

Your Behaviour Reflects Your Risk Attitude: The Influence of CEOs' Insurance Behaviours on Corporate Social Responsibility

Qian Wang¹ and Weichen Yan²

¹School of Economics, Beijing Technology and Business University, Beijing, 100048, China ²School of Economics and Management, Beihang University, Beijing, 100191, China

Corresponding author email: dr_yan@buaa.edu.cn

This study explores how CEOs' insurance behaviours outside the workplace, as measured by the premium rates of their self-purchasing critical illness insurance, are related to corporate social responsibility (CSR) performance. We show that such behaviours (i.e. the CEO-insurance effect) capture the variation in CEOs' risk aversion and are positively associated with CSR performance. We also find that our results align with the risk mitigation hypothesis rather than the agency conflict hypothesis. Additional analysis reveals that the main effect is more pronounced among firms in uncertain environments. Further evidence shows that accounting conservatism and internal control are potential channels through which the CEO-insurance effect boosts CSR performance. Collectively, our evidence contributes to research on managerial risk attitude, heterogeneity in CSR policies and 'off-the-job' determinants of CEOs' styles.

Introduction

Do managerial personality traits shape corporate social responsibility (CSR hereafter)? A burgeoning recent literature provides copious evidence that managerial characteristics influence CSR decisions and performance (e.g. Cronqvist and Yu, 2017; Davidson, Dey and Smith, 2019; O'Sullivan, Zolotoy and Fan, 2021; Shahab *et al.*, 2020; Tang, Mack and Chen, 2018). The difference in risk attitudes is one of the most important dimensions of heterogeneity among individuals. As a unique

characteristic, risk tolerance is regarded to be a fundamental aspect of one's value system, and its significance in explaining corporate practices has been well documented (Bernile, Bhagwat and Rau, 2017; Bodnar *et al.*, 2019; Choi and Jung, 2021; Nguyen, Nguyen and Sila, 2019). As emphasized by Hoskisson *et al.* (2017), managerial risk attitudes play a central role in strategic management research. The insight is also confirmed in an interview of 345 randomly sampled CEOs of private manufacturing firms in the Yangzi delta region in China by Oppen, Nee and Holm (2017). They emphasize the significance of risk aversion in explaining corporate strategic choices and performance.

Despite such clear evidence that risk attitude matters, empirical evidence supporting how managerial risk aversion affects CSR is relatively scarce. Particularly, the lack of large-sample data to capture managerial risk aversion has posed a significant challenge to providing empirical

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findings (Bodnar *et al.*, 2019). In response to this challenge and to fill the void, we present and validate a proxy for CEO risk aversion that is based on the literature on psychology and behavioural finance (e.g. Einav *et al.*, 2013; Handel and Kolstad, 2015; Outreville, 2014) and ‘behavioural consistency theory’ (i.e. individuals tend to behave in similar ways across diverse contexts) (Cronqvist, Makhija and Yonker, 2012).

Specifically, our study focuses on CEOs, who are considered to be among the most influential decision-makers in CSR (e.g. Davidson, Dey and Smith, 2019; Tang *et al.*, 2015; Yuan *et al.*, 2019). In this paper, we empirically capture the variation in CEOs’ risk aversion (i.e. the CEO-insurance effect, hereafter) using the premium rates of CEOs’ self-purchased critical illness insurance. CEO-level data offers benefits that prior research using aggregate regional and firm-level data might not provide. In particular, CEOs’ ‘off-the-job’ behaviours are less likely to be influenced by firms’ characteristics. The desirable properties of our measure make it particularly useful for investigating the following research questions: (1) Is the CEO-insurance effect related to better CSR performance? (2) If so, what are the motivations, underlying channels and economic consequences of this phenomenon?

We argue that the CEO-insurance effect is particularly pertinent to CSR performance for the following two reasons. Based on the risk mitigation hypothesis, risk-averse CEOs are more likely to engage in CSR as they offer the potential to mitigate firm risk from a variety of sources, including ‘insurance-like’ protection, improved risk management and easier access to financial markets and scarce resources (Bae *et al.*, 2021; Dremetic, Klein and Zwergel, 2020; Farrukh *et al.*, 2020; Tong, 2010). According to the agency conflict hypothesis, risk-averse CEOs might participate in CSR activities for private benefits, such as improving their reputation, gaining advancement opportunities and earning decent compensation (Awaysheh *et al.*, 2020; Flammer, 2015; Pedersen, Fitzgibbons and Pomorski, 2021). In both cases, we expect there to be a positive association between the CEO-insurance effect and CSR performance.

Using a proprietary dataset of CEOs’ critical illness insurance in China and a dataset of CSR from the Hexun database, we find that the CEO-insurance effect is positively related to CSR performance. In particular, if the CEO-insurance

effect increases by one standard deviation, the increase in CSR rating corresponds to about 12% of the mean value of CSR scores. Additionally, the aggregate effect is not driven by only one specific CSR category dwarfing all others. Further, we perform various robustness tests on the baseline results and propose a battery of strategies to mitigate potential endogeneity concerns. We also explore the motivations and potential channels underlying our main findings and conduct cross-sectional analyses to validate the core theoretical logic.

This paper contributes to the literature in two major ways. First, our study contributes to the behavioural consistency theory and the literature on managerial risk attitudes. Despite recent research that has recognized that CEOs’ risk attitudes could be shaped by demographic characteristics, incentives and past experiences (e.g. Bakke *et al.*, 2016; Faccio, Marchica and Mura, 2016; Nguyen, Nguyen and Sila, 2019; O’Sullivan, Zolotoy and Fan, 2021; Sunder, Sunder and Zhang, 2017), our study provides a novel measure of CEOs’ ‘type’ based on health insurance behaviour (i.e. ‘off-the-job’ experience) to this stream of literature. To the best of our knowledge, this study is one of the first to identify the role of CEOs’ health insurance behaviours in CSR performance, raising the possibility that this measure is also helpful in exploring other aspects of corporate decisions and performance.

Second, our study contributes to the body of literature on CSR by providing empirical evidence regarding the role of managerial risk attitude in explaining variation in CSR performance across firms. In previous studies (e.g. Davidson, Dey and Smith, 2019; Huang, 2013; McCarthy, Oliver and Song, 2017; Petrenko *et al.*, 2016), CSR determinants have been identified at managerial levels, including demographic backgrounds (e.g. age, gender), psychological characteristics (e.g. narcissism, materialism). We extend the latter line of literature by demonstrating that the risk-aversion predisposition – the CEO-insurance effect – is a vital CEO characteristic that contributes to CSR performance. Further, we also attempt to shed light on the motivations, potential channels and economic consequences of this phenomenon in depth. Additionally, we respond to the growing calls for deconstructing CSR measures (e.g. Al-Shammari, Rasheed and Al-Shammari, 2019; Wang and Choi, 2013). By examining multiple dimensions of CSR

separately, we demonstrate the possibility of gaining better insights into firms' CSR activities.

Background, literature and hypothesis development

Institutional background

The Chinese health insurance system is one of the largest in the world, comprising both basic and commercial health insurance. The majority of Chinese citizens have access to basic health insurance; however, compared with commercial health insurance, it offers limited financial protection. Consequently, individuals may suffer considerable financial losses in the event of critical illnesses.

Critical illness insurance (CII) is a type of commercial health insurance that has been gaining attention worldwide (Jiang *et al.*, 2019). It helps to cover the extra costs associated with dozens of serious illnesses, such as malignant tumours, severe acute myocardial infarction, acute severe hepatitis, severe chronic liver failure and severe Alzheimer's disease. With the growing emphasis on critical illnesses, CII continues to play an increasingly important role in filling the gap in insurance coverage and providing medical services to the population (Gatzert and Maegebier, 2015; Jiang *et al.*, 2019; Wan *et al.*, 2020). Despite the relatively late introduction of CII in China and the large gap with developed countries, it is desirable to utilize CII data to gauge risk attitude for the following reasons.

First, compared to other types of insurance, CII is less likely to suffer from issues like moral hazard. It is important to note that CII covers serious illnesses such as malignant tumours that pose a life-threatening risk, which reduces the potential for moral hazard (Hambel, 2020). Moreover, CII in China has a long waiting period, which reduces the likelihood of adverse selection. Consequently, the behaviour of purchasing CII is relatively straightforward. Further, we focus on CEOs of publicly listed firms in China. This group of individuals is generally better educated and has a higher income, which is typical of those buying CII. Therefore, it is relatively objective to use CII data to capture individual risk preferences.

Second, risk-averse individuals are generally more sensitive to uncertainty than risk-takers, and they are more likely to purchase insurance to transfer risk and protect against loss (Cleeton and Zellner, 1993; Einav *et al.*, 2013; Handel and Kol-

stad, 2015; Outreville, 2014; Sitkin and Weingart, 1995). This point is well supported by extensive evidence (e.g. Condliffe and Fiorentino, 2014; O'Donoghue and Somerville, 2018; Pauly, Blavin and Meghan, 2009). Further, some studies suggest that the purchase of CII reflects individuals' risk preferences (e.g. Hambel, 2020; Schmitz, 2011).

Third, culture, embedded in people's subconscious minds, affects individuals' value judgments and shapes their economic behaviours. As an illustration, Li *et al.* (2013) provide empirical evidence that cultural values (e.g. uncertainty avoidance) matter in corporate risk-taking. Confucianism is believed to be fundamental to Chinese culture, emphasizing caution and prudence and thus exhibiting aversion to risk. Therefore, the Chinese are more inclined to purchase insurance due to their risk aversion.

Overall, risk attitudes can be reflected in individuals' insurance behaviours, and we expect that it is feasible to utilize CEOs' CII behaviours to capture their risk preferences.

Managerial characteristics and corporate social responsibility

According to upper echelons theory (Hambrick and Mason, 1984), executives' choices are influenced by their values, dispositions and prior experiences, and corporate actions reflect their characteristics and preferences (Al-Shammari, Rasheed and Al-Shammari, 2019; Xu and Ma, 2021; Zhu and Chen, 2015). Substantial studies in economics, finance and management indicate that executives exert considerable influence over organizations, and it is generally accepted that CEOs are the most influential decision-makers (Hambrick, 2007; Hambrick and Mason, 1984; Huang, 2013; Li and Tang, 2010; Quigley and Graffin, 2017; Quigley and Hambrick, 2015; Yuan *et al.*, 2019). Since CEOs' dispositions and values affect corporate decision-making, it seems logical that a firm's CSR involvement and performance might also be influenced by the CEO's value system and personal characteristics (Datta and Iskandar-Datta, 2014; Petrenko *et al.*, 2016).

First, Hambrick and Mason (1984) point out that some observable factors (e.g. gender, age, education) can impact corporate decision-making (e.g. CSR-related decisions). For example, Borghesi, Houston and Naranjo (2014) and Hegde and Mishra (2019) emphasize the significance of

CEOs' gender on socially responsible corporate practices. In addition, Waldman, Siegel and Javidan (2006) demonstrate that older executives are more likely to consider the interests of multiple stakeholders, which results in improved CSR performance. Moreover, Tihanyi *et al.* (2000) state that highly educated executives are more likely to have ethical and compliance values regarding charitable participation and environmental issues.

Second, there is evidence that the specific experiences of top management (e.g. academic background, financial expertise and foreign experience) have an impact on CSR, promoting both effective performance and the implementation of environmental standards (Hambrick, 2007). For example, Lau, Lu and Liang (2016) find that the management team's foreign exposure has a positive effect on the organization's social and environmental performance. In a similar vein, Shahab *et al.* (2020) focus primarily on CEOs rather than top management teams and suggest that CEOs with academic backgrounds, financial expertise and foreign exposure are more likely to improve sustainable environmental management, performance and reporting.

Finally, some scholars explore psychological management characteristics and provide interesting and insightful results. Tang *et al.* (2015) demonstrate, for example, that hubristic CEOs tend to prioritize their own interests and ignore the interests of key stakeholders, which negatively impacts CSR performance. Petrenko *et al.* (2016) argue that CEOs' narcissism promotes CSR-related activities, but has a negative moderating effect on the relationship between CSR and corporate performance. Additionally, Cronqvist and Yu (2017) suggest that CEOs are shaped by their daughters. They find that when a firm's CEO has a daughter, the CSR performance is higher than the median. Additionally, Davidson, Dey and Smith (2019) point out that firms with materialistic CEOs have lower CSR performance.

Managerial risk attitude and corporate policies

Risk preference, one of the most fundamental personal characteristics of interest in economics, finance and accounting literature, is challenging to measure empirically. There is still a gap in our understanding of the factors that influence managerial risk-taking. We outline research on CEO risk attitudes from three perspectives: (1) CEO risk-

taking incentives; (2) CEO traits; and (3) CEO life experiences.

First, it has been observed that CEO compensation packages and stock option-based compensation shape CEOs' risk-taking incentives. Based on this insight, several studies examine the relationship between CEO compensation and CSR activities (e.g. Armstrong *et al.*, 2013; Bouslah *et al.*, 2018; Cai, Jo and Pan, 2011; Chen *et al.*, 2015; Mahoney and Thorn, 2006; McGuire, Dow and Argheyd, 2003). For instance, Chen *et al.* (2015) demonstrate a positive correlation between CEO compensation and stock return volatility (vega). Bouslah *et al.* (2018) focus on CEO risk-taking incentives, measured by the sensitivity of CEO wealth held in options to a change in stock return volatility or vega. Their findings suggest that CEO risk-taking incentives positively relate to socially irresponsible activities.

Second, there is burgeoning literature studying the relation between specific management attributes and economic outcomes. Particularly, some studies investigate the impact of CEO demographic characteristics (e.g. age, education and gender) on corporate risk-taking (Farg and Mallin, 2018). For instance, previous studies indicate that older and female CEOs are less risky and more conservative in terms of financing and investment decisions, acquisitions and diversification (e.g. Faccio, Marchica and Mura, 2016; Nguyen, Nguyen and Sila, 2019; Serfling, 2014). Moreover, these studies also show that highly educated CEOs are more open-minded to new innovative business ideas and better informed about the external environment.

Third, a number of studies indicate that exposure to traumatic events, experiences related to extreme sports or other special experiences could have a significant effect on CEO risk-taking and, thus, on corporate practices and decisions (Bamber, Jiang and Wang, 2010; Bernile, Bhagwat and Rau, 2017; Bertrand and Schoar, 2003; Dittmar and Duchin, 2016; Malmendier, Tate and Yan, 2011; Schoar and Zuo, 2017). For instance, in the stream of literature on traumatic experiences (e.g. Choi and Jung, 2021; Knüpfer, Rantapuska and Sarvimäki, 2017; Malmendier, Tate and Yan, 2011; O'Sullivan, Zolotoy and Fan, 2021), Malmendier, Tate and Yan (2011) demonstrate that CEOs who grew up in the Great Depression are risk-averse with respect to debt and rely primarily on their resources. Nevertheless, some experts believe that

CEOs who have experienced early-life disasters are more tolerant of risk and thus more willing to accept risks (Bernile, Bhagwat and Rau, 2017; Chen *et al.*, 2021). In addition, Benmelech and Frydman (2015) demonstrate that the military experience of CEOs is associated with more conservative corporate policies (e.g. lower corporate investment, less corporate fraud). Moreover, a CEO's marital experiences may also have an impact on corporate decisions. Based on Roussanov and Savor (2014), firms managed by single CEOs exhibit higher stock return volatility and pursue more aggressive investment strategies.

Furthermore, there is also a small but growing body of research applying behavioural consistency theory (i.e. the notion that individuals behave consistently across various situations) to explain the heterogeneity of corporate policies (e.g. Cronqvist, Makhija and Yonker, 2012). As an example, Hutton, Jiang and Kumar (2014) provide evidence that political conservatism correlates with a more conservative attitude towards corporate decision-making (e.g. corporate debt, capital expenditures and R&D expenditures). In addition, Cain and McKeon (2016) and Sunder, Sunder and Zhang (2017) suggest that CEOs with small-aircraft pilot licences have a greater appetite for risk when making corporate decisions.

In sum, our paper differs from existing studies in three major ways. First, CEOs' 'off-the-job' behaviours are less likely to be influenced than 'on-the-job' behaviours by firm characteristics (e.g. incentive plans), which facilitates the identification of managerial risk tolerance. Second, we extend beyond the observation of personal characteristics by investigating whether specific actions CEOs take in their personal lives impact their professional actions. Finally, in addition to providing a better understanding of the determinants of CSR, this paper highlights the role that CEOs' personal insurance behaviours play in shaping corporate decisions, an aspect that has been largely overlooked. In particular, we uncover explicit mechanisms through which the CEO-insurance effect affects CSR performance.

The CEO-insurance effect and CSR performance

Upper echelons theory (Hambrick, 2007; Hambrick and Mason, 1984) suggests that executives are bounded rational and usually act following their personal preferences, values and experiences.

Accordingly, they determine how (and to what extent) to fulfil social responsibilities based on stakeholder needs (Graham *et al.*, 2013). In the practice of CSR, executives undoubtedly incorporate their characteristics (e.g. risk preferences) into decision-making processes, thereby influencing CSR performance. Further, guided by the behavioural consistency theory (Cronqvist, Makhija and Yonker, 2012), if CEOs' health insurance behaviour (i.e. the CEO-insurance effect) corresponds to variations in their risk aversion, we predict that the CEO-insurance effect can improve CSR performance from two perspectives (*risk mitigation and agency conflict*).

Risk mitigation hypothesis. CEOs who are risk-averse are more likely to engage in CSR initiatives since CSR has the potential to mitigate firm risk from a variety of sources, such as 'insurance-like' protection, improved risk management and easier access to financial markets or scarce resources.

First, firms can establish positive relationships with their stakeholders if CEOs are more actively involved in CSR initiatives, which serves as 'a form of insurance'. Then, during times of crisis, firms' operations (supply and demand) can be stabilized, thus increasing resilience against external shocks and speeding up recovery (Bae *et al.*, 2021; Farrukh *et al.*, 2020; Zhang *et al.*, 2021). For example, Chih, Miao and Chuang (2014) examine CSR participation among Global 500 companies and conclude that CSR programmes provide organizations with latent insurance against adverse events. There is also some evidence that firms actively involved in social initiatives are rewarded with high credit ratings (e.g. Jiraporn *et al.*, 2014; Weber, Scholz and Michalik, 2010). In fact, CEOs purchase CII to minimize the damage caused by adverse events. Additionally, if the CEO is more risk-averse, there may be a higher level of the CEO-insurance effect. Similarly, the above 'insurance-like' benefits are consistent with the preferences of CEOs who are averse to risk.

Second, CSR is increasingly perceived as a risk management tool, particularly among risk-averse CEOs (Drempetic, Klein and Zwergel, 2020; Waddock and Graves, 1997; Zhang *et al.*, 2021). It has been shown that CSR engagement can help to reduce a firm's cost of equity capital (El Ghoul *et al.*, 2018), cost of debt (Gillan, Koch and Starks, 2021), idiosyncratic risk (Lin *et al.*, 2020) and firm crash risk (Kim, Li and Li, 2014). For

instance, Breuer *et al.* (2018) demonstrate that socially conscious investors favour firms with high levels of social responsibility performance, leading to lower costs of capital (or lower firm risks). Therefore, CEOs who are risk-averse may choose to engage in CSR activities in order to enhance risk management.

Finally, according to the agency theory, a risk-averse CEO may maintain large cash holdings to reduce firm risk at the expense of shareholder value (Tong, 2010). The stakeholder theory and resource dependence theory, however, suggest that CSR engagement can be a useful tool for reducing financial constraints and obtaining better access to financial markets (Cheng, Ioannou and Serafeim, 2014; García-Sánchez *et al.*, 2019). As a result, risk-averse CEOs are likely to engage in CSR activities to gain access to financial markets and reduce financial constraints. In addition, risk-averse CEOs often underestimate their abilities to solve problems, overestimate the resources required for strategic planning and subjectively believe that the organization lacks the necessary resources, thus depending more on stakeholders' resources (Al-Shammari, Rasheed and Al-Shammari, 2019; Li and Tang, 2010). Further, risk-averse CEOs may benefit from CSR initiatives since CSR activities can improve firms' capabilities and resources (e.g. external funding, improved community relations and social capital accumulation) while simultaneously enhancing shareholder value in the long term. Therefore, CSR activities can be used to reduce financial constraints and develop new capabilities and resources, thereby benefiting firms' risk management.

Agency conflict hypothesis. In traditional agency theory, CEOs (agents) are regarded as risk-averse and are bound to their firms by wealth and reputation (Jensen and Meckling, 1976). In contrast, shareholders (principals) are considered risk-neutral as they can diversify their investments to shield themselves against financial risks. According to Fama and French (1992), economic returns are associated with high risks, so we can assume that diversifying portfolios might lead firms to adopt riskier strategies in order to maximize portfolio value. Thus, since principals and agents have different risk preferences, governance mechanisms are helpful in reducing the potential costs to shareholders when CEOs are less likely to adopt 'high-

risk/high-return' strategies (Gomez-Mejia, Neacsu and Martin, 2019). For instance, equity-based compensation can serve as a promising solution to the agency problem (Jensen and Murphy, 1990).

A growing body of behavioural research, however, challenges the assumption that CEOs have fixed risk-taking preferences and suggests that their risk preferences are context-dependent (Gomez-Mejia, Neacsu and Martin, 2019; Martin, Gomez-Mejia and Wiseman, 2013). On the one hand, agents (CEOs) can lose accumulated equity (or current wealth) if risk strategies fail, leading them to risk-averse strategic decisions. On the other hand, agents could further enhance equity wealth (prospective wealth) when taking risks to promote higher-risk strategies.

In the above theoretical framework, the impact of an agent's heterogeneous risk behaviour is largely ignored. Agents' individual risk heterogeneity may also weaken or bolster their subjective expectations of present or future wealth. According to the traditional agency theory, we believe that individual risk-aversion preferences might lead agents (CEOs) to become more risk-averse in order to protect their own interests. Consequently, we discuss the CEO-insurance effect on CSR performance from the perspective of agency conflict as follows.

First, based on traditional agency theory and behavioural research, prior studies indicate that socially responsible firms frequently encounter agency problems when their agents (CEOs) place their interests above those of shareholders, which substantially increases agency costs (e.g. Borghesi, Houston and Naranjo, 2014; Brown, Helland and Smith, 2006; Krueger, 2015; Masulis and Reza, 2015). The arguments presented above are supported by numerous previous studies. For instance, Cespa and Cestone (2007) suggest that underperforming executives are more likely to use CSR activities to gain stakeholder support. Prior, Surroca and Tribó (2008) demonstrate that executives strategically engage in CSR practices to mask earnings manipulation. According to Petrenko *et al.* (2016) and Al-Shammari, Rasheed and Al-Shammari (2019), CEOs contribute to socially responsible initiatives to obtain attention and recognition as part of their pursuit of fame. In addition, Kim, Kim and Qian (2018) suggest that firms simultaneously engage in both positive and negative CSR. To mitigate the negative consequences of negative CSR on financial

performance, executives tend to engage in more positive CSR activities to hide negative behaviours.

Second, there is some evidence that risk-averse CEOs may participate in CSR activities in order to achieve private benefits, such as the improvement of their image as global citizens, advancement opportunities and decent salaries (Awaysheh *et al.*, 2020; Barnea and Rubin, 2010; Buchanan, Cao and Chen, 2018; Flammer, 2015; Pedersen, Fitzgibbons and Pomorski, 2021). According to agency theory and behavioural research, we expect that CEOs' health insurance behaviour may reinforce their risk-averse preferences, leading to better socially responsible performance that is self-serving at the expense of shareholders (Ferrell, Liang and Renneboog, 2016; Krueger, 2015). Accordingly, we propose the following research hypothesis:

H1: The CEO-insurance effect is positively associated with corporate social responsibility performance.

Sample, data and descriptive statistics

Sample and data

Our initial sample consists of firms listed on the Shanghai Stock Exchange (SHSE) and Shenzhen Stock Exchange (SZSE) from 2010 to 2018, and the start year is determined by the availability of CSR data. We start with a comprehensive dataset from three sources: (1) financial accounting, CEO characteristics and corporate governance data from the China Stock Market & Accounting Research (CSMAR) database; (2) CSR scores from the Hexun database; and (3) CEOs' CII data (proprietary dataset) from a leading insurance company in China. Panel A of Table 1 describes the sample selection process.

We first merge the CSMAR database with the CEOs' CII dataset. The next step is to identify CII related to CEOs using information from the CSMAR database pertaining to CEO characteristics. This process leads to a merged sample of 8240 observations. Second, in line with prior literature (e.g. Gong *et al.*, 2021; Xu and Ma, 2021; Zhu *et al.*, 2022), we take the following steps to filter our sample: (1) exclude financial firms; (2) drop observations of special treatment (ST or *ST) firms; (3) remove observations with missing data for CSR scores from the Hexun database; and (4) delete

observations with missing data for control variables. Using this selection procedure, we obtain a final sample of 6048 observations. All the data are cross-checked for consistency.

Variables

Measuring CSR performance. Following prior studies (e.g. Gong *et al.*, 2021; Xu and Ma, 2021; Zhu *et al.*, 2022), we measure CSR performance using CSR scores from the Hexun database, one of the largest financial information service providers that analyse financial information data in China. The Hexun CSR rating is widely recognized as a valuable proxy for evaluating the CSR performance of Chinese listed firms and has several advantages over other CSR metrics (e.g. Gong *et al.*, 2021; Su, 2019; Zhu *et al.*, 2022). A study conducted by Zhong *et al.* (2019) indicates that Hexun criteria are more reliable than other metrics in China for measuring CSR performance.

The Hexun database develops an index which measures the CSR performance of five stakeholder dimensions: shareholder, employee, supplier & customer, environment and society. An aggregate of five indicators is divided into 13 secondary and 37 third-level indicators. Furthermore, Hexun constructs different weights for various business sectors, depending on the importance of the responsibilities assigned to the stakeholders. Our primary CSR performance measure (*CSR*) is calculated as the weighted sum of the scores divided by 100, ranging from 0 to 1. Higher CSR scores correspond to better CSR performance.

Measuring CEOs' insurance behaviours. The insurance behaviours of CEOs can provide insight into their risk preferences. Risk preference is generally referred to as individuals' inherent style, which is an important determinant of how they view and assess risk (Arrow, 1992). In comparison to risk-takers, risk-averse individuals are more averse to uncertainty, more likely to purchase insurance to transfer risk and more willing to pay actuarially fair premiums in order to protect themselves against potential losses (Cleeton and Zellner, 1993; Sitkin and Weingart, 1995).

With reference to the literature on psychology and behavioural finance (e.g. Einav *et al.*, 2013; Handel and Kolstad, 2015; Outreville, 2014) as well as the 'behavioural consistency theory' (Cronqvist, Makhija and Yonker, 2012), we describe the

Table 1. Sample selection and summary statistics

Panel A: Sample selection procedure

	Observations
Initial sample:	
Observations of firms listed in the SHSE and SZSE over 2010–2018 from the merged CSMAR database and CII dataset	8240
Less:	
Observations of financial firms	(418)
Observations of special treatment (ST or *ST) firms	(764)
Observations with missing data for CSR scores from the Hexun database	(206)
Observations with missing data for control variables	(804)
Final sample	6048

Panel B: Distribution of firms by CSRC industry code

CSRC code	Industry description	(1) Number of firms	(2) Percentage of all firms (%)
A	Agriculture, forestry and fishing	10	1.49
B	Mining	26	3.87
C1	Food and beverage manufacturing	43	6.40
C2	Apparel and paper manufacturing	129	19.20
C3	Machine manufacturing	199	29.61
C4	Other manufacturing	6	0.89
D	Electricity, heat, gas and water	29	4.32
E	Construction	21	3.12
F	Wholesale and retail	57	8.48
G	Transportation, storage and postal	31	4.61
H	Accommodation and catering	4	0.60
I	Information, software and information technology	29	4.32
K	Real estate	45	6.70
L	Leasing and business services	8	1.19
M	Scientific research and technical services	4	0.60
N	Water conservancy, environment and public facilities management	8	1.19
O	Other service	1	0.15
Q	Health and social work	9	1.34
R	Culture, sports and entertainment	13	1.93
S	Conglomerates	10	1.49
Total		672	100

Panel C: Summary statistics

Variable	N	Mean	SD	P25	Median	P75
CSR	6048	0.292	0.184	0.177	0.235	0.318
CEO Insurance	6048	0.170	0.087	0.106	0.165	0.228
Size	6048	22.507	1.362	21.553	22.351	23.359
Leverage	6048	0.473	0.201	0.323	0.481	0.628
ROA	6048	0.043	0.049	0.017	0.036	0.065
MB	6048	1.962	1.132	1.196	1.574	2.245
Sales Growth	6048	0.179	0.367	−0.011	0.113	0.265
Cash	6048	0.180	0.127	0.092	0.145	0.231
Independent	6048	0.371	0.055	0.333	0.333	0.400
Board Size	6048	2.172	0.196	2.079	2.197	2.197
Firm Age	6048	2.449	0.604	2.197	2.639	2.890
IShare	6048	0.076	0.076	0.018	0.054	0.107
HHI	6048	0.221	0.181	0.096	0.131	0.296
SOE	6048	0.560	0.496	0.000	1.000	1.000
CEO Age	6048	3.895	0.126	3.829	3.912	3.989
CEO Education	6048	0.687	0.464	0.000	1.000	1.000
CEO Gender	6048	0.946	0.226	1.000	1.000	1.000

variation in CEO risk aversion by examining the percentage of CEO CII premiums over the amount insured. In the insurance literature, this measure is commonly referred to as the ‘premium rate’. As a result, we utilize the premium rate to reflect the CEO-insurance effect (i.e. *CEO Insurance*). Higher values of CEO Insurance are indicative of greater risk aversion of CEOs.

Control variables. Following prior studies about the determinants of CSR (e.g. Chen *et al.*, 2020; Cronqvist and Yu, 2017; Davidson, Dey and Smith, 2019; O’Sullivan, Zolotoy and Fan, 2021; Yuan *et al.*, 2019), we control for a comprehensive set of factors such as firm size (*Size*), leverage (*Leverage*), profitability (*ROA*), market-to-book (*MB*), annual sales growth rate (*Sales Growth*), cash holdings (*Cash*), corporate governance (*Independent*, *Board Size*), the numbers of years a firm has been listed (*Firm Age*), institutional ownership (*IShare*), Herfindahl index (*HHI*) and state-owned enterprises indicator (*SOE*). Further, we include three CEO characteristics: age (*CEO Age*), education (*CEO Education*) and gender (*CEO Gender*). Detailed definitions of these variables are presented in Appendix A, and we also winsorize all continuous variables at 1% in both tails.

Summary statistics

Panel B of Table 1 shows the distribution of firms across industries as classified according to the Industry Classification of Listed Companies issued by the CSRC in 2012. The top five industries are machine manufacturing (29.61%), apparel & paper manufacturing (19.20%), wholesale & retail (8.48%), real estate (6.70%) and food & beverage manufacturing (6.40%).

Panel C presents the descriptive statistics of the main variables used in our analysis. The mean and median for CSR are 0.292 and 0.235, respectively. This shows substantial variation across observations, with a standard deviation of 0.184. The mean value of CEO Insurance is 0.170, with a standard deviation of 0.087. The median of the CEO-insurance effect is 0.165, suggesting that the distribution is somewhat skewed to the right. The descriptive statistics for control variables are shown in reasonable ranges and are comparable to prior research (e.g. Chen *et al.*, 2020; Yuan *et al.*, 2019; Zhang, Kong and Wu, 2018).

We also test the correlation matrix among our main variables (untabulated). It shows that the CEO-insurance effect (*CEO Insurance*) is significantly and positively correlated with CSR performance (*CSR*), consistent with our main hypothesis. Moreover, in unreported tables, we conduct univariate analyses on the relation between the CEO-insurance effect and CSR scores. Generally, firms with high CEO-insurance effects (*High*) score higher on CSR performance than those with low CEO-insurance effects (*Low*). The two types of firms (High and Low) are classified according to the mean value of the CEO-insurance effect. The difference (0.061) is statistically significant at the 1% level. We further partition firms according to their CSR scores into five groups (0–0.2, 0.2–0.4, 0.4–0.6, 0.6–0.8 and 0.8–1) and compare the mean values of CSR between the two types of firms. We find similar results.

Empirical evidence

Main findings

Following prior studies (e.g. Cronqvist and Yu, 2017; Yuan *et al.*, 2019; Zhang, Kong and Wu, 2018), we estimate the empirical model as follows:

$$\text{CSR}_{i,t} = \alpha_0 + \alpha_1 \text{CEO Insurance}_{i,t} + \alpha_k \text{Controls}_{i,t} + \text{Industry} + \text{Year} + \varepsilon_{i,t} \quad (1)$$

where CSR represents CSR performance. CEO Insurance is our focus-independent variable. Control variables include firm and CEO characteristics. We also control for industry and year fixed effects in Equation (1). All variables are defined in Appendix A.

The CEO-insurance effect and CSR. Table 2 reports estimates from Equation (1). In column (1), the coefficient of CEO Insurance is positive and statistically significant at the 1% level (coefficient = 0.709, t-statistic = 6.37). In columns (2) and (3), we include variables of firm and CEO characteristics. In column (4), we further add firm fixed effects. As expected, the results are all positive and significant, at least at the 5% level, suggesting that the CEO-insurance effect is associated with a higher CSR score.

In terms of economic significance, taking column (3) as an example, a one-standard-deviation increase in the CEO-insurance effect (*CEO Insurance*) increases CSR performance by 0.036 (0.415

Table 2. The CEO-insurance effect and CSR performance

	(1) CSR	(2) CSR	(3) CSR	(4) CSR
CEO Insurance	0.709*** (6.37)	0.433*** (3.16)	0.415*** (2.80)	0.324*** (2.05)
Size		0.056*** (23.15)	0.056*** (22.89)	0.063*** (14.62)
Leverage		−0.077*** (−5.73)	−0.078*** (−5.73)	−0.080*** (−4.29)
ROA		0.898*** (16.89)	0.895*** (16.80)	0.709*** (13.62)
MB		0.011*** (4.74)	0.011*** (4.64)	0.010*** (3.94)
Sales Growth		−0.015*** (−2.92)	−0.014*** (−2.87)	−0.001 (−0.30)
Cash		−0.003 (−0.19)	−0.006 (−0.34)	−0.011 (−0.56)
Independent		−0.045 (−1.04)	−0.044 (−1.04)	0.010 (0.18)
Board Size		−0.000 (−0.03)	0.001 (0.05)	0.024 (1.21)
Firm Age		−0.005 (−1.25)	−0.006 (−1.38)	0.000 (0.03)
IShare		0.128*** (4.25)	0.128*** (4.25)	0.024 (0.76)
HHI		−0.008 (−0.43)	−0.008 (−0.42)	−0.004 (−0.28)
SOE		0.012*** (2.76)	0.012*** (2.60)	−0.001 (−0.09)
CEO Age			0.013 (0.84)	0.052*** (2.76)
CEO Education			0.007 (1.51)	−0.001 (−0.20)
CEO Gender			−0.017* (−1.85)	−0.010 (−0.99)
Intercept	0.290*** (59.86)	−0.971*** (−16.90)	−1.005*** (−12.87)	−0.995*** (−7.88)
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Firm FE	NO	NO	NO	YES
N	6048	6048	6048	6048
Adj_R ²	0.126	0.319	0.320	0.560

Note: Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * indicate statistically significant at the 1%, 5% and 10% levels, respectively.

× 0.087), which corresponds to 12% of the mean value of CSR scores (0.292) in the descriptive statistics table. Therefore, the influence of the CEO-insurance effect on CSR performance is both statistically significant and economically meaningful.

Evidence from the decomposition of CSR ratings. The primary findings demonstrate that a higher-level CEO-insurance effect is associated with better CSR performance. Our CSR measure is composed of five different categories: shareholder, employee,

supplier & customer, environment and social contribution. As such, we examine each of these categories separately.

Table 3 shows that the coefficients of *CEO Insurance* are significantly positive for all CSR categories (at the 10% level or better). Specifically, we find that CEO-insurance effects are associated with higher CSR scores by 0.202, 0.243, 0.188, 0.258 and 0.253 in each of the five categories, respectively. This suggests that the aggregate effect is not driven by only one specific category dwarfing all others.

Table 3. Evidence from the decomposition of CSR ratings

	(1) Shareholder	(2) Employee	(3) Supplier & Customer	(4) Environment	(5) Social Contribution
CEO Insurance	0.202** (2.27)	0.243** (2.05)	0.188* (1.89)	0.258** (2.16)	0.253** (2.01)
Size	0.011*** (20.03)	0.011*** (20.51)	0.014*** (17.35)	0.016*** (17.69)	0.004*** (7.37)
Leverage	-0.030*** (-8.13)	-0.014*** (-4.91)	-0.019*** (-4.25)	-0.024*** (-4.98)	0.009*** (2.66)
ROA	0.772*** (37.84)	0.005 (0.44)	0.021 (1.24)	-0.014 (-0.76)	0.111*** (9.60)
MB	-0.004*** (-6.22)	0.004*** (8.50)	0.005*** (6.24)	0.005*** (6.26)	0.000 (0.51)
Sales Growth	-0.004*** (-2.65)	-0.001 (-0.57)	-0.005*** (-3.29)	-0.003* (-1.73)	-0.002 (-1.27)
Cash	0.026*** (5.80)	-0.005 (-1.36)	-0.017*** (-2.98)	-0.028*** (-4.49)	0.018*** (4.33)
Independent	-0.026*** (-2.99)	0.000 (0.00)	0.000 (0.01)	-0.004 (-0.29)	-0.014 (-1.35)
Board Size	-0.001 (-0.22)	0.003 (0.94)	0.004 (0.86)	0.005 (1.09)	-0.010*** (-3.30)
Firm Age	-0.007*** (-7.07)	0.000 (0.49)	-0.001 (-0.51)	-0.003** (-2.24)	0.005*** (5.15)
IShare	0.064*** (10.25)	0.005 (0.74)	0.041*** (3.95)	0.012 (1.13)	0.007 (1.01)
HHI	-0.005 (-0.99)	-0.001 (-0.12)	0.005 (0.75)	-0.001 (-0.16)	-0.007 (-1.15)
SOE	-0.001 (-1.06)	0.005*** (4.76)	0.002 (1.23)	0.006*** (3.63)	0.000 (0.44)
CEO Age	0.010*** (2.72)	-0.003 (-1.00)	0.005 (0.95)	-0.000 (-0.04)	0.002 (0.48)
CEO Education	-0.000 (-0.10)	0.002* (1.68)	0.003** (2.02)	0.002 (1.21)	0.000 (0.23)
CEO Gender	-0.001 (-0.58)	0.000 (0.01)	-0.009*** (-2.73)	-0.004 (-1.33)	-0.003 (-1.27)
Intercept	-0.139*** (-7.85)	-0.202*** (-12.21)	-0.305*** (-11.59)	-0.322*** (-11.35)	-0.036* (-1.89)
Year FE	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES
N	6048	6048	6048	6048	6048
Adj_R ²	0.642	0.222	0.204	0.213	0.378

Note: Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * indicate statistically significant at the 1%, 5% and 10% levels, respectively.

In addition, following Al-Shammari, Rasheed and Al-Shammari (2019), we also divide the five dimensions into internal CSR (i.e. employee) and external CSR (i.e. shareholder, supplier & customer, environment and society). Untabulated results indicate that the CEO-insurance effect contributes to both internal and external CSR initiatives.

Robustness tests. In this section, we conduct a battery of robustness tests on the baseline results, including alternative measures for CSR and

the CEO-insurance effect, the influence of CEOs' compensation and chairmen. The results of the above analysis indicate that our findings are robust (see Appendix B for further details).

Endogeneity concerns

It has been documented that the CEO-insurance effect is positively related to CSR scores; however, several endogeneity concerns might exist, including omitted variable bias, selection bias and

reverse causality. To mitigate these endogeneity issues, we first describe them explicitly and then design specific tests (e.g. fixed-effects model, placebo test, propensity score matching, Heckman two-step model). See Appendix C for further details.

Further evidence and extensions

Motivation: risk mitigation or agency conflict

The purpose of this section is to explore the causes (motivations) for the positive relationship between the CEO-insurance effect and CSR performance (i.e. disentangle the agency conflict hypothesis from the risk mitigation hypothesis).

In order to test the risk mitigation hypothesis, we examine whether the CEO-insurance effect matters in the relationship between CSR and firm risk. In accordance with prior studies (e.g. Kim, Patro and Pereira, 2017; Koirala *et al.*, 2020; Ren *et al.*, 2021), we quantify firms' risk-taking behaviours by examining earnings volatility (*Firm Risk*). Earnings volatility is defined as the standard deviation of firms' ROA during each successive 3-year period.

Table 4 reports the results. The interaction of CSR $\times$ CEO Insurance is significantly negative, indicating that the CEO-insurance effect strengthens the negative relation between CSR and firm risk. This result is also consistent with our risk mitigation hypothesis.¹ Overall, the above results indicate that it is unlikely that the positive relation between the CEO-insurance effect and CSR performance is driven by agency concerns.

Cross-sectional analysis

According to our baseline results, there is a positive correlation between the CEO-insurance effect and CSR performance. Thus, it is natural to ask, under what conditions could the above correlation become stronger?

A number of studies (e.g. Agle *et al.*, 2006; Benischke, Martin and Glaser, 2019) suggest that managerial risk aversion is strengthened when

¹ Three approaches are used to rule out the agency conflict hypothesis (untabulated). We first examine the relationship between the CEO-insurance effect and CSR performance under weak corporate governance. Moreover, we investigate whether risk-averse CEOs can indirectly (e.g. gain reputation) and directly (e.g. compensation) benefit from CSR initiatives.

Table 4. Tests of motivation: risk mitigation or agency conflict

	Dependent variable: Firm Risk
CEO Insurance	−0.006* (−1.84)
CSR	−0.007* (−1.77)
CEO Insurance $\times$ CSR	−0.008** (−2.40)
Size	−0.002*** (−3.87)
Leverage	−0.001 (−0.16)
ROA	−0.045** (−2.43)
MB	0.003*** (6.62)
Sales Growth	0.005*** (4.08)
Cash	−0.004 (−1.17)
Independent	−0.003 (−0.44)
Board Size	0.002 (1.23)
Firm Age	0.005*** (7.65)
IShare	−0.022*** (−5.71)
HHI	−0.007* (−1.80)
SOE	−0.004*** (−5.37)
CEO Age	0.000 (0.11)
CEO Education	0.000 (0.17)
CEO Gender	−0.002 (−1.51)
Intercept	0.046*** (3.59)
Year FE	YES
Industry FE	YES
N	6048
Adj_R ²	0.311

Note: Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * indicate statistically significant at the 1%, 5% and 10% levels, respectively.

firms face uncertainty or unfavourable conditions. As such, we expect that the CEO-insurance effect might become more pronounced in uncertain situations. Previous research (e.g. Lee *et al.*, 2020) identifies several firm- and industry-level measures that can reflect uncertainty, such as firm-specific uncertainty, relative performance and competitive intensity. Then, we can conduct cross-sectional

analyses to examine whether our main hypothesis is more pronounced in uncertain environments.

Firm-specific uncertainty. Firms encounter a variety of uncertainties in their operations and attempt to mitigate these to optimize their management (Kim, Lee and Kang, 2021). Previous research (e.g. Peloza and Shang, 2011) suggests that CSR efforts contribute to risk mitigation. Accordingly, CSR can serve as a useful tool for firms to mitigate risk in uncertain conditions. Moreover, as previously discussed, CEOs' risk aversion is likely to be amplified by increased uncertainty (Benischke, Martin and Glaser, 2019). We therefore hypothesize that there might be a stronger association between the CEO-insurance effect and CSR performance in cases of high levels of firm-specific uncertainty.

In line with prior studies (e.g. Beckman, Haunschild and Phillips, 2004; Gulati, Lavie and Singh, 2009), we utilize stock price volatility as a proxy for firm-specific uncertainty. Then, firm-specific uncertainty (*Firm Uncertainty*) is defined as the difference between the focal firm's standardized monthly volatility in year t and the sampled firm's average standardized monthly volatility in the corresponding year. Specifically

$$\begin{aligned} & \text{Firm - specific uncertainty} \\ &= \frac{SD(P_{i,t})}{\text{Mean}(P_{i,t})} - \frac{SD(P_{s,t})}{\text{Mean}(P_{s,t})} \end{aligned} \quad (2)$$

where $SD(P_{i,t})$ is the standard deviation of firm i 's monthly closing stock price in year t , and $SD(P_{s,t})$ is the standard deviation of the average closing stock price across all sample firms in the focal firm's industry group in year t . $\text{Mean}(P)$ is the mean value of the monthly stock price during the year. Column (1) of Table 5 shows that the interaction variable of CEO Insurance $\times$ Firm Uncertainty is significantly positive, which supports our prediction that the relation between the CEO-insurance effect and CSR performance is stronger under conditions of high firm-specific uncertainty.

Relative firm performance. Several studies suggest that CEOs experiencing recent poor performance are more sensitive to the risks associated with declining firm performance (e.g. Cho *et al.*, 2016; Gordon, Loeb and Tseng, 2009). Particularly, this is the case for risk-averse CEOs, as they

are inherently risk-averse and therefore more likely to be sensitive to risk in the context of poor performance. Further, CEOs' perception of risk largely influences their risk-mitigating behaviours in uncertain environments. As noted by Chin, Hambrick and Treviño (2013), CEOs who view CSR as a vital part of business improvement are more likely to prioritize it when a firm's recent financial performance is poor. We expect this to be particularly true for risk-averse CEOs, who generally view CSR as a valuable tool for reducing risks (Drempetic, Klein and Zwergel, 2020; Waddock and Graves, 1997; Zhang *et al.*, 2021). Therefore, we speculate that the relationship between the CEO-insurance effect and CSR is stronger when the relative firm performance is poor (i.e. high uncertainty).

Following Chin, Hambrick and Treviño (2013), we utilize the relative firm performance (*Relative Performance*) to measure uncertain situations. This is computed as the market-to-book value of each firm minus the average market-to-book value in the industry. We report the results in column (2) of Table 5. Consistent with our prediction, the interaction variable CEO Insurance $\times$ Relative Performance is significant and negative, suggesting that the positive relation between the CEO-insurance effect and CSR relation is stronger for firms with lower relative firm performance.

Competitive intensity. In light of the fact that CSR involves a firm's resource allocation strategy, market competition may affect the firm's social responsibility (Campbell, 2007). In highly competitive markets, firms face increased complexity since their actions are influenced by their competitors' actions (Auh and Menguc, 2005; Hambrick and Finkelstein, 1987). That is to say, high market competition may be indicative of uncertainty. Moreover, risk-averse CEOs tend to view CSR initiatives as effective risk management tools in uncertain circumstances (Drempetic, Klein and Zwergel, 2020; Waddock and Graves, 1997; Zhang *et al.*, 2021). Hence, we expect the relationship between the CEO-insurance effect and CSR performance to be stronger when there is a high level of market competition.

We utilize the Herfindahl index to measure market competition and calculate it by dividing a firm's sales by total industry sales for each year. In order to facilitate interpretations, we reverse the

Table 5. Cross-sectional heterogeneity

	Dependent variable = CSR		
	Partition = Firm Uncertainty (1)	Partition = Relative Performance (2)	Partition = Competitive Intensity (3)
CEO Insurance	0.022* (1.84)	0.016** (2.07)	0.014* (1.91)
Partition	-0.004 (-0.20)	0.011 (0.62)	0.001 (0.38)
CEO Insurance × Partition	0.033*** (3.41)	-0.006*** (-3.29)	0.003*** (3.46)
Size	0.055*** (22.56)	0.055*** (22.69)	0.056*** (22.88)
Leverage	-0.078*** (-5.68)	-0.078*** (-5.74)	-0.078*** (-5.72)
ROA	0.914*** (16.85)	0.899*** (16.83)	0.894*** (16.77)
MB	0.011*** (4.56)		0.011*** (4.66)
Sales Growth	-0.015*** (-3.05)	-0.014*** (-2.86)	-0.014*** (-2.85)
Cash	-0.009 (-0.51)	-0.006 (-0.34)	-0.006 (-0.34)
Independent	-0.046 (-1.06)	-0.044 (-1.02)	-0.044 (-1.03)
Board Size	-0.000 (-0.02)	0.001 (0.06)	0.001 (0.07)
Firm Age	-0.006 (-1.38)	-0.005 (-1.34)	-0.006 (-1.40)
IShare	0.127*** (4.20)	0.131*** (4.37)	0.129*** (4.27)
HHI	-0.007 (-0.37)	-0.008 (-0.40)	
SOE	0.012*** (2.72)	0.012*** (2.61)	0.012*** (2.60)
CEO Age	0.012 (0.79)	0.013 (0.85)	0.013 (0.84)
CEO Education	0.007 (1.60)	0.007 (1.52)	0.007 (1.51)
CEO Gender	-0.017* (-1.82)	-0.017* (-1.84)	-0.017* (-1.85)
Intercept	-0.999*** (-12.62)	-0.982*** (-12.73)	-1.011*** (-12.91)
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
N	6048	6048	6048
Adj_R ²	0.339	0.323	0.326

Note: Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * indicate statistically significant at the 1%, 5% and 10% levels, respectively.

Herfindahl index. Accordingly, a higher value of the inverse Herfindahl index (*Competitive Intensity*) indicates a greater degree of market competition within an industry. The results in column (3) of Table 5 are in line with our prediction, and we find that the correlation between the CEO-insurance effect and CSR is stronger for firms with greater market competition.

Mechanism analysis

In light of our finding that the CEO-insurance effect increases CSR performance, we next examine two potential channels that might explain our findings. We propose that the CEO-insurance effect may enhance CSR performance via (1) adapting more conservative choices in accounting policies and (2) strengthening internal controls.

The accounting conservatism channel. There is evidence that risk-averse CEOs could be more acutely aware of future losses and, consequently, are more likely to identify losses before gaining (Hu *et al.*, 2020). A typical example is that these CEOs might recognize asset impairment when an asset's value decreases due to unfavourable conditions. Additionally, these CEOs have a greater tendency to provide prompt disclosure of negative news (Ruch and Taylor, 2015). As a result, when firms are led by risk-averse CEOs, their accounting procedures tend to be conservative. Moreover, Anagnostopoulou, Tsekrekos and Voulgaris (2021) suggest a positive correlation between a conservative view of financial reporting and a CSR orientation. Therefore, we expect that the CEO-insurance effect may influence CSR performance through accounting conservatism.

Following previous studies (e.g. Hu *et al.*, 2020), we utilize the C-score developed by Khan and Watts (2009) to measure accounting conservatism (*Cscore*). We first examine whether the CEO-insurance effect contributes to accounting conservatism. Furthermore, we construct an interaction term to examine its influence on CSR. In Table 6, the estimated coefficient of *CEO Insurance* is positive and significant in column (1), suggesting that the CEO-insurance effect results in more conservative accounting choices. Moreover, the interaction term in column (2) is also positively and significantly associated with CSR scores. As a result, these findings are in accordance with the accounting conservatism channel.

The internal control channel. The 'tone at the top', usually set by CEOs, is commonly regarded as a key influence on internal control, and it can also be reflective of management's preferences regarding risk (Ge, Matsumoto and Zhang, 2011; Skaife, Veenman and Wangerin, 2013). Accordingly, CEOs' subjective judgements and assessments of risk are largely influential in determining the quality of internal control. A study by Braumann, Grabner and Posch (2020) shows that risk-averse CEOs are inclined to be more concerned about internal control problems and, as a consequence, conduct internal control procedures with greater care. Consequently, firms led by risk-averse CEOs may have higher levels of internal control. Additionally, as noted in the Application Guideline No. 4 (i.e. Social Responsibility) of Firm Internal Control in China, internal control has a posi-

tive impact on CSR. As a result, we expect that the CEO-insurance effect could positively affect CSR performance by improving the quality of internal controls.

Following previous research (e.g. Chan, Chen and Liu, 2020; Wang *et al.*, 2018), we utilize the internal control data originating from the internal control database developed by DIB Business Risk Management Inc. in China. Based on a disclosure index system for internal control information, this database collects internal control data from annual reports and internal control assessment reports of Chinese listed firms. In this paper, we define *IC_Index* as the aggregated internal control index (in natural logarithm) assessing the quality of internal control.

In column (3) of Table 6, we observe a significantly positive association between the CEO-insurance effect (*CEO Insurance*) and internal control (*IC_Index*). Further, in column (4), the interaction is also positive and significant, suggesting that the CEO-insurance effect boosts CSR performance through the internal control channel.

Economic consequences

Based on the theory of 'dual responsibility' (Al-Shammari, Banerjee and Rasheed, 2022), firms must fulfil two primary responsibilities in order to achieve superior financial performance: economic responsibilities (shareholder perspective) and social responsibilities (stakeholder perspective). A number of studies have examined the relationship between socially responsible behaviours and financial performance (firm value) from these two perspectives. However, the relationship between CSR and financial performance (firm value) is tenuous at best, with research indicating positive, negative or neutral relationships (Al-Shammari, Banerjee and Rasheed, 2022; Apaydin *et al.*, 2021; Davidson, Dey and Smith, 2019; Dhaliwal *et al.*, 2014; Kim, Kim and Qian, 2018; McWilliams and Siegel, 2000; Orlitzky, Schmidt and Rynes, 2003).

According to the risk mitigation hypothesis, risk-averse CEOs are more likely to engage in CSR initiatives due to the potential for minimizing firm risks, which can also meet the expectations and demands of stakeholders. Accordingly, if the above arguments hold true, firms can achieve better performance by meeting the needs of stakeholders through CSR activities (Kim, Kim and Qian, 2018). We therefore examine this issue

Table 6. Mechanism analysis

	Partition = Cscore		Partition = IC_Index	
	(1) Partition	(2) CSR	(3) Partition	(4) CSR
CEO Insurance	0.327***	0.006*	0.018**	0.847*
	(3.37)	(1.82)	(2.14)	(1.86)
Partition		0.002*		0.198**
		(1.85)		(2.09)
CEO Insurance × Partition		0.037**		0.129***
		(1.99)		(2.66)
Size	−0.462***	0.054***	0.034***	0.049***
	(−10.82)	(19.00)	(19.23)	(19.62)
Leverage	0.769***	−0.064***	−0.014	−0.076***
	(4.75)	(−4.05)	(−1.19)	(−5.54)
ROA	0.986*	1.026***	0.691***	0.818***
	(1.67)	(5.97)	(14.86)	(13.86)
MB	−0.066***	0.012***	0.001	0.011***
	(−2.82)	(4.23)	(0.58)	(4.36)
Sales Growth	0.069	−0.012**	0.024***	−0.018***
	(1.06)	(−2.02)	(5.75)	(−3.63)
Cash	0.381**	−0.020	0.013	−0.015
	(2.11)	(−0.99)	(1.10)	(−0.82)
Independent	−0.345	−0.035	0.022	−0.045
	(−0.61)	(−0.76)	(0.78)	(−1.04)
Board Size	−0.031	−0.005	−0.018**	0.006
	(−0.21)	(−0.38)	(−2.38)	(0.45)
Firm Age	0.153***	−0.000	−0.014***	−0.002
	(3.35)	(−0.08)	(−5.67)	(−0.48)
IShare	0.950***	0.113***	0.100***	0.099***
	(2.68)	(3.39)	(5.72)	(3.26)
HHI	−0.124	−0.012	0.004	−0.007
	(−0.87)	(−0.57)	(0.28)	(−0.35)
SOE	−0.073*	0.010**	0.012***	0.010**
	(−1.72)	(1.96)	(4.05)	(2.22)
CEO Age	0.155	0.015	−0.020*	0.015
	(1.08)	(0.82)	(−1.94)	(0.92)
CEO Education	0.054	0.009*	−0.000	0.006
	(1.19)	(1.80)	(−0.08)	(1.31)
CEO Gender	0.112	−0.014	0.001	−0.018*
	(1.15)	(−1.35)	(0.21)	(−1.90)
Intercept	8.870***	−0.981***	5.830***	−2.164***
	(8.40)	(−11.20)	(10.20)	(−8.35)
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
N	6048	6048	6048	6048
Adj_R ²	0.231	0.328	0.302	0.325

Note: Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * indicate statistically significant at the 1%, 5% and 10% levels, respectively.

using the following model:

$$\begin{aligned}
 \text{Tobin(ROA)}_{i,t/t+1/t+2} = & \beta_0 + \beta_1 \text{CSR}_{i,t} \\
 & + \beta_2 \text{CEO Insurance}_{i,t} \\
 & + \beta_3 \text{CSR}_{i,t} * \text{CEO Insurance}_{i,t} \\
 & + \beta_k \text{Controls}_{i,t} + \text{Industry} \\
 & + \text{Year} + \varepsilon_{i,t}
 \end{aligned} \quad (3)$$

where the dependent variables are current, 1-year-ahead and 2-year-ahead accounting performance (ROA) and firm value (Tobin's Q value). In Table 7, we find a positive relationship between CSR scores and firm performance (value). Moreover, our findings suggest that the CEO-insurance effect could further strengthen the positive relationship. Therefore, our findings complement previous

Table 7. Economic consequences

	(1) ROA _t	(2) ROA _{t+1}	(3) ROA _{t+2}	(4) Tobin _t	(5) Tobin _{t+1}	(6) Tobin _{t+2}
CSR	0.068*** (9.90)	0.046*** (6.71)	0.046*** (6.61)	0.522*** (3.90)	0.554*** (4.02)	0.273* (1.86)
CEO Insurance	0.002 (0.16)	0.016 (1.27)	0.021* (1.70)	-0.027 (-0.12)	-0.107 (-0.43)	-0.174 (-0.58)
CEO Insurance × CSR	0.013** (2.38)	0.057** (2.06)	0.050** (2.02)	0.297** (2.14)	0.216** (2.10)	0.196** (2.01)
Size	0.004*** (5.67)	0.002*** (2.97)	0.001* (1.89)	-0.447*** (-29.92)	-0.408*** (-25.52)	-0.379*** (-19.34)
Leverage	-0.098*** (-18.13)	-0.068*** (-12.68)	-0.054*** (-12.23)	-0.636*** (-7.07)	-0.665*** (-6.82)	-0.765*** (-6.26)
Sales Growth	0.023*** (12.67)	0.017*** (9.42)	0.009*** (5.01)	0.068** (2.04)	0.074** (2.12)	0.035 (0.87)
Cash	0.033*** (5.76)	0.040*** (6.86)	0.033*** (6.08)	0.517*** (4.54)	0.548*** (4.59)	0.820*** (5.54)
Independent	-0.038*** (-3.73)	-0.034*** (-2.97)	-0.026** (-2.45)	1.194*** (5.42)	1.114*** (4.58)	1.213*** (4.40)
Board Size	-0.002 (-0.56)	-0.003 (-0.89)	-0.001 (-0.39)	0.163*** (2.67)	0.110* (1.70)	0.040 (0.54)
Firm Age	0.003** (2.58)	0.004*** (2.85)	0.004*** (3.56)	0.226*** (9.47)	0.219*** (8.87)	0.243*** (7.88)
IShare	0.102*** (14.66)	0.115*** (15.07)	0.088*** (11.62)	3.086*** (18.59)	2.033*** (12.04)	1.835*** (9.39)
HHI	0.008 (1.20)	-0.014* (-1.91)	-0.010 (-1.26)	0.094 (0.73)	0.431*** (2.95)	0.391** (2.19)
SOE	-0.007*** (-5.56)	-0.009*** (-6.07)	-0.007*** (-5.67)	-0.038 (-1.47)	-0.049* (-1.71)	-0.086** (-2.52)
CEO Age	0.007* (1.66)	0.012** (2.48)	0.010** (2.26)	0.312*** (3.42)	0.354*** (3.61)	0.488*** (4.14)
CEO Education	-0.000 (-0.19)	0.001 (0.57)	0.001 (0.76)	0.037 (1.49)	0.058** (2.23)	0.041 (1.30)
CEO Gender	-0.005** (-2.14)	-0.004 (-1.52)	-0.004* (-1.69)	-0.076 (-1.42)	-0.084 (-1.46)	-0.045 (-0.66)
Intercept	-0.058*** (-2.80)	-0.034 (-1.48)	-0.017 (-0.78)	9.307*** (21.79)	8.370*** (18.19)	7.361*** (13.45)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
N	6048	6048	6048	6048	6048	6048
Adj_R ²	0.328	0.222	0.208	0.454	0.420	0.345

Note: Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, ** and * indicate statistically significant at the 1%, 5% and 10% levels, respectively.

research on balancing dual responsibility (e.g. Al-Shammari, Banerjee and Rasheed, 2022) and extend it further into the domain of managerial risk attitude.

Conclusion and discussion

This paper examines whether and how the CEO-insurance effect is associated with the CSR performance of Chinese listed firms from 2010 to 2018. Using a dataset pertaining to CEOs'

self-purchasing critical illness insurance, we demonstrate a positive correlation between the CEO-insurance effect and CSR performance. This finding is statistically and economically significant. Furthermore, we find that our main finding is stronger among firms that operate in uncertain circumstances (i.e. higher firm-specific uncertainty, lower relative firm performance and higher competitive intensity). Moreover, to identify the underlying motivation for our main finding, we find that our results are in line with the risk mitigation hypothesis rather than the agency

conflict hypothesis. Further analysis indicates that accounting conservatism and internal control are potential mechanisms through which the CEO-insurance effect may affect CSR performance. Finally, we demonstrate that the CEO-insurance effect could reinforce the positive relationship between CSR performance and accounting performance (firm value).

We contribute to several active research areas. First, why do some firms perform better in CSR than others? Our research highlights the influence of managerial risk attitudes. When faced with corporate decisions pertaining to CSR, CEOs with insurance behaviours might act in accordance with their risk preferences. Second, what characteristics or behaviours indicate CEOs' risk preferences in corporate decision-making? Recent research has examined the demographic characteristics and personal experiences of CEOs (e.g. Davidson, Dey and Smith, 2019; Huang, 2013; McCarthy, Oliver and Song, 2017; Petrenko *et al.*, 2016). Our study, however, is among the first to identify the role of CEOs' health insurance behaviours in corporate decision-making. Thus, we contribute a novel and 'off-the-job' experience to this research area.

Future research may explore several different avenues. First, although CSR serves as the starting point for this paper, other corporate policies may also be examined. In our research, we demonstrate that the CEO-insurance effect is a reflection of CEO risk aversion. Therefore, other corporate policies may also be affected by this effect, such as corporate financial disclosure (e.g. Bamber, Jiang and Wang, 2010), innovation (e.g. Chen *et al.*, 2014) and tax avoidance (e.g. Dyreng, Hanlon and Maydew, 2010). Second, we use the health insurance data of Chinese CEOs to test our research questions. However, scholars have called for empirical research to be conducted in international contexts (e.g. El Ghouli *et al.*, 2018). Hence, future research may explore the impact of the CEO-insurance effect in other countries to better understand its generalizability. Finally, we have attempted to mitigate the endogeneity concerns by utilizing a set of robustness tests; however, endogeneity cannot be completely ruled out, as in many CEO studies. Despite this, we acknowledge that some of our approaches are imperfect. As such, more efforts in this direction are needed for future research.

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Qian Wang is Assistant Professor of Economics at Beijing Technology and Business University. She holds a PhD in economics from Tsinghua University. Her research interests include environmental economics and economics of insurance. Her research is published in *The North American Journal of Economics and Finance*, among others.

Weichen Yan is Assistant Professor of Accounting at Beihang University. He holds a PhD in accounting from Tsinghua University. His research interests are in the areas of corporate finance, corporate governance and corporate social responsibility. He has published his work in *Abacus*, among others.

Supporting Information

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Supporting Information