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Corporate Social Responsibility Performance and Financial Risk Dynamics in Turkish Companies Listed on Borsa Istanbul *

Borsa İstanbul'da İşlem Gören Türk Şirketlerinin Kurumsal Sosyal Sorumluluk Performansı ve Finansal Risk Dinamikleri

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ÖZ

Bu çalışma, 2010-2022 yılları arasında Borsa İstanbul'da işlem gören Türk şirketleri arasındaki kurumsal sosyal sorumluluk (KSS) performansı ile risk alma davranışları arasındaki etkileşimi araştırmaktadır. Panel veri yapısında OLS regresyonu kullanılarak elde edilen bulgular, KSS performansının ölçümünde kullanılan ESG ve ESG'nin alt dalları olan çevresel, sosyal ve yönetişim boyutlarının skoru ile firma riski arasında güçlü bir negatif ilişkiyi vurgulamaktadır. Farklı piyasa ve muhasebe temelli risk ölçütleri üzerinden, daha yüksek KSS performansına sahip şirketler, tutarlı bir şekilde daha düşük seviyelerde Sistematik Olmayan Risk, Toplam Risk, Varlık Getirisi Riski ve Temerrüt Riski sergilemektedir. Bu bulgular, etkili KSS uygulamalarının ve performansının riskleri hafifletme potansiyelini öne sürerken, şirketlerin KSS performansının hem muhasebe temelli hem de piyasa temelli risk değerlendirmelerindeki etkisini kapatmada bir köprü oluşturabileceğini göstermektedir.

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A B S T R A C T

The focus of this investigation is to analyse the link between the extent of corporate social responsibility (CSR) performance and the adoption of risk-taking behaviours within Turkish-listed companies on the Borsa Istanbul from 2010 to 2022. Employing OLS regression in a panel data structure, the findings underscore a negative relationship between CSR performance proxied by ESG and its individual pillars which are environmental, social, and governance and financial risk level of the companies. Across diverse market and accounting risk measures, companies with higher CSR performance showcase consistently reduced levels of Idiosyncratic Risk, Total Risk, Asset Return Risk, and Default Risk. These findings suggest the risk-mitigating potential of robust CSR practices, addressing the gap regarding the impact of the social responsibility performance of the Turkish-listed companies to accounting and market-based assessments of risk.

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1. Introduction

Although the role of businesses in society has long been a topic of discussion, the examination of their role has become even more important as the environmental and social challenges of society increase (Dyllick and Muff, 2016; Vermeulen and Witres, 2016). Companies have begun to acknowledge the significance of their impact on the environment and society, alongside their traditional profit-making objectives, which is viewed as one of the key strategies for cultivating lasting relationships with stakeholders (Lozano, 2015). Pioneered by world-wide corporations, companies around the globe have been developing sustainable and corporate social responsibility (CSR) strategies and policies in response to stakeholder pressure (Albuquerque et al., 2019). Therefore, alongside the objective of profit maximization, researchers and practitioners often emphasize the potential for companies to make positive contributions to society and the environment (Hahn et al., 2017).

Researchers have conceptualized CSR, an approach in which businesses seek to address societal concerns in addition to their traditional goals and activities, in a variety of ways. Carroll (1979) defines CSR as encompassing economic, legal, ethical, and discretionary demands that society imposes on organizations at any given moment. Mosca and Civera (2017) define CSR as the collective set of policies and strategies that businesses employ to align their activities with social and environmental benefits through a shared perspective, considering the interests of multiple stakeholders.

Given the growing involvement of regulatory bodies in Turkey in sustainability and fighting against climate change, and Turkey's commitment to achieving net-zero emissions by 2053 as presented in "Doing Business in Türkiye: Environmental, social and governance (ESG)" report published in February 2024 by Norton Rose Fulbright, it becomes increasingly important and inevitable for companies to enhance their sustainability and environmental performance. The Capital Markets Board of Turkey released a revised Communiqué on corporate governance in January 2014, which initiated policing public businesses' corporate governance procedures. This stipulates that public firms must adhere to sustainability principles and that these organisations' corporate governance compliance reports must explain their compliance with sustainability principles. This was a clear sign of how Turkey's regulatory bodies view international sustainability trends and how Turkish businesses will be affected by them.

While it is understood that businesses prioritising CSR activities would gain value in the eyes of society by improving the company's legitimacy, the impact of these businesses on risk management remains a contentious issue. This study aims to unveil the impact of CSR activities on firm risk. To achieve this, companies operating on the Borsa Istanbul between 2010 and 2022, with assigned environmental, social and governance (ESG) scores, are scrutinised using the panel data analysis method. The analysis reveals an inverse relationship between ESG scores and firm risk.

This study differs from other studies examining Turkish firms in terms of firm risk or CSR in two main aspects. First, our study includes a higher number of firms and observations compared to similar studies focusing on Turkish firms. For example, Açıkgöz (2022) analyses the effect of sustainability reporting on market risk using a sample of only 8 firms that published sustainability reports in 2021. In contrast, Atasel and Güneysu (2023) examine the relationship between ESG performance and the cost of debt using a sample of 66 firms from 2015 to 2021. Similarly, Sahabi (2022) utilises data from 15 non-financial companies between 2010 and 2020, with 165 firm-year observations, to assess the impact of sustainability performance on stock returns and volatility. Additionally, Borak and Doğukanlı (2022) investigate CSR and firm risk using a sample of 37 non-financial companies. Our study's broader dataset, including firms from both financial and non-financial sectors, provides a more expansive analysis of the relationship between CSR and firm risk.

Further, our assessment of the firms' risk-taking attributes includes both market- and accounting-based measures, including Systematic Risk (SR), Idiosyncratic Risk (IR), Total Risk (TR), Asset Return Risk (ARR), and Default Risk (Z-Score). In the extant literature on Turkish firms, Atasel and Güneysu (2023) utilise the cost of debt as an accounting-based risk measure. On the other hand, Sahabi examines how sustainability practices affect stock price returns and volatility. Similarly, Açıkgöz (2022) also proxies firm risk using market risk and volatility spillovers, while Borak and Doğukanlı (2022) employ market risk proxied by total, systematic, and unsystematic risk to measure firm risk. Finally, Öcek et al. (2021) assess financial failure risk using the Altman Z-Score. By incorporating both market- and accounting-based risk measures, our study provides a more comprehensive understanding of the relationship between ESG performance and firm risk, contributing valuable insights to the literature on Turkish firms.

The remaining parts of this study are structured as follows: Section 2 analyse the literature and theory and formulate the hypothesis. Section 3 outline the data set and methodology used. Section 4 present the empirical findings and engage in discussion. Finally, in Section 5, the results are evaluated and suggestions for future research are proposed.

2. Literature and Theoretical Review

The extant literature shows that CSR is referred to social and sustainability performance (Düzer, 2018) and it is measured by different methods (Sassen et al., 2016). For example, Elkington (1997) introduces the triple bottom line approach suggesting that corporations ought to take into account their economic, environmental and social impacts on stakeholders and society in general, in addition to their shareholders (Dyllick and Hockerts, 2002). In this regard,

corporate sustainability indicators such as ESG or MSCI are also widely used by both research (Chang et al., 2014; Eccles et al., 2014) and capital market regulators (Bassen and Senkl, 2011) to measure firms' economic, environmental, and societal impacts.

Orlitzky et al. (2003) analyse 52 studies on firm financial performance and find there is an improving impact of social performance on the financial performance of corporations. Margolis and Walsh (2003) conduct a meta-analysis of over 100 articles examining the relationship between corporate social performance and firm performance, revealing a positive correlation between corporate social behaviours and firm performance. Van Beurden and Gössling (2008) investigate the literature review comprising 34 studies, offering empirical evidence of a positive effect of corporate social performance on firm performance. Lin et al. (2009) discover that corporate social responsibility has a substantial impact on the long-term financial performance of a company. Saeidi et al. (2015) and Flammer (2015) find a positive relationship between CSR and firm performance. Eccles et al. (2014) assert that companies having high ESG scores perform better financially comparing to companies having low ESG scores. Similarly, many studies have revealed a correct relationship between ESG scores and firm performance (e.g., Ahmad et al.., 2023, Altibar et al., 2020; Bahadori et al., 2021; Fatemi et al., 2018; Mohammad and Wasiuzzaman, 2021; Wang et al., 2018).

Moreover, studies examining relationship among CSR performance and different risk types of firms reveal a negative association between ESG performance and firm risk (Oikonomou et al., 2012; Salama et al., 2011; Sharfman and Fernando, 2008). Benlemlih et al. (2016) observe that the extend of the environmental and social disclosures of the firms have a negative impact on riskiness of the companies. Similarly, Chollet and Sandwidi (2018) and Jo and Na (2012) find an adverse relationship between CSR and firm risk. Muhammad et al. (2014) find that environmental performance is associated with a decrease in firm market risk. In the same vein, Sassen et al. (2016) posit that superior performance, particularly in the social aspect, can potentially increase firm value by reducing firm risk. Orlitzky and Benjamin (2001) investigate CSR and firm risk, finding that higher CSR improves the financial stability of the firms. Orlitzky et al. (2003) and Peloza (2009) reveal that CSR is a tool to reduce the firms' risk-taking levels. Albuquerque et al. (2019) find that firms exhibiting elevated levels of CSR experience a reduced cost of equity financing, and the overall riskiness of the equity portfolio is reduced. Other studies attempting to reveal the association of firm risk with ESG scores suggest that a firm's better ESG performance plays a role in minimizing information asymmetry in the market and stock price volatility (Jia et al., 2020; Lueg et al., 2019). Kim et al. (2014) find a negative relationship between CSR performance and firm risk in a study on firms listed in the MSCI ESC Index. Sahabi (2023) reveals that high ESG scores reduce firm risk and provide high-return opportunities. Höck et al. (2023) determine that sustainable portfolios exhibit considerably lower vulnerability to credit risk compared to their non-sustainable counterparts. In the similar manner, Horn (2023) observes that businesses with high ESG tend to exhibit lower idiosyncratic firm risk.

In this study, we aim to expand upon previous research by examining the effect of CSR performance on the financial risk of corporations. It is worth noting that existing literature primarily focuses on analysing the association of CSR performance with riskiness of the firms from the perspectives of stakeholder and legitimacy theory.

Stakeholder theory advocates for a robust management style that considers businesses in the context of the environment in which they operate, aiming for the profitability of shareholders as well as the well-being of other stakeholder groups beyond shareholders (Mitchell et al., 1997). Freeman (2010) defines stakeholders as any collective or individual entity that has the capacity to influence or is influenced by the objectives of a business. The process of stakeholder management entails the creation and implementation of organizational policies and procedures that take into consideration the expectations and objectives of all relevant stakeholders (Post et al., 2002). This approach serves as the foundation for implementing CSR strategies and actions, requiring the allocation of available resources while considering the impact on internal and external stakeholders during organisational activities. Embracing a holistic approach, stakeholder management envisions the development of policies that not only meet the expectations and benefits of one stakeholder but also address those of all relevant stakeholders (Jones, 2005). Stakeholder theory is frequently employed to elucidate the positive impact of CSR performance on firm value (Clarkson, 1995; Donaldson and Preston, 1995; Freeman, 2010). It is asserted that incorporating the needs of stakeholders into CSR performance can generate added value for shareholders (Freeman, 2010). Building on stakeholder theory, one could suggest that CSR performance has an impact on firm risk. Specifically, lower CSR performance may result in higher litigation and fines, whereas higher CSR performance is likely to cultivate more stable relationships with the government, the financial community, and the public (McGuire et al., 1988). Superior CSR performance can be viewed as an indicator of excellent management skills (Waddock and Graves, 1997). Companies demonstrating high levels of CSR may attract greater investment interest from investors, thereby easing capital constraints for these firms (Cheng et al., 2014). Further, higher CSR performance could contribute to enhancing the reputation and image of the companies (Brown and Dacin, 1997; Cornell and Shapiro, 1987), making it more appealing to employees as an employer, and attracting a top-notch workforce (Turban and Greening, 1997). Taking all these factors into consideration, a company that demonstrates exceptional CSR is expected to experience reduced firm risk (Oikonomou et al., 2012).

Legitimacy theory suggests that organisations require societal approval to endure (Suchman, 1995). Legitimacy, within this framework, ensures the alignment of an organisation with its cultural environment. Organisational legitimacy elucidates an organisation's existence through established cultural characteristics (Meyer and Scott, 1983: 201). Suchman (1995) characterises legitimacy as the desirable, appropriate, and acceptable behaviour of an economic entity in accordance with norms, values, beliefs, and explanations structured by social systems. Legitimacy not only reflects how society perceives organisations but also how it comprehends their actions, essentially conveying what organisations do and how they do it (Jepperson, 1991). According to legitimacy theory, an organisation can persist as long as it maintains a social contract with society. The continued existence of businesses hinges on societal perceptions of their legitimacy. If society believes that a business breaches this social contract, the firm's survival becomes precarious. Society may manifest this by constraining the flow of financial capital to the enterprise and diminishing demand for its products and services. Furthermore, societal pressure may prompt the government to enact decisions limiting or prohibiting the activities of the implicated firm in accordance with societal expectations (Deegan, 2002). Companies with greater visibility often face diverse pressures from the public. Consequently, these companies may leverage social responsibility initiatives and the dissemination of corresponding metrics as a tool to showcase socially acceptable behaviours and alleviate such pressures (Baldini et al., 2018). According to legitimacy theory, influential factors such as financial performance, capital structure, company size, and the duration of being listed on the stock exchange amplify a firm's visibility and its demand for legitimacy. This demand is mirrored in CSR performance and reports of the companies (Şahin & Acar, 2023).

Taken together, it can be said that both theories are essentially complementary approaches. The primary distinction between these two theories lies in stakeholder theory, where organisational activities and reports align with the needs and influence of stakeholders, while in legitimacy theory, they align with expectations rooted in the social contract with society (Kalemci & Tüzün, 2008). Both stakeholder groups and society at large can directly or indirectly influence a firm's financial and other organisational resources. Hence, to optimise CSR performance, businesses should legitimise all their activities to relevant parties within an acceptable framework (Gray et al., 1995). Based on the assumption that robust CSR performance, within the scope of both theories, positively impacts the firm and diminishes firm risk, the study hypothesis is set as follows:

H_1: CSR performance negatively affects firm risk.

Better environmental performance of companies could play a negative role in affecting overall risk-taking behaviours of firms. First, Zhu et al. (2022) argue that managers who are inclined to improve environmental performance are less likely to make risky investment decisions. Therefore, managers have fewer incentives for risky projects if they are sensitive to environmental concerns. Furthermore, firms with stronger environmental practices have lower environmental liabilities and a better reputation among stakeholders, which results in reducing the likelihood of environmental incidents, compliance violations, and negative stakeholder reactions, all of which contribute to lowering firm risk (Clarkson et al., 2011). Additionally, strong environmental management can attract loyal investors who prioritize environmental issues, reducing the differences in investor preferences and leading to greater stability in the company's market performance. Finally, Sharfman and Fernando (2008) argue that environmental risk management practices help firms reduce their overall cost of capital, thereby minimizing financial risks. Based on these arguments, we set our next hypothesis as follows:

H_2: Environmental performance negatively affects firm risk.

Bouslah et al. (2013) argue that higher social performance in companies leads to a lower tendency to be exposed to social crises, and they are more likely to adapt to regulatory changes in social areas, such as the environment. Moreover, social performance is positively associated with firms' relationship-based intangible assets, such as trust, brand, reputation, employee well-being, and customer and employee loyalty. These intangible assets, often referred to as 'relational wealth,' provide firms with a competitive advantage by strengthening stakeholder confidence and ensuring more stable cash flows (Bouslah et al. 2016). This confidence among stakeholders, arising from the firm's moral capital, can also create an 'insurance-like' protection for the firm, fostering more positive attitudes and loyalty. Therefore, even during financial crises, higher social performance leads to less fluctuation in cash flows (Chang et al. 2014).

H_3: Social performance negatively affects firm risk.

Better governance performance, characterized by transparent decision-making, board independence, and effective management oversight, can alleviate agency problems and minimize the likelihood of financial mismanagement or fraud. In this regard, Core et al. (1999) suggest that weaker corporate governance, which exacerbates agency issues within companies, leads to greater financial risks. Similarly, Brown and Caylor (2009) find that firms with better governance structures, including independent boards and shareholder-friendly practices, have lower financial risks and volatility while Gompers et al. (2003) provide evidence that firms with stronger governance mechanisms tend to have better financial performance and lower firm-specific risk, as robust governance structures minimize agency problems. Therefore, our next hypothesis is formulated as follows:

H_4: Governance performance negatively affects firm risk.

3. Data and Method

3.1. Sample

To test our hypotheses, we assemble a sample of Turkish firms exclusively based on their listing on the BIST, without imposing any additional criteria such as market capitalization or industry classification. This approach ensures a broad representation across various sectors. Our initial sample comprises 652 BIST-listed companies. Further, we utilise ESG scores from the DataStream while assessing the CSR performance of the firms. Upon accessing ESG scores (ESG Score, Environmental Score, Social Score, and Governance Score) directly from the Eikon DataStream databases, the sample size is reduced to 109 firms.

The selected time frame for our study spans from 2010 to 2022. The decision to start in 2010 aligns with the availability of a sufficient volume of data in the database. Additionally, concluding the analysis in 2022 reflects the most recent data available at the time of our study. Although we lose 83.28% of our initial sample size after matching listed firms from DataStream, our study includes the highest number of firms and observations when compared to similar studies focusing on Turkish firms (Arslan and Yağcılar, 2023; Düzer, 2023; Güneysu, 2023; Karyağdı and Şit, 2023; Şişman and Çankaya, 2021; Yıkılmaz, 2022). This allows us to examine the relationship between CSR and firm risk-taking behaviours in a comprehensive and robust manner.

The final sample includes companies from 12 different industries; information and communication; education, health, sports and other social services; electricity gas and water; manufacturing; construction and public works; mining and quarrying; financial institutions; professional, scientific and technical activities; hotels and restaurants; technology; wholesale and retail trade; transportation and storage. Industry wise distribution of the sample is presented in Table 1.

3.2. Definitions and Measures of the Variables

i. Dependent Variables

Consistent with Pathan (2009), our assessment of the firms' risk-taking attributes incorporates both accounting and market-based measures, including Systematic Risk (*SR*), Idiosyncratic Risk (*IR*), Total Risk (*TR*), Asset Return Risk (*ARR*), and Default Risk (*Z-Score*).

For the calculation of *SR* and *IR*, we adopt the widely used two-index model, as employed by Chen et al. (2006), Pathan (2009), Pathan et al., (2016) and Sila et al. (2016):

$$R_{it} = \alpha_i + \beta_{1i} R_{mt} + \beta_{2i} Interest_t + \varepsilon_{it},$$

where, i and t denote for the company i and time t, respectively. R represents the annualised firm's stock return in the BIST; R_m is the annualised return on the BIST TUM (XUTUM) index; and Interest is the yield on the three-month Treasury-bill rate while α is the constant term; and ε is the residuals. β_{1i} is the *SR* of the company i; and the standard deviation of the ε is the *IR* of the company i. *SR* and *IR* are calculated for each year and each company.

Further, following the previous literature (Acharya et al. 2011; Bargeron et al. 2010; Faccio et al., 2011; John et al., 2008; Vallascas et al., 2017), *TR* is determined by the standard deviation of the natural logarithm of firm's daily stock returns for each year and each company:

$$TR_{it} = \sigma\left(ln \frac{P_{di}}{P_{di-1}}\right),$$

where, i and t denote for the company i and time t, respectively, while P_d is the daily stock closing price in the BIST. We calculate the *TR* for each year and each company applying a yearly time frame. This measure quantifies the volatility of the stock market or the difference between ask and bid prices of assets from their average value. Higher value of standard deviation in the asset prices indicates higher volatility, implying substantial price fluctuations, while a low standard deviation suggests low volatility with relatively stable prices.

Our final market-based risk measurement is ARR incorporating the stock's historical return volatility of a firm:

$$ARR_{it} = \sigma\left(ln \frac{P_{di}}{P_{di-1}}\right) \cdot \frac{MV_{E_{it}}}{MV_{A_{it}}} \cdot \sqrt{TD_t},$$

where, i and t denote for the company i and time t, respectively. P_d is the daily stock closing price in the BIST. MV_E and MV_A are the market value of equity and market value of assets of the company, and *TD* is the total number of trading days in the given year. A high *ARR* suggests that the firm's historical stock returns have exhibited significant volatility while Lower *ARR* implies that the stock prices have been more stable over time.

Our next risk measurement is, an accounting-based which is widely used in the extant literature, *Z-Score*:

$$Z\text{-}Score = \frac{\overline{ROA}_{it} + \overline{(E/A)}_{it}}{\sigma(E/A)_{it}}$$

where, i and t denote for the company i and time t, respectively. *ROA* represents the return on assets, *E* represents equity, and *A* represents the total assets. The *Z-Score* is a financial metric developed by Altman (1993), and it is commonly used to assess a company's financial health and likelihood of facing financial distress or bankruptcy. A higher *Z-Score* generally indicates a greater distance from bankruptcy, a lower risk of financial distress, while a lower *Z-Score* suggests a higher risk, a greater likelihood of facing financial difficulties. In conclusion, higher values of our market-based risk proxies (*IR*, *SR*, *TR*, and *ARR*) suggest increased risk, whereas a higher level of *Z-Score* value indicates a lower level of risk.

Table 1: Industry distribution of sample

	# of firm	% of firm	# of firm years	% of firm year
Information and communication	2	1.83%	24	4.83%
Electricity gas and water	10	9.17%	19	3.82%
Education, health, sports and other social services	1	0.92%	4	0.8%
Manufacturing	40	36.70%	166	33.40%
Construction and public works	2	1.83%	13	2.62%
Mining and quarrying	2	1.83%	15	3.02%
Financial institutions	36	33.03%	191	38.44%
Professional, scientific and technical activities	1	0.92%	1	0.20%
Hotels and restaurants	1	0.92%	3	0.60%
Technology	3	2.75%	9	1.81%
Wholesale and retail trade	9	8.26%	36	7.24%
Transportation and storage	2	1.83%	16	3.22%
Total	109	100.00%	497	100.00%

ii. Independent Variables

To measure the CSR performance of the companies in our sample, we utilise the Refinitiv Datastream ESG database (formerly known as Datastream Asset4). This database comprises environmental, social, and governance (ESG) scores meticulously designed to transparently and objectively evaluate a company's relative ESG performance, commitment, and effectiveness across the three pillars of environmental, social, and governance. The assessment spans 10 themes under these pillars, including emissions, environmental product innovation, resource use for the environmental pillar; workforce, human rights, community, and product responsibility under the social pillar; and management, shareholders, and CSR strategy under the governance pillar, comprising over 630 different items across these themes which are all scaled on a range from 1 to 100 points. We transform the scores of ESG, and each of the three pillars—environmental, social, and governance—into natural logarithmic values denoted as lnESG, lnENV, lnSOC, and lnGOV, respectively.

Gillan et al. (2021) posit that the foundation of ESG scores lies in CSR strategies, given their primary focus on CSR issues. Although CSR encapsulates broad and richer elements, incorporating with both qualitative and quantitative information (Clément et al., 2023), ESG scores have emerged as one of the most popular metrics for assessing CSR performance of a company (e.g., Cheng et al., 2014; Chiaramonte et al., 2022; Drempetic et al., ,2020; Di Tommaso and Thornton, 2020; Duque Grisales and Aguilera Caracuel, 2021; El Ghoul et al., 2011; Friedeetal., 2015; Gillan et al., 2021; Gull et al., 2023; Kölbel et al., 2017; Nadeem et al., 2020; Saadaoui and Soobaroyen, 2018; Xue et al., 2020).

Figures 1 to 4 demonstrate the average ESG Score, Environmental Score, Social Score, and Governance Score by year for the whole sample.

Figure 1: The average ESG scores by years

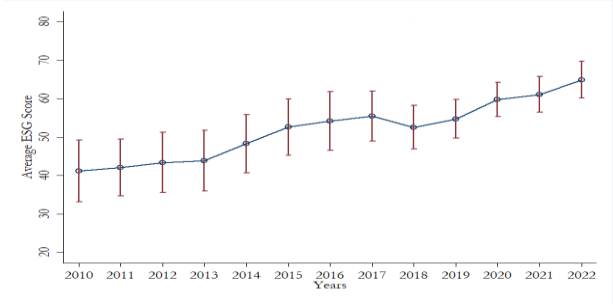


Figure 2: The average environmental scores by years

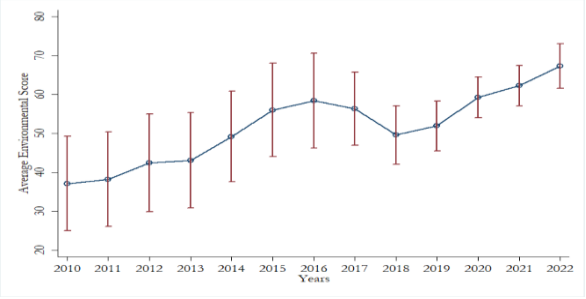


Figure 3: The average social scores by years

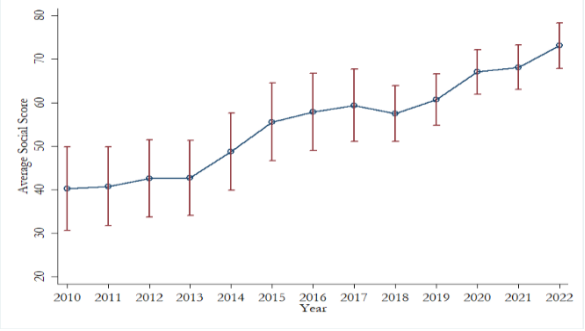
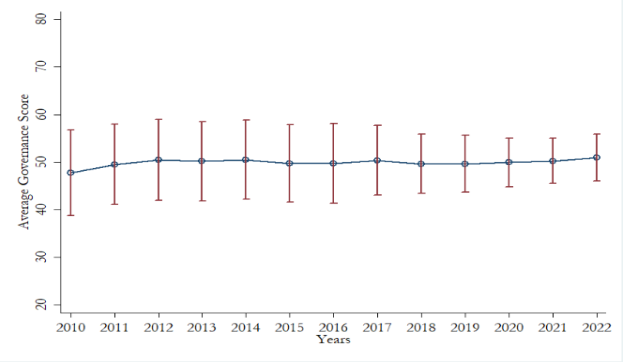


Figure 2: The average governance score by years.



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iii. Control Variables

In addition to the dependent and independent variables, we include comprehensive control measures for firm-specific factors that could impact the risk-taking behaviours of the studied firms. Firm size, proxied by the natural logarithm of total assets (*lnTA*), is a significant factor influencing risk. John et al. (2008) found a negative association between company size and operating risk, especially in stable business environments with predictable returns. Larger companies often leverage economies of scale and diversification to manage overall riskiness (Abedifar et al., 2013; Hughes et al., 2001). However, there is a counter argument suggesting that large companies, enjoying the 'too big to fail' safety net provided by governments, might engage in excessive risk-taking at the expense of stakeholders (Vallascas et al., 2017). Additionally, we incorporate measures of profitability and profits volatility, proxied by return on equity (*ROE*) and standard deviation of *ROE* (*sdROE*), following Ferreira and Laux (2007). Luo and Bhattacharya (2009) suggest that profitability and profits volatility provide insights into a firm's financial dynamics, influencing risk-taking behaviours by indicating potential future cash flow streams and associated uncertainties.

Tobin's Q (*TobinsQ*) is widely used to assess company investment performance, calculated as the sum of the book value of assets minus the book value of equity, plus the market value of equity, scaled by the book value of assets. Nakano and Nguyen (2012) argue that a lower Tobin's Q indicates poor investment decisions and less successful companies, increasing the risk exposure of the company (Cheng, 2008). Our study includes leverage (*Lev*) in our analysis to control for a firm's capital structure, calculated by the ratio of long-term debt to total assets following Bates et al. (2009) and Bouslah et al. (2013). Liquidity (*Liq*), measured by the ratio of current assets to current liabilities, is also added to our models. Excessive liquidity could aggravate the risk-taking moral hazard at firms, leading to increased risk-taking behaviours (Acharya and Naqvi, 2012). Conversely, liquidity constraints could make companies more conservative regarding risk-taking (Mollah et al., 2017; Čihák and Hesse, 2010). Finally, we introduce the natural logarithm of one plus the number of years since the firm was founded (*lnAge*) to control for the organisational life cycle of the firms. The literature suggests that younger companies tend to take more risks compared to older companies (Faccio et al., 2011; Nguyen, 2012).

3.3. Empirical Model

To investigate the association between the risk-taking behaviours exhibited by firms and their performance in CSR, we have employed panel data analysis using the Ordinary Least Squares (OLS) regression technique. The baseline model we have utilized is presented as follows:

$$Y_{i,t} = \alpha_0 + \beta_1 CSR_{i,t-1} + \gamma FC_{i,t-1} + \varepsilon_{i,t}$$

where, i and t denote for the company i and time t, respectively. $Y_{i,t}$ is a matrix of risk-taking behaviours of the firms for company i and year t proxied by *SR*, *IR*, *TR*, *ARR*, and *Z-Score*. $CSR_{i,t-1}$ is a matrix of CSR performance for company i and year *t-1* measured by overall *lnESG* score as well as by individual pillars which are *lnENV*, *lnSOC*, *lnGOV*. $FC_{i,t-1}$ is the firm's characteristics as control variables for company i time *t-1* including *lnTA*, *ROE*, *sdROE*, *TobinsQ*, *Lev*, *Liq*, and *lnAge*. Finally $\varepsilon_{i,t}$ is the error

term; α_0 is the constant; β_1 is the coefficient representing the estimation between firm risk-taking behaviours and CSR performance and γ is the vector of coefficient estimates for the control variables. All regressions include year and industry fixed effects with robust standard errors. Following the literature (Chang et al., 2014; Gramlich and Finster, 2013; Kim et al., 2014; Mollah et al., 2017; Waddock and Graves, 1997), while the dependent variables are contemporaneous risk-taking behaviours measures, we include 1 year lag independent and firm's characteristics as control variables into our models to capture any lag effects on the risk-taking behaviours of the companies.

Table 2: Descriptive statistics

Variables	Definition of Variables	Obs.	Mean	S.D.	Min	p50	Max
SR	Systematic Risk, the coefficient of Rmt (i.e. β1) in Eq. (1).	497	0.564	0.161	0.101	0.561	0.881
IR	Idiosyncratic Risk, the annualised standard deviation of the residuals from Eq. (1).	497	0.020	0.007	0.010	0.019	0.048
TR	Total Risk, the standard deviation of the daily firm stock returns in each year.	497	0.025	0.006	0.011	0.024	0.051
ARR	Asset Return Risk, the standard deviation of the daily stock returns times the ratio of market value of equity to market value of total assets times square root of the number of trading days in given year.	497	1.051	1.349	-0.973	0.571	7.415
Z-Score	Default Risk, the sum of the average ROA plus equity to asset ratio divided by the standard deviation of the ROA.	491	1.244	0.510	-0.713	1.226	2.583
ESG	The overall ESG score from Datastream ESG database.	497	58.318	21.048	2.400	58.660	94.230
lnESG	The natural logarithm of the overall ESG score from the Datastream ESG database.	497	3.867	0.599	0.815	4.072	4.546
ENV	The environmental score from the Datastream ESG database.	470	56.671	25.239	0.260	61.280	98.670
lnENV	The natural logarithm of the environmental score from the Datastream ESG database.	470	3.849	0.793	-1.347	4.115	4.592
SOC	The social score from Datastream ESG database.	497	58.498	24.689	0.500	62.320	98.400
lnSOC	The natural logarithm of the social score from the Datastream ESG database.	497	3.907	0.727	-0.693	4.132	4.589
GOV	The governance score from Datastream ESG database.	497	50.196	21.862	1.810	50.590	92.780
lnGOV	The natural logarithm of the governance score from Datastream ESG database.	497	3.772	0.623	0.593	3.924	4.530
FirmSize	The natural logarithm of total assets.	497	23.946	1.905	0.000	23.768	27.357
ROE	The ratio of net income to average total equity.	496	21.452	13.964	-2.780	18.195	43.150
sdROE	Standard deviation of the ratio of the net income to average total equity.	497	15.582	8.730	6.894	12.200	37.430
TobinsQ	The sum of the book value of assets minus the book value of equity, plus the market value of equity, scaled by the book value of assets.	496	0.810	0.887	0.033	0.597	4.761
Liq	The ratio of cash and short-term investments to total assets.	496	0.015	0.011	0.000	0.013	0.058
Lev	The ratio of long-term debt to total assets.	496	0.288	0.178	0.000	0.276	0.857
lnAge	The natural logarithm of one plus years since the firm was established.	497	3.812	0.509	1.609	3.951	4.585

3.4. Descriptive Statistics

Table 2 exhibits the variable explanations and summary metrics. To mitigate extreme outliers or potential data coding errors, all financial variables are winsorized at the 1st and 99th percentiles. The table provides the count of observations, average, standard deviation, minimum, 1st quartile, median, 3rd quartile, and maximum values for each variable. For key risk measures, the mean (median) values of *SR*, *IR*, *TR*, *ARR*, and *Z-Score* are 0.56 (0.56), 0.02 (0.02), 0.02 (0.02), 1.05 (0.57), and 1.24 (1.23), respectively. Similarly, the mean (median) values for ESG, Environmental, Social, and Governance scores are 58.32 (58.66), 56.67 (61.28), 58.50 (62.32), and 50.20 (50.59), respectively. These figures align with findings from comparable studies involving BIST-listed companies, such as Aevoae et al., (2023), Güneysu (2023) and Atasel and Güneysu (2023). Additionally, the mean of the natural

logarithm of total assets is 23.95, while the average return on equity and volatility of return on equity are 21.45 and 15.58, respectively. The average Tobin's Q, liquidity, and leverage are 0.81, 0.01, and 0.28, respectively. Finally, the average of the years since firms were established in our sample is 3.81 in natural logarithmic form or approximately 45 years in non-logarithmic representation of the variable.

Furthermore, Table 3 demonstrates Pearson's pairwise correlation analysis. The correlation of ESG, Environmental, Social, and Governance scores with *SR* is positive and significant, contrary to our expectations. On the other hand, the correlation matrix shows that CSR performance of the firms, measured by ESG, Environmental, Social, and Governance scores, decreases the risk-taking behaviours of the firms proxied by *IR*, *TR*, *ARR*, and *Z-Score*, as expected. The correlation between ESG, Environmental, Social, and Governance scores is negative with *IR*, *TR*, and *ARR*, while they are positively correlated with *Z-Score*, indicating a higher distance to default and lower risk-taking.

Table 3: Pairwise correlations

Var.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1)	1.000															
(2)	-0.443[a]	1.000														
(3)	-0.122[a]	0.934[a]	1.000													
(4)	-0.181[a]	0.427[a]	0.401[a]	1.000												
(5)	0.055[b]	-0.072[a]	-0.061[b]	0.168[a]	1.000											
(6)	0.173[a]	-0.141[a]	-0.082[b]	-0.057	0.083[b]	1.000										
(7)	0.153[a]	-0.122[a]	-0.074[c]	-0.074[c]	0.159[a]	0.792[a]	1.000									
(8)	0.171[a]	-0.095[b]	-0.026	-0.027	0.021	0.938[a]	0.658[a]	1.000								
(9)	0.149[a]	-0.256[a]	-0.235[a]	-0.115[a]	0.177[a]	0.745[a]	0.452[a]	0.569[a]	1.000							
(10)	0.441[a]	-0.187[a]	-0.021	-0.098[a]	0.169[a]	0.228[a]	0.218[a]	0.226[a]	0.222[a]	1.000						
(11)	-0.035	0.037	0.031	0.308[a]	0.327[a]	-0.049	-0.081[c]	-0.055	-0.007	0.026	1.000					
(12)	-0.173[a]	0.268[a]	0.223[a]	0.232[a]	-0.374[a]	0.066[c]	-0.088[b]	0.113[a]	-0.072[c]	-0.235[a]	-0.006	1.000				
(13)	-0.189[a]	0.091[a]	0.014	0.424[a]	0.198[a]	-0.215[a]	-0.242[a]	-0.217[a]	-0.126[a]	-0.321[a]	0.409[a]	0.018	1.000			
(14)	-0.032	-0.005	-0.009	0.051[c]	0.024	-0.124[a]	-0.071[c]	-0.151[a]	-0.109[a]	0.086[a]	0.192[a]	-0.092[a]	0.121[a]	1.000		
(15)	0.045	0.135[a]	0.161[a]	0.103[a]	-0.071[b]	0.323[a]	0.195[a]	0.295[a]	0.202[a]	0.105[a]	-0.125[a]	0.308[a]	-0.225[a]	-0.191[a]	1.000	
(16)	0.321[a]	-0.151[a]	-0.037	-0.104[a]	0.089[a]	0.117[a]	0.139[a]	0.096[b]	0.137[a]	0.533[a]	-0.107[a]	-0.329[a]	-0.226[a]	0.045[c]	0.034	1.000

Note: (1) SR, (2) IR, (3) TR, (4) ARR, (5) Z-Score, (6) lnESG, (7) lnENV, (8) lnSOC, (9) lnGOV, (10) FirmSize, (11) Profitability, (12) ProfitVol., (13) TobinsQ, (14) Liq, (15) Lev, (16) lnAge. [a], [b] and, [c] denote significant at the 0.01, 0.05 and 0.1 levels, respectively.

4. Empirical Results and Discussion

The primary objective of this study is to examine the relationship between the risk-taking behaviours of firms and their CSR performance. To achieve this, we initially test the relationship between *SR*, *IR*, *TR*, *ARR*, and *Z-Score* as risk-taking behaviours and the overall ESG score as the CSR performance metric for firms, employing Eq. 5. The results, presented in Table 4, suggest an overall negative association between CSR performance and risk-taking behaviours. This implies that higher ESG scores, indicating better CSR performance, lead companies to take a lower amount of risk. Examining each proxy for risk-taking behaviours, ESG scores are negatively associated with *IR* (Model 2), *TR* (Model 3), and *ARR* (Model 4), meaning firms with higher ESG scores are more likely to operate with lower risk exposures, confirming findings from studies such as He et al. (2022), Horn (2023), and Liu et al. (2023). Furthermore, the findings demonstrate that the higher ESG scores mitigate default risk, measured with *Z-Score* (Model 5), by increasing the distance to insolvency, aligning with results from Model 2, Model 3, and Model 4 and supporting existing literature (Maquieira et al., 2024; Vivel-Búa et al., 2023). On the other hand, inconsistent with Model 2, Model 3, Model 4, and Model 5, we find a statistically insignificant relationship between *SR* and CSR performance, as shown in Model 1 in Table 4. Nevertheless, this insignificant relationship between *SR* and CSR is consistent with the literature, as highlighted in studies such as Sassen et al. (2016), and Sciarelli et al. (2023).

Table 4: Risk-taking behaviours and ESG score

Variables	(1) SR	(2) IR	(3) TR	(4) ARR	(5) Z-Score
$lnESG_{t-1}$	0.006	-0.001[a]	-0.001[a]	-0.214[b]	0.150[a]
	(0.010)	(0.000)	(0.000)	(0.086)	(0.040)
$lnTA_{t-1}$	0.049[a]	-0.001[a]	-0.000	0.041	-0.047[b]
	(0.005)	(0.000)	(0.000)	(0.042)	(0.020)
ROE_{t-1}	0.000	-0.000[a]	-0.000[a]	-0.003	0.007[a]
	(0.000)	(0.000)	(0.000)	(0.004)	(0.002)
$sdROE_{t-1}$	0.001	0.000[a]	0.000[a]	0.054[a]	-0.027[a]

	(0.001)	(0.000)	(0.000)	(0.006)	(0.003)
$TobinsQ_{t-1}$	0.000	0.000	0.000	0.582 [a]	0.041
	(0.008)	(0.000)	(0.000)	(0.072)	(0.035)
Liq_{t-1}	-0.730	-0.007	-0.024	8.613 [c]	0.122
	(0.586)	(0.024)	(0.024)	(5.044)	(2.320)
Lev_{t-1}	0.033	0.004 [b]	0.004 [a]	1.029 [a]	0.195
	(0.035)	(0.001)	(0.001)	(0.304)	(0.140)
$lnAge_{t-1}$	0.075 [a]	-0.001 [c]	0.000	0.168	0.188 [a]
	(0.014)	(0.001)	(0.001)	(0.117)	(0.054)
Constant	-0.798 [a]	0.049 [a]	0.029 [a]	-1.775 [c]	2.030 [a]
	(0.111)	(0.005)	(0.005)	(0.958)	(0.441)
Observations	497	497	497	497	491
R-squared	0.612	0.635	0.601	0.591	0.402
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes

Note: Standard errors in parentheses. [a] p<0.01, [b] p<0.05, [c] p<0.1

Furthermore, Table 5 presents the evidence for H_2, H_3, and H_4 in which we assess the relationship between individual ESG pillars—Environmental, Social, and Governance scores—and the risk-taking behaviours of the firms. The findings indicate that the relationship between CSR performance measured by sub-pillars and risk-taking behaviour is consistent with the baseline findings from Table 4. Specifically, the environmental score of companies decreases both *IR* and *TR* at a 5% significance level, while social and governance scores impact them at a 1% level. Conversely, higher environmental and governance scores exhibit a negative effect on *ARR* at a 5% significance level, and the social score of the companies negatively associates with *ARR* at a 10% level. Furthermore, similar to *ARR*, environmental and governance scores decrease the default risk of companies at a 1% level, whereas the social performance of the companies shows a negative, albeit slightly weaker, relationship with default risk measured by *Z-Score*. Therefore, apart from some cases, the significance levels of the relationships become one level weaker, while maintaining overall consistency. Based on these findings, we accept H_2, H_3, and H_4, as the results demonstrate a negative relationship between the individual dimensions of ESG performance—environmental (H_2), social (H_3), and governance (H_4)—and firm risk-taking behaviours, as proposed.

In addition to these results, we also divide our sample into two distinct sectors: financial, and manufacturing. Different industries face unique challenges, such as regulatory environments, or stakeholder expectations, which can influence their relationship between CSR performance and firm risk. For example, environmental performance may be particularly significant for the manufacturing sector due to its direct impact on the environment. In contrast, financial institutions may influence the environment through their credit allocations to firms that affect the environment, highlighting the role of governance and their indirect effects. By dividing the sample into these three sectors, we aim to conduct a more detailed analysis that considers potential sector-specific variations in the relationship between CSR activities and firm risk.

Our results show that while a negative relationship between CSR activities and firm risk is observed in the financial and manufacturing sectors, this relationship is not significant in the other sectors. This variation can be attributed to the differing nature of sector-specific risks and the direct impact of CSR activities. For instance, CSR practices in the financial sector address governance issues and regulatory pressures, while in the manufacturing sector, they mitigate environmental risks. The results presented in Table 6 demonstrate no difference in the directions of the relationship between firm risk and ESG score across financial and manufacturing sectors, but the significance levels of the relationships show differences, reflecting the varied impact of CSR practices across different industries.

5. Conclusion

This study investigates the relationship between CSR activities and firm risk-taking behaviours among Turkish-listed companies on the Borsa Istanbul between 2010 and 2022. The analysis focuses on various risk measures, including SR, IR, TR, ARR, and Z-Score, and their association with CSR performance of the companies measured by the ESG scores obtained from the Refinitiv Datastream ESG. In the context of this analysis, OLS regression is employed in a panel data structure to assess the relationship between CSR performance and the identified risk measures. This statistical approach allows for a comprehensive examination of the data over the specified period and across different companies, providing insights into the strength and direction of the observed associations.

The findings reveal an overall negative association between CSR performance and firm risk. Specifically, companies with higher ESG scores are more likely to exhibit lower levels of IR, TR, ARR, and default risk. These results hold consistently across different market and accounting risk measures, highlighting the potential risk mitigation effect of robust CSR practices. Further exploration into individual ESG pillars—Environmental, Social, and Governance scores—reiterates the consistent negative relationship with various risk-taking behaviours. Environmental scores are found to decrease IR and TR, while Social and Governance scores impact these risks as well as ARR and default risk. These findings are consistent with the extant literature such as He et al. (2022), Horn (2023), Liu et al. (2023), Maquieira et al., (2024), Sassen et al. (2016), Sciarelli et al. (2023), and Vivel-Búa et al. (2023).

The significance of these findings lies in the context of the evolving role of businesses in society and the increasing emphasis on sustainability and corporate social responsibility. As regulatory bodies in Turkey become more involved in sustainability efforts, companies are compelled to enhance their CSR practices. This study contributes by demonstrating that such CSR activities not only positively influence societal perceptions and legitimacy but also play a role in reducing various dimensions of firm risk. The importance of these findings extends to stakeholders, regulatory bodies, and companies alike. Understanding the risk implications of CSR activities can inform strategic

decision-making, risk management practices, and regulatory frameworks. This knowledge is particularly relevant in the contemporary business landscape, where environmental and social challenges are on the rise, and businesses are expected to contribute positively to both societal well-being and environmental sustainability.

Table 5: Risk-taking behaviours and sub pillars of ESG

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Var	SR	IR	TR	ARR	Z-Score	SR	IR	TR	ARR	Z-Score	SR	IR	TR	ARR	Z-Score
$lnENV_{t-1}$	0.003	-0.001[b]	-0.001[b]	-0.143[b]	0.078[a]										
	(0.007)	(0.000)	(0.000)	(0.062)	(0.028)										
$lnSOC_{t-1}$						0.009	-0.001[a]	-0.001[a]	-0.133[c]	0.078[b]					
						(0.008)	(0.000)	(0.000)	(0.070)	(0.033)					
$lnGOV_{t-1}$											0.003	-0.001[a]	-0.001[a]	-0.154[b]	0.165[a]
											(0.009)	(0.000)	(0.000)	(0.075)	(0.034)
$lnTA_{t-1}$	0.047[a]	-0.001[b]	-0.000	0.037	-0.026	0.048[a]	-0.001[a]	-0.000	0.032	-0.037[c]	0.050[a]	-0.001[a]	-0.000[b]	0.016	-0.034[b]
	(0.005)	(0.000)	(0.000)	(0.043)	(0.020)	(0.005)	(0.000)	(0.000)	(0.043)	(0.020)	(0.005)	(0.000)	(0.000)	(0.040)	(0.018)
ROE_{t-1}	0.001	-0.000[a]	-0.000[a]	-0.005	0.008[a]	0.000	-0.000[a]	-0.000[a]	-0.004	0.007[a]	0.000	-0.000[a]	-0.000[b]	-0.003	0.007[a]
	(0.000)	(0.000)	(0.000)	(0.004)	(0.002)	(0.000)	(0.000)	(0.000)	(0.004)	(0.002)	(0.000)	(0.000)	(0.000)	(0.004)	(0.002)
$sdROE_{t-1}$	0.001	0.000[a]	0.000[a]	0.054[a]	-0.026[a]	0.001	0.000[a]	0.000[a]	0.054[a]	-0.027[a]	0.001	0.000[b]	0.000[a]	0.051[a]	-0.025[a]
	(0.001)	(0.000)	(0.000)	(0.006)	(0.003)	(0.001)	(0.000)	(0.000)	(0.006)	(0.003)	(0.001)	(0.000)	(0.000)	(0.006)	(0.003)
$TobinsQ_{t-1}$	-0.011	0.000	-0.000	0.601[a]	0.028	0.000	0.000	0.000	0.580[a]	0.042	0.001	0.000	-0.000	0.578[a]	0.046
	(0.010)	(0.000)	(0.000)	(0.089)	(0.040)	(0.008)	(0.000)	(0.000)	(0.072)	(0.035)	(0.008)	(0.000)	(0.000)	(0.072)	(0.034)
Liq_{t-1}	-0.946	-0.012	-0.032	7.235	0.971	-0.739	-0.014	-0.032	7.477	1.015	-0.705	-0.007	-0.021	8.439[c]	-0.420
	(0.584)	(0.024)	(0.025)	(5.150)	(2.329)	(0.580)	(0.024)	(0.024)	(5.011)	(2.321)	(0.588)	(0.024)	(0.024)	(5.071)	(2.302)
Lev_{t-1}	0.020	0.004[a]	0.004[a]	1.041[a]	0.285[b]	0.031	0.003[b]	0.004[a]	0.956[a]	0.256[c]	0.036	0.003[b]	0.004[a]	0.926[a]	0.242[c]
	(0.035)	(0.001)	(0.001)	(0.313)	(0.142)	(0.035)	(0.001)	(0.001)	(0.301)	(0.139)	(0.035)	(0.001)	(0.001)	(0.298)	(0.136)
$lnAge_{t-1}$	0.081[a]	-0.001[c]	0.000	0.276[b]	0.121[b]	0.077[a]	-0.001[c]	0.000	0.178	0.176[a]	0.074[a]	-0.001	0.000	0.197[c]	0.179[a]
	(0.014)	(0.001)	(0.001)	(0.120)	(0.054)	(0.014)	(0.001)	(0.001)	(0.117)	(0.054)	(0.013)	(0.001)	(0.001)	(0.115)	(0.053)
Constant	-0.735[a]	0.047[a]	0.029[a]	-2.111[b]	1.936[a]	-0.785[a]	0.048[a]	0.029[a]	-1.839[c]	2.051[a]	-0.808[a]	0.051[a]	0.032[a]	-1.376	1.659[a]
	(0.114)	(0.005)	(0.005)	(1.006)	(0.456)	(0.112)	(0.005)	(0.005)	(0.967)	(0.449)	(0.112)	(0.005)	(0.005)	(0.961)	(0.438)
Observations	470	470	470	470	465	497	497	497	497	491	497	497	497	497	491
R-squared	0.629	0.635	0.583	0.587	0.400	0.613	0.633	0.596	0.589	0.391	0.612	0.633	0.602	0.590	0.413
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Standard errors in parentheses. [a] p<0.01, [b] p<0.05, [c] p<0.1

Differing from other studies that have examined Turkish companies with respect to firm risk or CSR (Arslan and Yağcılar, 2023; Düzer, 2023; Güneysu, 2023; Karyağdı and Şit, 2023; Şişman and Çankaya, 2021; Yıkılmaz, 2022), our research encompasses the highest number of firms and the longest time period, resulting in the most extensive set of observations within this context. The identified inverse association between CSR performance and various risk measures underscores the multifaceted benefits of prioritising sustainability and responsible corporate practices. This not only contributes to the pursuit of long-term success and stakeholder value but also provides valuable insights for strategic decision-making, risk management practices, and the development of regulatory frameworks.

Table 6: Risk-taking behaviours and ESG score in cross sectors

	Financial Firms					Manufacturing Firms				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Var	SR	IR	TR	ARR	Z-Score	SR	IR	TR	ARR	Z-Score
$lnESG_{t-1}$	-0.011	-0.002[b]	-0.002[a]	-0.152[b]	0.181[b]	0.003	-0.003[a]	-0.003[a]	-0.527[a]	0.512[a]
	(0.018)	(0.001)	(0.001)	(0.061)	(0.070)	(0.019)	(0.001)	(0.001)	(0.179)	(0.093)
$lnTA_{t-1}$	0.058[a]	-0.001[b]	0.001[c]	0.010	-0.119[a]	0.045[a]	-0.001[a]	-0.000	0.076	-0.090[b]

	(0.008)	(0.000)	(0.000)	(0.025)	(0.030)	(0.007)	(0.000)	(0.000)	(0.070)	(0.036)
ROE_{t-1}	-0.002[c]	-0.000[b]	-0.000[a]	0.014[a]	0.008[b]	0.002[a]	-0.000[b]	-0.000	0.001	0.006[c]
	(0.001)	(0.000)	(0.000)	(0.003)	(0.003)	(0.001)	(0.000)	(0.000)	(0.006)	(0.003)
$sdROE_{t-1}$	0.004[b]	0.000	0.000[b]	-0.012[c]	-0.040[a]	0.001	0.000	0.000[c]	0.027[a]	-0.021[a]
	(0.002)	(0.000)	(0.000)	(0.006)	(0.007)	(0.001)	(0.000)	(0.000)	(0.009)	(0.005)
$TobinsQ_{t-1}$	0.021	0.001	0.001[b]	0.148[a]	-0.207[a]	-0.052[a]	0.002[a]	0.001[b]	1.505[a]	0.065
	(0.016)	(0.001)	(0.001)	(0.053)	(0.074)	(0.016)	(0.001)	(0.001)	(0.149)	(0.078)
Liq_{t-1}	-1.559	0.040	0.028	2.902	-4.680	-0.504	-0.040	-0.055	1.986	0.815
	(1.166)	(0.045)	(0.043)	(3.877)	(4.447)	(0.738)	(0.033)	(0.034)	(6.876)	(3.574)
Lev_{t-1}	-0.018	0.006[a]	0.006[a]	0.044	0.031	-0.036	0.006[b]	0.005[b]	2.110[a]	0.355
	(0.054)	(0.002)	(0.002)	(0.181)	(0.208)	(0.059)	(0.003)	(0.003)	(0.545)	(0.283)
$lnAge_{t-1}$	0.069[a]	-0.001	-0.000	-0.364[a]	0.090	0.115[a]	-0.002	0.000	-0.213	0.436[a]
	(0.022)	(0.001)	(0.001)	(0.072)	(0.082)	(0.025)	(0.001)	(0.001)	(0.236)	(0.122)
Constant	-0.888[a]	0.041[a]	0.018[a]	1.921[a]	3.495[a]	-0.898[a]	0.057[a]	0.039[a]	-0.936	-0.117
	(0.171)	(0.007)	(0.006)	(0.569)	(0.664)	(0.189)	(0.008)	(0.009)	(1.759)	(0.914)
Observations	191	191	191	191	189	166	166	166	166	166
R-squared	0.688	0.711	0.657	0.541	0.326	0.566	0.610	0.664	0.678	0.395
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Standard errors in parentheses. [a] $p<0.01$, [b] $p<0.05$, [c] $p<0.1$

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