and COD

The extant literature strongly suggests that CG plays a vital role in determining COD. Numerous studies have investigated this relationship, with their findings shedding light on the important role that effective governance practices play in reducing financing costs. For instance, Bradley and Chen (2011) explored how CG impacts COD and found that directors with cleaner records, i.e., fewer litigations associated with their names, significantly contribute to reducing COD. This reduction in financing costs can be attributed to the enhanced reputation of the firm, which in turn facilitates access to financing at lower interest rates. Their study also emphasized that directors' compensation plays a key role in mitigating financing costs, as higher compensation incentivizes directors to expend greater efforts in cost reduction. Similarly, Ghouma, Ben-Nasr, and Yan (2018) explored the empirical link between CG and COD financing in Canadian enterprises. Their findings showed that better governance quality, encompassing factors including board structure and disclosure quality, results in lower costs of bond financing. This suggests that companies with stronger governance practices can secure debt financing at lower costs. In another study, AlHares (2020) assessed CG's impact on the cost of capital in OECD countries, finding a negative relationship between the governance index and the cost of capital. This indicates that effective governance plays an important role in lowering the costs associated with acquiring capital.

Furthermore, Pandey, Biswas, Ali, and Mansi (2020) investigated female board directors' influence on COD financing in Australian enterprises. Their findings revealed that the presence of female board directors has a significant negative impact on COD financing, underscoring board diversity's substantial role in mitigating COD. Recently, Garcia-Blandon, Maria, and Diego (2022) investigated how female director appointments impact COD. They found that such appointments exert an insignificant influence on debt costs. In contrast, Aksoy and Yilmaz (2023) conducted their own analysis and noted that board diversity, including the presence of female directors and chairpersons, has a significant negative effect on COD. They argue that this confirms the vital role that an efficient board structure plays when it comes to mitigating debt costs. Additionally, Salehi, Moradi, and Faysal (2023) proposed that the overall CG structure can significantly lower not only the cost of equity but also COD. Taken together, these findings suggest that effective governance practices have a mitigating effect on financing costs. Accordingly, we construct our second hypothesis as follows:

H_2. *: Strong CG has a significant negative association with COD.*

2.3. EU, CG, and COD

The empirical literature contains several studies exploring the moderating role of CG in various firm decisions. One notable study by García-Sánchez and García-Meca (2018) investigated how CG moderates managerial capacity and investment efficiency. Their empirical analysis revealed that managerial ability and investment efficiency are positively correlated, particularly in companies with robust governance structures. They further concluded that countries that enforce rules and regulations effectively, protect investors' rights, and maintain effective boards tend to have lower risks of underinvestment or overinvestment. When Ahsan et al. (2021) investigated CG's moderating impact on the relationship between EU and sustainable growth, their empirical analysis of Chinese nonfinancial enterprises revealed that EU hinders sustainable growth. However, board diversity and ownership structure were found to positively moderate EU's negative impact on sustainable growth. This demonstrates that CG has a positive part to play in lessening EU's adverse effects on firm performance. We anticipate similar effects of CG in the relationship between EU and COD.

In recent scholarship, Boachie and Mensah (2022) established that earnings management positively impacts firm performance, with a

stronger effect noted when enterprises have robust governance systems. Their research supported agency theory, as it demonstrated that CG plays a moderating role in strengthening the earnings management–firm performance relationship. Additionally, Ahmad, Mobarek, and Raid (2023) conducted a comprehensive investigation into the moderating impact of firm size and CG factors on the GFC–firm performance relationship. Their analysis highlighted CG's positive impact on improving corporate performance, even during the challenging GFC period. Furthermore, Al-Gamrh, Ismail, Ahsan, and Alquhaif (2020) investigated how CG moderates the association between investment opportunities and firm performance, finding that CG positively contributes to improving corporate performance. They also emphasized the need for future research to explore the impact of CG from the perspective of firms' external environment.

A further study by Zahoor, Lew, Arslan, Christofi, and Tarba (2023) drew on numerous theories (stakeholder theory, resource dependence theory, and agency theory) to investigate CG's moderating role with regard to international CSR and the performance of new international ventures. Their findings revealed a significant moderating effect of CG on the CSR–performance nexus. While the existing literature has investigated how CG moderates various firm-level decisions, there is a noticeable gap regarding debtholders' perspectives on firms' CG quality during EU. Therefore, we set out to fill this gap by investigating the following hypothesis:

H_3. *: Strong CG decreases the destructive impact of EU on COD.*

3. Data, variables, and methodology

3.1. Data and sample

Our empirical analysis was conducted using a sample of nonfinancial enterprises from eight European countries, namely Belgium, France, Germany, Italy, the Netherlands, Spain, Switzerland, and the United Kingdom. We chose these countries due to the availability of the main variables of our study, i.e., *EU*, *CGI*, and *COD*. The analysis spans the years from 2013 to 2021; this period was chosen so that our analysis could connect the results of the study to the most recent economic legislation and uncertainties in Europe, i.e., the COVID-19 pandemic, Brexit, climate change, and digital transformation, etc. The eight European sample countries have diverse economic structures. The sample initially consisted of 12,555 firm-year observations; this was reduced to a maximum sample of 11,794 firm-year observations after excluding firms with missing financial data for a maximum of five years or missing CG ratings. The data were winorized at the 1 % level from both ends to ensure data quality.

Our financial data were sourced from the Refinitiv Eikon database and the CG data from Institutional Shareholders Services (ISS). We used the World Uncertainty Index by Ahir et al. (2022) to measure EU.

3.2. Variables studied

This study examines the impact of EU on COD. *COD* is a measure of a company's financial burden in terms of interest payments compared to total debt. It helps assess how effectively a company manages its debt obligations. When the *COD* ratio is high, this indicates that a significant proportion of a company's resources is used to pay off interest, which can influence profitability and financial flexibility. On the other hand, a lower *COD* ratio indicates efficient debt management, which enables the company to assign more resources to other areas. Following similar studies, we measure *COD* as the ratio of interest payments to total debt (Chen, Huang, Lobo, & Wang, 2016; Chui, Kwok, & Zhou, 2016; Tran, 2021).

EU is a measure of the level of uncertainty in a country's economic environment. We use an index-based proxy developed by Ahir et al. (2022) to measure *EU*. The index considers major economic and political developments in each country, as published in quarterly Economist Intelligence Unit (EIU) reports, and it forecasts a score for each country using text analysis. A higher *EU* score designates a higher level of uncertainty (Ahir et al., 2022; Fang, Gozgor, Lau, & Seetaram, 2022).

Table 1
Definition of the variables of the study.

Acronym	Variable	Measurement	Reference/Source
COD	Cost of debt	Interest expenses/total debt	Refinitiv Eikon
EU	Economic uncertainty	World uncertainty index	Economic uncertainty index developed by Ahir et al. (2022).
CGI	Corporate governance	Dummy 1 for a high median value of the corporate governance index and 0 otherwise. The index is developed by ISS-ESG based on four key dimensions i.e., Shareholder rights, Compensation, Audit, and board structure.	ISS Governance Quality Score
SHR	Shareholder rights	Dummy 1 for a high median value of shareholder rights score and 0 otherwise.	ISS Governance Quality Score
CMP	Compensation	Dummy 1 for a high median value of compensation score and 0 otherwise.	ISS Governance Quality Score
ADS	Audit oversight	Dummy 1 for a high median value of audit score and 0 otherwise.	ISS Governance Quality Score
BST	Board structure	Dummy 1 for a high median value of board structure score and 0 otherwise.	ISS Governance Quality Score
TTA	Tangibility ratio	Fixed assets/total assets	Refinitiv Eikon
FRS	Firm size	Log (total assets)	Refinitiv Eikon
LVR	Leverage ratio	Total liabilities/total assets	Refinitiv Eikon
FPR	Firm profitability	EBIT/total assets	Refinitiv Eikon

Notes: The table provides an overview of the key variables used in the study, along with their respective measurements and sources.

The measurement of *CGI* involves the use of the ISS governance quality score. ISS, a renowned CG advisory firm, offers CG solutions and proxy voting recommendations for institutional investors. The overall CG index (*CGI*) assesses four subindices: shareholder rights (*SHR*), audit insights (*ADS*), compensation (*CMP*), and board structure (*BST*). *CGI* encompasses the mechanisms, processes, and structures that oversee and guide a company's monitoring and governance practices. It involves multiple aspects of a corporation's operations and decision-making, with the aim of ensuring accountability, transparency, and fairness. In total, companies are evaluated based on more than 250 items. *SHR* refers to the privileges and protections afforded to shareholders in a corporation. These rights encompass various aspects, such as the ability and equal right to vote on important company decisions (e.g., electing directors, approving mergers), access to information about the company's operations and financial health, and anti-takeover mechanisms. *ADS* comprises items linked to auditor independence, the strength of the audit committee, and internal control. *CMP* is a measure of how a company's executive compensation packages are structured. It appraises the alignment of executive pay with company performance and shareholder interests as well as diverse metrics of executive pay practices. Finally, *BST* encompasses the composition and functions of a company's board of directors, its independence, and committees.

Complementing the main variables are several control variables, including the tangibility ratio (*TTA*), firm size (*FRS*), leverage ratio (*LVR*), and profitability (*FPR*). Extant literature has posited that these play a dynamic role in determining COD (Chen et al., 2016; Chui et al., 2016; Tran, 2021). Definitions of these variables are presented in

Table 2
Summary statistics.

	N	Mean	Std. Dev.	P25	Median	P75
COD	11,794	0.055	0.098	0.021	0.033	0.052
EU	11,794	0.427	0.270	0.238	0.336	0.522
CGI	5545	−2.673	7.777	−7.686	−1.632	3.344
SHR	5545	0.668	2.481	−0.433	1.475	1.920
CMP	5545	−1.978	3.407	−4.407	−0.882	0.731
ADS	5545	−0.442	1.309	−0.611	0.000	0.037
BST	5545	−0.921	4.229	−3.134	−0.231	2.171
TTA	11,794	0.257	0.252	0.059	0.186	0.367
FRS	11,794	14.281	2.241	12.638	14.077	15.677
LVR	11,794	0.595	0.224	0.442	0.585	0.743
FPR	11,794	0.053	0.100	0.019	0.056	0.095

Notes: The table presents summary statistics of the variables of the study. COD is cost of debt; EU is economic uncertainty; CGI is overall corporate governance index score; SHR is shareholding rights score; CMP is compensation score; ADS is audit score; BST is board structure score; TTA is tangibility ratio; FRS is firm size; LVR is leverage ratio; FPR is firm profitability. P25 and P75 show the mean values at the 25 % and 75 % quartiles, respectively.

Table 1.

3.3. Econometric models

To investigate the impact of *EU* on *COD* (H_1), we develop the following regression equation:

$$COD_{it} = \beta_{\circ} + \beta_1 EU_{jt} + \beta_2 Cont_{it} + yr_t + ind_i + \varepsilon_{it} \quad (1)$$

where COD_{it} represents the cost of debt (interest expense / total debt) of firm i at time t. EU_{jt} represents the level of *EU* in country j at time t, measured as an index developed by Ahir et al. (2022). $Cont_{it}$ represents four firm-level control variables, i.e., *TTA*, *FRS*, *LVR*, and *FPR*. yr_t and ind_i represent time and industry fixed effects, respectively. ε_{it} represents error terms.

Next, to investigate the impact of *CG* on *COD* (H_2), we extend Eq. 1 as below:

$$COD_{it} = \beta_{\circ} + \beta_1 EU_{jt} + \beta_2 CGI_{it} + \beta_3 Cont_{it} + yr_t + ind_i + \varepsilon_{it} \quad (2)$$

where CGI_{it} represents the corporate governance quality index of firm i at time t, as developed by ISS and introduced in Section 4.2. Other variables are as in Eq. 1.

Finally, to investigate *CG*'s moderating impact on the relationship between *EU* and *COD* (H_3), we modify Eq. 2 as follows:

$$COD_{it} = \beta_{\circ} + \beta_1 EU_{jt} + \beta_2 CGI_{it} + \beta_3 EU_{jt}\ x\ CGI_{it} + \beta_4 Cont_{it} + yr_t + ind_i + \varepsilon_{it} \quad (3)$$

where $EU_{jt}\ x\ CGI_{it}$ is the interaction term of *EU* with the *CGI* of firm i at time t. Other variables are as explained in Eq. 1.

4. Empirical results

4.1. Descriptive statistics and correlation analysis

Table 2 details a descriptive analysis of the variables, where standard deviation, median, and mean values are measured at two quantiles (P25 and P75) to assess the distribution of the data. The mean value of *COD* is 0.055, which represents the average ratio of interest expenses that the sample firms pay on their total debt acquisition. It indicates that, on average, interest expenses represent 5.5 % of the total debt of the sample firms. The mean value of 0.427 with a standard deviation of 0.270 for *EU* indicates variations in the EU of the sample countries. The mean value of −2.673 with a standard deviation of 7.777 for *CGI* indicates significant variations in the sample firms' CG strength. The mean value of 0.257 for *TTA* shows that, on average, the tangible assets of the sample firms are almost 25 % of their total assets. The mean (14.281) and median (14.077) values for *FRS* indicate that almost half the sample firms are of average size. The mean value of 0.595 for *LVR* shows that, on average, the total liabilities of the sample firms are almost 60 % of their total assets. The mean value of 0.053 for *FPR* indicates a good profitability ratio for the sample firms.

Table 3 details the pairwise correlations between the variables of the study. We observe a highly significant positive (0.026***) association between *EU* and *COD*, supporting H_1. We also observe some highly significant correlations between some of the other variables; therefore, we calculate the variance inflation factor (VIF) to ensure our regression models do not have multicollinearity issues (Baltagi, 2008). We observe

Table 3
Pairwise correlations.

Variables	COD	EU	CGI	SHR	CMP	ADS	BST	TTA	FRS	LVR	FPR
COD	1.000										
EU	0.026***	1.000									
	(0.005)										
CGI	0.033**	0.445***	1.000								
	(0.015)	(0.000)									
SHR	0.075***	0.396***	0.561***	1.000							
	(0.000)	(0.000)	(0.000)								
CMP	0.022	0.307***	0.767***	0.247***	1.000						
	(0.106)	(0.000)	(0.000)	(0.000)							
ADS	0.002	−0.009	0.198***	0.010	0.001	1.000					
	(0.899)	(0.504)	(0.000)	(0.477)	(0.915)						
BST	−0.002	0.342***	0.830***	0.243***	0.459***	0.047***	1.000				
	(0.882)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)					
TTA	−0.070***	0.026***	0.047***	0.026*	0.059***	0.061***	0.004	1.000			
	(0.000)	(0.004)	(0.001)	(0.054)	(0.000)	(0.000)	(0.762)				
FRS	−0.166***	−0.144***	0.002	−0.192***	0.072***	−0.094***	0.087***	0.005	1.000		
	(0.000)	(0.000)	(0.883)	(0.000)	(0.000)	(0.000)	(0.000)	(0.613)			
LVR	−0.121***	−0.076***	0.051***	−0.065***	0.065***	−0.095***	0.109***	−0.138***	0.310***	1.000	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
FPR	−0.029***	−0.013	0.038***	0.037***	0.048***	0.066***	−0.010	0.030***	0.028***	−0.207***	1.000
	(0.002)	(0.144)	(0.004)	(0.006)	(0.000)	(0.000)	(0.455)	(0.001)	(0.002)	(0.000)	
VIF		4.08	4.04	4.41	3.75	3.31	3.84	1.04	1.25	1.30	1.09

Notes: The table presents pairwise correlations. COD is cost of debt; EU is economic uncertainty; CGI is overall corporate governance index score; SHR is shareholding rights score; CMP is compensation score; ADS is audit score; BST is board structure score; TTA is tangibility ratio; FRS is firm size; LVR is leverage ratio; FPR is firm profitability. P-values are in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. VIF is the variance inflation factor.

Table 4
The impact of economic uncertainty on the cost of debt.

	(1)	(2)	(3)	(4)	(5)
	COD	COD	COD	COD	COD
EU	**0.009*** **	**0.036*** **	**0.009*** **	**0.037*** **	**0.022*** **
	(0.003)	**(0.004)**	**(0.003)**	**(0.004)**	**(0.004)**
TTA					−0.026***
					(0.004)
FRS					−0.005***
					(0.000)
LVR					−0.049***
					(0.006)
FPR					−0.054***
					(0.015)
Constant	0.052***	0.066***	0.049***	0.068***	0.184***
	(0.002)	(0.004)	(0.009)	(0.009)	(0.011)
Observations	11,794	11,794	11,794	11,794	11,794
Adj R^2	0.001	0.019	0.009	0.028	0.060
F-stat	7.654***	39.250***	37.255***	29.680***	27.660***
Time Effect	No	Yes	No	Yes	Yes
Industry Effect	No	No	Yes	Yes	Yes

Notes: The table presents the regression results investigating the impact of economic uncertainty on the cost of debt. Economic Uncertainty significantly increases the cost of debt across all models. COD is cost of debt; EU is economic uncertainty; TTA is tangibility ratio; FRS is firm size; LVR is leverage ratio; FPR is firm profitability. Robust standard errors are in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 5
The impact of economic uncertainty and corporate governance on the cost of debt.

	(1)	(2)	(3)	(4)	(5)
	COD	COD	COD	COD	COD
EU	0.018***	0.036***	0.016***	0.035***	0.020***
	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)
CGI	**0.000**	**−0.003**	**0.002**	**−0.001**	**0.002**
	(0.002)	**(0.003)**	**(0.002)**	**(0.002)**	**(0.002)**
TTA					−0.014***
					(0.005)
FRS					−0.004***
					(0.001)
LVR					−0.055***
					(0.009)
FPR					−0.018
					(0.020)
Constant	0.037***	0.042***	0.036***	0.041***	0.153***
	(0.002)	(0.004)	(0.003)	(0.005)	(0.012)
Observations	5545	5545	5545	5545	5545
Adj R^2	0.004	0.016	0.010	0.022	0.054
F-stat	11.232***	16.032***	9.925***	11.825***	11.138***
Time Effect	No	Yes	No	Yes	Yes
Industry Effect	No	No	Yes	Yes	Yes

Notes: The table presents the regression results investigating the impact of economic uncertainty and corporate governance on the cost of debt. Corporate Governance does not have a consistent significant impact on reducing the cost of debt. COD is cost of debt; EU is economic uncertainty; CGI is a dummy variable that takes the value 1 for a high median value of corporate governance index and 0 otherwise; TTA is tangibility ratio; FRS is firm size; LVR is leverage ratio; FPR is firm profitability. Robust standard errors are in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

VIF values under 10, indicating that the regression models do not suffer from multicollinearity (Baltagi, 2008; Qureshi, Gull, Ahsan, & Majeed, 2024).

4.2. Regression analysis

Table 4 presents the regression results investigating EU's impact on COD. We find highly significant positive coefficients for *EU* in all the models. Model 1 includes *EU* only (0.009***); model 2 controls for time fixed effects (0.036***); model 3 controls for industry fixed effects (0.009***); model 4 controls for time and industry fixed effects (0.037***); and model 5 includes control variables along with time and industry fixed effects (0.022***). The highly significant positive association between *EU* and *COD* in all our regression models indicates that EU in the sample countries increases COD for the firms, supporting H_1.

Table 5 presents the regression results investigating CG's impact on COD. We find insignificant associations of *CGI* with *COD* in all the regression models, indicating that the CG mechanism of the sample firms fails to secure favorable/better interest rates from creditors, opposing H_2.

Table 6
The moderating impact of corporate governance on the relationship between economic uncertainty and cost of debt.

	(1)	(2)	(3)	(4)
	COD	COD	COD	COD
EU	**0.047*** **	**0.027*** **	**0.047*** **	**0.035*** **
	(0.008)	**(0.007)**	**(0.008)**	**(0.008)**
CGI	0.003	0.008*	0.006	0.010**
	(0.004)	(0.004)	(0.004)	(0.004)
EU x CGI	**−0.015***	**−0.016***	**−0.017***	**−0.021** **
	(0.009)	**(0.009)**	**(0.009)**	**(0.009)**
TTA				−0.014***
				(0.006)
FRS				−0.004***
				(0.001)
LVR				−0.055***
				(0.006)
FPR				−0.018
				(0.013)
Constant	0.039***	0.032***	0.037***	0.149***
	(0.006)	(0.005)	(0.007)	(0.013)
Observations	5545	5545	5545	5545
Adj R^2	0.016	0.010	0.023	0.055
F-stat	9.273***	5.483***	7.089***	13.956***
Time Effect	Yes	No	Yes	Yes
Industry Effect	No	Yes	Yes	Yes

Notes: The table presents the regression results investigating the moderating impact of corporate governance on the relationship between economic uncertainty and the cost of debt. Strong Corporate Governance mitigates the negative impact of Economic Uncertainty on the cost of debt. COD is the cost of debt; EU is economic uncertainty; CGI is a dummy variable that takes the value 1 for a high median value of the corporate governance index and 0 otherwise; EU x CGI is the interaction term of EU with CGI. TTA is tangibility ratio; FRS is firm size; LVR is leverage ratio; FPR is firm profitability. Standard errors are in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 6 presents the regression results investigating CG's moderating impact on the EU–COD relationship. The interaction term *EU x CGI* is significant across all models, with interaction coefficients ranging between −0.015 and − 0.021 and significance varying from $p < 0.10$ to $p < 0.05$. This indicates that strong CG can mitigate the adverse impact of EU on COD. Model 4 (Table 6) includes control variables along with time and industry fixed effects and shows a moderately significant negative impact of CG on the EU–COD relationship, indicating that when strong CG mechanisms are in place, EU's negative impact on COD is mitigated, supporting H_3.

4.3. Robustness and endogeneity

To ensure our results are robust, i.e., that they are not sensitive to the measurement proxies of COD and CG, we use alternative proxies of both and run our regression analysis again for Eq. 3. Instead of the dummy variable for the high/low levels of CG (1 for a high median value for CGI and 0 otherwise), we use the raw score of CGI (*CGI_Alt*). Second, we use industry-adjusted values (Majeed, Ullah, Tariq, & Ahsan, 2023) of COD (*IA_COD*), as firms in certain industries may have higher/lower COD.

Table 7
Robustness - Alternate proxies and subsample analysis.

	Alternate proxies		Subsample analysis	
			Period < 2019	Period > 2019
	(1)	(2)	(3)	(4)
	COD	IA_COD	COD	COD
EU	**0.017*** **	**0.036*** **	**0.042*** **	**0.043*** **
	(0.005)	**(0.008)**	**(0.015)**	**(0.010)**
CGI_Alt	0.001***			
	(0.000)			
EU x CGI_Alt	**−0.001** **			
	(0.001)			
CGI		0.010**	0.017**	0.011*
		(0.004)	(0.007)	(0.006)
EU x CGI		**−0.022** **	**−0.049*** **	**−0.024** **
		(0.009)	**(0.017)**	**(0.012)**
TTA	−0.014***	−0.013**	−0.018**	−0.011
	(0.006)	(0.006)	(0.009)	(0.008)
FRS	−0.004***	−0.004***	−0.005***	−0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
LVR	−0.055***	−0.054***	−0.063***	−0.045***
	(0.006)	(0.006)	(0.009)	(0.008)
FPR	−0.019	−0.024*	−0.007	−0.031*
	(0.013)	(0.013)	(0.024)	(0.016)
Constant	0.159***	0.070***	0.165***	0.104***
	(0.013)	(0.013)	(0.019)	(0.016)
Observations	5545	5545	2991	1818
Adj R^2	0.056	0.046	0.045	0.058
F-stat	14.083***	11.573***	7.367***	7.167***
Time Effect	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes

Notes: The table presents the regression results investigating the moderating impact of corporate governance on the relationship between economic uncertainty and the cost of debt using alterative measurements and sub-sample. COD is cost of debt; IA_COD is industry-adjusted cost of debt; EU is economic uncertainty; CGI is a dummy variable that takes the value 1 for a high median value of the corporate governance index and 0 otherwise; CGI_Alt is the raw score for the overall corporate governance index. EU x CGI_Alt is the interaction term of EU with CGI_Alt; EU x CGI is the interaction term of EU with CGI. TTA is tangibility ratio; FRS is firm size; LVR is leverage ratio; FPR is firm profitability. Standard errors are in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 8
Robustness – Controlling for macroeconomic variables.

	(1)	(2)	(3)	(4)
	COD	COD	COD	COD
EU	**0.037*** **	**0.033*** **	**0.044*** **	**0.044*** **
	(0.008)	**(0.008)**	**(0.009)**	**(0.009)**
CGI	0.010**	0.009**	0.012***	0.011***
	(0.004)	(0.004)	(0.004)	(0.004)
EU x CGI	**−0.024*** **	**−0.018** **	**−0.024*** **	**−0.023*** **
	(0.009)	**(0.009)**	**(0.009)**	**(0.009)**
TTA	−0.015***	−0.014**	−0.014***	−0.014***
	(0.006)	(0.006)	(0.006)	(0.006)
FRS	−0.004***	−0.004***	−0.004***	−0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
LVR	−0.055***	−0.055***	−0.055***	−0.055***
	(0.006)	(0.006)	(0.006)	(0.006)
FPR	−0.017	−0.018	−0.018	−0.018
	(0.013)	(0.013)	(0.013)	(0.013)
INF	**0.004** **			
	(0.002)			
GDP		**0.001**		
		(0.001)		
BD			**−0.010** **	
			(0.005)	
SMD				**−0.004***
				(0.002)
Constant	0.139***	0.148***	0.158***	0.151***
	(0.013)	(0.013)	(0.013)	(0.013)
Observations	5545	5545	5545	5545
Adj R^2	0.056	0.055	0.056	0.056
F-stat	13.624***	13.491***	13.580***	13.542***
Time Effect	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes

Notes: The table presents the regression results investigating the moderating impact of corporate governance on the relationship between economic uncertainty and the cost of debt while controlling for macroeconomic factors. COD is cost of debt; EU is economic uncertainty; CGI is a dummy variable that takes the value 1 for a high median value of corporate governance index and 0 otherwise; EU x CGI is the interaction term of EU with CGI; TTA is tangibility ratio; FRS is firm size; LVR is leverage ratio; FPR is firm profitability; INF is consumer prices (annual %); GDP is GDP growth (annual %); BD is domestic credit to private sector by banks (% of GDP); Market capitalization of listed domestic companies (% of GDP); Standard errors are in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.10.

The results are presented in Columns 1 and 2 of Table 7. We note significant negative associations of the interaction terms using an alternative proxy of CG (*EU x CGI_Alt* = −0.001**) in Column 1 and industry-adjusted COD (*EU x CGI* = −0.022**) in Column 2, confirming the robustness of our main results.

Next, we conduct a subsample analysis. Our sample period is from 2013 to 2021 and includes the COVID-19 pandemic period. Empirical studies indicate that COVID-19 reduced firm performance (Cho & Saki, 2022) while increasing stock market volatility (Chowdhury, Dhar, & Stasi, 2022) and the cost of equity capital (Ke, 2022). Accordingly, COVID-19 may have affected the COD of our firms; therefore, we split the sample into two periods, i.e., before 2019 and after 2019, and rerun our regression analysis for Eq. 3. The results are presented in Columns 3 and 4 of Table 7. We note significant positive associations of *EU* with *COD* before (0.042***) and after (0.043***) 2019, indicating that EU increased the COD of the sample firms during both periods. Further, we observe significant negative associations of the interaction term (*EU x CGI*) with *COD* before (−0.049***) and after (−0.024**) 2019, indicating that better governance mechanisms helped firms reduce uncertainty-induced COD.

Macroeconomic conditions and institutional development can also affect COD (Chui et al., 2016). For example, a developed banking system provides easy access to debt financing, while a developed stock market may enhance the bargaining power of firms by providing alternative financing options, such as equity financing. Inflation can increase interest rates in the market (Ahsan & Qureshi, 2017; Chui et al., 2016). Therefore, we control our models for inflation (*INF*), economic growth (*GDP*), banking (*BD*), and stock market development (*SMD*) and rerun our regression analysis for Eq. 3. The results presented in Table 8 indicate positive associations of *EU* with *COD* and significant negative associations with the interaction term (*EU x COD*), consistent with the main results. Moreover, there is a significant positive association of *INF* with *COD* (0.004**) in Column 1 (Table 8), indicating that inflation increases corporate COD. The negative association of *BD* (−0.010**) in Column 3 (Table 8) and *SMD* (−0.004*) in Column 4 (Table 8) indicates that developed financial institutions decrease corporate COD (Chui et al., 2016).

One might raise the concern that the regression results could suffer from endogeneity due to reverse causality (Qureshi et al., 2024), as firms with higher COD may exhibit higher debt ratios and possibly lower profitability. Therefore, we rerun our regression analysis utilizing the system generalized method of moments (GMM), which is effective in ensuring endogeneity due to reverse causality (Qureshi et al., 2024; Roodman, 2009). We apply this approach using internal instruments because the use of variables' lagged values is inherently relevant. As they are derived from the same data, this ensures stronger, reliable correlations with the endogenous variables while they remain uncorrelated with the error terms (Ali, Liu, & Su, 2018). We take the one-year lagged value of COD (*L.COD*) as the endogenous variable in our GMM regression models. The results are presented in Table 9 (Columns 1 and 2). We note significant positive associations of *EU* in the baseline (0.015*** – Column 1) and extended (0.098** – Column 2) models. We also observe

Table 9
Panel (A)-Robustness – Alternate regression techniques.

	GMM		Pre-match Probit	Post-match Probit	Post-match OLS
	(1)	(2)	(3)	(4)	(5)
	COD	COD	EU_D	EU_D	COD
L.COD	0.233***	0.265***			
	(0.023)	(0.024)			
EU	**0.015*** **	**0.098** **			**0.057*** **
	(0.003)	**(0.038)**			**(0.012)**
CGI		0.048**			0.023***
		(0.021)			(0.007)
EU x CGI		**−0.118** **			**−0.059*** **
		(0.053)			**(0.016)**
TTA	−0.014***	−0.008*	0.364***	0.067	−0.003
	(0.004)	(0.004)	(0.110)	(0.136)	(0.009)
FRS	−0.004***	−0.003***	−0.169***	0.009	−0.005***
	(0.000)	(0.001)	(0.012)	(0.016)	(0.001)
LVR	−0.028***	−0.018***	−0.089	0.154	−0.055***
	(0.006)	(0.007)	(0.115)	(0.140)	(0.009)
FPR	−0.041***	−0.011	0.574**	0.192	−0.002
	(0.013)	(0.014)	(0.262)	(0.316)	(0.020)
Constant	0.094***	0.047***	2.168***	−0.463*	0.133***
	(0.011)	(0.014)	(0.204)	(0.281)	(0.018)
Observations	11,794	5545	4921	2646	2646
Instruments	59	59			
Hansen	39.064	30.191			
Hansen_P	0.253	0.608			
AR1	−6.796	−3.458			
AR1_P	0.000	0.001			
AR2	0.678	0.051			
AR2_P	0.498	0.959			
Pseudo R^2			0.200	0.004	
Adj R^2					0.050
Time Effect	Yes	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes	Yes

Panel B: Post-matched sample analysis

	Treatment group	Control group	
Variables	Mean	Mean	p > t
TTA	0.250	0.248	0.869
FRS	15.486	15.447	0.609
LVR	0.629	0.621	0.311
FPR	0.061	0.060	0.791

Notes: Panel A presents the regression results investigating the moderating impact of corporate governance on the relationship between economic uncertainty and cost of debt using alternate regression techniques. Panel B represents the results of the mean difference test between the control and treatment groups. COD is cost of debt; L.COD is one-year lagged value of COD (we only take L.COD as an instrumental variable in GMM regression); EU is economic uncertainty; EU_D is a dummy variable that takes the value 1 for a high median value of economic uncertainty index; CGI is a dummy variable that takes the value 1 for a high median value of corporate governance index and 0 otherwise; EU x CGI is the interaction term of EU with CGI; TTA is tangibility ratio; FRS is firm size; LVR is leverage ratio; FPR is firm profitability; Standard errors are in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

a significant negative association of the interaction term (*EU x CGI*) in Column 2 (−0.118**), in line with the main results. Further, a lower number of internal instruments (59) and the insignificance of the AR2 and Hansen test indicate that these results are robust to endogeneity issues due to reverse causality (Roodman, 2009).

Our final sample comprises the firms with CGI values provided by ISS; therefore, one could argue that our regression results are derived due to control variables in our sample other than *EU* (Mirza et al., 2024; Qureshi et al., 2024). To confirm that our results are robust to endogeneity issues due to selection bias, we apply propensity score matching (PSM) (Mirza et al., 2024; Qureshi et al., 2024). Panel A of Table 9 (Columns 3–5) presents the PSM analysis results. To apply PSM, we classify our firm-year observations into two categories using a dummy variable (*EU_D*): those with an EU level higher than the sample median (treatment group) and those with an EU level lower than the sample median (control group). Using this dummy (*EU_D*) as a dependent variable, we re-estimate Eq. 1 by including control variables and applying probit regression to get propensity scores for each firm-year observation. Based on these scores, we generate two similar subsamples representing the treatment and control groups. Next, we employ probit regression on the pre- (Column 3) and post-matched sample (Columns 4). The control variables are insignificant in the post-matched sample and there is a reduction in pseudo R^2 from 0.200 (Column 3 – pre-matched sample) to 0.004 (Column 4 – post-matched sample). Finally, we utilize OLS regression on the post-matched sample (Column 5): There is a significant positive association of *EU* (0.057***) and a significant negative association of the interaction term (*EU x CGI* = −0.059**). These results indicate that our regression results are not derived due to control variables in our sample other than *EU* (Mirza et al., 2024; Qureshi et al., 2024). Panel B of Table 9 details the results of the mean difference between the treatment and control groups. There are no significant differences between the mean values of the two groups, further enhancing the validity of the PSM analysis (Mirza et al., 2024).

4.4. Additional analysis

The measure of CGI incorporates four subindices: *SHR*, *CMP*, *ADS*, and *BST*. To investigate the individual impact of these four subindices, we rerun the regression analysis for Eq. 3 by including these subindices one by one in our regression models. The results are in Table 10. We find significant negative associations for shareholder rights (*EU x SHR* = −0.167**, Column 1) and compensation (*EU x CMP* = −0.142**,

Table 10
The moderating impact of corporate governance components on the relationship between economic uncertainty and cost of debt.

	(1)	(2)	(3)	(4)
	COD	COD	COD	COD
L.COD	0.275***	0.275***	0.277***	0.277***
	(0.027)	(0.023)	(0.023)	(0.023)
EU	**0.125*** **	**0.106*** **	**0.017**	**0.019*** **
	(0.048)	**(0.038)**	**(0.011)**	**(0.005)**
SHR	0.070***			
	(0.026)			
EU x SHR	**−0.167** **			
	(0.067)			
CMP		0.060**		
		(0.025)		
EU x CMP		**−0.142** **		
		(0.059)		
ADS			0.004	
			(0.017)	
EU x ADS			**−0.009**	
			(0.038)	
BST				0.003
				(0.002)
EU x BST				**−0.007**
				(0.005)
TTA	−0.008*	−0.005	−0.005	−0.005
	(0.005)	(0.004)	(0.004)	(0.003)
FRS	−0.003***	−0.003***	−0.003***	−0.003***
	(0.001)	(0.001)	(0.000)	(0.000)
LVR	−0.017**	−0.017**	−0.019***	−0.018***
	(0.007)	(0.007)	(0.006)	(0.006)
FPR	−0.014	−0.006	−0.007	−0.006
	(0.015)	(0.015)	(0.014)	(0.013)
Constant	0.040**	0.039**	0.069***	0.069***
	(0.016)	(0.015)	(0.009)	(0.008)
Observations	5545	5545	5545	5545
Instruments	59	59	59	60
Hansen	30.175	32.663	31.222	31.174
Hansen_P	0.608	0.484	0.556	0.607
AR1	−3.470	−3.514	−3.351	−3.354
AR1_P	0.001	0.000	0.001	0.001
AR2	−0.048	0.205	0.179	0.194
AR2_P	0.962	0.838	0.858	0.846
Time Effect	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes

Notes: The table presents the regression results investigating the moderating impact of corporate governance components on the relationship between economic uncertainty and the cost of debt. Strong shareholders rights SHR and compensation policy CMP mitigates the negative impact of Economic Uncertainty on the cost of debt. COD is cost of debt; L.COD is one-year lagged value of COD (we only take L.COD as instrumental variable in GMM regression); EU is economic uncertainty; EU_D is a dummy variable that takes the value 1 for a high median value of economic uncertainty index; SHR is a dummy variable that takes the value 1 for a high median value of shareholder score and 0 otherwise; EU x SHR is the interaction term of EU with SHR; CMP is a dummy variable that takes the value 1 for a high median value of compensation score and 0 otherwise; EU x CMP is the interaction term of EU with CMP; ADS is a dummy variable that takes the value 1 for a high median value of audit score and 0 otherwise; EU x ADS is the interaction term of EU with ADS; BST is a dummy variable that takes the value 1 for a high median value of board structure score and 0 otherwise; EU x BST is the interaction term of EU with BST; TTA is tangibility ratio; FRS is firm size; LVR is leverage ratio; FPR is firm profitability; Standard errors are in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Column 2), suggesting that improved shareholder rights and compensation plans help reduce corporate COD financing during EU. However, the interaction terms for audit insights (*EU x ADS* = −0.009, Column 3) and board structure (*EU x BST* = −0.007, Column 4) show negative but insignificant associations, indicating that these factors do not play a significant role in reducing uncertainty-induced corporate COD financing.

Finally, Table 11 summarizes the hypotheses tested in the study, detailing the expected relationships, actual results, support for each hypothesis, and findings from robustness checks. Hypothesis support is evaluated based on the consistency of results across various models and robustness checks, including alternate proxies, subsample analysis, macroeconomic controls, and different regression techniques.

5. Discussion

This study explores the relationship between EU, COD, and CG using an empirical approach. To achieve this, the analysis employed static and dynamic regression techniques. Our findings reveal a significant positive effect of EU on COD. This means that higher levels of EU have a direct impact on the COD of companies. This positive effect can be explained by the fact that high levels of EU discourage the banking sector from engaging in lending activities. As a result, the supply of bank loans decreases, leading to higher COD. When EU is high, banks and other debtholders tend toward risk aversion due to increased information asymmetry. Therefore, they may demand higher interest rates on debt instruments to counterbalance the increased perceived risk that accompanies uncertainty-induced information asymmetry.

Furthermore, when EU reaches high levels, it can also erode investor confidence in financial markets and the overall economy. This can result in a decline in stock prices, indirectly affecting COD. When stock prices fall, the cost of equity rises and companies must rely more heavily on debt financing, which can further increase their debt costs. Overall, the impact of EU on COD is multifaceted. It can raise interest rates, limit access to credit, erode investor confidence, affect credit ratings, increase risk premiums, and influence businesses' investment decisions. Our findings align with those of empirical studies by Tran (2021), Qiu and Zhang (2024), and Tran and Nguyen (2023).

The analysis also reveals an insignificant direct impact of CG on COD, consistent with Garcia-Blandon et al. (2022), who find that board diversity does not significantly impact COD. However, it contradicts the findings of other studies indicating a significant negative impact of CG on COD (Bradley & Chen, 2011; Ghouma et al., 2018). In contrast, the analysis reveals a significant negative moderating effect of CG on COD, indicating that the implementation of effective CG practices is vital in fostering transparency in financial reporting and decision-making, thereby reducing information asymmetry between companies and creditors. Furthermore, good governance practices boost the credibility and trustworthiness of a company's management, resolve agency issues, and make firms more appealing to lenders by reducing transaction costs for the lender and, ultimately, lowering the cost of borrowing for firms (AlHares, 2020; Mili & Alaali, 2023). Effective CG practices enable companies to better manage and alleviate EU-related risks. This includes the establishment of robust risk assessment processes, transparent decision-making procedures, and a strong board of directors that offers oversight and guidance on risk management strategies. When CG is strong, it enhances a company's ability to navigate the challenges posed by EU (Ahsan et al., 2021), thereby reducing perceived risk for creditors and potentially lowering COD. Although we did not come across any specific study exploring this particular relationship, other studies—such as those conducted by Ahsan et al. (2021), Boachie and Mensah (2022), and Ahmad et al. (2023)—have emphasized CG's moderating impact on various firm-level decisions under uncertainty.

Control variables such as the tangibility ratio, firm size, and firm profitability have a negative impact on COD. The tangibility ratio, a measure of the proportion of a firm's assets that can be used as collateral in the event of default, plays a key role in determining the lender's risk. A higher tangibility ratio diminishes risk for lenders, and it is therefore easier for firms to secure debt at lower interest rates (Thanatawee, 2023). Additionally, larger firms enjoy several advantages, including economies of scale, better access to capital markets, and diversified revenue streams. The aforementioned factors contribute to their creditworthiness, and the perception of such firms as being lower-risk borrowers enables them to negotiate lower interest rates on their debt. Another factor that affects a firm's ability to secure debt on favorable

Table 11
Summary of key findings and robustness results.

Hypothesis	Expected relationship	Result	Support	Robustness checks
H1: EU has a significant positive association with COD.	Positive (EU increases COD)	EU consistently shows a significant positive impact on COD across all models. Coefficients for EU range from 0.009 to 0.037 with $p < 0.01$.	Yes	EU remains significant across alternate proxies, subsample analysis, macroeconomic controls, and different regression techniques.
H2: Strong CG has a significant negative association with COD.	Negative (Strong CG reduces COD)	CG shows no consistent significant negative impact on COD. Coefficients for CGI range from −0.003 to 0.002, mostly insignificant across models.	No	CGI becomes significant in robustness checks using alternate proxies, subsample analysis, and macroeconomic controls.
H3: Strong CG decreases the destructive impact of EU on COD.	Negative interaction (Strong CG reduces EU's impact on COD)	The interaction term (EU x CGI) is negative and significant in most models, with coefficients ranging from -0.015 *to* -0.021*. Significance varies from $p < 0.10$ to $p < 0.05$.	Yes	The interaction term remains significant across various robustness checks, indicating a consistent moderating effect.

Notes: The table summarizes the hypotheses tested in the study, detailing the expected relationships, actual results, support for each hypothesis, and findings from robustness checks. Hypothesis support is evaluated based on the consistency of results across various models and robustness checks, including alternate proxies, subsample analysis, macroeconomic controls, and different regression techniques.

terms is firm profitability. Profitable firms are better able to generate consistent cash flows, which can be utilized to fulfill debt obligations. As a result, banks and other lending institutions view profitable firms as lower-risk borrowers and are more inclined to offer them debt on attractive terms, including lower interest rates (Li & Islam, 2019). In summary, the tangibility ratio, firm size, and firm profitability can reduce COD by improving a firm's creditworthiness and lowering perceived risk for lenders.

6. Conclusion

This study investigates the impact of EU on COD and how this relationship is affected by CG. Our empirical analysis was conducted on a dataset of 11,794 firm-year observations from eight European countries, utilizing robust regression analysis. Our findings reveal several key insights. Firstly, there is a significant positive impact of EU on COD. This suggests that an increase in EU tends to elevate COD for firms operating in these countries. Secondly, our analysis also reveals an insignificant impact of CG on COD. Thirdly, the analysis identifies the significant negative moderating role of CG on the EU–COD relationship. This underlines the significant role that effective governance mechanisms play in lessening EU's negative impact on COD. In essence, this study confirms that the relationship between EU, COD, and CG is multifaceted in nature. It argues that it is vitally important to consider not only the direct effects of EU on COD but also the role of CG when assessing the financial landscape of firms in the context of EU. These findings contribute to knowledge regarding the complexities surrounding financial decision-making in our ever-evolving economic environment.

Our findings have substantial policy implications for CG practices and economic policy formulation. Given the positive relationship between EU and COD, corporate managers need to be proactive in monitoring and managing their exposure to economic policy changes by developing strategies that involve diversifying funding sources, maintaining sufficient liquidity buffers, and implementing risk management practices to mitigate the adverse effects of EU. Furthermore, we urge policymakers to expend additional efforts in delivering transparent and more stable economic policies; this will reduce uncertainty for businesses, which are integral to the economic environment. Active engagement with key stakeholders, the provision of policy guidance, and effective communication are key means by which the goal of creating a more predictable business environment can be achieved. In addition, this study highlights the importance of robust CG practices. Corporations should prioritize and continuously strengthen their governance mechanisms. Companies should be encouraged to adopt governance practices that protect shareholder interests while also considering other stakeholders including debtholders, as this may eventually play a role in reducing COD. Corporate boards should focus on improving CG practices, closely monitoring economic developments, optimizing debt structures, and cultivating transparent communication with stakeholders. This can be achieved if companies institute effective and dedicated board committees to closely oversee the potential risks resulting from policy changes and create communications channels to facilitate better engagement with corporate insiders including internal auditors and risk management officers. Such strategies would effectively constrain the impact of EU on COD while enhancing firms' financial resilience. A salient recent example is the failure of Silicon Valley Bank (SVB) in early 2023, where weak board oversight permitted the absence of a chief risk officer (CRO) for several months at a time when interest rates were rising (Prakash, 2023). This lack of a senior executive dedicated to managing risk during a period of EU, coupled with increasing interest rates, played a role in the collapse of SVB, as the bank was holding sizable investments in long-term securities impacted by interest rate hikes. This event highlights the implications of weak governance oversight in times of policy uncertainty and serves as an important lesson for corporations and regulators.

Data availability

No

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