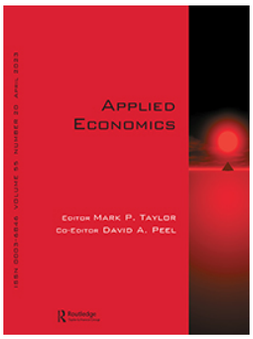

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Directors' and officers' liability insurance and corporate misconduct: Evidence from China

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ABSTRACT

This study examines whether directors' and officers' liability insurance (D&O insurance) plays a governance role in the Chinese capital market. We hypothesize and find that D&O insurance restrains corporate misconduct and that this phenomenon is much more significant in state-owned enterprises (SOEs) than in non-state-owned enterprises (non-SOEs). We think purchasing of D&O insurance can import supervisors to mitigate agency costs caused by owner absence. When agency costs are high, SOEs with D&O insurance experience less corporate misconduct. Our study also finds that when the agency problem caused by owner absence is more serious in SOEs, the role of D&O insurance in corporate governance becomes increasingly important.

KEYWORDS

D&O insurance; SOEs; owner absence; corporate misconduct; non-state shareholders' governance

JEL CLASSIFICATION

G30; G32; G34

I. Introduction

Corporate misconduct disrupts capital market order, undermines investor confidence, and aggravates market risk. Improving corporate governance can significantly increase the cost and difficulty of corporate misconduct; scholars have found that this is an effective way to reduce corporate misconduct (Lennox and Pittman 2010; Karpoff and Lou 2010; Massa, Zhang, and Zhang 2015; Khanna, Kim, and Lu 2015; Shi, Connelly, and Hoskisson 2017; Byun et al. 2019). The directors' and officers' liability insurance (D&O insurance) is introduced into the Chinese capital market as an important external corporate governance mechanism. However, whether D&O insurance can improve corporate governance remains unclear. There are two competing perspectives on D&O insurance: the governance effect and the opportunism effect (Baker and Griffith 2007, 2010; Yuan, Sun, and Cao 2016; Liao, Tang, and Lee 2016; Lin et al. 2022; Li, Yang, and Zhu 2022). The governance perspective maintains that D&O insurance can import a third-party supervisor and have a positive effect on corporate governance (Core 1997; O'sullivan 1997; Xu and Zheng 2012; Yuan, Sun, and Cao 2016; Liao, Tang, and Lee 2016), whereas the opportunism effect indicates that D&O insurance amplifies opportunistic behaviour and worsens corporate governance (Chalmers, Dann, and Harford 2002; Lin, Officer, and Zou 2011; Li and Liao 2014; Chen, Oliver, and Hong 2016; Weng, Chen, and Chi 2017).

To examine this, we test the effect of D&O insurance on corporate misconduct. We note a big gap in the purchase of D&O insurance between state-owned enterprises (SOEs) and non-state-owned enterprises (non-SOEs), and an extremely low coverage rate of D&O insurance for non-SOEs. Although agency problems exist in both SOEs and non-SOEs, they have their own unique and significant features (Jiang and Kim 2020). The governance problem of SOEs is mainly caused by the absence of owners, because the owner of SOEs is the state, or more accurately, the citizen in general. The State Assets Supervision and Administration Commission (SASAC) oversees SOEs. This means that effective supervision of SOE management is technically impossible and prohibitively costly. Based on these institutional contexts, D&O insurance may have different corporate governance effects. Therefore, this study empirically tests the impact of purchasing D&O insurance on corporate misconduct in SOEs and non-SOEs. We find that D&O insurance restrains corporate misconduct,

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and that this phenomenon is much more significant in SOEs than in non-SOEs. Moreover, D&O insurance can mitigate agency problems caused by owner absence and curb corporate misconduct. Our study further finds that instead of importing non-state shareholder governance to curb the agency problems caused by owner absence, D&O insurance can standardize executive behaviours and reduce corporate misconduct.

Our study makes the following contributions. First, it extends the literature on D&O insurance's effects on corporate misconduct. Our results support the governance perspective of D&O insurance (Core 1997; O'sullivan 1997; Xu and Zheng 2012; Yuan, Sun, and Cao 2016; Liao, Tang, and Lee 2016), and offer empirical evidence from China for the further development of D&O insurance and improvement of listed firms' governance.

Second, the existing literature focuses on the impact of internal governance mechanisms, such as ownership structure and board of directors, to improve corporate governance. Our findings suggest that D&O insurance can play a governance role and compensate for internal governance deficiencies. Our result suggests that the purchase of D&O insurances can import the insurance company as an external monitor, which can reduce the agency costs caused by owner absence and improve corporate governance in China.

Third, our study offers references for SOE reforms. Under the new round of SOE mixed-ownership reform, introducing non-state capital can overcome the absence of owners, and it is considered the main means of improving SOE corporate governance. Our study finds that when the governance of non-state shareholders is relatively poor, D&O insurance can improve the corporate governance of SOEs.

II. Literature review and hypothesis development

Corporate misconduct and D&O insurance

Scholars find that if the expected benefit of corporate misconduct is large and the expected cost is small, then executives increasingly engage in misconduct in listed firms to achieve self-serving aims (Lennox and Pittman 2010; Karpoff and Lou 2010; Massa, Zhang, and Zhang 2015; Khanna, Kim, and Lu 2015; Shi, Connelly, and Hoskisson 2017; Byun et al. 2019). They also find that internal and external governance can influence misconduct. Byun et al. (2019) find that shareholding structure arrangements can effectively curb corporate misconduct. Moreover, CEOs' connections with top executives and directors reduce the difficulty of misconduct, thus increasing its risk (Khanna, Kim, and Lu 2015). In addition, Lennox and Pittman (2010) find that a higher audit quality offers less scope for fraudulent financial reporting by corporations. Karpoff and Lou (2010) and Massa, Zhang, and Zhang (2015) posit that short selling can be regarded as an external governance mechanism for disciplining managers and reducing wrongdoing.

D&O insurance is a controversial aspect of the external governance mechanism. On the one hand, the existing studies have shown that D&O insurance can result in active and effective external supervision (Xu and Zheng 2012; Yuan, Sun, and Cao 2016; Liao, Tang, and Lee 2016), thus increasing the cost and difficulty of corporate misconduct and restraining such behaviours. On the other hand, scholars also find that D&O insurance can transfer the potential litigation risk that should be borne by the directors and executives, and weaken the restraint of legal mechanisms, thus stimulating the moral hazard and opportunistic behaviours of directors and executives (Chalmers, Dann, and Harford 2002; Lin, Officer, and Zou 2011; Li and Liao 2014; Chen, Oliver, and Hong 2016; Weng, Chen, and Chi 2017).

We posit that purchasing D&O insurance can restrain corporate misconduct because it increases the cost and difficulty of corporate misconduct through active and effective external supervision (Xu and Zheng 2012; Yuan, Sun, and Cao 2016; Liao, Tang, and Lee 2016). Although D&O insurance can transfer litigation risk, which may weaken the restraint of legal mechanisms and destroy the internal supervision mechanism of the enterprise, insurers have incentives to independently supervise the insured firms' liability exposure and reduce the potential fraud risk of the insured management (Cao and Narayanamoorthy 2014; Reza 2020). Insurers have advantages in information collection given their professional risk control technology

and professional risk assessment. To reduce information asymmetry, insurers investigate and judge the corporate governance risk of insured firms, and accurately evaluate the prospects of listed firms before underwriting (Boyer and Stern 2012, 2014). These insured firms are driven to improve their corporate governance levels so as to negotiate for a relatively low premium (Lin et al. 2013; Chen, Oliver, and Hong 2016). In addition, these insurers provide targeted stringent insurance clauses to executives for reducing opportunistic behaviours such as earnings management and financial restatement (Chalmers, Dann, and Harford 2002; Li and Liao 2014; Weng, Chen, and Chi 2017). After the insured firms purchase D&O insurance, they continuously supervise the insured firms' behaviour. Therefore, this study holds that D&O insurance can better restrain corporate behaviour and reduce opportunistic behaviour, and we propose the following basic hypothesis:

H1: Firms with D&O insurance will have fewer corporate misconduct behaviours.

Corporate misconduct and D&O insurance in SOEs and non-SOEs

Hu, Zhao, and H (2019) note that approximately 96% and 88% of the listed firms in the U.S. and Canada, respectively, purchase D&O insurance. In China, with the continuous rise in the listed firms' litigation cases, an increasing number of listed firms choose to purchase D&O insurance; however, the coverage rate of D&O insurance purchased by the Chinese listed firms remains relatively low (Jia, Mao, and Yuan 2019). The data show that, from 2013 to 2019, less than 10% of the listed firms, more than 10% of SOEs, and less than 3% of non-SOEs, purchased D&O insurance. To understand why the insurance coverage rates of enterprises with different property rights are so different, it is necessary to test the relationship between the purchase of D&O insurance and corporate misconduct in SOEs and non-SOEs.

Ownership and management are commonly separate in firms, and agency problems between corporate shareholders and executives are inevitable. However, SOEs face more serious agency problems than non-SOEs. The owner of SOEs is the citizen in general and the SASAC oversees the SOEs; therefore, effective supervision of the management of SOEs is unsound and non-standard. There is a high moral hazard in that the executives of SOEs will easily hide the real firms' status from owners, and the executives of SOEs can easily infringe on the rights of shareholders (Jiang and Kim 2020). Although non-SOEs also have agency problems, their shareholders have stronger incentives to gain insight into their self-serving behaviours, and the agency problems of owners and management in non-SOEs can be alleviated (Ali, Chen, and Radhakrishnan 2007). According to the literature (Friedman and Friedman 1980), the agency problems existing in SOEs and non-SOEs can be summarized as follows: shareholders of non-SOEs employ managers to spend shareholders' money to carry out the functions for shareholders, whereas SASAC employs managers to spend others' (the citizens in general) money to carry out the functions for others (the citizen in general). Therefore, it is the principal that cannot offer effective supervision of the management of SOEs not the agent aggravates the agency problem, and agency costs are always higher and corporate governance is poorer in SOEs (Fisman and Wang 2015; Bradshaw, Liao, and Ma 2019). So, the difficulty and cost of misconduct are relatively lower for SOE management, and SOE executives have both incentives and opportunities to engage in misconduct.

Purchasing D&O insurance for SOEs is an effective way to rule and monitor executives to mitigate or eliminate the prominent agency problem of owner absence. The purchase of D&O insurance can allow a third-party to discipline executives, thereby compensating for the lack of supervision caused by the absence of the owner. The insurers undoubtedly have advantages in risk control and risk assessment, and they can better monitor the executives (Chalmers, Dann, and Harford 2002; Cao and Narayanamoorthy 2014; Reza 2020). Moreover, these stringent D&O insurance clauses can restrict managers' decision-making behaviour and force SOEs to improve corporate governance levels. Due to the insufficient development of D&O insurance in non-SOEs and the more prominent agency problems caused by owner absence in SOEs, the purchase of D&O insurance can overcome

misconduct caused by a lack of owner supervision in SOEs, and D&O insurance can play a much more significant governance role in SOEs. Therefore, we propose the following hypothesis:

H2: SOEs with D&O insurance have fewer corporate misconduct behaviours than non-SOEs.

III. Data and research design

Data and sample

Our sample consists of the Chinese firms listed on the Shanghai Stock Exchange and Shenzhen Stock Exchange from 2013 to 2019. The data on the purchase of D&O insurance are obtained from the China Research Data Service (CNRDS) platform while the others are collected from the China Stock Market and Accounting Research (CSMAR) database; the data on non-state shareholder governance in SOEs are collected by the authors. We apply the following functions to these data. First, we exclude the companies in the financial and insurance industries. Second, we exclude the companies that have missing values. Third, we winsorize the continuous variables by 1% up and down to eliminate the influence of extreme values on the research results.

Research design

D&O insurance and corporate misconduct

First, we use the following probit regression model to examine the effect of D&O insurance on corporate misconduct in the full sample of SOEs and non-SOEs:

$$Misconduct_{i,t} = \beta_0 + \beta_1 D\&OIns_{i,t-1} + \gamma Controls_{i,t-1} + Year + Ind + \varepsilon_{i,t} \quad (1)$$

In Model (1), the dependent variable $Misconduct_{i,t}$ is a dummy variable (Khanna, Kim, and Lu 2015; Wang, Winton, and Yu 2010). If the listed firm is publicly punished by the China Securities Regulatory Commission, Shenzhen Stock Exchange, Shanghai Stock Exchange, and other regulatory authorities for wrongdoing in year t, the dummy variable *misconduct* is recorded as one, otherwise, the value is zero. We also use the variable Misconduct_Number as an alternative proxy for misconduct, which is the total number of misconduct cases of firm i in year t (Yang, Xue, and Liu 2023). Appendix A presents specific definitions for the different types of corporate misconduct.

The independent variable $D\&O\ Ins_{i,t-1}$ is a dummy variable that equals one when firm i purchases D&O insurance in year *t*-1 (Lin, Officer, and Zou 2011; Hu, Zhao, and H 2019; Liu et al. 2022). We also use the variable *Insured Amount*—the amount of insurance coverage intended to protect directors and officers from personal losses – as an alternative proxy for firms' purchases of D&O insurance.

$Controls_{i,t-1}$ includes the following variables in year *t*-1: *Asset*, *Lev*, *ROA*, *Age*, *Cash*, *Top*1, *Q*, *FI Holdings*, *Manafees*, *Inde Pent*, *Directors Holdings*, *Executives Holdings*, *Ana Follow*, and *Cross List*. The descriptive statistics and definitions of these variables are presented in Table 1. Moreover, we control for the effect of industry and time characteristics, and adjust the robust standard errors for clustering at the firm level for potential heteroskedasticity and autocorrelation.

D&O insurance, agency costs, and corporate misconduct

Second, we implement the following probit regression model to test whether D&O insurance can influence corporate governance in reducing agency costs for SOEs and non-SOEs.

$$Misconduct_{i,t} = \beta_0 + \beta_1 D\ \&\ OIns_{i,t-1} + \beta_2 D\ \&\ OIns_{i,t-1} \times ACHigh_{i,t-1} + \beta_3 ACHigh_{i,t-1} + \gamma Controls_{i,t-1} + Year + Ind + \varepsilon_{i,t} \quad (2)$$

In Model (2), $ACHigh_{i,t-1}$ is a dummy variable that equals one if the value of *top*25[1] of firm i is smaller than the median value of *top*25 in the same industry and the same property rights in year *t*-1, and zero otherwise. The other variables are the same as in Model (1). If the coefficients of $D\&O\ Ins_{i,t-1}\times ACHigh$ are significantly negative, it indicates

[1]According to Chen et al. (2012) finding, large shareholders have both the incentive and the ability to monitor the insiders' behaviour. We use *top*25 (the percentage of total shares held by the second to the fifth largest shareholders of a listed firm) to capture the monitoring intensity by large shareholders, and *top*25 is a proxy variable of large shareholders' supervision; the smaller the value of *top*25, the higher the agency cost.

Table 1. Descriptive statistics.

Variables	N	Mean	S.D.	Min	Median	Max	Definition
Panel A. Descriptive statistics of the full sample							
Misconduct	18,639	0.265	0.442	0.000	0.000	1.000	If a firm have misconduct behaviours in year t, *Misconduct* is recorded as one.
D&O Ins	18,639	0.057	0.232	0.000	0.000	1.000	If a firm purchases D&O insurance in year *t*-1, *D&O Ins* is recorded as one.
SOE	18,639	0.346	0.476	0.000	0.000	1.000	1=SOEs, 0=non-SOEs.
Asset	18,639	22.119	1.291	19.617	21.953	25.950	Measured as log (total assets+1)
Lev	18,639	0.425	0.212	0.052	0.412	0.922	Measured as total liabilities divided by total assets
ROA	18,639	0.037	0.059	−0.251	0.036	0.190	Measured as net income divided by total assets
Age	18,639	2.840	0.323	1.792	2.890	3.434	Measured as log (the number of listed years+1)
Cash	18,639	0.162	0.128	0.010	0.125	0.621	Measured as cash and cash equivalents divided by total assets
Top1	18,639	34.801	14.915	8.862	32.837	74.890	Measured as percentage of shares owned by the largest shareholder.
Q	18,639	1.894	0.761	1.046	1.649	3.336	Measured as the value of stock price divided by the book value.
FI Holdings	18,639	0.147	1.558	0.000	0.000	60.320	Measured as the percentage of shares owned by foreign investors.
Manafees	18,639	0.102	0.088	0.009	0.081	0.569	Measured as the administrative expenses divided by the revenue.
Inde Pent	18,639	0.375	0.054	0.250	0.353	0.571	Measured as the number of independent directors divided by total number of the board.
Directors Holdings	18,639	0.128	0.192	0.000	0.002	0.659	Measured as the percentage of shares owned by all the directors.
Executives Holdings	18,639	0.072	0.140	0.000	0.001	0.585	Measured as the percentage of shares owned by all the executives.
Ana Follow	18,639	1.482	1.144	0.000	1.386	3.761	Measured as log (the number of analysts who observe this firm+1)
Cross List	18,639	0.026	0.159	0.000	0.000	1.000	Dummy variable, if the listing of this firm's common shares is also on Hong Kong exchange, variable is recorded as one.
AC High	18,639	0.496	0.500	0.000	0.000	1.000	Dummy variable, if the agency cost is higher, variable is recorded as one.
NSSGov1	6,454	0.218	0.413	0.000	0.000	1.000	If non-state shareholders appoint directors, supervisors and executives in SOEs, *NSSGov*1 is recorded as one.
NSSGov2	6,454	0.067	0.250	0.000	0.000	1.000	If non-state shareholders appoint executives in SOEs, *NSSGov*2 is recorded as one.

Panel B. The percentage of D&O insurance coverage in SOEs and non-SOEs by year

	SOEs		Non-SOEs	
Year	N	Mean	N	Mean
2013	920	0.096	1,407	0.023
2014	896	0.095	1,343	0.028
2015	859	0.104	1,392	0.027
2016	872	0.112	1,599	0.028
2017	899	0.113	1,813	0.026
2018	966	0.123	2,269	0.028
2019	1,042	0.126	2,395	0.035
Total	6,454	0.110	12,218	0.029

that firms with D&O insurance will have less corporate misconduct behaviour even when the firm has a significantly higher agency cost.

D&O insurance, corporate misconduct, and non-state shareholders' governance in SOEs

The absence of ownership is the root cause of agency problems in SOEs because the principal lacks continuous internal consciousness and sufficient external motivation to supervise the agent in SOEs. The recent literature finds that importing non-state shareholders into SOEs is an effective way to overcome the agency problem of owner absence and improve the corporate governance of SOEs (Sun and Tong 2003; Liao, Liu, and Wang 2014), because non-state shareholders can participate in the decision-making of SOEs via the appointment of directors, supervisors, and executives, to improve the efficiency and governance of SOEs (Yu, Shen, and Jiang 2022; Ren and Shao 2022; Li, Yang, and Yin 2022). Non-state shareholders will be more conscientious to maximize their benefits, and they can point executives to work themselves and they can also point directors and supervisors to voice for themselves.

This section tests the governance effect of D&O insurance on SOEs with different levels of non-state shareholders' governance. Specifically, we import the dummy variable *NSSGov1* (*NSSGov2*) to measure the participation of non-state shareholders' governance in SOEs; if non-state shareholders appoint directors, supervisors, and executives (executives) in SOEs, *NSSGov1* (*NSSGov2*) is recorded as one and otherwise, as zero. We then reuse Model (1) to examine the governance effect of D&O insurance in SOEs when the variable NSSGov1 and NSSGov2 equals one and zero, respectively.

IV. Empirical results

Descriptive statistics of research data

Panel A of Table 1 reports the summary statistics of the regression variables. The mean *misconduct* is 0.265, indicating that 26.5% of the firm-year observations in our sample involve corporate misconduct. The coverage of D&O insurance is approximately 6%, which is far lower than that in developed countries. Of the firm-year observations, 34.6% are SOEs and 65.4% are non-SOEs. The means of *NSSGov*1 and *NSSGov*2 are 0.218 and 0.067, respectively, indicating that 21.8% of SOEs have directors, supervisors, and executives appointed by non-state shareholders, and 6.7% of SOEs have executives appointed by non-state shareholders.

Panel B of Table 1 reports the percentage of D&O insurance coverage across years for SOEs and non-SOEs. The percentages of firms with D&O insurance gradually increases across the sample years for SOEs and non-SOEs; however, the development of D&O insurance is very slow. The data show that, from 2013 to 2019, more than 10% of SOEs purchased D&O insurance, whereas less than 3% of non-SOEs did so.

Baseline regression

Table 2 reports the results of the baseline regression. We find a negative and significant relationship between D&O insurance and corporate misconduct in the full sample and in SOEs. The coefficients in Columns (1) and (2) are negative and statistically significant at the 1% significance level, which indicates that firms that have purchased D&O insurance have less corporate misconduct behaviour. For SOEs, the coefficients of *D&O Ins* are negatively and significantly associated with corporate misconduct, indicating that purchasing D&O insurance can significantly decrease the likelihood of corporate misconduct. However, the coefficient for *D&O Ins* is not significant for non-SOEs in Columns (5) and (6), indicating that D&O insurance cannot play the role of corporate governance in non-SOEs.

Further studies

Mechanism analysis based on agency cost

Table 3 reports the results using Model (2). The coefficient of *D&O Ins*×*ACHigh* is negatively and significantly associated with corporate misconduct in SOEs which means that when the monitoring intensity by large shareholders is weak and the agency problem is serious, the insurers will monitor the executives to restrict and standardize managers' behaviours. However, the coefficient of *D&O Ins*×*ACHigh* is not significant in non-SOEs. These results show that D&O insurance can reduce

Table 2. Baseline regression results: D&O insurance and corporate misconduct.

	Full Sample		SOEs		Non-SOEs	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
D&O Ins	**−0.216*** **	**−0.205*** **	**−0.253*** **	**−0.277*** **	**−0.092**	**−0.062**
	(−3.121)	**(−2.959)**	**(−2.580)**	**(−2.898)**	**(−0.958)**	**(−0.634)**
Asset	0.043**	0.031	−0.001	0.012	0.119***	0.106***
	(2.444)	(1.636)	(−0.017)	(0.331)	(5.390)	(4.472)
Lev	0.187**	0.227**	0.399**	0.420**	0.153	0.179
	(2.134)	(2.452)	(2.523)	(2.575)	(1.473)	(1.621)
ROA	−2.790***	−2.696***	−2.903***	−2.555***	−2.763***	−2.769***
	(−11.462)	(−10.984)	(−5.303)	(−4.565)	(−10.321)	(−10.174)
Age	−0.040	−0.059	0.028	0.155	−0.005	−0.045
	(−0.834)	(−1.114)	(0.290)	(1.412)	(−0.089)	(−0.751)
Cash	−0.612***	−0.657***	−0.236	−0.287	−0.542***	−0.569***
	(−5.191)	(−5.347)	(−0.919)	(−1.060)	(−4.095)	(−4.126)
*Top*1	−0.010***	−0.010***	−0.010***	−0.009***	−0.007***	−0.007***
	(−9.710)	(−9.334)	(−4.278)	(−4.436)	(−5.831)	(−5.238)
Q	0.136***	0.097***	0.089**	0.026	0.142***	0.121***
	(6.685)	(3.968)	(2.143)	(0.551)	(6.182)	(4.273)
FI Holdings	−0.021*	−0.021**	−0.013	−0.008	−0.023**	−0.023**
	(−1.906)	(−2.029)	(−0.337)	(−0.195)	(−2.196)	(−2.260)
Manafees	0.269	0.235	0.448	0.545	0.201	0.080
	(1.528)	(1.265)	(1.296)	(1.476)	(1.025)	(0.381)
Inde Pent	−0.170	−0.264	−0.870*	−0.845*	−0.009	−0.103
	(−0.681)	(−1.054)	(−1.880)	(−1.825)	(−0.031)	(−0.346)
Directors Holdings	0.367***	0.276**	2.071***	2.489***	0.002	−0.064
	(3.043)	(2.223)	(2.850)	(3.317)	(0.019)	(−0.493)
Executives Holdings	−0.078	−0.090	−1.183	−1.090	−0.030	−0.042
	(−0.514)	(−0.591)	(−0.958)	(−0.854)	(−0.195)	(−0.273)
Ana Follow	−0.059***	−0.069***	−0.075***	−0.097***	−0.078***	−0.084***
	(−4.106)	(−4.630)	(−2.743)	(−3.350)	(−4.663)	(−4.825)
Cross List	−0.529***	−0.472***	−0.247*	−0.228	−0.646***	−0.622***
	(−4.592)	(−4.061)	(−1.658)	(−1.537)	(−3.198)	(−3.010)
Constants	−1.164***	−1.041**	−0.456	−1.298	−2.897***	−2.601***
	(−2.929)	(−2.163)	(−0.613)	(−1.431)	(−5.852)	(−4.349)
Ind	NO	YES	NO	YES	NO	YES
Year	NO	YES	NO	YES	NO	YES
Obs	18,639	18,638	6,454	6,454	12,185	12,184
Pseudo R-squared	0.049	0.057	0.053	0.071	0.048	0.055

Year and industry fixed effects are included and not reported. Z-statistics reported in the brackets are based on robust standard errors adjusted for clustering at the firm level. The significance levels at 1%, 5% and 10% are identified by ***, ** and *, respectively.

Table 3. Further test: D&O insurance, corporate misconduct and agency cost.

	SOEs	Non-SOEs
Variables	(1)	(2)
D&O Ins	−0.100	0.090
	(−0.791)	(0.665)
D&O Ins×ACHigh	**−0.448****	**−0.302**
	(−2.386)	**(−1.551)**
ACHigh	0.046	−0.003
	(0.845)	(−0.102)
Asset	0.014	0.106***
	(0.396)	(4.455)
Lev	0.442***	0.187*
	(2.722)	(1.695)
ROA	−2.498***	−2.767***
	(−4.466)	(−10.151)
Age	0.152	−0.042
	(1.374)	(−0.700)
Cash	−0.276	−0.573***
	(−1.018)	(−4.159)
Top1	−0.010***	−0.006***
	(−4.288)	(−5.053)
Q	0.027	0.123***
	(0.565)	(4.318)
FI Holdings	−0.009	−0.024**
	(−0.212)	(−2.242)
Manafees	0.539	0.083
	(1.463)	(0.394)
Inde Pent	−0.818*	−0.099
	(−1.767)	(−0.334)
Directors Holdings	2.543***	−0.063
	(3.384)	(−0.486)
Executives Holdings	−1.066	−0.043
	(−0.837)	(−0.284)
Ana Follow	−0.096***	−0.085***
	(−3.343)	(−4.850)
Cross List	−0.323**	−0.657***
	(−1.967)	(−3.091)
Constants	−1.3758	−2.6113***
	(−1.5167)	(−4.3551)
Ind	YES	YES
Year	YES	YES
Obs	6,454	12,184
Pseudo R-squared	0.072	0.056

Year and industry fixed effects are included and not reported. Z-statistics reported in the brackets are based on robust standard errors adjusted for clustering at the firm level. The significance levels at 1%, 5% and 10% are identified by ***, ** and *, respectively.

Table 4. D&O insurance, non-state shareholder and corporate misconduct in SOEs.

	NSSGov1 == 1	*NSSGov2* == 1	*NSSGov1* == 0	*NSSGov2* == 0
Variables	(1)	(2)	(3)	(4)
D&O Ins	**−0.223**	**−0.293**	**−0.323*****	**−0.286*****
	(−1.153)	**(−0.912)**	**(−3.018)**	**(−2.878)**
Asset	0.120*	0.158	−0.025	0.002
	(1.845)	(1.365)	(−0.599)	(0.049)
Lev	−0.079	0.730	0.572***	0.379**
	(−0.242)	(1.044)	(3.062)	(2.237)
ROA	−4.751***	−4.639**	−1.949***	−2.306***
	(−3.999)	(−2.009)	(−3.038)	(−3.885)
Age	0.022	0.533*	0.229*	0.137
	(0.122)	(1.928)	(1.655)	(1.127)
Cash	−1.360***	−1.616**	0.061	−0.181
	(−2.585)	(−2.001)	(0.200)	(−0.635)
Top1	−0.013***	0.005	−0.007***	−0.009***
	(−2.796)	(0.670)	(−3.027)	(−4.308)
Q	0.045	−0.026	0.002	0.024
	(0.512)	(−0.164)	(0.039)	(0.466)
FI Holdings	0.002	0.039	−0.000	−0.021
	(0.028)	(0.548)	(−0.001)	(−0.431)
Manafees	2.154***	3.336**	0.071	0.496
	(2.643)	(1.990)	(0.177)	(1.289)
Inde Pent	0.778	−2.408	−1.121**	−0.757
	(0.792)	(−1.411)	(−2.179)	(−1.584)
Directors Holdings	1.839***	0.322	3.817	4.729***
	(2.600)	(0.319)	(1.553)	(4.214)
Executives Holdings	−1.610	1.287	−0.429	−2.623
	(−1.124)	(0.693)	(−0.131)	(−1.432)
Ana Follow	−0.074	−0.066	−0.104***	−0.106***
	(−1.404)	(−0.623)	(−3.041)	(−3.531)
Cross List	−0.477	−0.817	−0.142	−0.213
	(−1.538)	(−1.291)	(−0.849)	(−1.387)
Constants	−3.445**	−4.839*	−0.690	−1.021
	(−2.075)	(−1.821)	(−0.646)	(−1.062)
Ind	YES	YES	YES	YES
Year	YES	YES	YES	YES
Obs	1,396	415	5,047	6,022
Pseudo R-squared	0.116	0.173	0.0713	0.0740

Year and industry fixed effects are included and not reported. Z-statistics reported in the brackets are based on robust standard errors adjusted for clustering at the firm level. The significance levels at 1%, 5% and 10% are identified by ***, ** and *, respectively.

agency cost, thus restraining corporate misconduct in SOEs while D&O insurance cannot restrain non-SOEs' corporate misconduct.

Heterogeneity tests for SOEs

Through theoretical analyses and empirical tests, we find that the governance effect of D&O insurance is more pronounced in SOEs. If D&O insurance can mitigate the agency problems caused by owner absence in SOEs, the governance effect of D&O insurance will be more significant in SOEs when non-state shareholders' governance is lower. Table 4 reports the regression results of D&O insurance on corporate misconduct under the different governance levels of non-state shareholders in SOEs. Columns (1) and (2) report the results under a higher governance level of non-state shareholders in SOEs. The coefficients of *D&O Ins* are not significantly associated with corporate misconduct. Columns (3) and (4) reveal that the purchase of D&O insurance is negatively and significantly associated with corporate misconduct under a lower governance level of non-state shareholders in SOEs.

Robustness tests

Propensity score matching test

Using propensity score matching (PSM) method can help us compare insured firms with other firms that have the same observable dimensions. To identify the propensity-score matched control sample, we use the caliper matching method to match the samples of 'treatment group' and 'control group' with the ratio

Table 5. Robustness tests: PSM procedure.

	Full Sample	SOEs	Non-SOEs
Variables	(1)	(2)	(3)
D&O Ins	**−0.157****	**−0.287*****	**0.006**
	(−2.103)	**(−2.818)**	**(0.057)**
Asset	−0.026	−0.038	0.012
	(−0.577)	(−0.585)	(0.197)
Lev	−0.023	0.367	−0.241
	(−0.110)	(1.117)	(−0.844)
ROA	−2.982***	−3.553***	−2.487***
	(−4.760)	(−2.963)	(−3.265)
Age	−0.031	0.074	0.047
	(−0.204)	(0.329)	(0.236)
Cash	−0.459	−0.346	−0.407
	(−1.447)	(−0.610)	(−0.986)
Top1	−0.011***	−0.010***	−0.005
	(−4.430)	(−2.821)	(−1.531)
Q	0.030	−0.051	−0.002
	(0.445)	(−0.443)	(−0.024)
FI Holdings	−0.039	0.003	−0.096
	(−1.097)	(0.053)	(−1.058)
Manafees	0.295	1.052	−0.192
	(0.593)	(0.953)	(−0.355)
Inde Pent	0.160	−1.107	1.203
	(0.265)	(−1.196)	(1.383)
Directors Holdings	1.222*	2.101	0.384
	(1.950)	(0.644)	(0.569)
Executives Holdings	0.003	0.067	0.316
	(0.004)	(0.014)	(0.323)
Ana Follow	−0.070*	−0.053	−0.105**
	(−1.898)	(−0.943)	(−2.143)
Cross List	−0.383***	−0.194	−0.653***
	(−2.743)	(−1.061)	(−3.172)
Constants	0.324	0.318	−0.182
	(0.283)	(0.178)	(−0.120)
Ind	YES	YES	YES
Year	YES	YES	YES
Obs	2,452	1,397	1,047
Pseudo R-squared	0.099	0.109	0.081

Year and industry fixed effects are included and not reported. Z-statistics reported in the brackets are based on robust standard errors adjusted for clustering at the firm level. The significance levels at 1%, 5% and 10% are identified by ***, ** and *, respectively.

1:2, to obtain the sub-samples for robustness analysis. We estimate a logit model using the full sample with control variables and calculate the propensity score for each firm. We then match each insured firm with control firms that have similar characteristics according to their propensity to purchase D&O insurance and obtain the PSM sample. Finally, we re-test Model (1) using the PSM sample; the regression results are presented in Table 5. The results in Table 5 show that the coefficient estimate of *D&O Ins* is significant and negative in the full sample and SOEs, and that the relationship between D&O insurance and corporate misconduct is not significant in the subsample of non-SOEs, which is consistent with our baseline results. In addition, we adopt the balance test to ensure that the PSM matching is satisfactory; the results of the balance test are presented in Appendix C.

Heckman self-selection test

We use the Heckman self-selection model to test the robustness of our conclusions. The results of the Heckman self-selection process are presented in Table 6. The first-stage regression results are shown in Columns (1), (3), and (5), and the second-stage results are shown in Columns (2), (4), and (6). In the first stage, we use a probit model to regress the selection of D&O insurance purchases. Based on these results, we calculate the inverse Mills ratio (*IMR*). In the second-stage estimation, we add the inverse Mills ratio to Model (1) as the control variable and conduct a second-stage regression. The second-stage results in Columns (2) and (4) reveal that the coefficient estimates are still significant and negative in the full sample and the SOE sample, and the results in Column (6) indicate that the coefficients of D&O insurance and corporate misconduct are not significant in the non-SOE sample. These results are consistent with the baseline regression results.

Alternative proxy for misconduct behaviour

Unlike the recent literature (Heese and Pérez-Cavazos 2020; Jain and Zaman 2020), we use the number of misconduct cases in one year as an alternative proxy for misconduct, instead of the financial penalties imposed on a firm due to misconduct. In China, the punishment methods for corporate misconduct are very complex, and fine is only one of the.[2] The amount of financial penalties as an alternative proxy for corporate misconduct cannot measure all punishments. Table 7 shows the regression results when using the number of misconduct cases in one year as the independent variable. Columns (1) and (2) show that the coefficients of the dependent variable *D&O Ins* and the independent variable *Misconduct_Number*, are still significant and negative in the full sample and SOE sample, respectively, and the results in Column (3) indicate that the coefficients of *D&O Ins* and *Misconduct_Number* are not significant in the non-SOE sample. These results are consistent with the baseline regression results.

[2]There are many punishment methods, such as warning, suspending the licence, ordering the suspension of production and business, confiscating illegal gains, market entry prohibition, and so on..

Table 6. Robustness tests: Heckman self-selection model.

	Full Sample		SOEs		Non-SOEs	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
IV_Ins	**3.797*** **		**3.230*** **		**4.641*** **	
	(4.544)		**(3.667)**		**(3.553)**	
D&O Ins		**−0.160** **		**−0.264*** **		**−0.055**
		(−2.319)		**(−2.765)**		**(−0.565)**
IMR		**1.390*** **		**0.813*** **		**0.265**
		(10.775)		**(2.682)**		**(1.127)**
Asset	0.164***	0.255***	0.107*	0.090*	0.217***	0.149***
	(3.578)	(8.824)	(1.652)	(1.956)	(3.149)	(2.857)
Lev	0.358	0.672***	0.277	0.587***	0.435	0.361**
	(1.458)	(6.510)	(0.778)	(3.295)	(1.355)	(2.377)
ROA	−0.284	−3.041***	−0.407	−2.845***	−0.194	−2.715***
	(−0.575)	(−12.029)	(−0.458)	(−4.837)	(−0.331)	(−9.095)
Age	0.559***	0.662***	0.646***	0.590***	0.525**	0.043
	(3.464)	(7.643)	(3.007)	(2.922)	(2.272)	(0.334)
Cash	0.144	−0.367***	−0.530	−0.648**	0.635*	−0.356*
	(0.488)	(−2.916)	(−1.104)	(−2.178)	(1.808)	(−1.812)
*Top*1	−0.002	−0.012***	−0.000	−0.009***	−0.004	−0.007***
	(−0.905)	(−10.503)	(−0.080)	(−4.372)	(−1.233)	(−4.508)
Q	0.135**	0.254***	−0.064	−0.020	0.285***	0.184***
	(2.490)	(8.528)	(−0.754)	(−0.396)	(4.093)	(2.726)
FI Holdings	0.011	0.074	0.119**	−0.027**	−0.014	−0.027**
	(1.083)	(−0.886)	(2.156)	(1.499)	(−0.787)	(−2.521)
Manafees	0.036	0.277	−0.043	0.532	−0.048	0.156
	(0.088)	(1.455)	(−0.058)	(1.357)	(−0.102)	(0.696)
Inde Pent	0.575	0.390	0.909	−0.255	−0.023	−0.155
	(1.005)	(1.490)	(1.262)	(−0.492)	(−0.026)	(−0.494)
Directors Holdings	−0.614	−0.743***	−4.681	−1.546	−0.573	−0.236
	(−1.195)	(−4.806)	(−1.558)	(−0.932)	(−1.041)	(−1.288)
Executives Holdings	−0.834	−1.115***	1.134	0.086	−0.881	−0.212
	(−1.040)	(−6.100)	(0.269)	(0.065)	(−1.114)	(−0.848)
Ana Follow	−0.029	−0.120***	−0.025	−0.118***	−0.036	−0.096***
	(−0.830)	(−7.684)	(−0.554)	(−3.975)	(−0.696)	(−4.817)
Cross List	1.569***	1.099***	1.786***	0.721*	0.970***	−0.390
	(9.689)	(5.802)	(8.861)	(1.766)	(3.274)	(−1.410)
Constants	−7.527***	−11.195***	−6.011***	−5.204***	−8.765***	−4.076**
	(−6.493)	(−10.130)	(−3.758)	(−2.660)	(−4.990)	(−1.995)
Ind	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES
Obs	18,084	18,084	6,287	6,287	11,068	11,068
Pseudo R-squared	0.231	0.066	0.229	0.071	0.146	0.051

In the first-stage regression of Heckman self-selection model, we use the coverage of D&O insurance in each industry in year *t*-1 (IV_Ins) as instrument variable, since the purchase of D&O insurance in industry will affect the choice of firms in the same industry but will not affect the tendency of corporate misconduct. And Column (1), Column (2) and Column (3) of Table 4 show that the coefficient estimates for IV_Ins are significant and positive. Year and industry fixed effects are included and not reported. Z-statistics reported in the brackets are based on robust standard errors adjusted for clustering at the firm level. The significance levels at 1%, 5% and 10% are identified by ***, ** and *, respectively.

Table 7. Robustness tests: alternative proxy for misconduct behaviour.

	Full Sample	SOEs	Non-SOEs
	Misconduct_Number	*Misconduct_Number*	*Misconduct_Number*
Variables	(1)	(2)	(3)
D&O Ins	**−0.137****	**−0.093***	**−0.064**
	(−2.196)	**(−1.711)**	**(−0.541)**
Asset	0.068***	0.028	0.158***
	(3.457)	(1.451)	(5.167)
Lev	0.143	0.118	0.229
	(1.233)	(1.051)	(1.434)
ROA	−3.717***	−2.042***	−4.072***
	(−11.998)	(−4.896)	(−10.877)
Age	−0.030	0.102*	0.015
	(−0.605)	(1.735)	(0.247)
Cash	−0.492***	−0.269	−0.292*
	(−3.946)	(−1.605)	(−1.882)
Top1	−0.009***	−0.005***	−0.007***
	(−9.256)	(−4.177)	(−5.135)
Q	0.118***	0.016	0.141***
	(4.880)	(0.568)	(4.557)
FI Holdings	−0.010***	−0.006	−0.012***
	(−2.853)	(−0.395)	(−3.804)
Manafees	0.079	0.028	−0.061
	(0.397)	(0.120)	(−0.253)
Inde Pent	0.000	−0.530**	0.241
	(0.001)	(−2.199)	(0.717)
Directors Holdings	0.311***	3.262***	−0.043
	(2.629)	(2.708)	(−0.345)
Executives Holdings	−0.117	−1.797	−0.046
	(−0.752)	(−1.105)	(−0.298)
Ana Follow	−0.059***	−0.051***	−0.098***
	(−4.209)	(−3.175)	(−5.130)
Cross List	−0.305***	−0.143***	−0.451*
	(−3.767)	(−2.817)	(−1.794)
Constants	−0.639	−0.203	−2.529***
	(−1.269)	(−0.395)	(−3.108)
Ind	YES	YES	YES
Year	YES	YES	YES
Obs	18,639	6,454	12,185
R-squared	0.082	0.071	0.097
Pseudo R-squared	0.082	0.071	0.097

The independent variable is the number of misconduct cases. Year and industry fixed effects are included and not reported. T-statistics reported in the brackets are based on robust standard errors adjusted for clustering at the firm level. The significance levels at 1%, 5% and 10% are identified by ***, ** and *, respectively.

Alternative proxy for D&O insurance

Next, we use *Insured Amount*—the amount of insurance coverage intended to protect directors and officers from personal losses – as an alternative proxy for independent variable, and Table 8 reports the results. In Column (1), the coefficient of *Insured Amount* is significantly negative, indicating that firms that have purchased D&O insurance with a higher amount of insurance coverage are less likely to conduct misconduct. In Columns (2) and (3), the coefficients of *Insured Amount* are significantly negative and non-significant, respectively. These results also emphasize that D&O insurance is a governance tool in China, and that the governance effect of D&O insurance is more pronounced in SOEs.

Other robustness test

We consider the autocorrelation and heteroscedasticity of the variables at the firm level and use robust standard errors clustered at the firm level in our baseline regressions. To test the robustness of our results, we used robust standard errors to correct for heteroskedasticity problems and two-way cluster-robust standard errors clustered at both the firm and time levels (Abadie et al. 2023; Cameron and Miller 2015). The regression results adjusted by robust standard errors are reported in Columns (1) to (3) of Table 9, and the regression results adjusted by two-way cluster-robust standard errors at both the firm and time levels are reported in Columns (4) to (9) of Table 9, which are consistent with our baseline. Therefore, the findings of this study are considered reliable.

Table 8. Robustness tests: alternative proxy for D&O insurance.

	Full Sample	SOEs	Non-SOEs
Variables	(1)	(2)	(3)
Insured Amount	**−0.011***	**−0.013****	**−0.016**
	(−1.860)	**(−2.427)**	**(−1.219)**
Asset	0.061	0.035	0.167
	(0.857)	(0.503)	(1.222)
Lev	0.255	0.410*	0.158
	(1.207)	(1.876)	(0.408)
ROA	−0.059	−0.374	−0.166
	(−0.160)	(−0.802)	(−0.228)
Age	0.020	0.215	−0.596
	(0.047)	(0.617)	(−0.478)
Cash	−0.181	0.574	−0.700*
	(−0.616)	(1.371)	(−1.747)
Top1	−0.003	−0.002	−0.001
	(−0.774)	(−0.509)	(−0.101)
Q	−0.006	0.017	−0.017
	(−0.119)	(0.227)	(−0.199)
FI Holdings	0.019	0.026	0.005
	(1.022)	(1.248)	(0.145)
Manafees	0.406	−0.245	0.846
	(0.794)	(−0.327)	(1.172)
Inde Pent	0.345	0.029	2.316**
	(1.221)	(0.106)	(2.074)
Directors Holdings	1.000	47.953	0.869
	(1.063)	(0.699)	(0.852)
Executives Holdings	−0.540	0.871	−0.459
	(−0.761)	(0.033)	(−0.558)
Ana Follow	0.025	0.029	−0.005
	(0.953)	(1.015)	(−0.081)
Cross List	−0.094	0.422***	−0.946***
	(−0.170)	(5.079)	(−3.292)
Constants	−0.711	−1.579	−2.167
	(−0.328)	(−0.832)	(−0.477)
Ind	YES	YES	YES
Year	YES	YES	YES
Obs	1,163	761	402
R-squared	0.496	0.432	0.570

The dependent variable is the amount of insurance coverage, and research sample is firms that have purchased D&O insurances. Year and industry fixed effects are included and not reported. Z-statistics reported in the brackets are based on robust standard errors adjusted for clustering at the firm level. The significance levels at 1%, 5% and 10% are identified by ***, ** and *, respectively.

V. Discussion and implications

Our study investigates the corporate governance of D&O insurance among the Chinese listed firms and finds that firms with D&O insurance have low corporate misconduct. We also find that the governance effect of D&O insurance is more significant for SOEs than for non-SOEs. We argue that the corporate governance diversity of D&O insurance emerges from the different roots of agency problems in SOEs and non-SOEs, and the uneven development of China's D&O insurance.

Our findings have the following important theoretical and practical implications. First, it offers evidence from China regarding the governance perspective of D&O insurance and deepens our understanding of the development of D&O insurance in China. On the one hand, our study contributes to the study of D&O insurance by offering a governance perspective on its impact on corporate misconduct. On the other hand, our study adds to the empirical evidence from China that external governance mechanisms can inhibit corporate misconduct.

Second, our study contributes to the corporate governance of D&O insurance by aligning its impact on corporate misconduct with different property rights. Since the root of the agency problem between SOEs and non-SOEs is different, and the coverage of D&O insurance is also different in SOEs and non-SOEs, our work fills these research gaps and suggests that we cannot simply consider using corporate governance theories to solve these problems, and we need to pay attention to China's economic institutional background.

Third, our study shows that D&O insurance remains an immature external governance mechanism in China, although it can play a role in improving corporate governance. This study finds that the coverage of D&O insurance in China is far lower than that in developed countries, and that the Chinese capital market is a potentially large market for D&O insurance. The insurers should fully consider the needs of different listed firms and design D&O insurance that can improve the governance of the listed firms and protect the rights and interests of the shareholders and investors.

Finally, our study provides references for SOE reforms. To increase the enthusiasm for participating in SOEs' corporate governance, the Chinese government has allowed SOEs to bring in more non-state shareholders because increasing the shareholding ratio of non-state shareholders can effectively overcome agency problems caused by owner absence. Our research finds that D&O insurance can curb corporate misconduct in SOEs with no non-state shareholders, which suggests that policymakers should consider external governance tools to reform SOEs.

Table 9. Robustness tests: robust to heteroskedastic and 2waycluster.

	Full Sample	SOEs	Non-SOEs	Full Sample	SOEs	Non-SOEs
Variables	(1)	(2)	(3)	(4)	(5)	(6)
D&O Ins	**−0.205*** **	**−0.277*** **	**−0.062**	**−0.205*** **	**−0.277*** **	**−0.062**
	(−3.954)	**(−3.712)**	**(−0.804)**	**(−3.139)**	**(−3.160)**	**(−0.691)**
Asset	0.031**	0.012	0.106***	0.031	0.012	0.106***
	(2.180)	(0.442)	(5.887)	(1.215)	(0.452)	(2.956)
Lev	0.227***	0.420***	0.179**	0.227**	0.420**	0.179
	(3.326)	(3.258)	(2.167)	(2.160)	(2.551)	(1.528)
ROA	−2.696***	−2.555***	−2.769***	−2.696***	−2.555***	−2.769***
	(−12.478)	(−5.292)	(−11.257)	(−6.075)	(−4.640)	(−6.589)
Age	−0.059	0.155*	−0.045	−0.059	0.155	−0.045
	(−1.588)	(1.863)	(−1.065)	(−0.962)	(1.432)	(−0.725)
Cash	−0.657***	−0.287	−0.569***	−0.657***	−0.287	−0.569***
	(−6.795)	(−1.383)	(−5.138)	(−3.757)	(−0.939)	(−3.489)
*Top*1	−0.010***	−0.009***	−0.007***	−0.010***	−0.009***	−0.007***
	(−13.261)	(−6.529)	(−7.183)	(−7.387)	(−4.337)	(−5.363)
Q	0.097***	0.026	0.121***	0.097***	0.026	0.121***
	(4.958)	(0.674)	(5.234)	(3.493)	(0.481)	(4.382)
FI Holdings	−0.021*	−0.008	−0.023*	−0.021*	−0.008	−0.023*
	(−1.772)	(−0.221)	(−1.866)	(−1.894)	(−0.192)	(−1.651)
Manafees	0.235*	0.545*	0.080	0.235	0.545*	0.080
	(1.722)	(1.897)	(0.507)	(1.513)	(1.762)	(0.424)
Inde Pent	−0.264	−0.845**	−0.103	−0.264	−0.845	−0.103
	(−1.377)	(−2.251)	(−0.443)	(−0.686)	(−1.482)	(−0.239)
Directors Holdings	0.276***	2.489***	−0.064	0.276**	2.489***	−0.064
	(3.020)	(4.041)	(−0.662)	(2.275)	(3.711)	(−0.471)
Executives Holdings	−0.090	−1.090	−0.042	−0.090	−1.090	−0.042
	(−0.769)	(−1.003)	(−0.351)	(−0.776)	(−1.471)	(−0.342)
Ana Follow	−0.069***	−0.097***	−0.084***	−0.069***	−0.097***	−0.084***
	(−5.900)	(−4.270)	(−6.026)	(−4.327)	(−3.350)	(−5.025)
Cross List	−0.472***	−0.228**	−0.622***	−0.472***	−0.228*	−0.622**
	(−5.368)	(−2.005)	(−3.989)	(−4.650)	(−1.756)	(−2.547)
Constants	−1.041***	−1.298*	−2.601***	−1.041**	−1.298*	−2.601***
	(−2.907)	(−1.939)	(−5.686)	(−2.067)	(−1.723)	(−3.319)
Ind	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES
Obs	18,638	6,454	12,184	18,638	6,454	12,184
Pseudo R-squared	0.057	0.071	0.055	0.057	0.071	0.055

Year and industry fixed effects are included and not reported. *Z*-statistics reported in parentheses are based on robust standard errors in Column (1) to (3), and based on robust standard errors adjusted for clustering at both firm level and time level in Column (4) to (6). The significance levels at 1%, 5% and 10% are identified by ***, ** and *, respectively.

Highlights

- We investigate the effect of D&O insurance on corporate misconduct.
- Purchasing of D&O insurance can import supervisors to mitigate agency costs caused by owner absence.
- D&O insurance can reduce agency cost in SOEs and curb corporate misconduct.
- Instead of encouraging non-state shareholders into SOEs, D&O insurance can also improve SOEs' governance.

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References

Abadie, A., S. Athey, G. W. Imbens, and J. M. Wooldridge. 2023. "When Should You Adjust Standard Errors for Clustering?" *The Quarterly Journal of Economics* 138 (1): 1–35. doi:10.1093/qje/qjac038.

Ali, A., T.Y. Chen, and S. Radhakrishnan. 2007. "Corporate Disclosures by Family Firms." *Journal of Accounting and Economics* 44 (1): 238–286. doi:10.1016/j.jacceco.2007.01.006.

Baker, T., and S. J. Griffith. 2007. "Predicting Corporate Governance Risk: Evidence from the Directors' and Officers' Liability Insurance Market." *University of Chicago Law Review* 74 (2): 487–544.

Baker, T., and S. J. Griffith. 2010. *Ensuring Corporate Misconduct: How Liability Insurance Undermines Shareholder Litigation*. Chicago: The University of Chicago Press.

Boyer, M. M., and L. H. Stern. 2012. "Is Corporate Governance Risk Valued? Evidence from Directors' and Officers' Insurance." *Journal of Corporate Finance* 18 (2): 349–372. doi:10.1016/j.jcorpfin.2011.12.005.

Boyer, M. M., and L. H. Stern. 2014. "D & o Insurance and IPO Performance: What Can We Learn from Insurers?" *Journal of Financial Intermediation* 23 (4): 504–540. doi:10.1016/j.jfi.2014.05.001.

Bradshaw, M., G. Liao, and M. Ma. 2019. "Agency Costs and Tax Planning When the Government is a Major Shareholder." *Journal of Accounting Economics* 67 (2–3): 255–277. doi:10.1016/j.jacceco.2018.10.002.

Byun, H. S., W. Kim, E. Jung Lee, and K. Suh Park. 2019. "When and Why Do Takeovers Lead to Fraud?" *Financial Management* 48 (1): 45–76. doi:10.1111/fima.12213.

Cameron, A. C., and D. L. Miller. 2015. "A Practitioner's Guide to Cluster-Robust Inference." *The Journal of Human Resources* 50 (2): 317–372. doi:10.3368/jhr.50.2.317.

Cao, Z., and G. S. Narayanamoorthy. 2014. "Accounting and Litigation Risk: Evidence from Directors' and Officers' Insurance Pricing." *Review of Accounting Studies* 19 (1): 1–42. doi:10.1007/s11142-013-9249-4.

Chalmers, J. M. R., L. Y. Dann, and J. Harford. 2002. "Managerial Opportunism? Evidence from Directors' and Officers' Insurance Purchases." *The Journal of Finance* 57 (2): 609–636. doi:10.1111/1540-6261.00436.

Chen, Q., X. Chen, S. Katherine, Y. Xu, and J. Xue. 2012. "The Sensitivity of Corporate Cash Holdings to Corporate Governance." *The Review of Financial Studies* 25 (12): 3610–3644. doi:10.1093/rfs/hhs099.

Chen, Z., Z. L. Oliver, and Z. Hong. 2016. "Directors' and Officers' Liability Insurance and the Cost of Equity." *Journal of Accounting and Economics* 61 (1): 100–120. doi:10.1016/j.jacceco.2015.04.001.

Core, J. E. 1997. "On the Corporate Demand for Directors' and Officers' Insurance." *The Journal of Risk and Insurance* 64 (1): 63–87. doi:10.2307/253912.

Fisman, R., and Y. Wang. 2015. "Corruption in Chinese Privatizations." *Journal of Law, Economics, and Organization* 31 (1): 1–29. doi:10.1093/jleo/ewu003.

Friedman, M., and R. Friedman. 1980. *Free to Choose*. New York: Houghton, Mifflin, Harcourt Publishing Company, Inc.

Heese, J., and G. Pérez-Cavazos. 2020. "When the Boss Comes to Town: The Effects of Headquarters' Visits on Facility-Level Misconduct." *The Accounting Review* 95 (6): 235–261. doi:10.2308/tar-2019-0068.

Hu, G., Y. Zhao, and J. Hu. 2019. "Directors' and Officers' Liability Insurance, Risk Tolerance and Corporate Innovation." *Management World* 35 (8): 121–135. in Chinese.

Jain, T., and R. Zaman. 2020. "When Boards Matter: The Case of Corporate Social Irresponsibility." *British Journal of Management* 31 (2): 365–386. doi:10.1111/1467-8551.12376.

Jia, N., X. Mao, and R. Yuan. 2019. "Political Connections and Directors' and Officers' Liability Insurance—Evidence from China." *Journal of Corporate Finance* 58: 353–372. doi:10.1016/j.jcorpfin.2019.06.001.

Jiang, F., and K. A. Kim. 2020. "Corporate Governance in China: A Survey." *Review of Finance* 24 (4): 733–772. doi:10.1093/rof/rfaa012.

Karpoff, J. M., and X. Lou. 2010. "Short Sellers and Financial Misconduct." *The Journal of Finance* 65 (5): 1879–1913. doi:10.1111/j.1540-6261.2010.01597.x.

Khanna, V., E. H. Kim, and Y. Lu. 2015. "CEO Connectedness and Corporate Fraud." *The Journal of Finance* 70 (3): 1203–1252. doi:10.1111/jofi.12243.

Lennox, C., and J. Pittman. 2010. "Big Five Audits and Accounting Fraud." *Contemporary Accounting Research* 27 (1): 209–247. doi:10.1111/j.1911-3846.2010.01007.x.

Liao, L., B. Liu, and H. Wang. 2014. "China's Secondary Privatization: Perspectives from the Split-Share Structure Reform." *Journal of Financial Economics* 113 (3): 500–518. doi:10.1016/j.jfineco.2014.05.007.

Liao, H.M., L. Tang, and J.Z. Lee. 2016. "Directors' and Officers' Liability Insurance and Earnings Conservatism." *Journal of Accounting Review* 63 (7): 109–150.

Li, K.F., and Y.P. Liao. 2014. "Directors' and Officers' Liability Insurance and Investment Efficiency: Evidence from Taiwan." *Pacific-Basin Finance Journal* 29: 18–34. doi:10.1016/j.pacfin.2014.03.001.

Lin, F.Y., L. Guan, C. Ho, and T.S. Wang. 2022. "Examining the D&O Insurance Effect on Managerial Ability." *Finance Research Letters* 46: 102297. doi:10.1016/j.frl.2021.102297.

Lin, C., M. S. Officer, R. Wang, and H. Zou. 2013. "Directors' and Officers' Liability Insurance and Loan Spreads." *Journal of Financial Economics* 110 (1): 37–60. doi:10.1016/j.jfineco.2013.04.005.

Lin, C., M. S. Officer, and H. Zou. 2011. "Directors' and Officers' Liability Insurance and Acquisition Outcomes." *Journal of Financial Economics* 102 (3): 507–525. doi:10.1016/j.jfineco.2011.08.004.

Liu, J., Y. Jiang, S. Gan, and R. Chen. 2022. "The Impact of D&O Insurance on Excess Corporate Leverage." *China Journal of Accounting Research* 15 (4). doi:10.1016/j.cjar.2022.100271.

Li, W., X. Yang, and X. Yin. 2022. "Non-State Shareholders Entering of State-Owned Enterprises and Equity Mispricing: Evidence from China." *International Review of Financial Analysis* 84: 102362. doi:10.1016/j.irfa.2022.102362.

Li, T., T. Yang, and J. Zhu. 2022. "Directors' and Officers' Liability Insurance: Evidence from Independent Directors' Voting." *Journal of Banking & Finance* 138: 106425. doi:10.1016/j.jbankfin.2022.106425.

Massa, M., B. Zhang, and H. Zhang. 2015. "The Invisible Hand of Short Selling: Does Short Selling Discipline Earnings Management?" *Reviews of Financial Studies* 28 (6): 1701–1736. doi:10.1093/rfs/hhu147.

O'sullivan, N. 1997. "Insuring the Agents: The Role of Directors' and Officers' Insurance in Corporate Governance." *The Journal of Risk and Insurance* 64 (3): 545–556. doi:10.2307/253764.

Ren, X., and H. Shao. 2022. "Non-State Shareholder Governance and Shadow Banking Business: Evidence from Chinese State-Owned Manufacturing Enterprises." *Research in International Business and Finance* 60: 101631. doi:10.1016/j.ribaf.2022.101631.

Reza, S. W. 2020. "Officers' Fiduciary Duties and Acquisition Outcomes." *Financial Review* 55 (1): 91–119. doi:10.1111/fire.12194.

Shi, W., B. L. Connelly, and R. E. Hoskisson. 2017. "External Corporate Governance and Financial Fraud: Cognitive Evaluation Theory Insights on Agency Theory Prescriptions." *Strategic Management Journal* 38 (6): 1268–1286. doi:10.1002/smj.2560.

Sun, Q., and W. H. S. Tong. 2003. "China Share Issue Privatization: The Extent of Its Success." *Journal of Financial Economics* 70 (2): 183–222. doi:10.1016/S0304-405X(03)00145-4.

Wang, T. Y., A. Winton, and X. Yu. 2010. "Corporate Fraud and Business Conditions: Evidence from IPOs." *The Journal of Finance* 65 (6): 2255–2292. doi:10.1111/j.1540-6261.2010.01615.x.

Weng, T.C., G.Z. Chen, and H.Y. Chi. 2017. "Effects of Directors and Officers Liability Insurance on Accounting Restatements." *International Review of Economics and Finance* 49 (3): 437–452. doi:10.1016/j.iref.2017.02.010.

Xu, R., and Y. Zheng. 2012. "On the Corporate Demand for Directors' and Officers' Insurance in China." *Actual Problems of Economics* 137 (11): 381–387.

Yang, J., Y. Xue, and Y. Liu. 2023. "Short Selling, Managerial Alignment and Corporate Misconduct." *Pacific-Basin Finance Journal* 77: 101895. doi:10.1016/j.pacfin.2022.101895.

Yuan, R., J. Sun, and F. Cao. 2016. "Directors' and Officers' Liability Insurance and Stock Price Crash Risk." *Journal of Corporate Finance* 37: 173–192. doi:10.1016/j.jcorpfin.2015.12.015.

Yu, Z., Y. Shen, and S. Jiang. 2022. "The Effects of Corporate Governance Uncertainty on State-Owned Enterprises' Green Innovation in China: Perspective from the Participation of Non-State-Owned Shareholders." *Energy Economics* 115: 106402. doi:10.1016/j.eneco.2022.106402.

Appendix A Different Types of Corporate Misconduct

Types of misconduct	making up profits, making up assets, misrepresentation, delayed disclosure, major omission, false disclosure, fraudulent listing, illegal use of funds, unauthorized change of the use of funds, occupation of firm's assets, insider trading, trading stocks against the rules, manipulation of stock price, guarantee against the rules and others.

Appendix B Agency Costs, Firm Performance and Property Rights

We examine the differences in agency costs and the performance of firms with different property rights.
In Column (1), the independent variable is *Asset Turnover* which measures managers' agency costs; a lower *Asset Turnover* value means a higher agency cost for managers (Li, Yang, and Zhu 2022). We find that the coefficient of *SOE* is -0.036, which is negatively and significantly associated with the independent variable *Asset Turnover*, meaning that SOEs have a higher agency cost for managers than non-SOEs. In Columns (2) and (3), the independent variables are ROA and ROE, respectively, and the coefficients of *SOE* are -0.025 and-0.088, respectively. Thus, compared with non-SOEs, SOEs have poorer firm performance.

	(1)	(2)	(3)
Variables	*Asset Turnover*	*ROA*	*ROE*
SOE	−0.036**	−0.025***	−0.088***
	(−2.150)	(−3.873)	(−5.019)
Asset	−0.035***	−0.021***	−0.048***
	(−2.629)	(−7.190)	(−5.736)
Lev	0.181***	0.026**	0.078***
	(4.618)	(2.447)	(2.635)
ROA	0.206***	0.131***	0.168**
	(3.234)	(5.089)	(2.187)
Age	0.109	−0.018	−0.005
	(1.617)	(−1.055)	(−0.102)
Cash	−0.009	0.071***	0.146***
	(−0.308)	(9.014)	(7.384)
*Top*1	−0.001	0.000**	0.001***
	(−0.971)	(1.999)	(2.748)
Q	0.009*	0.010***	0.025***
	(1.825)	(5.987)	(6.004)
FI Holdings	−0.004	0.002	0.004**
	(−1.408)	(1.547)	(2.043)
Manafees	−0.597***	−0.040*	−0.048
	(−9.933)	(−1.709)	(−0.715)
Inde Pent	0.053	0.008	0.036
	(0.767)	(0.373)	(0.659)
Directors Holdings	−0.038	0.015	0.037
	(−0.907)	(1.112)	(1.081)
Executives Holdings	0.003	0.014	0.013
	(0.061)	(0.993)	(0.375)
Ana Follow	−0.001	0.006***	0.016***
	(−0.302)	(6.671)	(5.874)
Cross List	−0.088	−0.006	−0.009
	(−1.499)	(−0.838)	(−0.723)
Constants	1.089***	0.476***	0.961***
	(3.433)	(6.386)	(4.488)
ID	YES	YES	YES
Year	YES	YES	YES
Obs	18,639	18,639	18,554
R-squared	0.854	0.477	0.355

Year and firm fixed effects are included. T-statistics reported in the brackets are based on robust standard errors adjusted for clustering at the firm level. The significance levels at 1%, 5% and 10% are identified by ***, ** and *, respectively.

Appendix C PSM Balance Test Resultsg

To test whether the PSM is satisfactory, we adopt a balance test, and the results are presented in Appendix B. The results show after PSM matching, the standardized deviations of corporate characteristics after matching are significantly reduced, and the standardized deviations are less than 5%. Moreover, the differences in the mean values of the variables in the matched and unmatched samples are reduced, and the t-tests of all variables show that the differences are insignificant in the matched and unmatched samples. Therefore, the PSM matching is effective.

	Unmatched	Mean		%reduct		t-test	
Variable	Matched	Treated	Control	%bias	bias	t	p>t
Asset	U	23.34	22.06	88.10	96.80	32.04	0.000
	M	23.28	23.32	−2.800		−0.570	0.568
Lev	U	0.542	0.419	59	97.20	18.49	0.000
	M	0.536	0.533	1.600		0.380	0.701
ROA	U	0.0280	0.0379	−16.40	85.40	−5.270	0.000
	M	0.0283	0.0298	−2.400		−0.570	0.572
Age	U	2.975	2.830	47.10	88.20	14.33	0.000
	M	2.972	2.955	5.600		1.320	0.186
Cash	U	0.132	0.163	−27.50	79.30	−7.910	0.000
	M	0.133	0.140	−5.700		−1.410	0.160
*Top*1	U	37.55	34.73	18.70	96.60	5.970	0.000
	M	37.56	37.46	0.600		0.140	0.887
Q	U	1.605	1.906	−41.30	93.00	−12.61	0.000
	M	1.617	1.596	2.900		0.680	0.494
FI Holdings	U	0.204	0.144	4.800	22.50	1.210	0.228
	M	0.206	0.160	3.700		1.110	0.265
Manafees	U	0.0807	0.102	−26.40	99.20	−7.950	0.000
	M	0.0817	0.0815	0.200		0.0500	0.958
Inde Pent	U	0.379	0.374	7.600	50.60	2.400	0.0160
	M	0.378	0.380	−3.700		−0.830	0.407
Directors Holdings	U	0.0211	0.133	−75.80	99.20	−18.75	0.000
	M	0.0216	0.0226	−0.600		−0.270	0.786
Executives Holdings	U	0.00985	0.0754	−61.90	97.50	−15.01	0.000
	M	0.0101	0.0117	−1.500		−0.740	0.461
Ana Follow	U	1.670	1.478	16.30	79.70	5.320	0.000
	M	1.646	1.685	−3.300		−0.740	0.460
Cross List	U	0.272	0.0112	80.70	98	55.63	0.000
	M	0.255	0.260	−1.600		−0.280	0.782