Care or fear? The link between D&O liability insurance and CSR engagement: Evidence from China

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ABSTRACT

We examine the relationship between firms' purchasing of Directors' and Officers' (D&O) liability insurance and corporate social responsibility (CSR) engagement in China from 2009 to 2019. We find that firms with D&O insurance exhibit significantly higher engagement in CSR activities. The main finding remains significant when we employ 2SLS and PSM-DiD approaches to address potential endogeneity concerns. The mechanism tests reveal that the main finding is driven by the reduction of financial constraints facilitated by D&O insurance, although this positive effect can be weakened by the overinvestment restrictions associated with D&O insurance. Finally, the positive effect of purchasing D&O insurance on firms' CSR engagement is more pronounced for firms with high risk-taking behaviours, high levels of digital innovation, non-SOEs, and firms located in highly developed regions.

1. Introduction

The media released statistics that more than 200 publicly listed companies in China plan to opt for directors' and officers' liability insurance. Directors and Officers (D&O) insurance is a specialised type of liability insurance designed to protect corporate directors and officers from personal losses in the event they are sued for alleged wrongful acts while managing a company. It is a crucial risk management tool for organisations, protecting their leaders from personal liability associated with their decision-making roles. The active purchase is closely related to the recent full implementation of registration-based IPO systems and the improved legal framework for security interests and guarantees. Despite the controversial discussions about Directors' and Officers' liability insurance (also known as D&O insurance) since its first day of creation, as a meaningful tool to indemnify individual directors and monitor the firm governance, it has been widely carried by public firms in the developed countries such as the United States, Canada, Singapore, Germany, etc. The penetration rate in emerging markets is also promising. AIG's (2017) report commented that D&O insurance was still in its infancy throughout Asia. As the world's second-largest economy, China has experienced a significant increase in the demand for D&O insurance for listed firms, reaching a demand from 0 to 15 % over the past two decades (Li et al., 2022). With the augmenting demand for liability insurance in recent years, such financial protection for directors has influenced subsequent managerial decisions and firm performance. The coverage of D&O in China was maintained below 5 % before 2007, and a notable increase was achieved at 7.3 % by 2018. The recent active purchases by Chinese listed companies highlighted its growing importance. Notwithstanding its

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popularity, the effects and consequences of D&O insurance on corporations are academically contentious. Some justify the positive impact of risk diversification and practical company monitoring functions. At the same time, critics mainly argue that the policies weaken the litigation control over managerial behaviours and may result in moral hazard.

Corporate social responsibility (CSR) generally represents a long-term commitment by corporations to conduct their business with social responsibilities, especially coping with profitable operations, ethical engagement, community welfare, and social awareness (Carroll, 1979). It is considered part of corporate governance and helps firms balance maximising shareholders' wealth and improving social well-being (Haniffa and Cooke, 2005). Research trends have rapidly developed, focusing on CSR and sustainability in recent years, which might be driven by the attention and scrutiny from investors, media, and the broader public (Pandey et al., 2023). Firms engage in CSR activities in response to organisational legitimacy, representing the congruence between the corporation's social image and society's expectations (Dowling and Pfeffer, 1975). Based on continuous monitoring, firms regard social goals as usable guides and incorporate expectations into decision-making processes (Shocker and Sethi, 1973). Legitimate incentives motivate managers to engage in social and environmental-related activities, demonstrate their efforts to comply with specific social values, and foster their image as good corporate citizens. To decode a "business case for sustainability" notion, Schaltegger et al. (2019) support that better CSR tools positively impact firms' long-run financial performance and help gain a better reputation from the stakeholders' perspective.

This paper examines whether managers with Directors' and Officers' liability insurance engage in more CSR activities in China. Our assumption framework relies on two main theories: the stakeholder theory, which in favour of the positive impact of D&O insurance on CSR, assumes that competent and risk-averse managers with the protection of liability insurance (Bhagat et al., 1987) engage in more social and environmental activities as being encouraged to maintain a satisfying relationship with the stakeholders (Freeman et al., 2007); on the other hand, the agency theory suggests that D&O insurance protection leads to managers' opportunistic behaviours (Chalmers et al., 2002), during the "empire-building" process, their involvement in CSR activities to benefit society is reduced due to moral hazard.

This study analyses data from the Chinese stock market to explore the relationship between firms purchasing Directors and Officers (D&O) insurance and their CSR engagement in China from 2009 to 2019. Our main finding shows that firms purchasing D&O insurance engage more in firms' CSR, supporting the stakeholder theory and demonstrating that D&O insurance positively influences CSR by motivating managers to consider stakeholders' interests in their decision-making processes. We employ the two-stage least squares (2SLS) regression test and the difference-in-difference (DiD) approach combined with the propensity score matching (PSM) method to address potential endogeneity concerns. We use the number of provincial corporate lawsuits as the instrument variable (IV) in the 2SLS test. The main findings remain robust after the test. Furthermore, firms subjected to administrative penalties by the Securities Regulatory Commission are categorised into the treatment group, as the regulatory penalty can change the risk preference of managers (Yang, 2024). We find that firms subjected to administrative penalties are more likely to purchase D&O insurance, and the positive impact of D&O insurance on CSR engagement is strengthened in the five years following the penalties.

Moreover, the mediation analysis reveals that D&O insurance enhances CSR engagement by reducing financial constraints. However, D&O insurance also restricts managers' overinvestment behaviours, limiting investments in CSR activities, thereby mitigating the overall effect of D&O insurance. The heterogeneity analysis indicates that the positive D&O insurance effect is more pronounced in firms with higher risk-taking preferences and more substantial digital innovations. State-owned (SOE) firms and those located in highly developed regions are more likely to engage in CSR activities when purchasing D&O insurance. Finally, the D&O insurance effect is strengthened during periods with increasing Economic Policy Uncertainty (EPU) and optimistic market sentiment, proxied by the consumer confidence index (CCI), aligning with the strategic growth option theory.

This study contributes to the prior research in three main aspects. First, it provides evidence to enrich the ongoing debates about D&O insurance impacts on firms' corporate social responsibility. The extant literature about D&O liability insurance mainly discusses how it affects firms' financial arrangements and capital market performance, for example, merger and acquisition outcomes (Lin et al., 2011), loan spreads and credit risk (Lin and Yang, 2013), cost of equity (Chen et al., 2016), independent directors' voting and boardroom activities (Li et al., 2022), IPO performance (Boyer and Stern, 2014), maturity mismatch (Tang et al., 2022), and stock price crash risk (Yuan et al., 2016). The literature discusses the internal motivations, such as managers' preferences and initiatives (Tang et al., 2023; Lin, 2024), enhancing CSR activities while holding D&O insurance. We extend our study to examine the external motivations in the relationship between D&O insurance and CSR conduct, providing a meaningful and innovative contribution to the outcomes, especially regarding pressure from the government and regulatory bodies. Second, our study is related to corporate social responsibility, further facilitating the literature on this aspect. CSR is generally considered as actions to promote social and environmental good beyond obeying the law and firm-level interest (McWilliams and Siegel, 2000). Among the determinants of CSR scores, our paper sheds light on a new factor determining corporate CSR performance. Under the deterrent power of society and regulations, managerial teams protected by the D&O insurance tend to foster their social images and reputations in devotion to societal and environmental responsibility. We investigate a plausible interpretation of stakeholder theory in the relationship between the two and identify a new determinant that influences CSR. This study offers a new perspective and a better understanding of such active improvement for stakeholders and society.

Finally, this paper identifies the specific channels through which D&O coverage affects managerial behaviours. It provides supporting evidence to the prior literature that D&O insurers work as a monitoring mechanism for directors' performance (Alles et al., 2005; Holderness, 1990; O'Sullivan, 1997). There have been discussions about the moral hazard inherent in liability insurance and the demand to restrain executives' liability sought by institutional investors (Barrese and Scordis, 2006). Our study furthers the literature by stating that D&O insurance is an essential incentive tool because of corporate governance and presents evidence that purchasing D&O insurance facilitates managerial behaviours on a firm level.

The following paper is structured as follows. Section 2 reviews the works of literature in the field, and Section 3 develops the

research hypothesis. The data and methodology are discussed in Section 4, while Section 5 presents empirical results. Section 6 concludes the study.

2. Literature review

2.1. The debates about D&O insurance

The role of Directors and Officers (D&O) liability insurance in firm performance and corporate governance has been a contentious topic, with academia divided on its implications. From a risk management perspective, D&O insurance plays a dual role—both as a tool for risk shifting and as a mechanism for corporate governance and oversight. Purchasing D&O insurance might benefit firms in four aspects: risk management and monitoring, shareholder benefits, increased board independence, and strengthening firms' performance and innovation.

First, proponents argue that D&O insurance provides a mechanism for effective risk management (Mayers and Smith, 1982). By transferring the risk to insurers, firms can achieve efficient risk allocation. Insurers act as external monitors, scrutinising companies through due diligence before issuing policies and ongoing oversight (Holderness, 1990; O'Sullivan, 1997). Second, D&O insurance is also seen as beneficial to shareholders as it aligns managerial actions with shareholders' interests, primarily through the external monitoring function performed by insurers (Bhagat et al., 1987). This monitoring role is crucial during due diligence, policy coverage enforcement, and legal proceedings. Moreover, studies, such as those by Holderness (1990) and O'Sullivan (1997), suggest that firms with D&O insurance are more likely to have a higher proportion of independent directors, which enhances governance practices. For example, Li et al. (2022) used manually collected voting data of Chinese publicly listed firms on the Shanghai Stock Exchange (SSE) and the Shenzhen Stock Exchange (SZSE) during the period from 2005 to 2018 to study the relationship between D&O insurance and independent directors' voting. The empirical results proved that D&O protection facilitates independent directors' dissenting votes and provides positive incentives to monitoring mechanisms and the company's performance with fewer lawsuits, lower claim compensations, and less underinvestment. Finally, research in different contexts, such as Zhang et al. (2023) and Wang et al. (2020), shows that D&O insurance supports firm performance and innovation by providing managers with a safety net, thus encouraging calculated risk-taking and investment in innovation and environmental responsibility.

With the further blossoming of D&O insurance, more critical articles commented on the disincentive impacts of liability insurance on corporate managerial decisions and firm performance. The main arguments centred on the potential moral hazard problems induced by the shield from D&O against litigation deterrence. Critics argue that D&O insurance may induce moral hazard, insulating managers from the financial consequences of their actions and potentially leading to opportunistic behaviours that do not align with shareholder interests. This protection may reduce the deterrent effect of potential litigation (Baker and Griffith, 2010). Furthermore, studies such as Lin et al. (2011) and Baker and Griffith (2010) emphasise that extensive D&O coverage can result in poor decision-making, particularly in mergers and acquisitions, due to a reduced incentive for risk aversion. Finally, several studies, including Chalmers et al. (2002) and Boyer and Stern (2014), associate high levels of D&O coverage with negative stock performance, increased volatility, and negative post-acquisition performance, highlighting potential adverse outcomes of D&O coverage.

In the context of risk management, while D&O insurance provides a significant mechanism for reallocating risk and enhancing corporate monitoring, it also introduces potential challenges related to managerial behaviour and governance. Balancing risk management benefits and mitigating potential moral hazards remains critical for firms and policymakers.

2.2. The status quo of corporate social responsibility

The OECD (Organisation for Economic Co-operation and Development) Principles of Corporate Governance defines Corporate Social Responsibility as the practice of business decision-making in a responsible manner that takes people, communities, human rights, the environment, and health into consideration in a broad view of corporate activity outcomes (OECD, 2004). This is one of the significant concepts to measure firms' efforts to be socially responsible by conducting business with economic viability, legal commendation, ethical vigilance, and social awareness (Carroll, 1979). CSR is considered relative to corporate governance and helps firms balance profitable business activities and moral practices (Haniffa and Cooke, 2005). Prior research addresses that leadership plays a crucial role in formulating and performing CSR (Reimer et al., 2018; Yuan et al., 2020), and the relationship between managers and firms' CSR has drawn much attention in the scope of corporate governance (De Bakker et al., 2005; Howard, 2013; He et al., 2025; Zhao et al., 2018).

With the protection of D&O insurance, managers may tend to be more aggressive in implementing the 'empire-building' conduct, and more risks may result in better performance and better personal rewards. Under such circumstances, managers may be reluctant to invest excessive resources into unprofitable or short-term unprofitable channels, such as CSR activities (He et al., 2023). More preferably, they would engage more in pursuing benefits and compensations.

The other possibility may lead to the opposite; directors and officers could be less aggressive in enhancing their performance or urge for short-term profitability. On the other hand, they may pay more attention to the corporation's long-term value and social commitment to maintain a sound relationship with stakeholders and prefer to engage in more CSR-related investments.

2.3. The background of D&O insurance in China

The development of Directors and Officers (D&O) liability insurance in China began later than in more advanced countries. A

significant turning point occurred in 2001 when the China Securities Regulatory Commission (CSRC) highlighted the need for an independent directors' liability insurance system in its Guiding Opinion. This encouraged listed companies to create favourable conditions for implementing such insurance to enhance the practical workings of independent directors.

In 2002, further legal advancements were made when the Supreme People's Court of China issued a notice affirming shareholders' rights to initiate civil litigation in cases involving false statements in the securities market. Around the same time, China's Ministry of Commerce and the CSRC authorised listed firms to purchase D&O liability insurance. The first insurance policy of this kind was issued in January 2002, jointly by Ping An Insurance Company and Chubb Insurance Group, to Vanke, a well-known Chinese real estate company.

The expansion of D&O insurance continued with the 2004 release of the State Council's Several Opinions on Accelerating the Development of the Modern Insurance Service Industry, which promoted adopting such policies. Despite coverage for public firms remaining below 5 % before 2007, the market saw significant growth thereafter, with the penetration rate increasing to 7.3 % by 2018. Various governance reforms and a rising number of securities litigations throughout the country drove this growth. Recent disclosures reveal that over 200 companies in China are adopting D&O insurance, highlighting its increasing prevalence.

D&O insurance in China increasingly aligns with international standards, with insurers conducting thorough reviews of companies that assess various aspects of operations and governance. While the review primarily focuses on understanding risks associated with D&O liability, it indeed encompasses elements related to company decisions and practices. This engagement serves not only to inform the underwriting process but also to promote higher standards of corporate governance and accountability within organisations.

3. Hypotheses development

We intend to gain a better understanding of the relationship between the firm's purchase of the D&O liability insurance and its specific performance on social commitments; therefore, this paper focuses on the effects of the firm's purchase of the D&O insurance on its CSR engagement and proposes two competing hypotheses: the stakeholder theory hypothesis and the agency theory hypothesis.

Directors and Officers (D&O) insurance is significant in empowering executives to fulfil their social responsibilities for several reasons, including risk mitigation, encouraging ethical decision-making, enhancing stakeholder trust, facilitating good governance practices, and attracting talent (Freeman et al., 2007; He et al., 2025). To provide a theoretical structure in CSR, scholars support the stakeholder theory that firms have incentives to conduct and demonstrate commitment to ethical behaviour associated with stakeholders, which helps them to achieve competitive advantages (Jones, 1995). D&O insurance avoids deterrent legal punishment and provides financial reimbursement for managers. In another way, firms may attract competent and risk-averse candidates to join the managerial team, resulting in positive effects on shareholder wealth (Bhagat et al., 1987; He et al., 2024); it releases pressures and incentives for managers to fulfil their managerial obligations and investment decisions. Furthermore, the insurers conduct due diligence and provide external governance mechanisms for insured companies (Holderness, 1990), and the monitoring function enhances managers' performance (Yuan et al., 2022).

D&O insurance mitigates risk for executives and fosters an environment where social responsibilities can be embraced and championed. Organisations can enable their leaders to focus on fulfilling their broader ethical and social obligations by ensuring that executives feel secure in their roles. We expect that the stakeholder theory facilitates alignment with the goal of long-term value creation and encourages managers to address stakeholders' concerns in their decision-making process. Therefore, we propose the first hypothesis as below:

H1a.   Purchasing D&O insurance significantly improves firms' CSR performance.

While fulfilling social responsibilities can bring significant benefits to executives and their organisations, it also comes with various potential risks, such as financial risk, conflict of interest, change management challenges, and potential for litigation (Zhang et al., 2018). The agency theory concerns conflicting goals and interests from the perspective of principal-agent relationships (Eisenhardt, 1989; Hao et al., 2025). The shareholder groups are increasingly favourable to the engagement of CSR (O'Rourke, 2003), and the economic value of CSR engagement relates positively to shareholders' value (Godfrey et al., 2009). Meanwhile, CSR neutralises firms' financial performance (McWilliams and Siegel, 2000). D&O coverage provides financial indemnifications and constructs litigation protection for managers, which creates potential moral hazard problems by isolating their wealth from the imprudent fulfilment of managerial duties or even illegal actions. Liability insurance damages the preventive functions of law. While individuals are aware of the substantial reduction in the associated risk and the financial compensation from insurers, they have no incentives to avoid foreseeing damages (Lahnstein, 2011). Supportively, Baker and Griffith (2010) demonstrate that the safeguarding policy of D&O weakens the disciplinary impact of litigations and shields responsibilities from corporate misconduct.

With the protection of liability insurance, managers with more opportunistic behaviours and empire-building ambitions may ignore the intangible image and reputation of the firm in the long run, violate shareholders' priorities, and turn to pursue short-term personal profits. Without being afraid of lawsuits from stakeholders under such circumstances, managers reduce their devotion to CSR activities and are released from the constrain of social norms and expectations, concentrating on personal financial achievements that conflict with shareholders' benefits.

With the potential conflicts of interests and moral hazards in organisational contexts, D&O liability insurance exacerbates agency problems and leads to the misalignment of managers' advantages and shareholders' best interests. Taken together, we propose the competing hypothesis:

H1b.   Purchasing D&O insurance has a negative impact on firms' CSR engagement.

4. Methodology

4.1. Data and sample

We obtained corporate social responsibility (CSR) scores from Rankins[1] (RKS), which issued independent CSR rating reports since 2009 and terminated them in 2019. As CSR disclosure is not mandatory for listed firms, Rankins' rating system is based only on the firms' self-disclosed CSR reports. Following the prior literature, a higher score in the report signifies greater involvement in CSR activities (Zhang et al., 2018). The data on directors' and officers' liability insurance for Chinese publicly listed firms on the Shanghai Stock Exchange (SSE) and the Shenzhen Stock Exchange (SZSE) are from CSMAR.[2] The data of D&O insurance indicates whether a firm purchases D&O insurance in a particular year, which equals one if the insurance covers the firm and equals zero otherwise.

In addition, the financial and accounting performance, board structure, and ownership structure of the listed firms are also retrieved from CSMAR and supplemented by WIND.[3] Following the prior studies of Zhang et al. (2018), Jia and Tang (2018), and Tang et al. (2022), we consider the control variables that may cause potential confounding effects on firms' CSR performance: (1) financial indicators, including firm size, Tobin's Q, operating cash flows, cash holdings, leverage, and return on assets; (2) shareholdings, including the institutional ownership and holdings of the largest shareholder; (3) corporate governance, including the proportions of independent directors and female directors, CEO duality status, and firm age.

We match the above data to construct the panel sample for our analysis and exclude observations that may introduce noise into the empirical tests. Special treatment firms (*ST and ST), particular transfer (PT) firms, and firms in the financial industry are excluded due to their unique financial conditions and accounting practices. We also remove observations lacking CSR scores due to the absence of CSR disclosures and those with missing values in control variables. Finally, the sample comprises 6463 annual observations, covering 959 unique firms. Among these firms, we identified 152 that purchased D&O insurance at least once during the sample period, while the remainder did not. All numerical variables are adjusted using the winsorise approach at both tails with 1 %.

Table 1 shows the summary statistics of all variables in the sample. As the range of CSR scores is from 0 to 100, we use the natural logarithm of CSR scores in the experiments. Similarly, the total assets, operating cash flows, cash holdings, and firm age are also converted to natural logarithm values due to their scale. The average CSR is 3.6230, equivalent to 37.5 scores out of 100, indicating that Chinese firms' social initiative is insufficient even under voluntary disclosure. The average logarithm of firm size is 23.1229 (about 11.02 billion RMB, approximately 1.5 billion USD), and the average firm age in the sample is about 10 years. On average, about 38 % of board members are independent directors, and about 15 % are female, similar to the prior literature (Hao et al., 2024; Su et al., 2024). The sample also shows that institutional investors hold about 56 % of shares, and the largest shareholders hold about 38 % of shares on average.

Table 2 shows both Pearson's and Spearman's correlation matrix among each pair of variables. The upper-right side reports the Spearman's correlation coefficients and the bottom-left side reports the Pearson's correlation coefficients. This table shows a positive relationship between D&O insurance and the CSR scores. Besides, it shows that firms with a larger size, more operating cash flows and cash holdings, high leverage rates, a large portion of institutional and top shareholder holdings, and a long history are more likely to purchase D&O insurance. However, firms with higher Tobin's Q ratio, higher ROA, more female directors, and CEO duality are less likely to purchase D&O insurance.

4.2. The model

We implement the baseline regression to explore the impact of D&O on firms' reported CSR scores. We also consider several combinations of year, firm, province, and industry fixed effects to correct the standard errors and control for factors such as time-specific effects, industry characteristics, and spatial variations. The comprehensive regression model is shown as follows:

$$
\begin{aligned}
\mathrm{CSR}_{i,t} = {} & \alpha_{i,t} + \beta_1 \mathrm{D\&O}_{i,t} + \beta_2 \mathrm{Firm\ Size}_{i,t} + \beta_3 \mathrm{Tobin's\ Q}_{i,t} + \beta_4 \mathrm{Operating\ Cash\ Flow}_{i,t} + \beta_5 \mathrm{Cash\ Holding}_{i,t} + \beta_6 \mathrm{Leverage}_{i,t} \\
& + \beta_7 \mathrm{ROA}_{i,t} + \beta_8 \mathrm{Institutional\ Holding}_{i,t} + \beta_9 \mathrm{Top\ Share\ Holding}_{i,t} + \beta_{10} \mathrm{Independent\ Director}_{i,t} \\
& + \beta_{11} \mathrm{Female\ Director}_{i,t} + \beta_{12} \mathrm{Firm\ Age}_{i,t} + \mathrm{Fixed\ Effects}
\end{aligned}
\tag{1}
$$

5. Empirical analysis

5.1. Baseline results

Table 3 reports the main results of the regressions while controlling the complete set of control variables and several combinations of year, firm, province, and industry fixed effects. Column (1) reports the OLS regression without considering any fixed effects. Columns (2) to (5) report the fixed effect regression results that control the year effect with the firms, province, and industry effects, respectively. Lastly, column (6) reports results combining year, province, and industry effects.

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[1] A leading sustainability rating agency based on Beijing, China.

[2] Short for China Stock Market and Accounting Research Database. A comprehensive research-oriented database focusing on China Finance and Economy.

[3] A complete and accurate large-scale financial engineering and financial data center on financial and securities data in China.

Table 1

Descriptive statistics.

Sample Stocks	Chinese A-Share stocks listed in SSE & SZSE Excluding: *ST, ST & PT Firms; Finance Firms							
Sample Period	2009–2019							
Variables	Symbol	Obs.	Mean	Std	Min	25 %	Median	75 %	Max
CSR Score (log)	CSR	6463	3.6230	0.3043	2.5900	3.4197	3.6039	3.8190	4.4886
Firm Assets (log)	Size	6463	23.1229	1.3992	19.5751	22.0723	23.0077	24.0604	26.0909
Tobin' Q	Tobin	6463	1.5057	1.5114	0.1645	0.5326	1.0546	1.8870	11.2414
Operating Cash Flow (log)	OPCF	6463	16.7539	7.7648	0.0000	18.0596	19.7846	21.0932	23.3913
Cash Holding (log)	Cash	6463	21.0578	1.4228	16.7421	20.0399	20.9992	22.0005	24.0275
Leverage	Lev	6463	0.4909	0.1967	0.0535	0.3451	0.5038	0.6432	0.9047
ROA	ROA	6463	0.0402	0.0559	−0.2714	0.0152	0.0355	0.0645	0.1954
Institutional Ownership	InstHold	6463	0.5635	0.2266	0.0038	0.4175	0.5984	0.7303	0.9297
Top Hold Ratio	TopHold	6463	0.3756	0.1583	0.0878	0.2470	0.3677	0.4989	0.7482
Independent Director	Indep	6463	0.3760	0.0562	0.3333	0.3333	0.3636	0.4000	0.5714
Female Director	Female	6463	0.1539	0.1012	0.0000	0.0800	0.1364	0.2143	0.5556
Duality	Duality	6463	0.1663	0.3724	0.0000	0.0000	0.0000	0.0000	1.0000
Firm Age (log)	Age	6463	2.3581	0.7211	0.0000	2.0794	2.5649	2.8904	3.5264

This table reports summary statistics for variables in the sample from 2009 to 2019. After excluding the *ST, ST, and PT firms, financial firms, and missing values, the sample includes 959 firms in total, comprising 6463 annual observations. The variables include the logarithm of CSR scores, logarithm of firm assets, Tobin's Q, logarithm of operating cash flows, logarithm of cash holdings, leverage, return on assets, the percentage of institutional ownership, the largest shareholder's holding rate, the portion of independent directors, the portion of female directors, CEO duality status, and the logarithm of firm age. Variables have been defined in Appendix A.

The results show that the coefficients of D&O insurance are positively associated with the CSR scores at the 1 % significance level for all the columns. The coefficient of D&O insurance is 0.0809 while controlling for year, province, and industry effects, indicating that firms holding D&O insurance are associated with an 8.09 % increase in CSR scores. The finding suggests that firms holding D&O insurance promote their managers' CSR engagement, aligning with our hypothesis H1a.

In the baseline model, firm size (SIZE) and operating cash flows (OPCF) both exhibit significant positive associations with CSR scores at the 1 % and 5 % levels, respectively, supporting the argument that larger firms and those with stronger profitability are more inclined to engage in CSR initiatives, consistent with Gamerschlag et al. (2011). Tobin's Q also demonstrates a strong positive correlation with CSR scores (significant at the 1 % level), reinforcing the finding of Awaysheh et al. (2020) that firms with higher market valuations tend to invest more in CSR (He et al., 2022). Institutional ownership (InstHold) is positively and significantly linked to CSR engagement at the 1 % level, echoing the findings of Erhemjamts and Huang (2019) and Zhou et al. (2024).

In contrast, financial leverage (Lev) and firm age (Age) both show significant negative relationships with CSR scores (at the 1 % level), suggesting that highly leveraged and more established firms may be less proactive in CSR, in line with Beck et al. (2018) and Withisuphakorn and Jiraporn (2016). Furthermore, CEO duality is negatively associated with CSR scores at the 5 % level, lending support to Voinea et al. (2022) that concentrated leadership power may hinder CSR engagement. Conversely, the results indicate that variables such as cash holdings (Cash), return on assets (ROA), top shareholder concentration (TopHold), board independence (Indep), and female board representation (Female) do not have statistically significant effects on CSR performance in this sample.

5.2. Robustness tests

To verify the robustness of the main finding, we employ the environment, social, and governance (ESG) scores rated by the Sino-Securities Index Information Service as an alternative proxy to replace the CSR score. The ESG score presents a firm's social responsibility based on third-party investigations rather than voluntary disclosures. Table 4 reports the regression results of D&O insurance on the ESG scores with the complete set of control variables. Regardless of whether the fixed effects are controlled for or not, the coefficients of the D&O insurance remain consistently positive and statistically significant. The coefficient of D&O insurance in column (3), which controls for year, province, and industry effects, is 0.0810, approximately the same as in the baseline regressions. The results prove the robustness of our main finding when the alternative dependent variable is used.

5.3. Addressing endogeneity concerns

This research utilises the 2SLS and PSM-DiD approaches to address endogeneity concerns, such as omitted variable bias, selection bias, measurement error, and reverse causality.

5.3.1. The 2SLS approach

We employ the number of provincial lawsuits as the instrument variable (IV) in the 2SLS approach to alleviate endogeneity concerns about reverse causality and the omitted variable bias. The corporate lawsuit data is obtained from the announcements published by the China Securities Regulatory Commission (CSRC), the Ministry of Finance (MOF) of China, the Shenzhen Stock Exchange (SZSE), the Shanghai Stock Exchange (SSE), or the listed companies involved in the lawsuits themselves. We aggregate the

Table 2
Pearson and spearman correlation matrix.

	D&O	CSR	Size	Tobin	OPCF	Cash	Lev	ROA	InstHold	TopHold	Indep	Female	Duality	Age
D&O		0.2059***	0.2793***	−0.2317***	0.2040***	0.2503***	0.1646***	−0.0558***	0.2423***	0.0877***	0.0104	−0.0863***	−0.0911***	0.1311***
CSR	0.2263***		0.4002***	−0.2081***	0.3104***	0.3649***	0.1085***	0.0104	0.2005***	0.1110***	0.0266**	−0.0019	−0.0395***	0.1002***
Size	0.3002***	0.4440***		−0.6704***	0.5962***	0.8720***	0.5210***	−0.0909***	0.4455***	0.2576***	0.0894***	−0.2071***	−0.1234***	0.2433***
Tobin	−0.1701***	−0.1622***	−0.5187***		−0.2841***	−0.5063***	−0.6664***	0.4317***	−0.1833***	−0.1471***	−0.0059	0.1817***	0.1561***	−0.2656***
OPCF	0.0684***	0.1665***	0.1898***	−0.0145		0.1914***	0.1365***	0.2148***	0.3758***	0.2062***	0.0522***	−0.1293***	−0.0691***	0.1073***
Cash	0.2626***	0.3963***	0.8715***	−0.3653***	0.1914***		0.5446***	0.0326***	0.4352***	0.2313***	0.1000***	−0.1623***	−0.0969***	0.1881***
Lev	0.1630***	0.1158***	0.5235***	−0.5263***	−0.0729***	0.3766***		−0.4561***	0.1513***	0.0844***	0.0168	−0.1688***	−0.1043***	0.1857***
ROA	−0.0540***	0.0258**	−0.0345***	0.3299***	0.2338***	0.0819***	−0.3909***		0.1641***	0.0669***	−0.0216*	0.1116***	0.0865***	−0.1536***
InstHold	0.2301***	0.2114***	0.4580***	−0.1466***	0.1643***	0.4299***	0.1836***	0.1540***		0.6253***	0.0349***	−0.2180***	−0.1557***	0.0061
TopHold	0.0807***	0.1355***	0.2635***	−0.1096***	0.0877***	0.2274***	0.0825***	0.0917***	0.6104***		0.0747***	−0.1956***	−0.1265***	−0.0586***
Indep	0.0051	0.0423***	0.1091***	0.0265**	−0.0003	0.1166***	0.0450***	−0.0271**	0.0281**	0.0747***		0.0397***	0.0922***	−0.0037
Female	−0.0842***	−0.0274**	−0.2099***	0.1620***	−0.0487***	−0.1608***	−0.1713***	0.0703***	−0.2256***	−0.1817***	0.0238*		0.1286***	0.0569***
Duality	−0.0911***	−0.0460***	−0.1180***	0.1404***	−0.0376***	−0.0875***	−0.1068***	0.0630***	−0.1753***	−0.1251***	0.0925***	0.1210***		−0.1312***
Age	0.1202***	0.0803***	0.2326***	−0.2289***	0.0420***	0.1611***	0.2120***	−0.1361***	0.0726***	−0.0716***	−0.0054	0.0229*	−0.1468***	

This table reports the Pearson and Spearman correlation matrix for the sample variables. The bottom-left side shows the Pearson correlation coefficients, and the upper-right side shows the Spearman correlation coefficients for each pair of variables. T-statistics are in parentheses. ***, **, and * represent significance levels of 1 %, 5 %, and 10 %, respectively. Variables have been defined in Appendix A.

Table 3
Baseline regression.

	CSR					
	(1)	(2)	(3)	(4)	(5)	(6)
D&O	0.0930***	0.0955***	0.0595***	0.0866***	0.0932***	0.0809***
	(9.13)	(9.99)	(4.37)	(8.96)	(9.80)	(8.39)
Size	0.1178***	0.0903***	0.0564***	0.0871***	0.0910***	0.0862***
	(20.09)	(16.15)	(6.79)	(15.80)	(15.59)	(14.84)
Tobin	0.0111***	0.0058**	0.0043*	0.0036	0.0099***	0.0085***
	(3.85)	(2.04)	(1.66)	(1.29)	(3.34)	(2.92)
OPCF	0.0026***	0.0022***	−0.0004	0.0020***	0.0011**	0.0010**
	(5.74)	(5.03)	(−1.32)	(4.83)	(2.53)	(2.46)
Cash	−0.0042	−0.0044	−0.0006	−0.0054	0.0013	0.0010
	(−0.84)	(−0.94)	(−0.14)	(−1.17)	(0.27)	(0.20)
Lev	−0.2218***	−0.0937***	−0.0666**	−0.0936***	−0.0892***	−0.0858***
	(−9.70)	(−4.25)	(−2.56)	(−4.29)	(−3.78)	(−3.65)
ROA	−0.2414***	0.1046	0.0237	0.1078	−0.0045	−0.0023
	(−3.40)	(1.54)	(0.46)	(1.60)	(−0.07)	(−0.03)
InstHold	−0.0338	0.0568***	−0.0339	0.0639***	0.0331*	0.0532***
	(−1.62)	(2.86)	(−1.36)	(3.25)	(1.67)	(2.71)
TopHold	0.0608**	0.0332	0.0084	0.0246	0.0369	0.0107
	(2.25)	(1.31)	(0.22)	(0.96)	(1.44)	(0.41)
Indep	−0.0779	−0.0883	−0.0691	−0.0933*	−0.0278	−0.0350
	(−1.29)	(−1.56)	(−1.27)	(−1.67)	(−0.50)	(−0.63)
Female	0.1983***	0.0383	−0.0841**	0.0200	0.0173	0.0085
	(5.76)	(1.16)	(−2.20)	(0.61)	(0.51)	(0.25)
Duality	−0.0015	−0.0186**	−0.0096	−0.0169**	−0.0208**	−0.0187**
	(−0.16)	(−2.14)	(−1.21)	(−1.98)	(−2.41)	(−2.22)
Age	−0.0079	−0.0318***	−0.0200**	−0.0404***	−0.0282***	−0.0350***
	(−1.62)	(−6.77)	(−2.10)	(−8.62)	(−5.92)	(−7.39)
Cons.	1.0466***	1.3945***	2.6295***	1.4948***	1.2676***	1.3080***
	(13.85)	(18.76)	(14.39)	(19.42)	(14.30)	(14.08)
Year FE	No	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	Yes	No	No	No
Province FE	No	No	No	Yes	No	Yes
Industry FE	No	No	No	No	Yes	Yes
Obs.	6463	6463	6463	6463	6463	6463
Adj.R2	0.2344	0.3265	0.7954	0.3645	0.3902	0.4255

This table reports the results of ordinary least squares (OLS) regression and fixed effect regressions of D&O insurance on CSR scores while controlling for the full set of control variables. The fixed effects involve several combinations of year effect, firm effect, province effect, and industry effect. T-statistics are in parentheses. ***, **, and * represent significance levels of 1 %, 5 %, and 10 %, respectively. Variables have been defined in Appendix A.

Table 4
Robustness test.

	ESG Score		
	(1)	(2)	(3)
D&O	0.0736**	0.1589***	0.0810**
	(1.98)	(3.00)	(2.22)
Cons.	−1.3690***	−4.4323***	−1.7024***
	(−4.96)	(−6.24)	(−4.84)
Control	Yes	Yes	Yes
Year FE	No	Yes	Yes
Firm FE	No	Yes	No
Province FE	No	No	Yes
Industry FE	No	No	Yes
Obs.	6463	6463	6463
Adj.R2	0.0557	0.7135	0.2379

This table reports the robustness results for the main finding in the baseline regressions. We employ the ESG scores from the Sino-Securities Index Information Service as an alternative measurement of corporate social initiatives to replace the CSR scores. The fixed effects also involve several combinations of year effect, firm effect, province effect, and industry effect. T-statistics are in parentheses. ***, **, and * represent significance levels of 1 %, 5 %, and 10 %, respectively. Variables have been defined in Appendix A.

number of these lawsuit events annually for each province to serve as a proxy for litigation intensity in each region. Lawsuits with long-term proceedings are counted only once in the year they are first registered in the official system.

As the aggregate number of corporate lawsuits reflects the strictness of regulations and the legal awareness of local communities, frequent lawsuits demonstrate their threatening power to local firms, compelling corporate managers to purchase insurance for protection. Table 5 reports the results of 2SLS regressions, where column (1) shows the first stage analysis, and the coefficient of the provincial lawsuit variable is positively associated with D&O insurance at the 1 % significance level. Column (2) shows the second-stage analysis, which uses the estimated D&O insurance status from the first stage to regress the CSR score while controlling for year and industry-fixed effects.[4] The coefficient of estimated D&O insurance is still positive at the 5 % significance level. These findings support that the main results in Table 3 remain significant after alleviating the endogeneity issue.

5.3.2. PSM-DiD analysis with administrative penalty

In this section, we first employ the propensity score matching (PSM) approach (Shipman et al., 2017) to address self-selection concerns. Yang (2024) suggests that managers' risk preferences can change after regulatory penalties. Therefore, we split the sample observations into two groups based on whether the firms were subject to administrative penalties by the Securities Regulatory Commission in the previous five years. Firms that received administrative penalties are classified as the treatment group, and other observations are in the control group. Table 6 Panel A reports the statistics of the control variables of the two groups and their differences before and after nearest neighbour matching based on the propensity scores.[5]

Next, we apply the difference-in-difference (DiD) method to examine the impact of administrative penalties on managers' decisions regarding D&O insurance, thereby promoting CSR engagement. Therefore, the DiD model is shown as follows:

$$D\&O_{i,t} = \alpha_0 + \alpha_1 Treat_i \times Post_i + \sum Controls_{i,t} + Year + Firm \tag{2}$$

$$CSR_{i,t} = \beta_0 + \beta_1 D\&O_{i,t} \times Treat_i \times Post_i + \beta_2 D\&O + \sum Controls_{i,t} + Year + Firm \tag{3}$$

Where $Treat_i$ is a dummy variable, reflecting that the observation is in the treatment group. We designate the specific year in which firms receive administrative penalties as the shock year, defining the subsequent five years as $Post_i$, which equals 1 during this period and 0 otherwise. Table 6 Panel B reports the results of the DiD analysis, and column (1) shows that the coefficient of the interaction term between *Treat* and *Post* on D&O insurance is positive at 1 % significance level. Column (2) shows that the interaction term among the D&O insurance, *Treat*, and *Post* is also positively significant for CSR engagement at the 1 % significance level. These results prove the promoting impact of administrative penalties on purchasing D&O insurance. Then, firms holding D&O insurance are more likely to engage in CSR activities in the following years for safety considerations and to recover their social image in the community.

5.4. Mediation analysis

This section conducts the mediation analysis to examine the mechanisms underlying our main finding. Following Hadlock and Pierce (2010) and Whited and Wu (2006), we employ the FC and WW indexes as proxies for corporate financial constraints. Table 7 reports the mediation analysis results with the financial constraint indicators. Columns (1) and (3) report the coefficients of D&O insurance on the FC Index and WW Index, respectively, and the coefficients are negative at the 1 % significance level. Columns (2) and (4) report the D&O insurance coefficients on CSR scores while controlling for the FC and WW Index. The results show that the impact of D&O insurance on CSR scores remains positively significant, but both financial constraint indicators are negatively associated with CSR scores at the 1 % significance level. The findings suggest that financial constraints can significantly mediate the impact of D&O insurance on CSR engagement by enhancing funding.

Second, we examine the over-investment mechanism and its impact on the main finding. Following the approach of Richardson (2006) and Shi (2019), we establish the over-investment indicator based on the following functions:

$$I_{total} = Dep\&Amor + I_E + I_\varepsilon \tag{4}$$

$$FCF = CFO - Dep\&Amor - R\&D - I_\varepsilon \tag{5}$$

Where I_{total} refers to the total investment, *Dep&Amor* stands for the depreciation and amortisation expenses, *FCF* is the free cash flow, *CFO* is the operating cash flow, and *R&D* indicates the research and development expenses. Notably, I_E refers to the new investment under expectation and I_ε is the abnormal investment, measuring the amount of corporate over-investment.

Table 8 reports the regression results using the amount of over-investment as the mediator. Column (1) shows that the coefficient of D&O insurance on the over-investment is negative at the 1 % significance level. Column (2) shows the coefficients of D&O insurance and over-investment on CSR scores. D&O insurance remains positively significant for CSR; however, the coefficient of over-investment is positive at the 5 % significance level. This finding suggests that over-investments can also fund CSR activities. CSR activities are also

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[4] As the instrument variable is using the number of provincial lawsuits, controlling the province fixed effect might dilute the effect of lawsuits in each province. Therefore, the province fixed effect is temporarily removed from the regression model in the 2SLS analysis.

[5] As the number of observations in the treatment group is significantly smaller than that in the control group, we employ the 1:2 nearest neighbour matching to expand the sample size for more reasonable regression results.

Table 5
Endogeneity test with 2SLS regression.

	D&O	CSR
	(1)	(2)
Estimated D&O		0.2041**
		(2.46)
Provincial Lawsuit	0.0523***	
	(9.26)	
Size	0.0244***	0.0875***
	(3.18)	(13.62)
Tobin	−0.0054	0.0105***
	(−1.39)	(3.47)
OPCF	0.0002	0.0010**
	(0.37)	(2.42)
Cash	0.0289***	−0.0015
	(4.46)	(−0.28)
Lev	−0.0464	−0.0828***
	(−1.50)	(−3.42)
ROA	−0.4152***	0.0398
	(−4.67)	(0.52)
InstHold	0.2496***	0.0059
	(9.70)	(0.21)
TopHold	−0.1900***	0.0572*
	(−5.67)	(1.91)
Indep	−0.0701	−0.0173
	(−0.96)	(−0.30)
Female	−0.0372	0.0207
	(−0.84)	(0.60)
Duality	−0.0296***	−0.0175*
	(−2.63)	(−1.95)
Age	0.0245***	−0.0304***
	(3.93)	(−6.00)
Cons.	−1.0562***	1.3990***
	(−9.11)	(10.56)
Year FE	Yes	Yes
Province FE	No	No
Industry FE	Yes	Yes
Obs.	6463	6463
Adj.R2	0.1894	0.3816

This table reports the 2SLS regression results. The instrument variable is the number of provincial corporate lawsuits. Column (1) reports the coefficients from the first stage of the IV regressions, and the second stage results are reported in column (2). The regression controls for the full set of control variables and the combination of year effect and industry effect. T-statistics are in parentheses. ***, **, and * represent significance levels of 1 %, 5 %, and 10 %, respectively. Variables have been defined in Appendix A.

limited when D&O insurance restricts managers' abnormal investment behaviours. Overall, the results indicate that over-investment is not only a mediator but also presents a suppression effect, mitigating the positive impact of D&O insurance on CSR engagement.

5.5. Firm heterogeneity analysis

In this section, we examine the impact of firms' heterogeneity on our main finding, including risk-taking behaviours, digital innovations, state ownership status, and the level of market development across regions. First, we measure corporate risk-taking behaviours using the previous year's debt-to-equity ratio (DE). To examine the impact of risk-taking behaviours, we create an interaction term between the DE ratio and D&O insurance. Table 9 Panel A shows the regression results without and with the interaction term in columns (1) and (2), respectively. The DE ratio interaction term coefficient is positive at the 5 % significance level, while the coefficients of D&O insurance remain significantly positive. The finding suggests that firms with higher risk-taking preferences are more likely to engage in CSR activities under the protection of D&O insurance.

Second, we examine the impact of digital innovation on the relationship between firms' purchase of D&O insurance and CSR engagement. Digital innovation is proxied by the digital achievement scores, estimated based on firms' digital standards, digital research, patents, digital innovation qualifications, and national digital awards. In Panel B of Table 9, the coefficient of the interaction term between D&O insurance and digital innovation is also positive at the 1 % significance level. The result indicates that digitally innovative firms are more likely to conduct CSR activities while holding D&O insurance.

Thirdly, according to the ownership structure of the sample firms, we generate a dummy variable reflecting their state ownership status, which equals one if the firms are not state-owned and zero otherwise. The non-SOE dummy and D&O insurance coefficient remain positive at the 10 % significance level. The results indicate that the impact of D&O insurance on CSR engagement is more

Table 6
PSM-DID analysis with administrative penalty.

Panel A. Step 1

Variable	1:2 Match	Treatment		Control		Diff (%)	t-value	p-value
		Obs.	Mean	Obs.	Mean			
Size	Before	565	22.6415	5898	23.1690	−2.3300	−0.4297	0.6676
	After	565	22.6415	1130	22.6797	−0.1687	−0.0261	0.9792
Tobin	Before	565	1.7249	5898	1.4847	13.9262	2.0255	0.0433
	After	565	1.7249	1130	1.7863	−3.5606	−0.4107	0.6814
OPCF	Before	565	15.1590	5898	16.9067	−11.5287	−0.3126	0.7547
	After	565	15.1590	1130	14.9830	1.1609	0.0266	0.9788
Cash	Before	565	20.5733	5898	21.1042	−2.5801	−0.4158	0.6778
	After	565	20.5733	1130	20.6274	−0.2629	−0.0367	0.9708
Lev	Before	565	0.4797	5898	0.4920	−2.5715	−2.8648	4.3e-03
	After	565	0.4797	1130	0.4778	0.3932	0.3751	0.7078
ROA	Before	565	0.0312	5898	0.0410	−31.3809	−105.4381	0.0000
	After	565	0.0312	1130	0.0311	0.5323	1.5399	0.1241
InstHold	Before	565	0.4444	5898	0.5749	−29.3611	−28.4824	0.0000
	After	565	0.4444	1130	0.4353	2.0464	1.6676	0.0960
TopHold	Before	565	0.3151	5898	0.3814	−21.0571	−33.1318	0.0000
	After	565	0.3151	1130	0.3165	−0.4673	−0.6300	0.5290
Indep	Before	565	0.3746	5898	0.3761	−0.3991	−1.6606	0.0973
	After	565	0.3746	1130	0.3765	−0.5090	−1.7913	0.0738
Female	Before	565	0.1810	5898	0.1513	16.4035	34.0277	0.0000
	After	565	0.1810	1130	0.1781	1.6290	2.9219	3.6e-03
Duality	Before	565	0.2106	5898	0.1621	23.0419	12.9250	0.0000
	After	565	0.2106	1130	0.2230	−5.8824	−2.7783	5.6e-03
Age	Before	565	2.3944	5898	2.3546	1.6584	0.5378	0.5909
	After	565	2.3944	1130	2.3621	1.3484	0.3771	0.7062

Panel B. Step 2

		D&O	CSR
		(1)	(2)
Treat × Post		0.0494***	
		(3.47)	
D&O × Treat × Post			0.1251***
			(2.84)
D&O			−0.0425
			(−1.07)
Cons.		1.8408***	2.8396***
		(4.57)	(7.16)
Control		Yes	Yes
Year FE		Yes	Yes
Firm FE		Yes	Yes
Obs.		1695	1695
Adj.R2		0.8277	0.8132

This table reports the 2SLS regression results. The instrument variable is the number of provincial corporate lawsuits. Column (1) reports the coefficients from the first stage of the IV regressions, and the second stage results are reported in column (2). The regression controls for the full set of control variables and the combination of year effect and industry effect. T-statistics are in parentheses. ***, **, and * represent significance levels of 1 %, 5 %, and 10 %, respectively. Variables have been defined in Appendix A.

pronounced in non-SOE firms than in SOE firms.

Finally, we examine and match the provincial marketisation index with listed firms according to their headquarters. The marketisation index reflects the level of market development among the provinces in China. In Panel D, the coefficient of the interaction term between the D&O insurance and the marketisation index remains positive at the 1 % significance level. The finding suggests that firms located in markets with higher development levels are more likely to conduct CSR activities while holding D&O insurance.

5.6. The impact of EPU and sentiment

This section focuses on the impact of market conditions on the positive D&O insurance effect, including economic policy uncertainty (EPU) (Baker et al., 2016) and sentiment proxied by the consumer confidence index (CCI). We employ the EPU and CCI and examine their movements using the change in EPU and CCI over time. Table 10 reports the regression results of the D&O insurance on CSR scores while controlling for the interaction terms between the D&O insurance and the EPU, the change of EPU, the CCI, and the change of CCI, respectively. Columns (1) and (3) show that the coefficients of interaction terms are positive at the 1 % significance

Table 7
Mediation effect analysis with financial constraints.

	FC-Index	CSR	WW-Index	CSR
	(1)	(2)	(3)	(4)
D&O	−0.1997***	0.0788***	−0.2523***	0.0810***
	(−7.29)	(8.15)	(−9.35)	(8.39)
FC-Index		−0.0901***		
		(−20.41)		
WW-Index				−0.0982***
				(−22.01)
Cons.	1.6807***	3.2717***	1.6246***	3.2789***
	(9.89)	(54.31)	(9.65)	(54.43)
Control	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	6463	6463	6463	6463
Adj.R2	0.5591	0.4262	0.5511	0.4254

This table reports the results of the mediation effect analysis with corporate financial constraints. Financial constraints are measured by the FC-Index and WW-Index, respectively. Columns (1) and (3) show the effect of D&O insurance on the corporate financial constraints. Columns (2) and (4) show the relationship between D&O insurance and CSR engagement while controlling for financial constraints. The regression controls for the full set of control variables and the combination of year effect, province effect, and industry effect. T-statistics are in parentheses. ***, **, and * represent significance levels of 1 %, 5 %, and 10 %, respectively. Variables have been defined in Appendix A.

Table 8
Mediation effect analysis with over-investment.

	Over Investment	CSR
	(1)	(2)
D&O	−1.1820***	0.0819***
	(−3.09)	(8.48)
Over Investment		0.0008**
		(2.49)
Cons.	−16.4256***	1.3210***
	(−4.45)	(14.20)
Control	Yes	Yes
Year FE	Yes	Yes
Province FE	Yes	Yes
Industry FE	Yes	Yes
Obs.	6463	6463
Adj.R2	0.1672	0.4259

This table reports the results of the mediation effect analysis with over-investment. Column (1) shows the effect of D&O insurance on over-investments. Column (2) shows the relationship between the D&O insurance and CSR engagement while controlling for over-investments. The regression controls the full set of control variables and the combination of year effect, province effect, and industry effect. T-statistics are in parentheses. ***, **, and * represent significance levels of 1 %, 5 %, and 10 %, respectively. Variables have been defined in Appendix A.

level, indicating that the D&O insurance effect on CSR engagement is more pronounced during periods of high EPU and strong sentiment. Moreover, the coefficients of interaction terms in columns (2) and (4) remain positive at the 1 % significance level. These findings also suggest that the impact of D&O insurance is more pronounced when the EPU and sentiment are rising. In such an environment, managers are optimistic about taking risks, thereby investing more in social responsibility with protection from D&O insurance.

6. Conclusion

This study sheds light on the intricate relationship between firms' purchasing D&O liability insurance and CSR engagement among publicly listed firms in China. By leveraging comprehensive data and robust methodologies, we demonstrate that purchasing D&O insurance positively influences CSR engagement, encouraging managers to prioritise stakeholders' interests. Our findings substantiate stakeholder theory, highlighting the insurance's role in reducing financial constraints and mitigating managerial over-investment behaviours. Furthermore, the study reveals significant heterogeneity in the impact of D&O insurance, with more substantial effects observed in non-state-owned enterprises, firms in developed regions, and those characterised by risk-taking preferences and digital innovation. Notably, the influence of purchasing D&O insurance intensifies under conditions of heightened economic policy uncertainty and optimistic market sentiment.

Table 9
Heterogeneity analysis.

Panel A. Risk-taking behaviour		
	CSR	
	(1)	(2)
D&O	0.0602***	0.0612***
	(4.42)	(4.49)
DE	0.0087	0.0033
	(1.29)	(0.45)
D&O × DE		0.0270**
		(1.97)
Cons.	2.6392***	2.6312***
	(14.43)	(14.43)
Control	Yes	Yes
Year FE	Yes	Yes
Firm FE	Yes	Yes
Obs.	6463	6463
Adj.R2	0.7954	0.7955

Panel B. Digital innovation		
	(1)	(2)
D&O	0.0795***	0.0771***
	(8.26)	(7.98)
Digital Achievement	0.0271***	0.0227***
	(6.39)	(5.03)
D&O × Digital Achievement		0.0240***
		(2.93)
Cons.	1.4067***	1.4172***
	(14.98)	(15.09)
Control	Yes	Yes
Year FE	Yes	Yes
Province FE	Yes	Yes
Industry FE	Yes	Yes
Obs.	6463	6463
Adj.R2	0.4291	0.4297

Panel C. non-SOE		
	(1)	(2)
D&O	0.0792***	0.0715***
	(8.20)	(6.69)
non-SOE	−0.0248***	−0.0286***
	(−3.04)	(−3.38)
D&O × non-SOE		0.0379*
		(1.68)
Cons.	1.3290***	1.3302***
	(14.27)	(14.29)
Control	Yes	Yes
Year FE	Yes	Yes
Province FE	Yes	Yes
Industry FE	Yes	Yes
Obs.	6463	6463
Adj.R2	0.4262	0.4264

Panel D. Marketisation Index		
	(1)	(2)
D&O	0.0908***	0.0844***
	(9.45)	(8.62)
Marketisation Index	0.0066*	0.0035
	(1.86)	(0.95)
D&O × Marketisation Index		0.0335***
		(3.24)
Cons.	1.2814***	1.2960***
	(14.40)	(14.56)
Control	Yes	Yes
Year FE	Yes	Yes
Province FE	No	No

Table 9 (*continued*)

Panel C. non-SOE		
	(1)	(2)
Industry FE	Yes	Yes
Obs.	6463	6463
Adj.R2	0.3905	0.3914

This table reports the results of the firms' heterogeneity test. Panel A shows the impact of firm risk-taking behaviours, measured by the debt-to-equity ratio in the previous year. Panel B shows the impact of innovation capability, proxied by digital achievement. Panel C shows the impact of state ownership. Panel D examines the impact of market development. We create interaction terms between D&O insurance and these firm characteristics. The regression controls the full set of control variables and the combination of year effect, province effect, and industry effect. T-statistics are in parentheses. ***, **, and * represent significance levels of 1 %, 5 %, and 10 %, respectively. Variables have been defined in Appendix A.

Table 10
Market condition analysis.

	CSR			
	(1)	(2)	(3)	(4)
D&O	0.0729***	0.0781***	0.0712***	0.0842***
	(6.91)	(7.89)	(6.17)	(7.74)
EPU	0.0432			
	(0.01)			
D&O × EPU	0.0502***			
	(6.81)			
ΔEPU		0.0277		
		(0.01)		
D&O × ΔEPU		0.0324***		
		(4.22)		
CCI			0.1598	
			(0.02)	
D&O × CCI			0.0748***	
			(7.19)	
ΔCCI				0.3067
				(0.02)
D&O × ΔCCI				0.1005***
				(4.59)
Cons.	3.3299	3.3180	3.3058***	3.2408
	(1.05)	(1.12)	(7.42)	(1.28)
Control	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs.	6463	6463	6463	6463
Adj.R2	0.4256	0.4254	0.4255	0.4253

This table reports the results of the market condition analysis. The market conditions include economic policy uncertainty (EPU), the change in EPU, the consumer confidence index (CCI), and the change in CCI. We create interaction terms of D&O insurance and the above market indicators. The regression controls the full set of control variables and the combination of year effect, province effect, and industry effect. T-statistics are in parentheses. ***, **, and * represent significance levels of 1 %, 5 %, and 10 %, respectively. Variables have been defined in Appendix A.

This research contributes to the ongoing discourse on D&O insurance by expanding its scope beyond financial outcomes to explore its role as a governance mechanism that aligns managerial behaviours with broader societal expectations. By identifying new determinants of CSR performance and exploring the external pressures shaping managerial decisions, our findings offer valuable insights for policymakers, regulators, and corporate stakeholders aiming to enhance governance frameworks. Ultimately, this study underscores the dual role of D&O insurance as both a protective tool and a catalyst for fostering responsible corporate behaviour in an increasingly dynamic and interconnected global economy.

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CRediT authorship contribution statement

Xin Huang: Writing – review & editing, Project administration, Conceptualization. **Ji (George) Wu:** Software, Methodology, Formal analysis, Data curation. **Hengyu Bai:** Writing – original draft, Supervision, Conceptualization. **Hanze Yu:** Software,

Methodology, Formal analysis, Data curation. **Jing Li:** Writing – review & editing, Visualization, Resources, Funding acquisition, Data curation.

Author statement

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Appendix A. Variable definitions

Variable	Definition
D&O	A dummy variable equals 1 if a firm is holding D&O liability insurance and 0 otherwise
CSR Score	The total CSR score of the public firms obtained from Rankins rating report
ESG Score	The total ESG score of the public firms obtained from the Sino-Securities Index Information Service
Firm Size	Measured by the natural logarithm of the book value of total assets
Tobin's Q	Measured by the market value divided by total assets
Operating Cashflows	Measured by the natural logarithm of firms' operating cashflows
Cash Holdings	Measured by the natural logarithm of firms' cash holdings
Leverage	Measured by the total debt divided by total assets
ROA	Measured by the net profit divided by the total assets
Institutional Ownership	The percentage of shares held by institutional investors
Top Hold Ratio	The percentage of shares held by the largest shareholder
Independent Director	The percentage of independent directors in the board of directors
Female Director	The percentage of female directors in the board of directors
Duality	A binary variable equals 1 if the CEO and the Chair are the same person and 0 otherwise
Firm Age	Measured by the natural logarithm of (1 + firm's established period)
Lawsuit	The total number of corporate lawsuits in particular year for each province
Penalty	A dummy variable equals 1 if a firm receive an administrative penalty in the previous five years
FC-Index	A financial constraints measurement introduced by Hadlock and Pierce (2010)
WW-Index	A financial constraints measurement introduced by Whited and Wu (2006)
Over-Investment	An over-investment measurement employed by Shi (2019)
DE Ratio	Measured by the total debt divided by the shareholder's equity
Digital Achievement	The score estimated based on firms' digital standard, digital research, digital innovation patents, digital innovation qualifications, and digital national awards
Non-SOE	An indicator equals 1 if the firm is a non-SOE firm, and 0 otherwise
Marketisation Index	A provincial market development index obtained from the WIND database
EPU	The economic policy uncertainty index obtained from the Baker, Bloom, and Davis's EPU website
CCI	The consumer confidence index obtained from the CSMAR database

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