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What protects me also makes me behave: The role of directors' and officers' liability insurance on empire-building managers in China☆

Qingbin Meng [a], Ziya Zhong [a], Xinyu Li [b,*], Song Wang [c]

[a] School of Business, Renmin University of China, Beijing 100872, China
[b] School of Economics, Shandong University, Jinan 250100, China
[c] Norris Vincent College of Business, Angelo State University, San Angelo TX 76909, USA

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ABSTRACT

In this paper, we examine the monitoring effect of Directors' and Officers' liability insurance (D&O insurance) on firms' acquisitions in China. We find that firms with managers covered by D&O insurance are less likely to undertake acquisitions and if they do, their acquisitions are associated with smaller bid premium of the acquired targets, higher stock returns upon acquisition announcements, and better operating performance post-acquisition. The deterrence of D&O insurance on acquisition is more pronounced when the insurance providers are more active and when managerial moral hazard is more likely to exist. Further findings suggest that D&O insurance diminishes the effect of CEO's overconfidence and risk-seeking behaviors on their acquisition decisions. Overall, our study suggests that D&O insurance can play an effective monitoring role that deters empire-building acquisitions.

1. Introduction

For over a hundred years, corporate managers are conjectured to be empire builders that are inclined to pursue acquisitions beyond an optimal scale (Schumpeter, 1911; Mueller, 1969; Jensen, 1986; Bliss and Rosen, 2001; Grinstein and Hribar, 2004). While the acquisitions lead to the growth of the managers' power, social status, compensation, and job security, detriments usually occur to the acquiring firms' operating efficiency and shareholders' value (Jensen, 1986). In this paper, we explore a potential tool to refrain managers from building empires, namely, directors' and officers' liability insurance (D&O insurance). While the insurance plan covers for the monetary losses of insured corporate managers in litigations, the insurance providers have ample incentives to avoid the litigations. One effective way is to refrain the covered managers from making bad acquisition decisions (Bhagat et al., 1987; O'Sullivan, 1997; Chi et al., 2013; Cao and Narayanamoorthy, 2014). As Holderness (1990) points out, insurers have to investigate their clients' acquisition plans before the insurance policy is issued. When the insurance plan is active, the insurer also facilitates internal

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* Corresponding author.
E-mail addresses: mengqingbin@rmbs.ruc.edu.cn (Q. Meng), rbszhongziya@163.com (Z. Zhong), lixinyu@sdu.edu.cn (X. Li), song.wang@angelo.edu (S. Wang).

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monitoring over the managers. The insurers, while facing an acquisition with bad potentials, could either threaten to cease the insurance contract, or renegotiate for higher insurance premiums (Chung and Wynn, 2014; Boyer and Stern, 2014; Nwaeze and Kalelkar, 2014), so that less value-destroying acquisitions could take place.

Our primary task is to systematically test whether D&O insurance could deter acquisitions by exerting a monitoring component on the acquiring managers. We use a sample of Chinese publicly traded firms from 2003 to 2019 with 4843 acquisition events. It is interesting to explore the Chinese market because it is the second largest acquisition market in the world, and more importantly, its D&O insurance market is quite different from the western markets. As in China, the decision of D&O insurance purchase is made by shareholders (see later), not by the managers to be covered. Therefore, the insurance is more aligned with the interest of shareholders. It is highly plausible that the shareholders use D&O insurance as a tool to improve corporate governance and refrain managerial misbehaviors.

Our preliminary result shows that firms whose managers are covered by D&O insurance are less likely to be acquirers, and that if these firms ever engage in acquisitions, the deal sizes are much smaller and the bid premiums on the targets are much lower, compared to the deals without D&O insurance coverage. In addition, the covered firms also experience higher short-term cumulative abnormal returns and higher long-term buy-and-hold abnormal returns upon acquisition announcements, and better long-term operating performance after effective acquisitions. All the evidence suggests D&O insurance can help firms make prudential and better acquisition decisions.

To support the notion that D&O insurance plays an important monitoring role in acquisitions, we show that the deterrence effect of D&O insurance on acquisitions is stronger when the duration of insurance coverage is longer, and when the insurance businesses are more active in the firm's region. We also find that the deterrence effect of D&O insurance on acquisition is more pronounced under the presence of CEO duality and longer CEO tenure, both of which indicate weak governance and empire-building potentials (see Kim et al., 2009; Chikh and Filbien, 2011; Walters et al., 2007).

To further understand how D&O insurance works on the insured CEOs, we propose a *behavioral correction hypothesis* that D&O insurers could refrain CEOs from making irrational decisions. A strand of literature suggests that managers are more likely to make poor acquisition decisions when they are overconfident (Brown and Sarma, 2007; Malmendier and Tate, 2008; Ferris et al., 2013) and risk-seeking (Cain and McKeon, 2016; Bernile et al., 2017; Lin et al., 2018). Thus, the monitoring component of D&O insurance, if effective, should be stronger when managers are more irrational, all else being equal. Indeed, using various measures of behavioral traits,[1] we find that the deterrence effect of D&O insurance on acquisitions is stronger (weaker) when managers are more (less) behaviorally biased.

To further strengthen our argument, we reject a competitive hypothesis, called *litigation threat effect*, which could possibly explain the negative relationship between D&O insurance and acquisitions. The *litigation threat effect* suggests that the victim investors of bad acquisitions fight harder in the litigations, after they see the corporate plaintiff is covered by D&O insurance, so extra monetary awards can be earned from the lawsuit. In other words, D&O insurance encourages more litigation threat from investors and hence discourages value-destroying acquisitions. Our empirical test does not support this hypothesis.

Our paper contributes to the literature on several fronts. First, we expand the knowledge of agency problem in acquisitions. While many studies suggest that D&O insurance spoils managers with moral hazard, we offer novel and different evidence on the role of D&O insurance. In particular, we show that the monitoring effect of D&O insurance on managers is effective and hence prevents them from making poor acquisition decisions. In addition, with its managers covered by D&O insurance, an acquiring firm is more likely to have a stock market value enhancement and better ex-post operating performance. Second, this paper complements the emerging literature of behavioral traits of managers. For firms with overconfident or risk-seeking managers, the monitoring effect of D&O insurers is stronger, and the corporate decisions tend to be less detrimental. Third, this paper is related to the larger body of literature on corporate governance and provides a new angle of view by looking at the Chinese market, where the usage of D&O insurance is more bonded with the interest of shareholders than the interest of managers. Our research yields new insight by observing this unique setting. Put together, D&O insurance can be a successful tool to monitor managers with moral hazard and hence prevent them from making irrational decisions.

The remainder of this paper is organized as follows: Section 2 briefly introduces the institutional background in China. Section 3 develops hypotheses. Section 4 describes data and variables. Section 5 reports and discusses the main empirical results. Section 6 conducts robustness checks, and Section 7 concludes.

2. Institutional background

When D&O insurance was first introduced to the Chinese market, its growth was very slow at the start. For many years, the definition of managerial responsibilities in lawsuits was quite ambiguous, the litigations against firm managers were few, the winning chance of plaintiffs was low, and the sentencing upon the managers was light. As the legal system matured in China, litigation risk has become a significant risk factor for the companies and an insurance policy that shields these risks has become quite useful for the corporate managers. Fig. 1 illustrates the growth of the D&O insurance business in China. The number of public firms covered by D&O

[1] In our tests, we use CEO's overestimation of forecasted earnings (Lin et al., 2005), relative compensation of managers (Hayward and Hambrick, 1997), and increase in CEO shareholding with a negative buy-and-hold abnormal return (Kolasinski and Li, 2013) as proxies for managerial overconfidence, and we use earnings volatility (John et al., 2008), and CEO's gambling propensity (Ji et al., 2021) to proxy for CEO's risk-seeking attitude.

insurance has been growing steadily in the past 18 years, from 28 (2.12% of total) in 2002 to 307 (7.89% of total) in 2019. However, still the D&O insurance quite underdeveloped in China, compared to the developed economies. For example, in US and Canada, the D&O insurance covers over 90% of the listed firms (Towers, 2004), and in Hong Kong, 60% (Yuan et al., 2016).

The monitoring role of D&O insurance on managers is largely vacant in the studies on the western markets such as the US and Canada. More often, the insurance offers protection to managers and hence induces their moral hazard, reflected in poor corporate decisions (Core, 1997; Chalmers et al., 2002; Boubakri et al., 2008; Lin et al., 2011; Rees et al., 2011; Lin et al., 2013; Li and Liao, 2014; Boyer and Tennyson, 2015; Chang and Chen, 2018). One important reason is that the purchase of D&O insurance in the US and Canada is a decision made by the managers to be covered by the insurance, and the insurance purchase does not need the approval of shareholders (Core, 1997). In such a situation, the managers who value their autonomy are more likely to avoid the monitoring component within the insurance and only obtain the indemnification terms. In response, the D&O insurance providers in the US even purposefully insure companies with higher litigation risk, so they can charge higher fees and premiums (Baker and Griffith, 2007).

The purchase of D&O insurance in China takes a different process. According to the "Guidelines for Corporate Governance of Public Companies" released by the Chinese Securities Regulatory Committee (CSRC) in 2002, D&O insurance must be purchased upon the approval of shareholders at their meetings and must not be determined by the management alone. In many cases, the controlling shareholders who would be covered by the insurance are exempt from the voting on the purchase of such insurance, leaving the rest of the shareholders to decide. In some other cases, the minority shareholders even collectively veto the purchase of the insurance. For examples, on May 20, 2022, the shareholders of Beijing Shuzhi Technology Co., Ltd. (300038, delisted in June 2022) voted on the firm's proposal on the purchase of liability insurance for directors and executives at the shareholders' general meeting. 49.8768% of the total number of voting shares of shareholders present at the meeting and shareholders' agents approved the proposal, 49.5619% of them voted against it, others were abstained. All the opposing votes were raised by the minority shareholders. The proposal failed to pass because the required number of votes (more than half) was not satisfied. On June 20, 2022, the shareholders of Pinlive Foods Co., Ltd. (300892) voted 95.0992% against the firm's proposal on the purchase of liability insurance for directors and executives at the shareholders' general meeting. The votes were mostly casted by minority shareholders because the controlling shareholders, who are also the managers to be covered by the insurance, recused themselves from the voting. Therefore, one can expect that in the Chinese setting, shareholders' interests are more aligned with that of D&O insurers than with the managers. While the governance problem is more severe in China,[2] shareholders can rely more on the monitoring component of D&O insurance to refrain the managers from value-destroying activities. Thus, the monitoring effect of the insurance can be more noticeable in the Chinese setting (Zou et al., 2008; Yuan et al., 2016; Jia et al., 2019).

3. Hypothesis development

We examine the effect of D&O insurance on managers' acquisition decisions. An acquisition is one of the largest investments for a firm, as it empowers the firms with more resources (Wernerfelt, 1984), allows them to penetrate new markets (Martin et al., 1998), and even promotes their technology level (Chung and Alcácer, 2002). However, studies find that acquisitions also raise management complexity and help selfish managers pursue compensation, power, and reputation (Mueller, 1969; Ely and Song, 2000; Grinstein and Hribar, 2004). To maximize their interests, managers are likely to engage in suboptimal acquisitions, or so-called empire-building activities (Mueller, 1969; Jensen, 1986; Stulz, 1990; Morck et al., 1990; Bebchuk and Fried, 2009). When the agency problem is severe, the acquisitions often result in destructions in shareholders' stock value (Moeller et al., 2005; Harford and Li, 2007) and poor performance post acquisitions (Harford et al., 2012).

To the extent that D&O insurance providers can constantly examine and monitor the insured managers, we develop a *Monitoring Hypothesis*, under which D&O insurance refrains ego-driven managers from empire-building (value-destroying) acquisitions. We also develop a contradicting hypothesis called *Spoiling Hypothesis*. It is consistent with most of the existing studies in predicting that D&O insurance induces the moral hazard of the covered managers and therefore encourages empire-building acquisitions.[3]

Monitoring Hypothesis: H1a. D&O insurance is negatively associated with empire-building acquisitions.

Spoiling Hypothesis: H1b. D&O insurance is positively associated with empire-building acquisitions.

If D&O insurance serves as an effective governance factor, then one should expect relatively less payment for the acquired targets, higher stock valuation at the acquisition announcements and better operating performance ex-post. On the contrary, if the protection

[2] Protection to investors is generally weaker in civil law jurisdictions (La Porta et al., 1998), especially for East Asian countries like China (Chen et al., 2013; Zhang, 2007; Fan and Wong, 2002; MacNeil, 2002; Jiang et al., 2010). Shareholders are more often at disadvantage for legal issues against corporate managers (Zou et al., 2008; Yuan et al., 2016; Jia et al., 2019).

[3] For example, some argue that D&O insurance reduces the litigation risk faced by managers and thereby provides a protective umbrella for the managers' risky behaviors (Core, 1997; Chalmers et al., 2002; Lin et al., 2011; Rees et al., 2011; Lin et al., 2013; Masulis et al., 2007; Baker and Griffith, 2010; Hwang and Kim, 2016). Moreover, Research shows that while the managers are covered by D&O insurance, the quality of information disclosure of the firm tend to be low (Zou et al., 2008). For the firms with more extensive coverage with higher limits, their accounting policies are more aggressive, the level of earnings management is higher (Boubakri et al., 2008; Boyer and Tennyson, 2015; Chang and Chen, 2018), and repeat financial restatements are more likely (Lin et al., 2013; Weng et al., 2017). In Jia and Tang (2018), D&O insurance could cause higher cost of capital (Chen et al., 2016), less incentives for managerial efforts (Wang and Chen, 2016), and lower efficiency in investment decisions (Chi et al., 2013; Li and Liao, 2014).

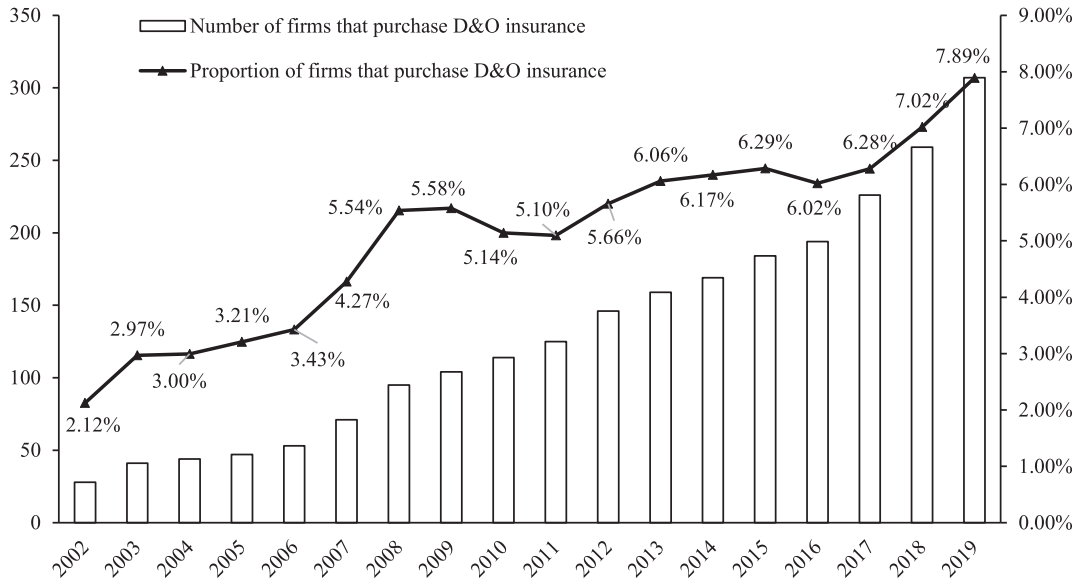

Fig. 1. The number of Chinese public companies with managers covered by D&O insurance across years.
This figure plots the number and proportion of the Chinese publicly-listed firms that purchase D&O insurance. The horizontal axis represents the year, the left vertical axis represents the number of firms, and the right vertical axis represents the percentage of firms. The line chart shows the trend of the number of firms that purchase D&O insurance, and the histogram shows the trend of the proportion of firms that purchase D&O insurance.

of D&O induces moral hazard of the managers, then the payment would be higher, stock valuation would be lower, and post-acquisition operating performance would be worse. We use bid premium over the target firms to measure acquisition payment.

Monitoring Hypothesis: H2a. D&O insurance is negatively related to bid premium, and is positively associated with stock value and post-acquisition operating performance.

Spoiling Hypothesis: H2b. D&O insurance is positively related to bid premium, and is negatively associated with stock value and post-acquisition operating performance.

The literature suggests that in absence of effective governance, managers are more likely to make poor acquisition decisions.[4] If the monitoring component of D&O insurance serves as an effective factor, then the deterrence effect of D&O insurance on acquisitions should be strengthened when the firm is in a better insurance environment, or when the firm's governance is relatively weaker. Below is our third testing hypothesis.

H3a. The monitoring effect of D&O insurance is more pronounced when the insurance provider is more active or when the governance of the acquirer is weaker.

The personal characteristics of managers could also affect the decisions of acquisitions. Studies find that acquisitions are more likely to take place when managers show behavioral biases such as overconfidence (Brown and Sarma, 2007; Malmendier and Tate, 2008; Ferris et al., 2013), risk-seeking preference (Graham et al., 2013), and aggressiveness (Rajagopalan, 1997; Bentley et al., 2013). All of these behavioral traits predict a bad acquisition outcome.[5] If the monitoring component of D&O insurance exists, then its deterrence effect would be more pronounced when managers are more biased in their behaviors, as the improvements shall be more obvious for those who need to be improved.

H4a. The monitoring effect of D&O insurance is more pronounced when managers are more behaviorally biased.

[4] A number of governance factors have been documented to have positive effect on acquisition decisions. For example, large ownership hold by board members (Morck et al., 1988; Stulz, 1988; Carline et al., 2009), Large size of board (Yermack, 1996), large ownership held by majority holders (Carline et al., 2009), separate positions for CEO and board chair (Grinstein and Hribar, 2004; Masulis et al., 2007), high concentration of ownership (Shleifer and Vishny, 1986), compensation with option incentives (Morck et al., 1990; Datta et al., 2001), less anti-takeover provisions (Masulis et al., 2007), and short-selling eligibility of company stocks (Chang et al., 2018).

[5] CEO background also has some predicting power on acquisition outcomes. For example, the empire-building tendency is stronger when managers have political connections (Schweizer et al., 2019). On the other hand, some studies suggest that acquisition activities could be reduced when managers protect their earned reputation and social status (Plaksina et al., 2019), have previous work experience in investment banks, and are able to better evaluate the target firm (Huang et al., 2014). El-Khatib et al. (2015) suggest that when managers are well socially connected, they can reduce the cost of information collection during acquisitions and clear the obstacles of the acquisitions.

4. Data and variables

4.1. Data

We use the Chinese public-listed firms from 2003 to 2019 as our initial sample. The data for acquisition events,[6] CEO background, and financial information of the firms, as well as the trading records of their stocks come from the China Stock Market and Accounting Research Database (CSMAR). The data of D&O insurance coverage, earnings forecasts and lottery sales are from the Chinese Research Data Services platform (CNRDS). The sample is sifted after several data-filtering steps. In particular, we exclude firms in the financial industry, firms that lack sufficient financial data, firms under special treatment by the securities regulator, and firms with a total debt ratio >1 or <0. Altogether, we end up with 4843 acquisition events of 3516 firms, and 29,056 firm-year observations. All the continuous variables in our study are winsorized at 1%–99% level.

4.2. Variables

To examine the impact of D&O insurance on acquisition decisions in H1, we use the following testing model:

$$Acquisitions_{i,t} = \beta_0 + \beta_1 D\&O\ Insured_{i,t} + \sum Controls_{i,t} + \sum Year_{i,t} + \sum Ind_{i,t} + \sum Prov_{i,t} + \xi_{i,t} \quad (1)$$

where *Acquisitions* represents a firm's acquisition decisions. Specifically, we follow the previous studies (Miller et al., 2010; Plaksina et al., 2019; Schweizer et al., 2019) and construct four variables for the acquisition decisions: (1) The total value of all takeover deals in the year, scaled by the acquiring firm's total assets (*Deal Value*), (2) A dummy variable indicating whether the firm undertakes an acquisition in the current year or not (*Acq Dummy*), (3) The value of the largest takeover deal in the year, scaled by the acquiring firm's total assets (*Large Deal Value*) and (4) The number of takeover deals for the firm in the current year (*Acq Num*). *D&O Insured* represents D&O insurance coverage on the managers of the companies. It equals 1 if a firm has purchased D&O insurance in the year, and 0 otherwise (Zou et al., 2008; Yuan et al., 2016). Our control variables are related to firm financials and stock information, as indicated in Appendix A. We also control for year, industry, province fixed effects. In addition, we apply an OLS regression, as well as a Logit regression to estimate model (1) when using *Deal Value/Large Deal Value/Acq Num* or *Acq Dummy* as the dependent variable. All the standard errors of regression coefficients are clustered at the firm level to alleviate the possible serial correlation problem. We focus on the regression coefficient β_1 in Model (1). If β_1 is negative and significant, then it indicates that D&O insurance deters a firm's acquisitions as predicted by the *Monitoring Hypothesis* in H1.

To test H2 for the impact of D&O insurance on bid premiums over the acquisition targets, we follow Huang et al. (2014), Jory et al. (2016), Li et al. (2019) and Luo and Wang (2022) by introducing two proxy variables for the bid premium of the acquisition targets. One is the deal value minus net asset book value of the target firm, scaled by the net asset book value (*BidPremium1*) and the other is the deal value minus net asset appraisal value of the target firm, scaled by the net asset appraisal value (*BidPremium2*).[7]

To test H2 for the impact of D&O insurance on stock valuation upon the acquisition announcements, we use the cumulative abnormal returns around the announcements ($CAR[t_1, t_2]$) to measure the short-term market reaction, and we use the buy-and-hold abnormal returns following the acquisitions ($BHAR[T]$) to reflect the long-term market performance. Specifically, following Lin et al. (2011), we apply the market model to calculate $CAR[t_1, t_2]$, as shown in Model (2):

$$R_{i,t} = \alpha_i + \beta_i R_{M,t} + \varepsilon_{i,t}, \quad (2)$$

where $R_{i,t}$ is the stock return of firm i on trading day t, $R_{M,t}$ is the Chinese market return (all A-share stocks) on trading day t, and $\varepsilon_{i,t}$ represents the random disturbance term. We estimate the parameters of Model (2) using returns from event day −210 to event day −11 (day 0 is the acquisition announcement date), and further calculate the abnormal return (AR) of firm i on trading day t as:

$$AR_{i,t} = R_{i,t} - \left(\widehat{\alpha}_i + \widehat{\beta}_i R_{M,t}\right). \quad (3)$$

By adding up all the abnormal returns of firm i within the period of time $[t_1, t_2]$, we obtain its cumulative abnormal return around the acquisition announcements, as shown in Model (4):

$$CAR_i[t_1, t_2] = \sum_{t=t_1}^{t_2} AR_{i,t}. \quad (4)$$

In addition, $BHAR[T]$ is the T-year buy-and-hold return of a firm after its acquisition minus the buy-and-hold return of Chinese

[6] We require all acquirers to have over 50% ownership of their target after takeover.

[7] We do not use the targets' market capitalization to calculate bid premiums for two reasons. First, China's stock market is still at the growing stage, resulting in a very limited number of publicly listed target firms. In our research sample, M&A events with listed target firms accounted for only 4.8%. Since most of these target firms are unlisted and do not have a stock price prior to an M&A announcement, we cannot use market capitalization to calculate their bid premiums. Second, compared to the US stock market, China's stock market is still immature and subject to many irrational factors. The stock price of a listed target firm usually does not accurately reflect its real value, especially when they are small firms vulnerable to market manipulation.

market (all A-share stocks) in the same years.

To test H2 for the impact of D&O insurance on long-term operating performance due to acquisitions, we follow Chen et al. (2007) to construct four proxy variables. The first one is the abnormal change in industry-adjusted return on total asset (*ΔROA*). In particular, we subtract the median *ROA* of all firms in the same industry with the acquiring firm from the acquiring firm's *ROA*. We then regress three-year-average industry-adjusted *ROA* post-acquisition on the variable pre-acquisition. The residual from the regression is our measurement for the abnormal change in operating performance. In the same way, we construct our second and third measurements as the abnormal change in industry-adjusted return on equity (*ΔROE*) and the abnormal change in asset turnover (*ΔTurnover*). Fourthly, we use the three-year-average industry-adjusted goodwill impairments following the acquisition (*GW Impair*) for the performance measurement. Each year's goodwill impairments variable is standardized by the total assets in the previous year.

To test H3 for the moderating effect of a firm's insurance environment, we introduce two variables, namely the insurance premium per capita (*InsuPrem*) and the number of insurance companies (*InsuNum*) in the firm's located province, to reflect the prevalence of

Table 1
Summary statistics.

Variables	N	Mean	Sd	P50	Max	Min
Deal Value	29,056	0.022	0.106	0.000	0.820	0.000
Acq Dummy	29,056	0.110	0.313	0.000	1.000	0.000
Large Deal Value	29,056	0.019	0.092	0.000	0.712	0.000
Acq Num	29,056	0.129	0.399	0.000	7.000	0.000
CAR[0,0]	3246	1.215	3.862	0.611	7.512	−6.546
CAR[−1, +1]	2285	0.382	4.449	0.221	11.840	−11.331
CAR[−2, +2]	2237	0.249	5.498	0.167	14.626	−14.339
CAR[−3, +3]	2162	0.166	6.291	0.070	16.624	−16.565
CAR[−4, +4]	2122	0.170	7.106	0.170	18.416	−18.457
CAR[0, +1]	2073	0.163	7.738	0.144	20.079	−20.299
CAR[−1, +2]	3057	0.977	5.039	0.360	10.032	−9.380
BHAR1	4560	0.044	0.441	−0.052	1.838	−0.681
BHAR2	4560	0.069	0.735	−0.143	3.133	−1.107
BHAR3	4560	0.042	0.955	−0.235	4.249	−1.490
BidPremium1	2406	5.277	10.910	1.927	78.681	−1.000
BidPremium2	2507	0.552	2.669	0.000	20.270	−1.000
ΔROA	3198	−0.008	0.056	0.001	0.210	−0.378
ΔROE	3201	−0.016	0.140	0.014	0.520	−1.189
ΔTurnover	3201	−0.061	0.312	−0.066	2.263	−2.441
GW Impair	2430	0.038	0.082	0.002	0.351	−0.007
D&O Insured	29,056	0.056	0.230	0.000	1.000	0.000
InsuPrem	29,056	2304.000	1867.000	1788.000	9090.000	170.800
InsuNum	29,056	13.410	19.230	4.000	70.000	0.000
Insu Time	29,056	0.338	1.621	0.000	11.000	0.000
Tenure	19,445	6.606	3.964	6.000	18.000	1.000
OverEstimate	29,056	0.227	0.419	0.000	1.000	0.000
Rel Comp	27,291	0.453	0.132	0.435	0.862	0.213
△CEO shr	29,052	0.059	0.237	0.000	1.000	0.000
Vol(EBITDA)	19,190	0.135	0.788	0.039	7.438	0.006
Gamble_Local	21,544	0.017	0.006	0.017	0.0795	0.000
Gamble_CEO	4733	0.020	0.020	0.016	0.306	0.000
Size	29,056	22.000	1.265	21.820	25.980	19.630
Leverage	29,056	0.448	0.203	0.450	0.886	0.056
Tobin's Q	29,056	1.949	1.237	1.530	8.171	0.890
Tangible	29,056	0.239	0.173	0.205	0.733	0.002
Soe	29,056	0.099	0.194	0.000	0.718	0.000
Return	29,056	0.198	0.722	−0.018	3.157	−0.705
NO. Director	29,056	8.851	1.815	9.000	15.000	5.000
Indpt Dir	29,056	0.369	0.053	0.333	0.571	0.273
Dual CEO	29,056	0.217	0.412	0.000	1.000	0.000
Separate	29,056	5.047	7.780	0.000	29.220	0.000
Top Share	29,056	36.190	15.200	34.090	75.000	9.420
Cash Flow	29,056	0.046	0.074	0.045	0.251	−0.180
Cash Level	29,056	0.176	0.144	0.133	0.724	0.009
Age	29,056	2.715	0.395	2.773	3.434	1.609
ROA	29,056	0.036	0.056	0.034	0.189	−0.212
Loss	29,056	0.096	0.294	0.000	1.000	0.000
Turnover	29,056	0.749	0.577	0.604	3.528	0.067
Deal Size	4615	0.227	0.595	0.044	4.305	0.000
Cash Payment	4615	0.671	0.470	1.000	1.000	0.000
Stock Payment	4615	0.154	0.361	0.000	1.000	0.000
Related Deal	4615	0.355	0.479	0.000	1.000	0.000
Major Deal	4615	0.246	0.431	0.000	1.000	0.000

This table presents the summary statistics of all the empirical variables used in this study. The variable definitions are in Appendix A.

insurance businesses surrounding a firm. In a more intense insurance industry, providers are more likely to deliver valuable products for firm owners and possibly better monitoring on the firms during coverage. In addition, we also use the number of years that a firm is covered by D&O insurance (*Insu Time*) as a proxy of monitoring efficiency, since insurance providers obtain a deeper understanding of the insured firm as time extends. To test H3 for the moderating effect of acquirer's governance, we use the CEO duality (*Dual CEO*) and CEO tenure (*Tenure*) to reflect the level of governance efficiency and managerial moral hazard. Generally, a more powerful CEO is more likely to deviate from the goal of maximizing shareholder wealth, and the insurance would have more impact on these more powerful CEOs.

We also test the moderating effect of managerial behavior traits on acquisition decisions predicted in H4. To measure managerial overconfidence, we construct three proxy variables following Lin et al. (2005), Hayward and Hambrick (1997), and Kolasinski and Li (2013). These proxies are overestimation of forecasted earnings (*OverEstimate*), relative compensation of managers (*Rel Comp*) and increase in CEO shareholding with a negative buy-and-hold abnormal return ($\triangle$*CEO shr*). Specifically, *OverEstimate* equals 1 if the estimated net profit in a firm's earnings preannouncement is higher than the actual net profit, and 0 otherwise. Since Chinese listed firms do not disclose CEO compensation, we use the sum of the top three executives' annual salaries divided by the sum of all executives' annual salaries to measure the relative compensation of managers (*Rel Comp*). In addition, $\triangle$*CEO shr* equals 1 if a CEO increases his/her shareholding with a negative buy-and-hold abnormal return in the next two years, and 0 otherwise. According to the literature, when *OverEstimate*/$\triangle$*CEO shr* equals 1, or *Rel Comp* is higher, the CEO is considered overconfident.

To measure managerial risk-seeking behavior, we construct two proxy variables following John et al. (2008). These proxies are earnings volatility (*Vol(EBITDA)*), and CEO's gambling propensity (*Gamble_Local* or *Gamble_CEO*). Earnings volatility (*Vol(EBITDA)*) is calculated by the standard deviation of *EBITDA* to total assets in the past five years. CEO's gambling propensity (*Gamble_Local or Gamble_CEO*) is measured by the lottery ticket sales per capita in the firm's located province or the CEO's hometown province. Managerial risk-seeking attitude is supposed to be stronger when earnings volatility is higher, or the CEO's gambling propensity is higher.

4.3. Summary statistics

Table 1 presents the summary statistics of our dependent, explanatory, and control variables. The mean values of *Deal Value* and *Large Deal Value* are 0.022 and 0.019, indicating that the total values of all takeover deals and the largest takeover deal in the year account for 2.2% and 1.9% of the acquiring firm's total assets respectively. The mean values of *Acq Dummy* and *Acq Num* are 0.110 and 0.129. They indicate that 11% of our firm-year observations are associated with one or more acquisitions and that on average each firm has engaged in 0.129 acquisitions per year. For *D&O Insured*, the mean value is 0.056, indicating a much smaller coverage of D&O insurance in China than in the western countries.

5. Empirical results

5.1. D&O insurance and empire-building acquisitions

We present the regression result of our model in Table 2. The coefficients of *D&O Insured* are significantly negative at the 1% and 5% levels, suggesting that D&O insurance deters a firm's acquisitions in size and propensity. The economic impact of D&O insurance on acquisition decisions also appears to be significant. In the columns of (1), (3) and (4), the coefficients of *D&O Insured* are −0.0079, −0.0067 and − 0.0317. As a firm is covered by D&O insurance, it will experience a reduction in the total acquisition value, the largest acquisition value (both scaled by total assets) and the number of acquisitions by 0.0079, 0.0067 and 0.0317 (or 35.91%, 35.26% and 24.57% decrease from their mean values 0.022, 0.019 and 0.129). In Column (2), the coefficient of *D&O Insured* is −0.2591. That is, with the presence of D&O insurance, the ratio of the probability of undertaking an acquisition to the probability of no acquisitions will decrease by 22.83% ($1\text{-}e^{-0.2591}$).[8]

The control variables, if significant, carry the expected signs. For example, the coefficients of *Soe*, *Return*, *Dual CEO*, *Cash Level*, and *Turnover* are positive and significant at the 1% and 5% levels. When a firm has higher state-ownership, larger annual stock return, more abundant cash holdings, quicker asset turnover, or dual CEO, its acquisition activities are more active. In contrast, the coefficients of *Leverage*, *Tobin's Q*, *Tangible*, *Top Share*, *ROA*, and *Loss* are negative and significant at the 1% level. It indicates that acquisitions are less active with high financial leverage, good growth opportunities, large proportion of fixed assets, large board, concentrated ownership structure, and poor profitability.

5.2. D&O insurance and bid premium over the acquisition targets

Table 3 presents the regression result for D&O insurance' impact on acquisition premium without control variables in Column (1) and (3) and with control variables in Column (2) and (4). We find that the coefficients of *D&O Insured* are negative and significant at the 1% and 5% levels, suggesting that D&O insurance is associated with lower acquisition premium. These results are economically significant. From Column (2) to (4), the coefficients of *D&O Insured* are −2.6187 and − 0.3344. When a firm is covered by D&O

[8] We interpret the economic significance of *D&O Insured*'s coefficient by calculating odds ratio, since we apply a Logit regression when *Acq Dummy* is the dependent variable.

Table 2
D&O insurance and acquisitions.

	(1)	(2)	(3)	(4)
Variables	*Deal Value*	*Acq Dummy*	*Large Deal Value*	*Acq Num*
D&O Insured	−0.0079***	−0.2591**	−0.0067***	−0.0317***
	(−2.9328)	(−2.3054)	(−2.8535)	(−2.7409)
Size	0.0003	−0.0124	0.0000	−0.0013
	(0.3757)	(−0.4327)	(0.0760)	(−0.3837)
Leverage	−0.0367***	−0.0689	−0.0310***	0.0131
	(−6.9159)	(−0.4456)	(−6.7053)	(0.7343)
Tobin's Q	−0.0072***	−0.1915***	−0.0061***	−0.0199***
	(−9.6806)	(−7.2654)	(−9.5358)	(−6.7136)
Tangible	−0.0304***	−1.1899***	−0.0262***	−0.1097***
	(−6.2614)	(−6.3590)	(−6.1955)	(−6.0937)
Soe	0.0281***	0.5530***	0.0239***	0.0387***
	(6.3793)	(3.2734)	(6.2368)	(2.7649)
Return	0.0200***	0.3719***	0.0166***	0.0421***
	(10.1009)	(8.0913)	(9.9308)	(7.4202)
NO. Directors	−0.0015***	−0.0657***	−0.0012***	−0.0075***
	(−3.8488)	(−3.7775)	(−3.7226)	(−4.8595)
Indpt Director	−0.0167	−0.5002	−0.0149	−0.0361
	(−1.2573)	(−0.9994)	(−1.3076)	(−0.6523)
Dual CEO	0.0048***	0.1669***	0.0042***	0.0273***
	(2.6152)	(3.2193)	(2.6667)	(3.5489)
Separate	0.0000	0.0026	0.0000	0.0001
	(0.2121)	(0.8177)	(0.1933)	(0.3725)
Top Share	−0.0004***	−0.0078***	−0.0003***	−0.0010***
	(−7.0604)	(−4.3706)	(−6.7284)	(−4.6500)
Cash Flow	−0.0144	−0.7473**	−0.0122	−0.0751**
	(−1.6325)	(−2.2560)	(−1.5785)	(−2.0736)
Cash Level	0.0476***	0.6823***	0.0400***	0.0731***
	(5.6953)	(3.9323)	(5.5425)	(3.1103)
Age	0.0006	−0.4185***	0.0002	−0.0516***
	(0.2586)	(−5.3287)	(0.1193)	(−4.9716)
ROA	−0.1030***	−0.4007	−0.0890***	−0.0214
	(−6.5419)	(−0.7474)	(−6.4202)	(−0.3600)
Loss	−0.0077***	−0.3173***	−0.0067***	−0.0335***
	(−3.2125)	(−3.1409)	(−3.2089)	(−3.7737)
Turnover	0.0329***	0.4259***	0.0285***	0.0491***
	(11.7382)	(10.0597)	(11.7237)	(8.2611)
Constant	0.0285*	−2.2696***	0.0284*	0.2772***
	(1.7022)	(−2.9981)	(1.9425)	(3.7898)
Year&Ind&Prov	Yes	Yes	Yes	Yes
N	29,056	29,056	29,056	29,056
R^2/Pesudo R^2	0.085	0.116	0.083	0.068

This table reports the impact of D&O insurance on acquisition decisions. The dependent variables include the total value of all takeover deals in the year scaled by the acquiring firm's total assets (*Deal Value*), the dummy variable indicating whether the firm undertakes an acquisition in the year or not (*Acq Dummy*), the value of the largest takeover deal in the year scaled by the acquiring firm's total assets (*Large Deal Value*) and the number of takeover deals for the firm in the year (*Acq Num*). *D&O Insured* equals 1 if a firm has purchased D&O insurance in the year, and 0 otherwise. Year, industry and province fixed effects are included. Definitions of other variables are presented in Appendix A. T-statistics are given in parentheses with standard errors clustered at the firm level. ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively.

insurance, its acquisition premium is lower by 261.87% or 33.44% (respectively decreasing 49.62% and 60.58% from their mean values 5.277 and 0.552 in our sample, as many Chinese acquirers are willing to pay an offering price at multiples of the target's book value). This result is consistent with our monitoring hypothesis, by showing that the D&O insurance can deter the insured firms from overpaying for acquisitions.

5.3. D&O insurance and stock valuation at the acquisition announcements

Panel A of Table 4 presents the impact of D&O insurance on short-term market reaction, measured by acquirers' cumulative market-adjusted abnormal returns in different time windows around acquisition announcements. Across the specifications, the coefficients of the key variable *D&O Insured* are significantly positive at the 1% or 5% level, suggesting that the market react quite positively to the D&O insurance coverage of the acquiring firms. The economic significance of the coefficients is also large. For example, in Column (4) where *CAR* [−3, +3] is defined as the dependent variable, an acquirer with D&O insurance coverage experience a 2.33% higher *CAR* on average compared to an acquirer without the coverage (nearly 14 times larger (2.3251/0.166) from the mean value). This result supports shows that the market realizes the value of D&O insurance coverage in deterring value-destroying acquisitions. The control variables, if significant, carry the expected signs. It is also worth noting that the percentage ownership of the

Table 3
D&O insurance and acquisition premium.

	(1)	(2)	(3)	(4)
Variables	*BidPremium1*	*BidPremium1*	*BidPremium2*	*BidPremium2*
D&O Insured	−3.1459***	−2.6187***	−0.4437***	−0.3344**
		(−4.8847)		(−2.4525)
Size		−0.0118		0.0067
		(−0.0448)		(0.0848)
Leverage		−5.8158***		0.2300
		(−3.8452)		(0.7199)
Tobin's Q		0.2889		0.0621
		(1.0787)		(0.8407)
Tangible		−5.1444***		−0.0861
		(−2.7832)		(−0.1864)
Soe		−5.0607***		−0.7263***
		(−4.2940)		(−2.6818)
Return		0.8787		−0.0929
		(1.4803)		(−0.5975)
NO. Directors		0.2871*		0.0034
		(1.6920)		(0.0888)
Indpt Director		6.2042		−0.2198
		(1.1974)		(−0.1842)
Dual CEO		−0.1541		0.1334
		(−0.3079)		(0.9315)
Separate		−0.0318		−0.0011
		(−1.1422)		(−0.1457)
Top Share		−0.0018		0.0083*
		(−0.1109)		(1.8590)
Cash Flow		4.2592		−0.2187
		(1.0577)		(−0.2321)
Cash Level		−1.4691		0.0572
		(−0.8250)		(0.1285)
Age		0.1620		−0.1989
		(0.2519)		(−1.1563)
ROA		−1.6887		4.9507***
		(−0.2015)		(2.9357)
Loss		1.3163		0.2541
		(1.1193)		(1.0857)
Turnover		−0.2335		−0.2682***
		(−0.6805)		(−4.3649)
Constant		1.1956		1.5915
		(0.1942)		(0.8312)
Year&Ind&Prov	Yes	Yes	Yes	Yes
N	2406	2406	2507	2507
R^2	0.069	0.092	0.030	0.045

This table reports the effect of D&O insurance on acquisition premium. The dependent variable is proxied by two metrics, including the deal value minus target's net asset book value divided by the net asset book value (*BidPremium1*) and the deal value minus target's net asset appraisal value divided by the net asset appraisal value (*BidPremium2*). *D&O Insured* equals 1 if a firm has purchased D&O insurance in the year, and 0 otherwise. Year, industry, and province fixed effects are included. Definitions of other variables are presented in Appendix A. T-statistics are given in parentheses with standard errors clustered at the firm level. ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively.

largest shareholder (*Top Share*) is negative correlated with market returns. Highly concentrated ownership indicates weak corporate governance that could harm the firms' market value during acquisition.

Panel B of Table 4 presents the impact of D&O insurance on long-term post-acquisition market performance, which is proxied by acquirers' one-year, two-year and three-year buy-and-hold abnormal returns following the acquisitions (*BHAR*[1], *BHAR*[2], *BHAR*[3]). The coefficients of *D&O Insured* are 0.0793, 0.1836 and 0.1559, all positively significant at the 5% or 10% level. It shows that the presence of D&O insurance is significantly higher in the one-, two-, and three-year windows by 1.8 times (0.0793/0.044), 2.7 times (0.1836/0.069), and 3.7 times (0.1559/0.042), respectively. Overall, the results suggest better long-term acquisition market performance for firms covered with D&O insurance.

In Appendix B, we segment the samples based on the value effect of the acquisitions. We define value-enhancing (destroying) acquisitions if the acquisitions are associated with positive (negative) *CAR* upon announcements (*CAR*[0,1]) or positive (negative) *BHAR* during the first year after the acquisitions (*BHAR* [1]). The regression result shows that the deterrence effect of D&O insurance only exists for the value-destroying acquisitions, and not for value-enhancing acquisitions. This result supports our argument that D&O insurance providers could recognize the potential damages of empire-building acquisitions and effectively prevent them from happening.

Table 4
Stock valuation at the acquisition announcements.

Panel A: Short-term market reactions to acquisition announcements

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	*CAR*[0, 0]	*CAR*[−1, +1]	*CAR*[−2, +2]	*CAR*[−3, +3]	*CAR*[−4, +4]	*CAR*[0, +1]	*CAR*[−1, +2]
D&O Insured	1.2178***	1.3839**	2.1105**	2.3251***	2.1178**	1.5156***	1.5028**
	(3.3022)	(2.2939)	(2.5413)	(2.6762)	(2.0424)	(2.9793)	(2.2350)
Size	−0.1134	0.1234	0.1746	0.0927	0.3148	−0.1265	0.1583
	(−0.9983)	(0.8345)	(0.9894)	(0.4646)	(1.1260)	(−0.9366)	(0.9980)
Leverage	0.6761	−0.1355	−0.7670	−0.1449	−0.7261	1.3828*	−0.5342
	(1.0802)	(−0.1574)	(−0.7092)	(−0.1162)	(−0.4824)	(1.6666)	(−0.5489)
Tobin's Q	−0.1199	0.0585	0.0803	0.0941	0.3008	0.0399	0.0920
	(−1.1984)	(0.4737)	(0.4908)	(0.4979)	(1.3491)	(0.3081)	(0.6318)
Tangible	0.5650	0.5092	1.4700	2.2277	2.4807	0.9040	1.5681
	(0.8497)	(0.5177)	(1.1675)	(1.5040)	(1.4545)	(0.9406)	(1.4435)
Soe	0.6989	1.8685*	2.1621	1.9920	2.3861	1.7259*	2.1225*
	(1.0076)	(1.8312)	(1.4447)	(1.1222)	(1.1932)	(1.7765)	(1.8304)
Return	0.2066	0.6389**	0.7165*	1.2468***	1.1399**	0.3714	0.5049
	(0.9610)	(2.1542)	(1.8505)	(2.6405)	(2.1257)	(1.1547)	(1.4973)
NO. Directors	0.0615	−0.0150	0.0083	0.0116	0.0232	0.0566	0.0468
	(1.0143)	(−0.1716)	(0.0707)	(0.0859)	(0.1535)	(0.6699)	(0.4610)
Indpt Director	2.0009	0.2281	1.4625	2.9777	3.6320	0.8195	1.1386
	(1.1261)	(0.0919)	(0.4951)	(0.8977)	(0.9266)	(0.3270)	(0.4144)
Dual CEO	0.0949	0.1954	0.6984**	0.5709	0.3458	0.4329*	0.3591
	(0.5102)	(0.7451)	(2.2015)	(1.5833)	(0.7979)	(1.6808)	(1.2600)
Separate	−0.0169	0.0050	0.0154	0.0219	0.0042	−0.0101	0.0023
	(−1.5896)	(0.3471)	(0.9028)	(1.0213)	(0.1718)	(−0.6868)	(0.1442)
Top Share	−0.0154**	−0.0163**	−0.0165	−0.0159	−0.0360**	−0.0201**	−0.0143
	(−2.4594)	(−1.9866)	(−1.6386)	(−1.3521)	(−2.4432)	(−2.4696)	(−1.5731)
Cash Flow	0.0281	−1.0544	−3.5872	−3.5297	−1.3838	−2.1132	−1.3053
	(0.0216)	(−0.5293)	(−1.4244)	(−1.1594)	(−0.3953)	(−1.1112)	(−0.5800)
Cash Level	0.5873	−0.5276	−0.2668	−2.0695	−2.5974	0.9167	−0.0937
	(0.7677)	(−0.4056)	(−0.1664)	(−1.1971)	(−1.2124)	(0.9493)	(−0.0643)
Age	−0.2035	−0.1714	0.3713	0.3546	0.0410	−0.2567	−0.0952
	(−0.7228)	(−0.4406)	(0.8525)	(0.7371)	(0.0633)	(−0.6496)	(−0.2358)
ROA	0.9105	−1.2159	−5.3124	−0.1653	−3.9307	0.6998	−6.3971*
	(0.3926)	(−0.3669)	(−1.2725)	(−0.0325)	(−0.6837)	(0.2142)	(−1.6872)
Loss	−0.2365	−1.0786*	−1.6583**	−1.1359	−1.5258	−0.6563	−2.0083***
	(−0.5466)	(−1.8364)	(−2.2007)	(−1.3057)	(−1.5276)	(−1.1118)	(−3.1168)
Turnover	−0.0222	0.1268	0.1657	0.1732	−0.4577	−0.2093	0.3797
	(−0.1319)	(0.4686)	(0.5044)	(0.4844)	(−1.0217)	(−0.8507)	(1.3343)
Deal Size	−0.0003	−0.3806	0.6098	0.5274	1.2671	−0.1890	−0.2508
	(−0.0013)	(−0.7834)	(0.7289)	(0.5646)	(1.1289)	(−0.5433)	(−0.2887)
Cash Payment	−2.7976***	0.6508	0.4481	0.7065	0.6323	−3.6472***	0.3294
	(−5.9200)	(0.7565)	(0.5224)	(0.6464)	(0.5379)	(−5.2620)	(0.3715)
Stock Payment	−0.1995	2.3765**	0.9941	2.9646*	3.4140**	−0.5417	1.7280
	(−0.3642)	(2.0999)	(0.7417)	(1.9034)	(1.9923)	(−0.6419)	(1.4172)
Related Deal	0.1487	−0.1253	−0.1351	0.0426	−0.1571	0.0427	0.0086
	(0.7376)	(−0.4867)	(−0.4126)	(0.1104)	(−0.3565)	(0.1505)	(0.0286)
Major Deal	0.2310	−0.7466	−1.8190	−2.9577**	−2.9397**	0.1871	−1.7457*
	(0.5201)	(−0.8493)	(−1.6226)	(−2.3503)	(−2.2043)	(0.2590)	(−1.7483)
Constant	2.5759	−5.1699	−8.0425*	−7.4066	−12.1369**	3.1596	−7.7332**
	(0.9220)	(−1.4318)	(−1.9305)	(−1.5052)	(−2.0171)	(0.9136)	(−1.9768)
Year&Ind&Pro	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3246	2285	2237	2162	2122	3057	2265
R^2	0.223	0.068	0.069	0.072	0.073	0.165	0.063

Panel B: Long-term market performance following acquisitions

	(1)	(2)	(3)
Variables	*BHAR*[1]	*BHAR*[2]	*BHAR*[3]
D&O Insured	0.0793**	0.1836**	0.1559*
	(2.0864)	(2.3193)	(1.7545)
Size	−0.0480***	−0.1010***	−0.1174***
	(−4.8165)	(−5.0749)	(−4.4838)
Leverage	0.1950***	0.0875	−0.0944
	(3.3574)	(0.8367)	(−0.7238)
Tobin's Q	−0.0067	−0.0546***	−0.0663***

(*continued on next page*)

Table 4 (*continued*)

Panel B: Long-term market performance following acquisitions			
	(1)	(2)	(3)
Variables	*BHAR*[1]	*BHAR*[2]	*BHAR*[3]
	(−0.6004)	(−2.6837)	(−2.8239)
Tangible	0.0171	0.0752	0.2570
	(0.2605)	(0.6320)	(1.6394)
Soe	−0.0324	−0.1496	−0.0802
	(−0.5023)	(−1.2708)	(−0.5480)
Return	0.2257***	0.2188***	0.1802***
	(7.6464)	(4.8860)	(3.4284)
NO. Directors	0.0071	0.0059	0.0220
	(1.2898)	(0.5793)	(1.3615)
Indpt Director	0.1871	0.0488	0.3181
	(1.0726)	(0.1688)	(0.8178)
Dual CEO	0.0203	0.0155	−0.0150
	(1.0971)	(0.4057)	(−0.3330)
Separate	−0.0018	−0.0066***	−0.0052**
	(−1.5383)	(−3.4994)	(−2.0804)
Top Share	0.0005	0.0036***	0.0052***
	(0.7353)	(2.9929)	(3.5963)
Cash Flow	0.3877***	0.5362**	0.1363
	(2.7314)	(1.9937)	(0.4195)
Cash Level	0.0824	0.1402	0.2126
	(1.3470)	(1.2104)	(1.3706)
Age	0.0110	0.0015	−0.0690
	(0.3936)	(0.0257)	(−0.9334)
ROA	0.5008*	0.9928**	0.6815
	(1.9413)	(2.2466)	(1.2230)
Loss	0.0009	0.0347	0.0042
	(0.0212)	(0.4968)	(0.0472)
Turnover	0.0087	0.0155	0.0340
	(0.5715)	(0.4776)	(0.8882)
Deal Size	0.0056	−0.0187	−0.0223
	(0.3833)	(−0.7300)	(−0.6815)
Cash Payment	−0.0179	0.0326	0.1200*
	(−0.5881)	(0.5868)	(1.6848)
Stock Payment	−0.0033	0.1459**	0.2162***
	(−0.1036)	(2.3461)	(3.0194)
Related Deal	−0.0108	−0.0318	−0.1042**
	(−0.6124)	(−0.9561)	(−2.4921)
Major Deal	−0.0207	−0.0350	0.0088
	(−0.7628)	(−0.7493)	(0.1623)
Constant	0.7342***	1.8872***	1.9124***
	(2.8610)	(3.8841)	(3.0551)
Year&Ind&Prov	Yes	Yes	Yes
N	4560	4560	4560
R^2	0.235	0.239	0.251

Panels A and B of Table 4 report the impact of D&O insurance on the short-term market reactions to acquisition announcements and the long-term market performance following acquisitions, respectively. The dependent variables in Panel A are the cumulative abnormal returns ($CAR[t_1, t_2]$) over the trading days surrounding the acquisition announcements. The dependent variables in Panel B are the 1-, 2-, and 3-year buy-and-hold abnormal returns after the acquisitions (*BHAR*[1], *BHAR*[2], *BHAR*[3]). *D&O Insured* equals 1 if a firm has purchased D&O insurance in the year, and 0 otherwise. Year, industry, and province fixed effects are included. Definitions of other variables are presented in Appendix A. T-statistics are given in parentheses with standard errors clustered at the firm level. ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively.

5.4. D&O insurance and post-acquisition operating performance

Since D&O insurance deters value-destroying acquisitions, does it further improve a firm's post-acquisition operating performance? The result in Table 5 provides the answer. In this section, we use the abnormal change in return on total asset (*ΔROA*), the abnormal change in return on equity (*ΔROE*), the abnormal change in asset turnover (*ΔTurnover*), and the three-year-average industry-adjusted goodwill impairments following an acquisition (*GW Impair*) to measure improvement or deterioration of operating performance. We find that the presence of D&O insurance is positively associated with *ΔROA/ΔROE/Δturnover* and is negatively related to *GW Impair*. These results are economically significant. In the first four columns, the coefficients of *D&O Insured* are 0.0086, 0.0245, 0.0774 and −0.0101. It means that when a firm is covered by D&O insurance, its *ROA/ROE/Turnover* will increase by 0.86%/2.45%/7.74% respectively, and its goodwill impairments (divided by total assets) will decline by 0.0101 following an acquisition. Overall, Table 5 suggests that acquisition operating performance appear significantly better, both statistically and economically, with the presence of D&O insurance coverage.

Table 5
D&O insurance and post-acquisition operating performance.

	(1)	(2)	(3)	(4)
Variables	*ΔROA*	*ΔROE*	*ΔTurnover*	*GW Impair*
D&O Insured	0.0086**	0.0245***	0.0774**	−0.0101*
	(2.0209)	(2.5918)	(2.4112)	(−1.7024)
Size	−0.0016	−0.0035	−0.0337***	0.0023
	(−1.2702)	(−1.1501)	(−4.2051)	(1.0099)
Leverage	0.0012	−0.0106	−0.0253	−0.0926***
	(0.1512)	(−0.5226)	(−0.5505)	(−5.8360)
Tobin's Q	0.0006	0.0065**	0.0179**	−0.0066***
	(0.4077)	(2.3146)	(2.4956)	(−2.8586)
Tangible	0.0708***	0.1087***	0.1875***	−0.1277***
	(7.7189)	(5.0483)	(3.2964)	(−8.0839)
Soe	−0.0015	−0.0176	−0.1999***	−0.0244**
	(−0.2003)	(−1.0709)	(−3.2469)	(−2.1490)
Return	0.0047**	0.0093**	−0.0205	0.0145***
	(2.2321)	(2.0118)	(−1.5079)	(3.7333)
NO. Directors	0.0013*	0.0047**	0.0095**	−0.0003
	(1.7487)	(2.4939)	(2.0277)	(−0.1958)
Indpt Director	0.0294	0.0925	0.1581	−0.0462
	(1.2321)	(1.6366)	(1.1921)	(−1.0276)
Dual CEO	−0.0049**	−0.0108*	0.0040	0.0118***
	(−1.9629)	(−1.6955)	(0.2942)	(2.6610)
Separate	0.0001	0.0004	−0.0011	−0.0007***
	(0.7860)	(1.1086)	(−1.1461)	(−2.9747)
Top Share	0.0002***	0.0009***	0.0005	−0.0003***
	(3.1761)	(4.7768)	(0.9699)	(−2.5997)
Cash Flow	0.0953***	0.2014***	0.1385	0.0204
	(4.8219)	(4.2859)	(1.3369)	(0.6928)
Cash Level	0.0217***	0.0715***	−0.1107**	−0.0478***
	(2.8632)	(4.0167)	(−2.2734)	(−3.2880)
Age	−0.0063*	0.0006	−0.0442**	0.0088
	(−1.8438)	(0.0695)	(−2.1115)	(1.5631)
ROA	0.0506	0.1413	−0.3890**	−0.2575***
	(1.4504)	(1.5673)	(−2.5451)	(−5.0678)
Loss	0.0083	0.0148	−0.0649**	0.0004
	(1.4279)	(1.0018)	(−2.2388)	(0.0462)
Turnover	0.0043**	0.0142***	−0.0427***	0.0128***
	(2.4167)	(3.2060)	(−2.6206)	(3.5771)
Constant	−0.0355	−0.1155	0.6678***	0.0342
	(−1.0073)	(−1.3316)	(3.0150)	(0.6060)
Year&Ind&Prov	Yes	Yes	Yes	Yes
N	3198	3201	3201	2102
R^2	0.147	0.149	0.111	0.227

This table reports the impact of D&O insurance on post-acquisition operating performance. The dependent variable is proxied by four metrics, including the abnormal change in return on total asset (*ΔROA*), the abnormal change in return on equity (*ΔROE*), the abnormal change in asset turnover (*ΔTurnover*), and the three-year-average industry-adjusted goodwill impairments following the acquisition (*GW Impair*). Year, industry, and province fixed effects are included. Definitions of other variables are presented in Appendix A. T-statistics are given in parentheses with standard errors clustered at the firm level. ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively.

5.5. The monitoring effect of insurance providers

From the perspective of insurance providers, we perform a grouping regression test on Eq. (1) using the year-industry median of insurance premium per capita (*InsuPrem*) and the number of insurance companies (*InsuNum*) in a firm's located province. The results are presented in the first eight columns of Table 6. The coefficients of *D&O Insured* are significantly negative in the provinces with high *InsuPrem* and *InsuNum*, which indicates that D&O insurance has a stronger deterrence effect on acquisitions when the firm is in a better insurance environment, that is, insurance companies may have greater influence and higher monitoring ability on local listed firms. In addition, we examine the impact of the number of years D&O insurance coverage (*Insu Time*) on acquisitions. Column (9) shows a significantly negative relationship between *Insu Time* and *Deal Value*. Column (10) shows a negative relationship between *Insu Time* and *Acq Dummy* which is close to statistical significance (T-value is −1.63). These results indicate that when the insurance companies have spent more time with the insured, they can obtain a better understanding of the insured firms, and hence monitor more effectively in their acquisition decisions.

5.6. D&O insurance and corporate governance

Kim et al. (2009) and Chikh and Filbien (2011) find that when a manager serves as both corporate CEO and board chairperson (CEO

Table 6
The monitoring effect of insurance companies: insurance providers' perspective.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Insurance premium per capita				Number of Insurance companies					
	High	Low	High	Low	High	Low	High	Low		
Variables	*Deal Value*	*Deal Value*	*Acq Dummy*	*Acq Dummy*	*Deal Value*	*Deal Value*	*Acq Dummy*	*Acq Dummy*	*Deal Value*	*Acq Dummy*
D&O Insured	−0.0132***	−0.0010	−0.3555**	−0.1369	−0.0124***	−0.0021	−0.4161***	−0.0635		
	(−4.2147)	(−0.2209)	(−2.4993)	(−0.8081)	(−3.4264)	(−0.5469)	(−2.7546)	(−0.3965)		
Insu Time									−0.0010**	−0.0262
									(−2.4888)	(−1.6331)
Size	0.0007	−0.0004	−0.0099	−0.0179	0.0006	0.0001	0.0177	−0.0425	0.0002	−0.0158
	(0.6693)	(−0.3631)	(−0.2657)	(−0.4049)	(0.4878)	(0.0698)	(0.4271)	(−1.1036)	(0.2683)	(−0.5546)
Leverage	−0.0382***	−0.0341***	0.1678	−0.3485	−0.0404***	−0.0337***	0.0483	−0.0822	−0.0366***	−0.0619
	(−5.2267)	(−4.3513)	(0.7988)	(−1.5152)	(−4.6265)	(−4.9799)	(0.1965)	(−0.4156)	(−6.8723)	(−0.4004)
Tobin's Q	−0.0079***	−0.0067***	−0.1643***	−0.2334***	−0.0082***	−0.0067***	−0.1660***	−0.2164***	−0.0072***	−0.1924***
	(−7.1260)	(−6.7014)	(−4.7661)	(−5.5997)	(−6.3065)	(−7.4635)	(−4.1813)	(−6.1052)	(−9.6913)	(−7.2937)
Tangible	−0.0355***	−0.0254***	−1.1406***	−1.2993***	−0.0434***	−0.0224***	−1.1352***	−1.2618***	−0.0304***	−1.1891***
	(−5.1603)	(−3.6719)	(−4.4602)	(−4.6674)	(−5.2493)	(−3.7465)	(−3.9187)	(−5.2232)	(−6.2488)	(−6.3555)
Soe	0.0260***	0.0308***	0.3800	0.7676***	0.0247***	0.0302***	0.1472	0.8650***	0.0279***	0.5471***
	(4.4312)	(4.7264)	(1.6241)	(3.1346)	(3.5169)	(5.2777)	(0.5443)	(3.9805)	(6.3484)	(3.2397)
Return	0.0217***	0.0183***	0.3249***	0.4566***	0.0236***	0.0177***	0.3538***	0.4006***	0.0200***	0.3725***
	(7.6091)	(6.7030)	(5.3822)	(6.2597)	(6.8900)	(7.4428)	(5.1230)	(6.3833)	(10.1011)	(8.1070)
NO. Directors	−0.0010*	−0.0019***	−0.0753***	−0.0501**	−0.0016***	−0.0013***	−0.0923***	−0.0434*	−0.0015***	−0.0664***
	(−1.8213)	(−3.3803)	(−3.1211)	(−1.9939)	(−2.6280)	(−2.6404)	(−3.4760)	(−1.9197)	(−3.8947)	(−3.8145)
Indpt Director	−0.0188	−0.0097	−1.2763*	0.7640	−0.0092	−0.0201	−1.4196*	0.3487	−0.0169	−0.5082
	(−0.9837)	(−0.5229)	(−1.8782)	(1.0504)	(−0.4168)	(−1.2028)	(−1.9567)	(0.5151)	(−1.2684)	(−1.0150)
Dual CEO	0.0031	0.0067**	0.0828	0.2793***	0.0023	0.0062***	0.1408*	0.1731**	0.0048***	0.1675***
	(1.2719)	(2.4232)	(1.2746)	(3.3924)	(0.7874)	(2.7136)	(1.8852)	(2.4368)	(2.6159)	(3.2276)
Separate	0.0000	0.0000	−0.0003	0.0068	−0.0001	0.0001	−0.0033	0.0069*	0.0000	0.0026
	(0.3085)	(0.1525)	(−0.0712)	(1.4044)	(−0.7647)	(0.8578)	(−0.6666)	(1.6609)	(0.2208)	(0.8052)
Top Share	−0.0004***	−0.0003***	−0.0075***	−0.0079***	−0.0004***	−0.0003***	−0.0064**	−0.0090***	−0.0004***	−0.0078***
	(−5.2619)	(−4.4420)	(−3.2339)	(−2.7978)	(−5.0589)	(−4.9655)	(−2.4435)	(−3.7283)	(−7.0730)	(−4.3818)
Cash Flow	−0.0224*	−0.0062	−1.2094***	−0.1750	−0.0142	−0.0138	−1.5897***	−0.0874	−0.0145	−0.7526**
	(−1.9195)	(−0.4571)	(−2.8216)	(−0.3416)	(−1.0131)	(−1.1973)	(−3.2178)	(−0.1972)	(−1.6445)	(−2.2730)
Cash Level	0.0372***	0.0605***	0.5505**	0.8334***	0.0316***	0.0589***	0.4606*	0.7954***	0.0477***	0.6847***
	(3.5509)	(4.4237)	(2.4327)	(3.1055)	(2.6502)	(5.1175)	(1.7885)	(3.4400)	(5.7059)	(3.9511)
Age	−0.0001	0.0012	−0.3278***	−0.5295***	0.0017	0.0001	−0.2352**	−0.5805***	0.0006	−0.4209***
	(−0.0193)	(0.3251)	(−3.2724)	(−4.2042)	(0.4607)	(0.0313)	(−2.0298)	(−5.6495)	(0.2463)	(−5.3532)
ROA	−0.1057***	−0.0987***	0.3187	−1.3002	−0.1136***	−0.0961***	0.0503	−0.6275	−0.1027***	−0.3847
	(−5.0226)	(−4.1576)	(0.4469)	(−1.6271)	(−4.4114)	(−4.7701)	(0.0602)	(−0.8952)	(−6.5213)	(−0.7173)
Loss	−0.0090**	−0.0058*	−0.2567*	−0.3629**	−0.0085*	−0.0066**	−0.3068*	−0.2915**	−0.0077***	−0.3172***
	(−2.3578)	(−1.8807)	(−1.8368)	(−2.4347)	(−1.8392)	(−2.4223)	(−1.8892)	(−2.2747)	(−3.2101)	(−3.1393)
Turnover	0.0272***	0.0393***	0.3540***	0.5182***	0.0258***	0.0376***	0.2976***	0.5205***	0.0329***	0.4262***
	(7.5292)	(9.2768)	(6.0117)	(8.7721)	(6.2840)	(10.1410)	(4.3963)	(9.7830)	(11.7328)	(10.0695)
Constant	0.0294	0.0136	−1.9009*	−3.1523***	0.0382	0.0062	−2.1474*	−15.9660***	0.0303*	−2.1847***
	(1.2466)	(0.5425)	(−1.8389)	(−2.7658)	(1.4005)	(0.2489)	(−1.8091)	(−18.0459)	(1.8143)	(−2.8939)
Year&Ind&Prov	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	15,525	13,531	15,482	13,515	11,316	17,740	11,208	17,734	29,056	29,056
R^2/Pesudo R^2	0.081	0.098	0.115	0.125	0.078	0.095	0.106	0.126	0.085	0.116
P-value of Permutation Test	0.003***		0.064*		0.009***		0.010**			

This table reports the moderating effect of monitoring ability by insurance companies on the relationship between D&O insurance and acquisitions. We introduce the insurance premium per capita (*InsuPrem*) and the number of insurance companies (*InsuNum*) in a firm's located province to reflect the level of monitoring ability by insurance companies, and partition the full sample into two subsamples based on the year-industry median of *InsuPrem* and *InsuNum*. The dependent variable is proxied by two metrics, namely a dummy variable indicating whether the firm undertakes an acquisition in the year or not (*Acq Dummy*) and the total value of all takeover deals in the year scaled by the acquiring firm's total assets (*Deal Value*). *D&O Insured* equals 1 if a firm has purchased D&O insurance in the year, and 0 otherwise. *Insu Time* is the number of years a firm has purchased D&O insurance. Year, industry, and province fixed effects are included. Definitions of other variables are presented in Appendix A. T-statistics are given in parentheses with standard errors clustered at the firm level. ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively.

duality), then the empowered manager is more likely to carry out empire-building acquisitions. Indeed, the previous Table 2 presents that CEO duality, as a control variable, is positively associated with acquisition decisions. If D&O exerts a strong monitoring component, then it would play a more important role against empire-building managers, especially those highly empowered and entrenched CEOs. In Table 7, we tabulate the regression results by the level of CEO duality and the level of CEO tenure.[9] The coefficients of *D&O Insured* are significantly negative for the subsample firms with either dual CEO or higher CEO tenure, and quite

Table 7
The monitoring effect of insurance companies: insured firms' perspective.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	CEO Duality				CEO Tenure			
	Yes	No	Yes	No	Long	Short	Long	Short
Variables	*Deal Value*	*Deal Value*	*Acq Dummy*	*Acq Dummy*	*Deal Value*	*Deal Value*	*Acq Dummy*	*Acq Dummy*
D&O Insured	−0.0256***	−0.0061**	−0.5065*	−0.2293*	−0.0107***	−0.0048	−0.5426***	−0.1225
	(−2.8682)	(−2.3691)	(−1.7279)	(−1.8735)	(−2.9410)	(−0.8899)	(−2.5845)	(−0.6722)
Size	0.0028	−0.0002	0.0157	−0.0208	−0.0002	0.0002	0.0060	0.0222
	(1.3755)	(−0.2173)	(0.3052)	(−0.6294)	(−0.1952)	(0.1649)	(0.1234)	(0.4400)
Leverage	−0.0644***	−0.0298***	−0.0307	−0.0444	−0.0329***	−0.0502***	−0.0853	−0.3209
	(−4.5727)	(−5.3528)	(−0.1094)	(−0.2450)	(−3.9706)	(−5.1884)	(−0.3238)	(−1.1689)
Tobin's Q	−0.0093***	−0.0063***	−0.1664***	−0.1999***	−0.0067***	−0.0089***	−0.2048***	−0.2265***
	(−5.8435)	(−7.5670)	(−3.5432)	(−6.6287)	(−5.7930)	(−6.0876)	(−4.4386)	(−4.7291)
Tangible	−0.0743***	−0.0212***	−1.3232***	−1.1804***	−0.0276***	−0.0457***	−1.0632***	−1.3658***
	(−5.3561)	(−4.2184)	(−3.5792)	(−5.5205)	(−3.8861)	(−4.9257)	(−3.5190)	(−4.2779)
Soe	0.0418**	0.0269***	0.6003	0.5825***	0.0286***	0.0323***	0.8436***	0.4513
	(2.3629)	(5.9571)	(1.1835)	(3.2488)	(4.0671)	(3.8463)	(2.9341)	(1.6091)
Return	0.0297***	0.0168***	0.4021***	0.3560***	0.0226***	0.0248***	0.4809***	0.4468***
	(5.7471)	(8.2611)	(4.7055)	(6.4016)	(6.8439)	(6.7630)	(6.4528)	(5.5694)
NO. Directors	−0.0027**	−0.0014***	−0.0598	−0.0716***	−0.0015***	−0.0014*	−0.0518**	−0.0891***
	(−1.9838)	(−3.6784)	(−1.5461)	(−3.7603)	(−2.9074)	(−1.9053)	(−1.9603)	(−2.9201)
Indpt Director	−0.0670*	−0.0082	−2.1957**	0.1426	−0.0050	−0.0564**	−0.0530	−0.6652
	(−1.9494)	(−0.5660)	(−2.2279)	(0.2476)	(−0.2639)	(−2.0670)	(−0.0645)	(−0.7063)
Dual CEO					0.0041	0.0085**	0.1591*	0.1342
					(1.4785)	(2.0355)	(1.7854)	(1.3376)
Separate	0.0002	−0.0000	0.0105	0.0011	0.0001	−0.0001	0.0061	−0.0019
	(0.7393)	(−0.0389)	(1.6165)	(0.2989)	(0.8377)	(−0.3282)	(1.2237)	(−0.3226)
Top Share	−0.0004***	−0.0003***	−0.0033	−0.0090***	−0.0003***	−0.0004***	−0.0072**	−0.0125***
	(−3.0499)	(−6.1233)	(−1.0246)	(−4.2453)	(−4.6095)	(−3.7682)	(−2.5164)	(−3.7966)
Cash Flow	−0.0212	−0.0136	−1.4382**	−0.5358	−0.0125	−0.0051	−0.9041	−0.3608
	(−0.9457)	(−1.4636)	(−2.3825)	(−1.3934)	(−0.9646)	(−0.2924)	(−1.5807)	(−0.5987)
Cash Level	0.0192	0.0614***	0.0653	1.0402***	0.0306**	0.0460***	0.4322	1.3013***
	(1.1720)	(6.3308)	(0.2098)	(5.0384)	(2.4911)	(2.9106)	(1.3951)	(4.1334)
Age	−0.0041	0.0025	−0.4804***	−0.3866***	−0.0062*	0.0044	−0.4717***	−0.4247***
	(−0.7706)	(1.0443)	(−3.3279)	(−4.2927)	(−1.8025)	(1.0419)	(−3.8453)	(−2.9392)
ROA	−0.1964***	−0.0808***	−1.1519	−0.1215	−0.0987***	−0.0796***	−0.5261	−0.3220
	(−4.2661)	(−5.1835)	(−1.1984)	(−0.1884)	(−3.6244)	(−3.0321)	(−0.5213)	(−0.3517)
Loss	−0.0173**	−0.0055**	−0.4354**	−0.2677**	−0.0095***	−0.0060	−0.2727	−0.2397
	(−2.4909)	(−2.2718)	(−2.0931)	(−2.3258)	(−2.5924)	(−1.4973)	(−1.6420)	(−1.4123)
Turnover	0.0524***	0.0286***	0.5100***	0.3951***	0.0215***	0.0333***	0.3898***	0.3566***
	(6.7918)	(10.0864)	(6.2640)	(8.2923)	(6.0293)	(7.3786)	(5.5034)	(5.5037)
Constant	0.0393	0.0220	−14.7932***	−2.3863***	0.0628**	0.0542*	−2.7951**	−2.0581
	(0.8690)	(1.2541)	(−18.0950)	(−2.8949)	(2.4079)	(1.7246)	(−2.0995)	(−1.3692)
Year&Ind&Prov	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	6298	22,758	6216	22,758	10,783	8674	10,707	8658
R^2/Pesudo R^2	0.109	0.081	0.105	0.118	0.076	0.107	0.127	0.134
P-value of Permutation Test	0.000***		0.008***		0.227		0.007***	

This table reports the moderating effect of managerial moral hazard on the relationship between D&O insurance and acquisitions. We introduce the CEO duality (*Dual CEO*) and the CEO Tenure (*Tenure*) to reflect the level of managerial moral hazard, and partition the full sample into two subsamples based on *Dual CEO* and the year-industry median of *Tenure*. The dependent variable is proxied by two metrics, namely a dummy variable indicating whether the firm undertakes an acquisition in the year or not (*Acq Dummy*) and the total value of all takeover deals in the year scaled by the acquiring firm's total assets (*Deal Value*). *D&O Insured* equals 1 if a firm has purchased D&O insurance in the year, and 0 otherwise. Definitions of other variables are presented in Appendix A. T-statistics are given in parentheses with standard errors clustered at the firm level. ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively.

[9] Likewise, Walters et al. (2007 Journal of Business Research) document that high level of CEO tenure is negatively associated with valuation effect of acquisitions.

insignificant for the other segmented groups. It shows that while deterring firm acquisitions, D&O insurance has a larger impact on the entrenched powerful CEOs.

5.7. Behavioral biases of CEOs

Based on the behavioral studies of CEO irrationality, we also test whether D&O insurance could correct the behavioral biases of empire-building managers or preclude their irrationality from taking place. Specifically, we show in Table 8 a more negative impact of D&O insurance on acquisitions when CEOs are more overconfident, proxied by the level of earnings overstatement by the CEO, higher relative compensation, or increased CEO shareholding with a negative buy-and-hold abnormal return. In Table 9, we show that the deterrence effect of D&O insurance is more pronounced when CEOs are more risk-loving, indicated by higher level of earnings volatility, or higher CEOs' gambling propensity. In an unreported analysis, we find that such result is driven by the samples of value-destroying acquisitions, consistent with the notion that the behavioral biases of CEO are detrimental to firm value. The results in both tables support our H4 that D&O insurance corrects behavioral biases of empire-building managers.

6. Robustness tests

6.1. Competitive hypotheses: The lawsuit threat effect

It is possible that the relationship between D&O insurance coverage and empire-building acquisitions is driven by other factors other than taming overpowered and irrational CEOs. A competitive hypothesis is that the deterrence effect of D&O insurance on acquisitions is due to the litigation threat incurred by the D&O insurance and not by managers. Because the plaintiff investors view D&O insurers as rich payers, they would fight harder for more compensations in the same event (Bhagat et al., 1987). If the *lawsuit threat effect* is established, then D&O insurance should significantly increase the lawsuits against insured firms. In the first eight columns of Table 10, we segment the sample firms by the number of lawsuits (*LawNum*) and a dummy variable indicating whether there are major lawsuits (*MajLaw*) in the year. It can be seen that the coefficients of *D&O Insured* are insignificant when *LawNum* and *MajLaw* are low. In the last two columns of Table 10, we directly examine the impact of D&O insurance on *LawNum* and *MajLaw*. The coefficients of *D&O Insured* are also insignificant. These results indicate that the D&O insurance is not affected by litigation risk against the insured firm. Thus, the *litigation threat effect* is excluded.

6.2. Propensity score matching

While our results strongly support the hypothesis that D&O insurance deters empire-building acquisitions, it is still possible that the effects we observe are at least partially attributable to selection bias. Specifically, the purchase of D&O insurance may proxy for certain firm characteristics, and firms with these characteristics may avoid value-destroying acquisitions. We mitigate the selection bias by applying propensity score matching (PSM). PSM is to replicate the test by matching the treated observations (covered by D&O insurance) and control observations by using a propensity score model that is based on a few variables (control variables used in Table 2) and then comparing the outcome of interest for the treated and control samples. When the confounding characteristics are balanced in the treated and control samples. The difference in acquisition outcomes between the two groups comes out as unbiased.

Panel A of Table 11 provides a univariate comparison of the two groups before PSM. Significant differences exist in many dimensions for the two groups. For example, the treated firms are likely to be of larger size, higher leverage, and fewer growth opportunities, etc. Panel A also provides the same comparison of the two groups after PSM is executed. The differences in the firm characteristics between the two groups diminish to an insignificant level both statistically and economically. Panel B reports the multivariate analysis results based on the specifications in Table 2, using only treated and control samples pooled together. D&O Insurance is still negatively related with all four dependent variables for acquisitions at reasonable confidence levels.[10]

6.3. Instrumental variable method

Another potential endogeneity issue may lie in the reverse causality from acquisition to D&O insurance. The negative correlation found in Table 2 may be due to the fact that firms with fewer acquisitions are more willing to purchase D&O insurance, instead of that D&O insurance deters acquisitions. To address this issue, we follow Lin et al. (2011) and select an instrumental variable that is closely related to D&O insurance coverage but is unrelated to acquisition decisions and then run a two-stage least square regression model for our main test. The instrumental variable we use is the industrial level of D&O insurance coverage (*Ave Insu Time*), measured as the average number of years of D&O insurance coverage for all the firms in the same industry in the same year. As Lin et al. (2011) argues, such an industrial climate for insurance is more likely to affect an individual firm's choice of insurance policy but is highly unlikely to affect the firm's investment decision such as acquisitions. Column (1) of Table 12 shows that the coefficient of *Ave Insu Time,* as we expected, is positive and significant at the 1% level in explaining *D&O Insured*. Based on the first-stage model in Column (1), we predict

[10] In un-tabulated tests, we also try to mitigate the selection bias of Tables 3–5 by applying PSM, and the results show consistent with our main arguments.

Table 8
D&O insurance and acquisitions: the moderating effect of managerial overconfidence.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Overvalued Earnings forecast				Relative compensation of managers				CEO Shareholding increases and *BHAR*[2] is negative			
	Yes	No	Yes	Yes	High	Low	High	Low	Yes	No	Yes	No
Variables	*Deal Value*	*Deal Value*	*Acq Dummy*	*Acq Dummy*	*Deal Value*	*Deal Value*	*Acq Dummy*	*Acq Dummy*	*Deal Value*	*Deal Value*	*Acq Dummy*	*Acq Dummy*
D&O Insured	−0.0189***	−0.0048	−0.4072***	−0.0568	−0.0141***	−0.0044	−0.2776***	0.0290	−0.0337***	−0.0067**	−0.2559	−0.1254**
	(−3.9311)	(−1.4827)	(−2.9685)	(−0.8869)	(−3.1596)	(−1.4222)	(−3.1192)	(0.3901)	(−3.4212)	(−2.4350)	(−1.1500)	(−2.1149)
Size	0.0030*	−0.0001	0.0686*	−0.0187	0.0011	0.0004	0.0218	−0.0250	−0.0007	0.0002	−0.0925*	−0.0016
	(1.9072)	(−0.1380)	(1.8715)	(−1.1161)	(0.9941)	(0.4065)	(1.0675)	(−1.1874)	(−0.1730)	(0.2928)	(−1.7381)	(−0.1011)
Leverage	−0.0274***	−0.0417***	−0.0455	−0.0159	−0.0422***	−0.0347***	−0.0067	−0.0501	−0.0328	−0.0372***	0.3306	−0.0254
	(−2.8696)	(−6.5459)	(−0.2550)	(−0.1716)	(−5.4060)	(−4.4362)	(−0.0613)	(−0.4024)	(−1.2587)	(−6.9407)	(1.1265)	(−0.3014)
Tobin's Q	−0.0064***	−0.0072***	−0.0990***	−0.0957***	−0.0085***	−0.0051***	−0.0994***	−0.0874***	−0.0125***	−0.0071***	−0.1533***	−0.0981***
	(−4.5364)	(−8.1350)	(−3.4648)	(−6.1645)	(−8.3881)	(−4.2539)	(−5.8301)	(−3.9094)	(−3.1527)	(−9.4474)	(−3.4644)	(−6.8580)
Tangible	−0.0236**	−0.0352***	−0.5505***	−0.6148***	−0.0408***	−0.0254***	−0.5993***	−0.6564***	−0.0820***	−0.0283***	−1.0748***	−0.5614***
	(−2.5747)	(−6.0873)	(−2.8471)	(−5.4639)	(−5.3512)	(−3.8009)	(−4.4911)	(−4.8548)	(−3.4577)	(−5.7273)	(−2.9263)	(−5.6679)
Soe	0.0317***	0.0260***	0.3043	0.2383**	0.0241***	0.0373***	0.0978	0.5148***	0.0885**	0.0267***	−0.0693	0.2708***
	(3.2551)	(5.2734)	(1.6332)	(2.4062)	(3.1481)	(5.7444)	(0.7702)	(4.2375)	(2.4692)	(6.0082)	(−0.1334)	(3.0384)
Return	0.0198***	0.0201***	0.1509***	0.2028***	0.0241***	0.0156***	0.2021***	0.1812***	0.0429***	0.0187***	0.4757***	0.1744***
	(4.6964)	(8.9527)	(2.7788)	(7.2677)	(8.1454)	(5.8251)	(6.1487)	(4.8034)	(4.2536)	(9.2534)	(4.9464)	(6.7127)
NO. Directors	−0.0023***	−0.0012***	−0.0620***	−0.0264***	−0.0010	−0.0014***	−0.0316**	−0.0296**	−0.0021	−0.0015***	−0.0804***	−0.0316***
	(−2.7552)	(−2.6619)	(−2.8426)	(−2.6806)	(−1.4765)	(−2.7478)	(−2.3878)	(−2.4256)	(−0.9195)	(−3.8415)	(−2.7436)	(−3.4642)
Indpt Director	0.0020	−0.0164	−0.3224	−0.1206	0.0003	−0.0264	0.1533	−0.4601	−0.0344	−0.0155	−1.1994	−0.1201
	(0.0700)	(−1.0823)	(−0.5223)	(−0.4123)	(0.0126)	(−1.5586)	(0.4101)	(−1.2585)	(−0.6095)	(−1.1316)	(−1.3470)	(−0.4407)
Dual CEO	0.0051	0.0045**	0.0760	0.0909***	0.0011	0.0087***	0.0119	0.1759***	0.0073	0.0045**	0.0841	0.0890***
	(1.2863)	(2.2132)	(1.1183)	(2.9595)	(0.4292)	(3.2570)	(0.3201)	(4.3681)	(0.9603)	(2.3715)	(0.9815)	(3.0359)
Separate	−0.0003*	0.0001	−0.0013	0.0015	−0.0001	0.0000	0.0006	0.0008	0.0008*	−0.0000	0.0175***	0.0004
	(−1.6884)	(0.9358)	(−0.3460)	(0.8178)	(−0.4916)	(0.4095)	(0.2627)	(0.3149)	(1.7648)	(−0.2039)	(2.9670)	(0.2526)
Top Share	−0.0003**	−0.0004***	−0.0030	−0.0043***	−0.0004***	−0.0004***	−0.0021*	−0.0053***	−0.0004	−0.0004***	−0.0015	−0.0040***
	(−2.4897)	(−6.6599)	(−1.3971)	(−4.0922)	(−4.7029)	(−5.4363)	(−1.6988)	(−4.0109)	(−1.5862)	(−6.9918)	(−0.4772)	(−4.1152)
Cash Flow	0.0202	−0.0231**	0.5893	−0.5807***	−0.0073	−0.0234*	−0.2094	−0.6134**	−0.0276	−0.0148	0.5918	−0.4639**
	(1.1498)	(−2.2529)	(1.5598)	(−2.8933)	(−0.5308)	(−1.9584)	(−0.9049)	(−2.2648)	(−0.6135)	(−1.6447)	(0.9537)	(−2.4976)
Cash Level	0.0653***	0.0436***	0.6822***	0.2783***	0.0544***	0.0430***	0.5245***	0.2047	0.1112***	0.0443***	0.1366	0.3943***
	(3.3168)	(4.6508)	(3.0050)	(2.7320)	(4.6183)	(3.3729)	(4.2586)	(1.4055)	(2.6953)	(5.2068)	(0.3977)	(4.0983)
Age	0.0066	−0.0013	0.0063	−0.2665***	0.0022	−0.0021	−0.1984***	−0.2652***	0.0039	0.0004	−0.4038***	−0.2044***
	(1.2751)	(−0.5014)	(0.0554)	(−5.8656)	(0.6297)	(−0.6683)	(−3.5001)	(−4.5276)	(0.3637)	(0.1651)	(−2.9693)	(−4.7350)
ROA	−0.0518**	−0.1248***	−0.3898	−0.1571	−0.1051***	−0.1148***	−0.1636	−0.1755	−0.1494**	−0.0981***	−1.5079*	0.0131
	(−2.1856)	(−6.2143)	(−0.6781)	(−0.4797)	(−4.5062)	(−5.0612)	(−0.4544)	(−0.3885)	(−2.2020)	(−6.0284)	(−1.6949)	(0.0440)
Loss	−0.0012	−0.0098***	−0.1515	−0.1348**	−0.0055	−0.0115***	−0.0900	−0.2002**	−0.0093	−0.0074***	−0.1982	−0.1448***
	(−0.3074)	(−3.3165)	(−1.5057)	(−2.2142)	(−1.4244)	(−3.5957)	(−1.2703)	(−2.5124)	(−0.6527)	(−3.0510)	(−1.0432)	(−2.6568)
Turnover	0.0276***	0.0351***	0.1658***	0.2469***	0.0379***	0.0306***	0.2384***	0.2218***	0.0169	0.0335***	0.0726	0.2323***
	(5.3453)	(10.4598)	(3.4904)	(9.2495)	(9.4317)	(7.5631)	(8.0682)	(6.4140)	(1.4123)	(11.7203)	(0.7865)	(10.0265)
Constant	−0.0757**	0.0518***	−2.9624***	−0.8272**	−0.0081	0.0340	−5.5616***	−3.6715***	0.0658	0.0295*	−0.9448	−1.3288***
	(−2.1227)	(2.6641)	(−3.2485)	(−1.9632)	(−0.3045)	(1.5202)	(−11.0497)	(−7.4638)	(0.7991)	(1.7358)	(−0.7737)	(−3.4275)
Year&Ind&Prov	Yes	Yes	Yes	*Yes*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	6582	22,474	6578	22,474	13,745	13,546	13,675	13,530	1728	27,324	1614	27,324
R^2/Pesudo R^2	0.098	0.087	0.135	0.114	0.094	0.082	0.107	0.114	0.114	0.085	0.123	0.113
P-value of Permutation Test	0.001***		0.001***		0.011**		0.000***		0.001***		0.152	

This table reports the results for the moderating effect of managerial overconfidence on the relationship between D&O insurance and acquisitions. Managerial overconfidence is measured by three variables: the overestimation of forecasted earnings (*OverEstimate*), the relative compensation of managers (*Rel Comp*), and the increase in CEO shareholding with a negative *BHAR*[2] (△*CEO shr*). The full sample is partitioned into two sub-samples based on *OverEstimate*, △*CEO shr*, and the year-industry median of *Rel Comp*. The dependent variable is proxied by two metrics, namely a dummy variable indicating whether the firm undertakes an acquisition in the year or not (*Acq Dummy*) and the total value of all takeover deals in the year scaled by the acquiring firm's total assets (*Deal Value*). *D&O Insured* equals 1 if a firm has purchased D&O insurance in the year, and 0 otherwise. Definitions of other variables are presented in Appendix A. T-statistics are given in parentheses with standard errors clustered at the firm level. ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively.

Table 9
D&O insurance and acquisitions: the moderating effect of managerial risk-seeking.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	EBITDA volatility				Lottery sales per capita in firm's located province				Lottery sales per capita in CEO's native province			
	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Variables	*Deal Value*	*Deal Value*	*Acq Dummy*	*Acq Dummy*	*Deal Value*	*Deal Value*	*Acq Dummy*	*Acq Dummy*	*Deal Value*	*Deal Value*	*Acq Dummy*	*Acq Dummy*
D&O Insured	−0.0123**	−0.0016	−0.2785*	−0.2028	−0.0118**	−0.0055	−0.3562**	−0.1348	−0.0179**	−0.0028	−0.2614	−0.0275
	(−2.5181)	(−0.5502)	(−1.6704)	(−1.1736)	(−2.4869)	(−1.4192)	(−2.1393)	(−0.8599)	(−2.2306)	(−0.7437)	(−0.8699)	(−0.1268)
Size	0.0000	−0.0000	0.0437	−0.0016	−0.0003	0.0015	−0.0535	−0.0008	−0.0026	−0.0020*	−0.1745	−0.0751
	(0.0070)	(−0.0505)	(0.8842)	(−0.0332)	(−0.2392)	(1.3368)	(−1.2763)	(−0.0211)	(−0.9990)	(−1.7166)	(−1.5274)	(−1.0818)
Leverage	−0.0326***	−0.0423***	−0.0763	−0.2497	−0.0520***	−0.0435***	0.2109	−0.2758	−0.0313	−0.0376***	0.7319	−0.6367
	(−3.5497)	(−6.1912)	(−0.3340)	(−0.8999)	(−4.9927)	(−5.0821)	(0.8565)	(−1.2973)	(−1.2730)	(−4.0167)	(1.2599)	(−1.4139)
Tobin's Q	−0.0087***	−0.0061***	−0.1678***	−0.1959***	−0.0099***	−0.0073***	−0.2011***	−0.1969***	−0.0109***	−0.0051***	−0.3478***	−0.1729**
	(−7.2883)	(−5.1830)	(−4.0937)	(−4.0216)	(−6.9281)	(−6.8965)	(−5.1454)	(−5.3743)	(−4.1768)	(−3.0186)	(−3.4796)	(−2.3939)
Tangible	−0.0468***	−0.0188***	−1.3487***	−1.1719***	−0.0661***	−0.0274***	−1.2930***	−1.2247***	−0.0271	−0.0045	−1.0269	−0.2211
	(−5.2102)	(−3.5095)	(−4.8041)	(−3.9556)	(−6.3812)	(−3.6718)	(−4.4368)	(−4.7045)	(−1.3112)	(−0.5684)	(−1.6333)	(−0.4674)
Soe	0.0518***	0.0236***	1.1714***	1.0410***	0.0442***	0.0438***	0.7938***	0.7565***	0.0199	0.0189**	1.2254**	0.9943**
	(4.4561)	(4.9955)	(4.0573)	(3.4972)	(3.7476)	(5.1399)	(2.8989)	(3.2462)	(0.9708)	(2.2227)	(2.0106)	(2.3106)
Return	0.0231***	0.0137***	0.3503***	0.3296***	0.0364***	0.0237***	0.4238***	0.3874***	0.0309***	0.0185***	0.6836***	0.4978***
	(6.5258)	(5.8237)	(4.3367)	(3.9528)	(7.2474)	(7.1475)	(6.0030)	(5.8113)	(2.9082)	(4.6761)	(4.2454)	(4.0989)
NO. Directors	−0.0023***	−0.0009**	−0.0794***	−0.0604**	−0.0018**	−0.0014**	−0.0886***	−0.0525**	−0.0010	−0.0001	−0.0373	0.0257
	(−3.1259)	(−2.0257)	(−2.9192)	(−2.3414)	(−2.0302)	(−2.1863)	(−3.2672)	(−2.1659)	(−0.6875)	(−0.2301)	(−0.6500)	(0.6153)
Indpt Director	−0.0054	−0.0174	0.0359	−1.1396	−0.0130	−0.0252	−1.4645*	−0.0954	−0.0127	0.0014	−1.9904	−1.5139
	(−0.2077)	(−1.0808)	(0.0440)	(−1.4350)	(−0.4676)	(−1.2552)	(−1.8567)	(−0.1388)	(−0.2344)	(0.0565)	(−1.2573)	(−1.0601)
Dual CEO	0.0058	0.0050*	0.1471*	0.3063***	0.0057*	0.0053**	0.1707**	0.1530**	0.0139**	0.0022	0.4381**	0.4695***
	(1.6336)	(1.9436)	(1.7588)	(3.4246)	(1.7629)	(1.9714)	(2.2087)	(2.1018)	(2.3083)	(0.5850)	(2.3994)	(3.2682)
Separate	−0.0001	0.0000	0.0036	0.0043	−0.0001	0.0001	−0.0051	0.0049	0.0006*	−0.0000	0.0172	−0.0049
	(−0.6997)	(0.5161)	(0.6884)	(0.8646)	(−0.8960)	(0.6345)	(−1.0163)	(1.1032)	(1.8171)	(−0.0011)	(1.5653)	(−0.5978)
Top Share	−0.0003***	−0.0003***	−0.0073**	−0.0124***	−0.0005***	−0.0004***	−0.0069***	−0.0085***	−0.0004**	−0.0001	−0.0091	−0.0014
	(−3.3004)	(−4.8126)	(−2.5624)	(−4.2326)	(−4.9709)	(−4.8107)	(−2.6516)	(−3.3657)	(−2.3566)	(−0.9458)	(−1.4450)	(−0.3163)
Cash Flow	−0.0052	−0.0080	−0.0412	−1.4492**	−0.0323*	−0.0093	−0.9532*	−0.7172	−0.0764**	0.0118	−0.9431	−0.7821
	(−0.3028)	(−0.7393)	(−0.0824)	(−2.3109)	(−1.8161)	(−0.6313)	(−1.8889)	(−1.5306)	(−1.9938)	(0.7744)	(−0.8623)	(−0.9098)
Cash Level	0.0906***	0.0441***	0.9399***	0.9862***	0.0124	0.0809***	0.0587	1.1502***	0.0193	0.0160	0.3777	0.0293
	(5.1115)	(3.1767)	(3.1232)	(2.7430)	(0.9293)	(6.0736)	(0.2155)	(4.8714)	(0.6753)	(1.0972)	(0.6130)	(0.0555)
Age	−0.0067	−0.0049	−0.4942***	−0.6112***	−0.0009	0.0003	−0.2684**	−0.5718***	0.0002	0.0040	−0.2499	−0.0765
	(−1.2346)	(−1.5255)	(−3.7341)	(−4.5982)	(−0.2185)	(0.0965)	(−2.2201)	(−5.4608)	(0.0214)	(0.9489)	(−0.8675)	(−0.3508)
ROA	−0.0801***	−0.1047***	−0.6465	0.3544	−0.1470***	−0.1177***	−0.0803	−0.7444	−0.1084	−0.0833***	1.1763	0.1444
	(−3.6972)	(−4.6828)	(−0.9384)	(0.2426)	(−4.7148)	(−4.6477)	(−0.0935)	(−1.0079)	(−1.4453)	(−3.2584)	(0.5723)	(0.0841)
Loss	−0.0075*	−0.0024	−0.3236**	−0.1888	−0.0128**	−0.0064*	−0.4414***	−0.2702**	−0.0202**	−0.0065*	0.1266	−0.3393
	(−1.9426)	(−0.8162)	(−2.2314)	(−1.0702)	(−2.3788)	(−1.7592)	(−2.6360)	(−1.9650)	(−2.4787)	(−1.7986)	(0.3411)	(−1.1882)
Turnover	0.0419***	0.0195***	0.4616***	0.4010***	0.0384***	0.0444***	0.3882***	0.4871***	0.0314***	0.0209***	0.3550**	0.5103***
	(8.4391)	(6.2048)	(7.9658)	(5.2069)	(7.1008)	(9.7064)	(5.6085)	(8.5833)	(3.2902)	(4.3220)	(2.3008)	(4.9830)
Constant	0.0056	0.0479**	−0.5743	−1.8502	0.0886**	−0.0105	1.7607	−2.2042*	0.0975	0.0567**	5.0332*	−2.7523
	(0.1621)	(2.3021)	(−0.4695)	(−1.5890)	(2.4637)	(−0.4019)	(1.5041)	(−1.9100)	(1.4727)	(2.0216)	(1.7533)	(−1.5485)
Year&Ind&Prov	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	9725	13,180	9711	13,156	9419	13,384	9414	13,103	2152	5569	2077	5139
R^2/Pesudo R^2	0.110	0.075	0.111	0.151	0.089	0.101	0.0804	0.0917	0.114	0.076	0.118	0.147
P-value of Permutation Test	0.005***		0.220		0.114		0.066*		0.021**		0.246	

This table reports the moderating effect of managerial risk-seeking on the relationship between D&O insurance and acquisitions. We introduce four variables, including the EBITDA volatility (*Vol* (*EBITDA*)), the lottery sales per capita in firm's located province (*Gamble_Local*), and the lottery sales per capita in CEO's native province (*Gamble_CEO*) to reflect the level of managerial risk-seeking, and partition the full sample into two sub-samples based on the year-industry median of *Vol*(*EBITDA*), and the year median of *Gamble_Local* and *Gamble_CEO*. The dependent variable is proxied by two metrics, namely a dummy variable indicating whether the firm undertakes an acquisition in the year or not (*Acq Dummy*) and the total value of all takeover deals in the year scaled by the acquiring firm's total assets (*Deal Value*). *D&O Insured* equals 1 if a firm has purchased D&O insurance in the year, and 0 otherwise. Definitions of other variables are presented in Appendix A. T-statistics are given in parentheses with standard errors clustered at the firm level. ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively.

Table 10
Competitive hypotheses: the lawsuit threat effect.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Number of lawsuits				Major lawsuits					
	High	Low	High	Low	Yes	No	Yes	No		
Variables	*Deal Value*	*Deal Value*	*Acq Dummy*	*Acq Dummy*	*Deal Value*	*Deal Value*	*Acq Dummy*	*Acq Dummy*	*LawNum*	*MajLaw*
D&O Insured	−0.0091	−0.0076***	−0.2463	−0.2657**	−0.0091	−0.0076***	−0.2496	−0.2648**	0.2169	0.1908
	(−1.2995)	(−2.8638)	(−1.0983)	(−2.0461)	(−1.3038)	(−2.8625)	(−1.1138)	(−2.0385)	(1.5389)	(1.2661)
Size	0.0002	0.0001	0.0107	−0.0207	0.0002	0.0001	0.0095	−0.0203	0.0608**	−0.0230
	(0.0946)	(0.1710)	(0.1788)	(−0.6446)	(0.1179)	(0.1696)	(0.1600)	(−0.6301)	(2.2406)	(−0.6281)
Leverage	−0.0277**	−0.0387***	0.3868	−0.1907	−0.0278**	−0.0387***	0.3786	−0.1894	0.4770***	1.0918***
	(−2.0881)	(−6.8454)	(1.1587)	(−1.1047)	(−2.1097)	(−6.8315)	(1.1386)	(−1.0958)	(3.4124)	(5.5489)
Tobin's Q	−0.0089***	−0.0067***	−0.1502***	−0.1992***	−0.0089***	−0.0067***	−0.1512***	−0.1986***	0.0297*	0.0279
	(−5.0434)	(−8.2082)	(−2.8121)	(−6.6700)	(−5.0798)	(−8.1800)	(−2.8414)	(−6.6432)	(1.7136)	(1.0581)
Tangible	−0.0419***	−0.0290***	−1.0274***	−1.2376***	−0.0429***	−0.0289***	−1.0398***	−1.2339***	−0.3743**	−0.3512
	(−3.0396)	(−5.7765)	(−2.6101)	(−5.9991)	(−3.1458)	(−5.7419)	(−2.6554)	(−5.9701)	(−2.5644)	(−1.5814)
Soe	0.0316**	0.0275***	0.3804	0.5919***	0.0313**	0.0275***	0.3752	0.5911***	0.3262**	0.3526*
	(2.3205)	(6.0531)	(0.9895)	(3.2174)	(2.3067)	(6.0528)	(0.9778)	(3.2122)	(2.4482)	(1.7061)
Return	0.0266***	0.0189***	0.2671**	0.4001***	0.0266***	0.0189***	0.2670**	0.4000***	−0.0373*	−0.0399
	(4.2121)	(9.1853)	(2.4123)	(7.8835)	(4.2184)	(9.1823)	(2.4098)	(7.8797)	(−1.7078)	(−0.9953)
NO. Directors	−0.0023*	−0.0013***	−0.1419***	−0.0494***	−0.0023*	−0.0013***	−0.1441***	−0.0491***	−0.0088	−0.0167
	(−1.8570)	(−3.3090)	(−3.5858)	(−2.6187)	(−1.8719)	(−3.3029)	(−3.6487)	(−2.6007)	(−0.6413)	(−0.8274)
Indpt Director	−0.0602	−0.0065	−2.6437**	0.0086	−0.0620*	−0.0061	−2.6762**	0.0177	−0.4862	−0.6575
	(−1.6046)	(−0.4528)	(−2.2151)	(0.0157)	(−1.6745)	(−0.4248)	(−2.2594)	(0.0322)	(−1.2559)	(−1.0296)
Dual CEO	0.0049	0.0047**	0.1364	0.1784***	0.0047	0.0047**	0.1257	0.1808***	0.0112	−0.0153
	(0.9478)	(2.4246)	(1.1661)	(3.1463)	(0.9140)	(2.4378)	(1.0733)	(3.1865)	(0.2533)	(−0.2266)
Separate	0.0001	0.0000	0.0174**	−0.0007	0.0001	0.0000	0.0179**	−0.0008	−0.0034	−0.0050
	(0.2268)	(0.0525)	(2.4619)	(−0.1900)	(0.2023)	(0.0662)	(2.5255)	(−0.2321)	(−1.3495)	(−1.1326)
Top Share	−0.0006***	−0.0003***	−0.0093**	−0.0076***	−0.0006***	−0.0003***	−0.0091**	−0.0076***	−0.0017	−0.0040*
	(−4.0202)	(−5.9947)	(−2.3001)	(−3.9037)	(−3.9617)	(−6.0012)	(−2.2724)	(−3.9064)	(−1.0563)	(−1.6741)
Cash Flow	−0.0166	−0.0134	−1.2193*	−0.5505	−0.0174	−0.0133	−1.2733*	−0.5382	0.1477	−0.4777
	(−0.7401)	(−1.4029)	(−1.7913)	(−1.4732)	(−0.7812)	(−1.3924)	(−1.8734)	(−1.4394)	(0.6811)	(−1.4989)
Cash Level	0.0874***	0.0405***	0.8208**	0.6368***	0.0857***	0.0408***	0.7819*	0.6464***	0.1718	−0.1131
	(3.3816)	(4.7098)	(1.9841)	(3.3957)	(3.3461)	(4.7274)	(1.9009)	(3.4427)	(1.4587)	(−0.4789)
Age	−0.0095	0.0019	−0.5952***	−0.3856***	−0.0093	0.0019	−0.5912***	−0.3863***	0.1358**	0.5525***
	(−1.4060)	(0.8146)	(−3.4560)	(−4.4878)	(−1.3860)	(0.8089)	(−3.4367)	(−4.4850)	(2.2700)	(4.7460)
ROA	−0.0792**	−0.1128***	0.6572	−0.9106	−0.0811**	−0.1127***	0.6789	−0.9218	−3.4994***	−1.9836***
	(−2.3913)	(−6.1984)	(0.5873)	(−1.4751)	(−2.4528)	(−6.1896)	(0.6105)	(−1.4904)	(−6.8823)	(−4.3955)
Loss	−0.0045	−0.0082***	−0.4743**	−0.2652**	−0.0048	−0.0082***	−0.4573**	−0.2720**	0.1612**	0.2507***
	(−0.7073)	(−3.2751)	(−2.2220)	(−2.3535)	(−0.7642)	(−3.2543)	(−2.1527)	(−2.4083)	(2.3161)	(3.2964)
Turnover	0.0452***	0.0305***	0.5104***	0.4126***	0.0447***	0.0305***	0.5022***	0.4143***	0.0755*	0.0251
	(6.3422)	(10.4669)	(6.2270)	(8.8931)	(6.3151)	(10.4690)	(6.1533)	(8.9150)	(1.6573)	(0.4613)
Constant	0.0644	0.0256	−0.4444	−2.5797***	0.0647	0.0253	−0.3771	−2.5976***	−1.3043**	−2.9546***
	(1.3476)	(1.4463)	(−0.2957)	(−2.9839)	(1.3583)	(1.4318)	(−0.2513)	(−3.0041)	(−2.1803)	(−3.4819)
Year&Ind&Prov	Yes	Yes	Yes	*Yes*	Yes	Yes	Yes	Yes	Yes	Yes
N	4613	24,443	4613	24,437	4632	24,424	4632	24,418	29,056	27,568
R^2/Pesudo R^2	0.117	0.082	0.118	0.119	0.117	0.082	0.118	0.119	0.098	0.114
P-value of Permutation Test	0.433		0.477		0.437		0.474			

Columns (1)–(8) of Table 10 reports the results for the moderating effect of litigation threat on the relationship between D&O insurance and acquisitions. We choose the number of lawsuits (*LawNum*) and a dummy variable indicating whether there are major lawsuits (*MajLaw*) in the year to reflect the litigation threat against a firm, and partition the full sample into two sub-samples based on *MajLaw* and the year-industry median of *LawNum*. The dependent variable is proxied by two metrics, namely a dummy variable indicating whether the firm undertakes an acquisition in the year or not (*Acq Dummy*) and the total value of all takeover deals in the year scaled by the acquiring firm's total assets (*Deal Value*). *D&O Insured* equals 1 if a firm has purchased D&O insurance in the year, and 0 otherwise. Columns (9) and (10) of Table 10 reports the results for the direct impact of D&O insurance on litigation threat. Year, industry, and province fixed effects are included. Definitions of other variables are presented in Appendix A. T-statistics are given in parentheses with standard errors clustered at the firm level. ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively.

Table 11
Propensity score matching analysis to correct for selection bias in the relation between D&O insurance coverage and acquisitions.

Panel A: Univariate comparison of variables before and after Propensity Score Matching

	Before PSM				After PSM			
Variables	Treatment	Control	Difference	T-stat	Treatment	Control	Difference	T-stat
Size	23.1398	21.9234	1.2164	38.65***	23.1398	23.0763	0.0635	1.15
Leverage	0.5347	0.4412	0.0936	18.18***	0.5347	0.5261	0.0086	1.26
Tobin's Q	1.6550	1.9655	−0.3105	−9.87***	1.6550	1.6603	−0.0053	−0.14
Tangible	0.2604	0.2356	0.0248	5.65***	0.2604	0.2660	−0.0057	−0.81
Soe	0.1121	0.0973	0.0149	3.01***	0.1121	0.1229	−0.0107	−1.47
Return	0.1685	0.1986	−0.0301	−1.64*	0.1685	0.1765	−0.0080	−0.33
NO. Directors	9.3264	8.8106	0.5157	11.18***	9.3264	9.3627	−0.0363	−0.52
Indpt Director	0.3752	0.3686	0.0066	4.94***	0.3752	0.3731	0.0021	1.06
Dual CEO	0.1071	0.2270	−0.1198	−11.34***	0.1071	0.1133	−0.0062	−0.56
Separate	5.1827	5.0179	0.1648	0.83	5.1827	4.9599	0.2228	0.79
Top Share	38.2765	36.0163	2.2602	5.84***	38.2765	38.9977	−0.7211	−1.29
Cash Flow	0.0531	0.0453	0.0079	4.20***	0.0531	0.0541	−0.0010	−0.37
Cash Level	0.1415	0.1797	−0.0383	−10.36***	0.1415	0.1416	−0.0001	−0.03
Age	2.8847	2.7039	0.1808	18.04***	2.8847	2.8669	0.0178	1.45
ROA	0.0311	0.0361	−0.0049	−3.11***	0.0311	0.0303	0.0008	0.38
Loss	0.0954	0.0945	0.0009	0.13	0.0954	0.0967	−0.0012	−0.12
Turnover	0.7718	0.7520	0.0198	1.34	0.7718	0.7593	0.0126	0.54

Panel B: Multivariate analysis based on PSM samples

	(1)	(2)	(3)	(4)
Variables	*Deal Value*	*Acq Dummy*	*Large Deal Value*	*Acq Num*
D&O Insured	−0.0078**	−0.3569***	−0.0070**	−0.0413***
	(−2.3937)	(−2.7773)	(−2.4427)	(−2.9685)
Size	−0.0039**	−0.1849***	−0.0032**	−0.0205***
	(−2.4775)	(−2.7396)	(−2.3774)	(−2.8458)
Leverage	−0.0206	0.2723	−0.0183	0.0347
	(−1.5644)	(0.6039)	(−1.5761)	(0.7253)
Tobin's Q	−0.0086***	−0.2279***	−0.0074***	−0.0261***
	(−4.7984)	(−2.9298)	(−4.6671)	(−3.8374)
Tangible	−0.0003	−1.0383**	−0.0005	−0.0760*
	(−0.0262)	(−2.2241)	(−0.0532)	(−1.7552)
Soe	0.0368***	0.8558**	0.0325***	0.0765*
	(3.1231)	(2.1543)	(3.1085)	(1.8932)
Return	0.0129**	0.3044**	0.0115**	0.0276
	(2.3035)	(2.0772)	(2.3283)	(1.5768)
NO. Directors	−0.0016*	−0.0451	−0.0016**	−0.0084**
	(−1.8901)	(−1.1444)	(−2.0337)	(−2.1567)
Indpt Director	0.0053	1.3369	−0.0089	0.1302
	(0.1539)	(1.1318)	(−0.3136)	(0.8735)
Dual CEO	−0.0028	0.1021	−0.0024	0.0078
	(−0.5454)	(0.5499)	(−0.5366)	(0.3141)
Separate	0.0000	0.0118	−0.0000	0.0006
	(0.1687)	(1.4464)	(−0.0666)	(0.6847)
Top Share	−0.0003***	−0.0120**	−0.0003***	−0.0010**
	(−2.6019)	(−2.2937)	(−2.6457)	(−2.0171)
Cash Flow	0.0174	−1.1903	0.0161	−0.1350
	(0.6464)	(−1.1867)	(0.6828)	(−1.2190)
Cash Level	0.0965***	1.6378***	0.0820***	0.1945**
	(3.2150)	(2.6885)	(3.1467)	(2.5469)
Age	−0.0029	−0.1792	−0.0042	−0.0286
	(−0.3909)	(−0.6946)	(−0.6336)	(−1.0050)
ROA	−0.0829**	1.8827	−0.0715**	0.1399
	(−2.2089)	(1.1886)	(−2.1356)	(0.8135)
Loss	−0.0082	0.1658	−0.0066	0.0030
	(−1.6428)	(0.6056)	(−1.4430)	(0.1157)
Turnover	0.0283***	0.4016***	0.0243***	0.0533***
	(3.9063)	(3.8752)	(3.8855)	(3.5928)
Constant	0.0680	0.2101	0.0674*	0.5157***
	(1.6368)	(0.1100)	(1.8450)	(2.7667)
Year&Ind&Prov	Yes	Yes	Yes	Yes
N	3248	3220	3248	3248
R^2/Pesudo R^2	0.100	0.101	0.098	0.067

This table presents results from propensity score analysis where firms whose managers are covered with D&O insurance (treatment group) are compared to uncovered firms (control group). Probit models are used to compute propensity scores (probability of D&O insurance coverage) to match treatment and control firms. All variables are defined in Appendix A. Based on the estimated propensity scores for the treatment and control samples, we use nearest-neighbor (NN) matching with replacement to implement one-to-one matching of treatment and control samples. We allow for replacement because a control firm can be the best match for more than one treatment firm. In Panel A we compare the means of the covariates for the treatment group to those of the one-to-one matched control group before and after PSM. Panel B reports results of multivariate regression of acquisition variables on D&O insurance, using the pooled treatment and control observations. Year, industry, and province fixed effects are included. Definitions of other variables are presented in Appendix A. T-statistics are given in parentheses with standard errors clustered at the firm level. ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively.

$\widehat{D\&O\ Insured}$ and use it as the key test variable in the second stage of acquisition determination. In the columns of (2)–(5), the coefficients of $\widehat{D\&O\ Insured}$ remain negative and significant at the 5% or 10% level. Hence, the findings in Table 2 stay robust after accounting for the endogeneity issue of reverse causality.

6.4. Removing the non-acquiring firms

In columns (1) and (3) of Table 2, we examine the impact of D&O insurance on the deal sizes of the acquisitions (*Deal Value* or *Large Deal Value*) with both acquiring firms and non-acquiring firms. However, it is necessary to restrict our sample to only acquiring firms, so that the relationship between the insurance and deal value is not affected by those non-acquiring firms. The regression results are presented in Table 13. Consistent with our main regressions, the coefficients of *D&O Insured* with *Deal Value* and *Large Deal Value* are still significantly negative.

7. Conclusion

This paper examines the role of D&O insurance in firms' acquisition decisions. Studying the Chinese market, we find that firms with managers covered by D&O insurance are less likely to engage in value-destroying acquisitions, and if these firms do, the deal sizes and the number of the deals are significantly lower, compared to firms with uncovered managers. This acquisition deterrence effect is especially pronounced among firms with better insurance environment, weaker corporate governance, or more serious managerial moral hazard. Moreover, with their managers covered by D&O insurance, the acquiring firms experience lower bid premium, better market performance, and better operating performance ex-post. Put together, D&O insurance plays an active and effective role in terms of monitoring corporate managers and preventing them from empire-building activities.

Moreover, we explain the monitoring effect of D&O insurance from a behavioral standpoint. The literature has established that managers with cognitive biases (e.g., risk-seeking, overconfidence, etc.) are more likely to make poor corporate decisions. In our study, the managers with overconfident mentality are much less likely to engage in empire-building acquisitions, when they are insured by D&O insurance. Likewise, Chinese managers with risk-loving backgrounds are less likely to engage in poor acquisitions, only when they are under the watch of D&O insurers. It is obvious that D&O insurers refrain managers from making decisions driven by irrationality.

Our paper sheds a light on the literature on several fronts. First, we expand the knowledge of agency problem in acquisitions. While an overwhelming number of studies suggest that D&O insurance induces managers' moral hazard, we offer novel and differing evidence to the debate on the role of D&O insurance. In particular, we show that the monitoring effect of D&O insurance on managers is robust and hence prevents them from making poor acquisition decisions. Second, this paper is related to the large body of literature on corporate governance and provides a new angle of view by looking at the Chinese firms, where the D&O insurance business is more connected to the interest of shareholders than that of managers. Furthermore, this paper sheds a new light on the emerging literature focusing on how behavioral traits of managers could affect corporate investment policies. We show that for firms with overconfident or risk-seeking managers, the monitoring effect of D&O insurers is stronger. Overall, D&O insurance monitors the managers with moral hazard and prevents them from making irrational decisions.

CRediT authorship contribution statement

Qingbin Meng: Conceptualization, Supervision, Validation. **Ziya Zhong:** Data curation, Software, Methodology, Formal analysis, Writing – original draft. **Xinyu Li:** Project administration, Writing – original draft, Writing – review & editing, Funding acquisition. **Song Wang:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing, Supervision.

Table 12
Instrumental variable estimation to alleviate endogeneity in the relation between D&O insurance coverage and acquisitions.

	(1)	(2)	(3)	(4)	(5)
	First Stage	Second Stage			
Variables	*D&O Insured*	*Deal Value*	*Acq Dummy*	*Large Deal Value*	*Acq Num*
Ave Insu Time	0.0741***				
	(4.2099)				
$\widehat{D\&O\ Insured}$		−0.1151**	−0.2631*	−0.0989**	−0.3162*
		(−2.2608)	(−1.7177)	(−2.2229)	(−1.6444)
Size	0.0390***	0.0045**	0.0082	0.0037*	0.0098
	(7.4330)	(2.0236)	(1.2543)	(1.8972)	(1.2104)
Leverage	0.0097	−0.0354***	−0.0036	−0.0298***	0.0166
	(0.4081)	(−5.9364)	(−0.2385)	(−5.7669)	(0.8601)
Tobin's Q	0.0090***	−0.0062***	−0.0155***	−0.0053***	−0.0174***
	(3.6762)	(−7.0454)	(−5.9661)	(−6.9348)	(−5.1464)
Tangible	0.0043	−0.0297***	−0.0842***	−0.0256***	−0.1078***
	(0.1471)	(−5.0928)	(−5.3496)	(−5.0643)	(−5.4375)
Soe	0.0146	0.0290***	0.0429***	0.0247***	0.0413***
	(0.8027)	(6.0565)	(3.4572)	(5.9125)	(2.7428)
Return	−0.0043*	0.0195***	0.0342***	0.0162***	0.0410***
	(−1.7000)	(9.8043)	(7.5836)	(9.6391)	(7.1476)
NO. Directors	0.0025	−0.0012**	−0.0052***	−0.0010**	−0.0067***
	(1.1201)	(−2.4918)	(−3.6181)	(−2.4095)	(−3.7666)
Indpt Director	0.1345**	−0.0026	0.0022	−0.0028	0.0014
	(2.0988)	(−0.1612)	(0.0442)	(−0.1985)	(0.0217)
Dual CEO	−0.0164***	0.0029	0.0158**	0.0026	0.0224***
	(−3.1320)	(1.3836)	(2.4236)	(1.4385)	(2.6314)
Separate	−0.0001	0.0000	0.0001	0.0000	0.0001
	(−0.1490)	(0.1139)	(0.3957)	(0.1004)	(0.2970)
Top Share	−0.0001	−0.0004***	−0.0008***	−0.0003***	−0.0010***
	(−0.5493)	(−6.2024)	(−4.7676)	(−5.9255)	(−4.4828)
Cash Flow	0.0478*	−0.0096	−0.0588**	−0.0080	−0.0624
	(1.7125)	(−1.0044)	(−1.9844)	(−0.9646)	(−1.6383)
Cash Level	0.0111	0.0494***	0.0652***	0.0416***	0.0778***
	(0.5373)	(5.6297)	(3.3478)	(5.4820)	(3.1594)
Age	0.0530***	0.0063*	−0.0248**	0.0052	−0.0363**
	(4.5940)	(1.7337)	(−2.1734)	(1.6289)	(−2.4843)
ROA	−0.1544***	−0.1205***	−0.0835	−0.1040***	−0.0677
	(−3.4313)	(−6.3501)	(−1.5643)	(−6.2284)	(−0.9794)
Loss	−0.0061	−0.0084***	−0.0260***	−0.0074***	−0.0356***
	(−0.8562)	(−3.3236)	(−3.3931)	(−3.3161)	(−3.8533)
Turnover	−0.0036	0.0325***	0.0437***	0.0281***	0.0481***
	(−0.4771)	(11.4420)	(8.4759)	(11.4324)	(7.6339)
Constant	−1.0110***	−0.0804	−0.0219	−0.0653	−0.0118
	(−8.4393)	(−1.4441)	(−0.1312)	(−1.3432)	(−0.0569)
Year&Ind&Prov	Yes	Yes	Yes	Yes	Yes
N	29,056	29,056	29,056	29,056	29,056
Underidentification test		15.70	15.70	15.70	15.70
p-value		7.41e-05	7.41e-05	7.41e-05	7.41e-05
Weak identification test		17.72	17.72	17.72	17.72
R^2	0.093	0.036	0.045	0.035	0.044

This table reports the results for the instrumental variable estimation for the impact of D&O insurance on acquisitions. We use the average number of years that listed firms in the same "industry-year" have purchased D&O insurance (*Ave Insu Time*) as an instrumental variable of *D&O Insured*. A firm's acquisition decision is proxied by four metrics, namely a dummy variable indicating whether the firm undertakes an acquisition in the year or not (*Acq Dummy*), the total value of all takeover deals in the year scaled by the acquiring firm's total assets (*Deal Value*), the value of the largest takeover deal in the year scaled by the acquiring firm's total assets (*Large Deal Value*) and the number of takeover deals for the firm in the year (*Acq Num*). *D&O Insured* equals 1 if a firm has purchased D&O insurance in the year, and 0 otherwise. Year, industry, and province fixed effects are included. Definitions of other variables are presented in Appendix A. T-statistics are given in parentheses with standard errors clustered at the firm level. ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively.

Table 13
The impact of D&O insurance on the deal sizes of acquiring firms.

	(1)	(2)
Variables	*Deal Value*	*Large Deal Value*
D&O Insured	−0.0377**	−0.0324*
	(−1.9805)	(−1.9288)
Size	−0.0037	−0.0054
	(−0.7345)	(−1.2016)
Leverage	−0.2786***	−0.2356***
	(−8.5801)	(−8.2590)
Tobin's Q	−0.0261***	−0.0221***
	(−5.4004)	(−5.2406)
Tangible	−0.1990***	−0.1702***
	(−5.6008)	(−5.3950)
Soe	0.2041***	0.1766***
	(5.1600)	(5.0300)
Return	0.0874***	0.0702***
	(8.4164)	(7.8998)
NO. Directors	−0.0022	−0.0012
	(−0.7526)	(−0.4754)
Indpt Director	−0.0873	−0.0837
	(−1.0089)	(−1.1170)
Dual CEO	0.0047	0.0046
	(0.4999)	(0.5678)
Separate	−0.0006	−0.0006
	(−1.1043)	(−1.1322)
Top Share	−0.0010***	−0.0008***
	(−3.2642)	(−2.7921)
Cash Flow	0.0747	0.0666
	(1.1142)	(1.1389)
Cash Level	0.1739***	0.1411***
	(5.1560)	(4.7573)
Age	0.0287**	0.0241**
	(2.2158)	(2.0883)
ROA	−0.5439***	−0.4844***
	(−4.9440)	(−5.1040)
Loss	−0.0091	−0.0084
	(−0.4250)	(−0.4562)
Turnover	0.1315***	0.1136***
	(13.7891)	(13.7321)
Constant	0.3301***	0.3422***
	(2.5835)	(2.9398)
Year&Ind&Prov	Yes	Yes
N	3201	3201
R^2/Pesudo R^2	0.285	0.273

This table reports the impact of D&O insurance on the deal sizes of the acquisitions with the testing sample as the acquiring firms only. The dependent variables include the total value of all takeover deals in the year scaled by the acquiring firm's total assets (*Deal Value*), and the value of the largest takeover deal in the year scaled by the acquiring firm's total assets (*Large Deal Value*). *D&O Insured* equals 1 if a firm has purchased D&O insurance in the year, and 0 otherwise. Year, industry and province fixed effects are included. Definitions of other variables are presented in Appendix A. T-statistics are given in parentheses with standard errors clustered at the firm level. ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively.

Appendix A. Variable definitions

Variable name	Variable definition
Deal Value	The total value of all deals for the same acquiring firm in the year scaled by the firm's total assets. If no acquisition takes place, it equals 0.
Acq Dummy	Equals 1 if the firm undertakes acquisition(s) in the year, and 0 otherwise
Large Deal Value	The value of the largest takeover deal in the year scaled by the acquiring firm's total assets
Acq Num	The number of acquisitions undertaken by the firm in the year
$CAR[t_1, t_2]$	The cumulative abnormal return in the event window $[t_1, t_2]$ calculated by the market model, where $t = 0$ is the acquisition announcement date
BHAR[*T*]	The T-year buy-and-hold return of a firm after its acquisition minus the buy-and-hold return of Chinese market (all A-share stocks) in the same years
BidPremium1	The deal value minus net asset book value of the target firm, scaled by the net asset book value
BidPremium2	The deal value minus net asset appraisal value of the target firm, scaled by the net asset appraisal value
ΔROA	The abnormal change in return on total asset calculated by the method of Chen et al. (2007)
ΔROE	The abnormal change in return on equity calculated by the method of Chen et al. (2007)
ΔTurnover	The abnormal change in asset turnover calculated by the method of Chen et al. (2007)
GW Impair	The three-year-average industry-adjusted goodwill impairments following an acquisition. Each year's goodwill impairments variable is standardized by the total assets in the previous year.
D&O Insured	Equals 1 if the company's managers are covered by Directors' and Officers' Liability Insurance
InsuPrem	The insurance premium per capita in a firm's located province
InsuNum	The number of insurance companies in a firm's located province
Insu Time	The number of years a firm has purchased D&O insurance
Tenure	The number of years the CEO serving the firm
OverEstimate	Equals 1 if the estimated net profit is higher than the actual net profit while 0 otherwise
Rel Comp	The sum of top three executives' annual salaries divided by the sum of all executives' annual salaries
△CEO shr	Equals 1 if the difference between CEO shareholding ratio in years *t* and *t*-1 is positive, and the buy-and-hold abnormal return in the next two years is negative
Vol(EBITDA)	The standard deviation of *EBITDA* to total assets in the past five years
Gamble_Local	The lottery sales per capita in company's located province
Gamble_CEO	The lottery sales per capita in CEO's native province
Size	The natural logarithm of total assets
Leverage	Total liabilities scaled by total assets
Tobin's Q	The market value of a company divided by its assets' replacement cost
Tangible	Fixed assets scaled by total assets
Soe	State equity ownership scaled by total shares outstanding
Return	Stock return of the year including dividends
NO. Director	Number of board members
Indpt Director	The ratio of independent directors in the board
Dual CEO	Equals 1 if the CEO is the firm's chairperson at the same time, and 0 otherwise
Separate	Ultimate controlling right minus cash claim right
Top Share	The ownership percentage of the largest shareholder
Cash Flow	Operating cash flows divided by total assets
Cash Level	Cash and equivalents divided by total assets
Age	The natural logarithm of the current year minus IPO year
ROA	Return on Assets
Loss	Equals 1 if net profit is negative, and 0 otherwise
Turnover	Revenue divided by total assets
Deal Size	The value the deal scaled by the firm's total assets.
Cash Payment	Equals 1 if the deal is paid by cash, and 0 otherwise
Stock Payment	Equals 1 if the deal is paid by stock, and 0 otherwise
Related Deal	Equals 1 if the deal is related transaction, and 0 otherwise
Major Deal	Equals 1 if the deal involves major assets restructuring, and 0 otherwise

Appendix B. The effect on D&O insurance on acquisitions by value effect

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Value-enhancing acquisitions								Value-destroying acquisitions							
	CAR[0, 1] ≥ 0				*BHAR*[1] ≥ 0				*CAR*[0, 1] < 0				*BHAR*[1] < 0			
Variables	*Deal Value*	*Acq Dummy*	*Large Deal Value*	*Acq Num*	*Deal Value*	*Acq Dummy*	*Large Deal Value*	*Acq Num*	*Deal Value*	*Acq Dummy*	*Large Deal Value*	*Acq Num*	*Deal Value*	*Acq Dummy*	*Large Deal Value*	*Acq Num*
D&O Insured	−0.0004	−0.1237	−0.0004	−0.0045	−0.0015*	−0.1815	−0.0012	−0.0113*	−0.0005**	−0.4957***	−0.0005**	−0.0165***	−0.0030**	−0.2569**	−0.0028**	−0.0185**
	(−1.1306)	(−0.7863)	(−1.1344)	(−0.6392)	(−1.7820)	(−1.1164)	(−1.6107)	(−1.7721)	(−2.4785)	(−2.8920)	(−2.3229)	(−3.6439)	(−2.2525)	(−1.9823)	(−2.5132)	(−2.3692)
Size	−0.0005***	−0.0295	−0.0004***	−0.0016	−0.0008***	−0.0968**	−0.0007***	−0.0040**	−0.0002***	−0.0329	−0.0002***	−0.0012	0.0005	0.0687**	0.0004	0.0036
	(−4.2710)	(−0.7573)	(−4.3676)	(−0.8705)	(−3.1600)	(−2.4977)	(−3.3617)	(−2.1220)	(−2.9239)	(−0.8017)	(−2.9220)	(−0.7341)	(1.4841)	(2.0415)	(1.2109)	(1.6111)
Leverage	0.0013*	0.4992**	0.0011*	0.0278***	−0.0029*	0.3863*	−0.0027*	0.0254**	0.0009**	0.6154***	0.0008**	0.0229***	−0.0139***	−0.3033	−0.0115***	−0.0145
	(1.7909)	(2.2650)	(1.7107)	(2.8662)	(−1.8144)	(1.7829)	(−1.8947)	(2.4721)	(2.3416)	(2.7028)	(2.2172)	(2.6400)	(−5.4222)	(−1.6252)	(−5.1536)	(−1.1341)
Tobin's Q	−0.0004***	−0.1049***	−0.0004***	−0.0053***	−0.0018***	−0.2183***	−0.0016***	−0.0104***	−0.0001*	−0.0863**	−0.0001*	−0.0029*	−0.0023***	−0.1370***	−0.0019***	−0.0090***
	(−3.5621)	(−3.0986)	(−3.4421)	(−3.4708)	(−6.2519)	(−5.9416)	(−6.0969)	(−5.4240)	(−1.8642)	(−2.3003)	(−1.9274)	(−1.9415)	(−6.9289)	(−4.4214)	(−6.6594)	(−5.0485)
Tangible	−0.0005	−0.5370**	−0.0004	−0.0171*	−0.0043***	−0.8943***	−0.0036**	−0.0341***	−0.0010**	−0.7640***	−0.0010***	−0.0264***	−0.0164***	−1.2480***	−0.0141***	−0.0723***
	(−0.7487)	(−2.1632)	(−0.6324)	(−1.7331)	(−2.6893)	(−3.5571)	(−2.5551)	(−3.2233)	(−2.5035)	(−2.6815)	(−2.6530)	(−2.8864)	(−7.1261)	(−5.5582)	(−6.9842)	(−5.8519)
Soe	0.0014**	0.1557	0.0012**	0.0023	0.0034**	0.1473	0.0030**	0.0032	0.0001	−0.0906	0.0001	0.0007	0.0138***	0.7558***	0.0118***	0.0342***
	(2.3514)	(0.6286)	(2.1145)	(0.2887)	(2.4942)	(0.6438)	(2.4848)	(0.3910)	(0.2059)	(−0.3428)	(0.1979)	(0.0971)	(6.3954)	(3.6431)	(6.2838)	(3.2823)
Return	0.0012***	0.1471**	0.0010***	0.0083***	0.0076***	0.6485***	0.0068***	0.0460***	0.0003*	0.1616**	0.0003*	0.0056*	0.0024***	−0.0967	0.0020***	−0.0076**
	(4.1248)	(2.3163)	(4.0137)	(2.6869)	(10.3151)	(12.0340)	(10.2382)	(10.8306)	(1.8101)	(2.1554)	(1.8059)	(1.8863)	(2.8433)	(−1.3313)	(2.6857)	(−2.1255)
NO. Directors	−0.0001	−0.0590**	−0.0001	−0.0028***	−0.0003**	−0.0347	−0.0002**	−0.0024***	−0.0001**	−0.0542**	−0.0001**	−0.0020***	−0.0006***	−0.0783***	−0.0005***	−0.0049***
	(−1.6241)	(−2.4562)	(−1.5127)	(−3.3161)	(−2.2990)	(−1.5104)	(−2.2210)	(−2.6963)	(−2.1576)	(−2.3078)	(−2.1423)	(−2.6503)	(−2.8971)	(−3.7199)	(−2.7516)	(−4.4211)
Indpt Director	−0.0030	−1.1791	−0.0026	−0.0462	−0.0038	−0.5347	−0.0029	−0.0227	−0.0010	−0.0664	−0.0009	0.0044	−0.0067	−0.7025	−0.0059	−0.0177
	(−1.4083)	(−1.6342)	(−1.3601)	(−1.4752)	(−0.8047)	(−0.7641)	(−0.6826)	(−0.6618)	(−0.7541)	(−0.0911)	(−0.6782)	(0.1544)	(−0.9764)	(−1.1344)	(−0.9902)	(−0.4514)
Dual CEO	0.0007**	0.2706***	0.0007**	0.0167***	0.0011*	0.1205*	0.0010*	0.0119**	0.0001	0.0070	0.0001	0.0010	0.0022**	0.1883***	0.0021**	0.0147***
	(2.3571)	(3.7334)	(2.4642)	(3.8588)	(1.6839)	(1.6932)	(1.7673)	(2.5720)	(0.5889)	(0.0826)	(0.6475)	(0.2440)	(2.4228)	(3.1750)	(2.5691)	(2.8694)
Separate	−0.0000	0.0009	−0.0000	−0.0000	−0.0000	0.0010	−0.0000	−0.0001	−0.0000	−0.0023	−0.0000	−0.0001	0.0000	0.0031	0.0000	0.0002
	(−0.9158)	(0.2093)	(−0.8940)	(−0.1736)	(−0.5098)	(0.2408)	(−0.5269)	(−0.2565)	(−0.4265)	(−0.4713)	(−0.5973)	(−0.7987)	(0.7002)	(0.8163)	(0.5602)	(0.7207)
Top Share	−0.0000***	−0.0049*	−0.0000***	−0.0003**	−0.0001***	−0.0024	−0.0000***	−0.0002*	−0.0000	−0.0020	−0.0000	−0.0002	−0.0002***	−0.0110***	−0.0002***	−0.0007***
	(−3.5896)	(−1.9061)	(−3.4854)	(−2.0795)	(−3.4191)	(−1.0278)	(−3.1830)	(−1.7324)	(−1.4314)	(−0.7384)	(−1.5477)	(−1.5304)	(−7.4166)	(−5.1791)	(−7.3407)	(−5.1342)
Cash Flow	−0.0010	−0.6386	−0.0010	−0.0288	−0.0020	−0.0471	−0.0021	0.0112	0.0005	−0.7708	0.0005	−0.0190	−0.0074*	−1.1262***	−0.0072*	−0.0809***
	(−0.6988)	(−1.3656)	(−0.7969)	(−1.5102)	(−0.6848)	(−0.1050)	(−0.7727)	(0.5154)	(0.4761)	(−1.4568)	(0.5059)	(−0.9745)	(−1.6722)	(−2.7237)	(−1.8545)	(−3.0881)
Cash Level	0.0046***	0.7173***	0.0041***	0.0405***	0.0101***	0.7622***	0.0086***	0.0582***	0.0018***	0.3764	0.0015***	0.0158	0.0092**	0.3608*	0.0077**	0.0080
	(4.1365)	(3.0375)	(4.0135)	(2.9442)	(3.8230)	(3.2670)	(3.6467)	(3.6602)	(2.9333)	(1.4612)	(2.6892)	(1.3511)	(2.3929)	(1.7131)	(2.2980)	(0.5013)
Age	−0.0011***	−0.4949***	−0.0010***	−0.0244***	−0.0016**	−0.4432***	−0.0013*	−0.0254***	−0.0005**	−0.3977***	−0.0004**	−0.0191***	−0.0006	−0.3683***	−0.0006	−0.0250***
	(−2.9739)	(−4.6367)	(−2.9779)	(−4.2470)	(−1.9958)	(−4.4250)	(−1.8653)	(−4.0306)	(−2.0379)	(−3.5255)	(−1.9768)	(−3.6464)	(−0.5187)	(−4.0324)	(−0.6728)	(−3.7374)
ROA	0.0019	1.4804*	0.0020	0.0627**	−0.0039	1.8863**	−0.0035	0.0432	0.0017	1.8354**	0.0015	0.0645**	−0.0383***	−0.6096	−0.0333***	−0.0383
	(0.8820)	(1.7595)	(0.9958)	(2.1224)	(−0.8873)	(2.5083)	(−0.8772)	(1.4586)	(1.0806)	(1.9614)	(1.0683)	(2.0519)	(−4.6407)	(−0.9636)	(−4.6046)	(−0.8034)
Loss	−0.0006	−0.3190**	−0.0005	−0.0118**	−0.0013	−0.3436**	−0.0012	−0.0145***	−0.0002	−0.0841	−0.0002	−0.0035	−0.0035***	−0.2344*	−0.0031***	−0.0154**
	(−1.5846)	(−2.1597)	(−1.4718)	(−2.4503)	(−1.5922)	(−2.1591)	(−1.6037)	(−2.8512)	(−0.7903)	(−0.5576)	(−0.7615)	(−0.7137)	(−2.7508)	(−1.8812)	(−2.8022)	(−2.2201)
Turnover	0.0014***	0.2043***	0.0013***	0.0106***	0.0059***	0.3493***	0.0053***	0.0187***	0.0005***	0.1395**	0.0004***	0.0042	0.0101***	0.3712***	0.0088***	0.0275***
	(5.0505)	(3.6924)	(4.9746)	(3.3320)	(7.6405)	(6.3912)	(7.6187)	(5.1611)	(3.1015)	(2.2181)	(3.1042)	(1.5595)	(8.7532)	(7.8831)	(8.7346)	(6.5767)
Constant	0.0132***	−3.6039***	0.0123***	0.1193***	0.0267***	−1.7882*	0.0243***	0.1713***	0.0067***	−2.5610**	0.0063***	0.1057***	0.0065	−4.5407***	0.0073	0.0868*
	(5.3025)	(−3.2105)	(5.3746)	(3.0540)	(4.7697)	(−1.7404)	(4.8077)	(4.0553)	(4.0050)	(−2.4329)	(4.0344)	(2.8215)	(0.8231)	(−4.6572)	(1.0586)	(1.7612)
Year&Ind&Prov	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	29,056	29,056	29,056	29,056	29,056	29,048	29,056	29,056	29,056	28,916	29,056	29,056	29,056	29,056	29,056	29,056
R^2/Pesudo R^2	0.023	0.0715	0.022	0.023	0.046	0.114	0.045	0.043	0.012	0.0580	0.012	0.017	0.052	0.120	0.052	0.055

This table reports the impact of D&O insurance on acquisition decisions for samples segmented based on the value effect of acquisitions. The value-destroying (value-enhancing) acquisitions are defined as the ones with negative (positive) cumulative abnormal stock return upon acquisition announcement (*CAR*[0, 1]) or negative (positive) buy-and-hold abnormal return within 1 year after the acquisition (*BHAR*[1]). The dependent variables include the total value of all takeover deals in the year scaled by the acquiring firm's total assets (*Deal Value*), the dummy variable indicating whether the firm undertakes an acquisition in the year or not (*Acq Dummy*), the value of the largest takeover deal in the year scaled by the acquiring firm's total assets (*Large Deal Value*) and the number of takeover deals for the firm in the year (*Acq Num*). *D&O Insured* equals 1 if a firm has purchased D&O insurance in the year, and 0 otherwise. Year, industry and province fixed effects are included. Definitions of other variables are presented in Appendix A. T-statistics are given in parentheses with standard errors clustered at the firm level. ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively.

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