

Removing Vacant Chairs: Does Independent Directors' Attendance at Board Meetings Matter?

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Received: 10 February 2014 / Accepted: 14 September 2014 / Published online: 23 September 2014
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Abstract In this paper we investigate whether independent directors' attendance at board meetings enhances investor protection using a difference-in-difference approach. We find that independent directors' attendance alleviates tunneling. This effect is more pronounced in non-state-owned enterprises (non-SOEs) than in state-owned enterprises. The reinforcement of external supervision substitutes for the role of independent directors' attendance and this substitution effect is more significant in non-SOEs. Together, these results imply that independent directors' attendance at board meetings can play an important role in protecting investors, especially in non-SOEs and when external supervision is weak. This paper sheds new light on independent directors' function in corporate governance, and has implications for institutional improvements.

Keywords China · Corporate governance · Independent directors · Investor protection

Introduction

The effectiveness of independent directors in corporate governance has long been discussed and disputed.

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Regulatory authorities have high expectations on independent directors. One of the most salient features of the Sarbanes–Oxley Act, issued after a series of accounting scandals, is the highlighting of independent directors' role in the boards and audit committees. However, researchers and scholars have not reached a consensus on whether independent directors always fulfill their duties as expected.

Fama and Jensen (1983) argue that independent directors, as an outside party, can safeguard the interests of shareholders. However, Mace (1986) contradicts this view, pointing out that the appointing and sourcing of independent directors largely depend on managers, which makes independent directors “rubber stamps” and limits their power in corporate governance. The debate over the effectiveness of independent directors continues, and the results of studies on this issue are mixed. Existing literature mostly focuses on how board composition and independent directors' personal characteristics influence corporate governance, and the majority finds a positive relationship. Specifically, Rosenstein and Wyatt (1990) find an abnormal increase in firm value when an additional independent director is appointed. Brickley et al. (1994) and Peng (2004) also find a positive relationship between the proportion of independent directors and firm performance. However, there is also a large body of literature that reports inconsistent evidence regarding the effectiveness of appointing independent directors. For example, Yermack (1996) finds an inverse relationship between the percentage of independent directors on a board and the value of a firm. Bhagat and Black (2002) also challenge the conventional belief with their findings that firms with more independent boards do not perform better than others. Yet the effectiveness of independent directors in corporate governance still remains unclear.

A potential reason that previous studies disagree is that they ignore an important issue underpinning the independent director system: independent directors can hardly exercise their rights and execute their duties if they are not present at board meetings. Attendance at board meetings not only reflects independent directors' diligence in performing their work, but also affects their participation in corporate governance directly. Independent directors' power relies to a great extent on their voting rights. Given that most of the votes on firm decisions are held at board meetings, there is no way to guarantee that independent directors can express their opinions completely and accurately if they do not attend these meetings. Board meetings are also important sources of information for independent directors. They provide directors with opportunities to communicate with each other on various issues that affect the firm. Therefore, independent directors' power in corporate governance is significantly constrained when they do not attend board meetings, even if they have impressive credentials and comprise a majority of the board. In fact, the regulatory authorities of many countries, including the United States and China, require independent directors to attend board meetings.

The significance of independent directors is also affected by the potential for improvement in corporate governance; another factor that has been overlooked by the literature. Leaving out the function of independent directors, the severity of corporate governance problems can vary greatly among companies. Given the level of diligence they can apply, and the limited time they are able to devote to the company, independent directors are more likely to become aware of more serious, larger deficiencies in corporate governance, rather than smaller ones. Therefore, the effect of independent directors' attendance should be more significant when the corporate governance problem is more severe.

This paper sheds light on the role of independent directors in corporate governance by exploring how their attendance at board meetings affects a widespread form of corporate abuse: that of controlling shareholders siphoning funds from listed companies (i.e., tunneling). The paper also studies the circumstances under which the effect of independent directors' attendance is more significant. The Chinese market is well-suited for examining this issue for at least three reasons. Firstly, the China Securities Regulatory Commission (CSRC) requires Chinese listed companies to disclose the attendance of all independent directors at board meetings, which provides us with a unique dataset to analyze.

Secondly, Chinese listed firms are characterized by having a dominant shareholder (Xu 2004). Tunneling has become a severe problem in Chinese companies over the past decade, and is greatly impairing investors' interests (Jiang et al. 2010). Chinese regulatory authorities expect that independent directors can effectively develop their

supervisory function in preventing minority shareholder expropriation. To protect minority shareholders is viewed as one of the most essential purposes that Chinese policy makers establish an independent director system. The role of independent directors in monitoring the extraction of funds from listed companies by controlling shareholders is particularly emphasized. For example, the CSRC requires independent directors to issue independent opinions on "shareholders, actual controller, and their affiliates' borrowed loans or other fund transfers from listed companies if the amount is over 3 million RMB or 5 % of the firms' audited net assets, and whether listed companies have taken effective measures to collect these debts." This enables us to find a straightforward channel through which independent directors can play the governance role.

Finally, the unique context of China provides us with an effective method to address endogeneity. China's unique property rights system divides listed companies into state-owned enterprises (SOEs) and non-state-owned enterprises (non-SOEs). Compared to those of non-SOEs, the controlling shareholders of SOEs have less incentive to siphon funds from the firm. If we find that the attendance of independent directors in SOEs and non-SOEs produces different effects, we can conclude that the differences are due to independent directors' attendance rather than other firm fundamentals. Meanwhile, the State Council of China released *the Notice of the State Council on Approving and Forwarding CSRC's Opinions on Improving Quality of Listed Companies* on October 19, 2005. This declaration significantly enhances the supervision over controlling shareholders and actual controllers on tunneling in China, which has led to a change in the level of siphoning by controlling shareholders. If we find different change effects of independent directors' attendance in SOEs and non-SOEs, we can say that the effect is attributable to the independent directors' attendance rather than other exogenous factors. Together, both cross-sectional and time-series variations enable us to use a difference-in-difference method which is an effective approach to address the issue of endogeneity.

Our results show that independent directors' attendance lessens the problem of tunneling. This effect is more pronounced in non-SOEs than in SOEs. Furthermore, the reinforcement of external supervision substitutes for the role of independent directors' attendance and this substitution effect is also more significant in non-SOEs. These results together imply that independent directors' attendance at board meetings can play an important role in protecting shareholders, especially in non-SOEs and when external supervision is weak.

This paper contributes to the existing stream of research on independent directors' role in corporate governance in several ways. Firstly, most current studies focus on how

independent directors' personal characteristics and the proportion of independent directors on the board affect their ability to protect investors. However, independent directors can hardly exercise their rights and perform their duties if they are not present at board meetings. We add to the understanding of the role of independent directors by proposing that independent directors' actions and conduct are also critical to the effect they can have on corporate governance.

Secondly, as far as we are aware, this study is the first to provide empirical evidence supporting regulator's requirements on independent directors' attendance. Though regulatory authorities in many countries require independent directors to attend board meetings, there is no extant research focusing on this issue. Our empirical results not only demonstrate that independent directors' attendance has an effect on corporate governance, but also show that the effect differs with types of company ownership and under different levels of supervision. These findings are very illuminating for policy makers.

In addition, extant studies on independent directors suffer substantially from the problem of endogeneity. Yet there are several papers that have taken note of the endogeneity problem (Agrawal and Knoeber 1996; Vafeas 2000; Bhagat and Black 2002; Ahmed and Duellman 2007) and try to address it using statistical methods such as the Hausman test and 2SLS regressions. By taking advantage of the distinct institutional environment in China, we examine the different effects of independent directors' attendance using a difference-in-difference approach, which enables us to better address the problem of endogeneity.

The remainder of this paper proceeds as follows: (1) In Sect. 2, we introduce the independent director system in China; (2) in Sect. 3, we review some of the current studies; (3) in Sect. 4, we develop our hypotheses; (4) in Sect. 5, we describe the research design; (5) in Sect. 6, we present the sample and data description; (6) in Sect. 7, we report the results and (7) in Sect. 8 we conclude the paper.

Independent Director System in China

The independent director policies were first voluntary in China in early 1990s when Chinese listed firms were not mandated to have independent directors on the board. For example, there were no rules setting out requirements for introducing independent directors in *The Corporate Law* of 1993. *The Guidance for the Articles of Listed Company* enacted in 1997 merely states that companies may have independent directors on the board as needed. Mandatory regulations regarding independent directors in China were first imposed on H-share companies (mainland China

registered companies listed in Hong Kong market). In March 1999, the Chinese State Economic and Trade Commission and the CSRC jointly issued *Measures on Further Promoting Standardized Operations and Deepening the Reform in Overseas-listed Companies*, requiring that external directors should hold more than half of the board seats with at least two independent directors for H-share firms. In August 2001, the CSRC published *Guidelines for Introducing Independent Directors to the Board of Directors of Listed Companies* (referred to as "*the Guidance*" hereafter). This document signals the start of mandatory enforcement of the independent director system in China.

One of the CSRC's primary purposes in applying the independent director system to Chinese listed companies is to fully enable the supervisory function of independent directors. *The Guidance* states that the duties of independent directors include protecting the overall interests of the company. Specifically, *the Guidance* stipulates that independent directors shall be especially concerned with protecting the interests of minority shareholders.

More importantly, *the Guidance* establishes explicit rules regarding independent directors' rights and duties in major related party transactions. The CSRC requires that major related party transactions be approved by independent directors before they are submitted to the board for discussion. Moreover, independent directors are required to issue independent opinions on "any existing or newly borrowed loans or other funds transfers from the company by shareholders, actual controller, and their affiliates if the amount is over 3 million RMB or 5 % of the firms' audited net assets, and whether the listed firm has taken effective measures to collect the amount due". Given these statements, it can be confidently inferred that Chinese policy makers have a high expectation that independent directors should be fully involved in corporate governance.

To achieve its goal of promoting independent directors' competence in protecting shareholders, the CSRC regulates specifically on the conduct of independent directors. In *the Guidance*, the CSRC rules that independent directors can concurrently hold the positions of independent director in no more than five listed companies. The CSRC explains that this is to ensure that independent directors have enough time and energy to perform their duties effectively. Additionally, the CSRC has noted the importance of independent directors' attendance at board meeting, and proposes in *the Guidance* that if an independent director fails to attend a board meeting in person on three consecutive occasions, the board of directors may request the shareholders' meeting to find a replacement for the director.

Literature Review

Many existing studies support the view that independent directors are related to superior corporate governance. Several channels have been explored to support this positive association. First of all, some researchers argue that independent directors help improve the quality of firms' decisions. Weisbach (1988) observes that independent directors are associated with higher CEO turnover when firms are not performing well. By examining 128 tender offer bids, Byrd and Hickman (1992) report higher announcement-date abnormal returns in bidding firms with boards dominated by independent directors than in firms with insider-dominated boards. Independent directors also affect the influence the board leadership has on "poison pill" decisions (Malette and Fowler 1992); the market reacts positively to the adoption of "poison pills" when a majority of the board is comprised of independent directors (Brickley et al. 1994). Cotter et al. (1997) find that in a takeover attempt, if the board of the target company is independent, the bid premium and the target shareholder gain over the entire tender offer period are both higher.

Certain studies also claim that independent directors reduce a company's agency cost and cost of capital. Brickley and James (1987) find a significant decrease in managerial consumption of perquisites when the proportion of independent directors on the board increases. Bhojraj and Sengupta (2003) and Ashbaugh-Skaife et al. (2006) link corporate governance mechanisms to bond ratings and bond yields. They provide evidence that a higher proportion of independent director is associated with higher bond ratings and lower bond yields.

Lastly, independent directors are found to be connected with higher financial information quality and less financial fraud. Dechow et al. (1996) investigate firms that are alleged to have manipulated earnings and find these firms are more likely to be dominated by inside directors. Basley (1996) finds that the inclusion of a larger proportion of outside directors on the board significantly reduces the likelihood of financial statement fraud. Klein (2002) reports a negative relationship between the proportion of independent directors and abnormal accruals. Xie et al. (2003) find that independent directors with corporate or financial backgrounds can improve the quality of a company's accounting information. Ahmed and Duellman (2007) find that the percentage of outside directors' shareholdings is positively related to conservatism.

The opposing view is that independent directors are irrelevant to firm performance. For instance, Mehran (1995) and Klein (1998) both fail to find evidence of any effect independent directors may have on a company's performance. Agrawal and Knoeber (1996) even propose that the proportion of independent directors on the board is

negatively related to firm performance. Vafeas (2000) demonstrates that the percentage of independent directors is not significantly associated with financial reporting quality. Park and Shin (2004) also fail to find a relationship between independent directors and firms' reported discretionary accruals.

Studies conducted in the Chinese market also report disparate results. Chen et al. (2006) study boardroom characteristics in Chinese listed companies and find that a high proportion of independent directors on the board is associated with less financial fraud. However, Tang et al. (2005) examine the extent to which independent directors control the behaviors of the largest shareholders, and find no significant evidence to support this. To summarize, the effectiveness of independent directors remains open to question.

Hypotheses Development

Independent directors are more independent and objective than internal directors, making them better guardians to supervise managers' behavior and to protect investors' interests (Fama and Jensen 1983). As most internal directors and managers are appointed by controlling shareholders, they cannot always be relied on by minority shareholders to represent them when conflicts of interests between controlling and minority shareholders arise. Independent directors are more likely to support minority shareholders and protect their interests, because of their independence and objectivity.

However, these natural features of independent directors do not guarantee that they will protect investors. The actions of independent directors must be considered, and failure to do this may be one of the reasons why previous studies do not find evidence supporting their effectiveness. The power of independent directors not only depends on their general characteristics, but also their willingness to act, and their behavior. They cannot fulfill their responsibilities unless they have both the ability and the intention to do so. Attending board meetings is critical for independent directors to successfully execute their duties. Independent directors' attendance can be viewed as a signal of diligence. Prior literature argues that directors with multiple directorships are associated with weak corporate governance (Core et al. 1999; Shivdasani and Yermack 1999; Fich and Shivdasani 2006). A potential reason for this is that multiple directorships limit the time, independent directors can devote to each firm (Ferris et al. 2003). Similarly, the frequency of attendance also signals an independent director's commitment to the job and will therefore have an effect on a firm's corporate governance.

Perhaps more importantly, the board meeting is a principal source of information for independent directors.

Independent directors must have sufficient information to ensure that they are capable of fulfilling their responsibilities (Mace 1986; Duchin et al. 2010). Board meetings gather and present information from various sources, including investors, managers, and other independent directors. This broad level of information enables independent directors to make more informed decisions.

In summary, we expect that independent directors' attendance at board meetings can enhance the corporate governance of a firm. La Porta et al. (1999) argue that the central agency problem in large corporations around the world is that of restricting expropriation of minority shareholders by controlling shareholders. Chinese listed companies are featured with highly concentrated ownership structure, and therefore the agency problem between controlling shareholders and minority shareholders becomes a serious issue, and one that can hinder the effectiveness of corporate governance. There are numerous reports documenting the severe tunneling problem in China (Berkman et al. 2009; Jiang et al. 2010). Whether independent directors are able to restrict tunneling is a particularly important measurement of their performance in protecting investors. Therefore, we predict that independent directors' attendance at board meetings reduces the problem of tunneling. Thus, we propose our first hypothesis as follows:

H1 When independent directors are more diligent in attending board meetings, controlling shareholders are less likely to extract funds from the firm.

Compared to those of non-SOEs, the controlling shareholders of SOEs have less incentive to siphon funds out of the firm. The state, which represents the largest shareholder in SOEs, should not have a strong incentive to exploit company wealth, as its goals are often different from those of private large-block shareholders. A state shareholder will put more importance on the maximization of social welfare than personal wealth (Shleifer and Vishny 1994; Boycko et al. 1996). Also, managers of SOEs are frequently reviewed by government agencies, and their political advancement may well depend on their performance. The potential loss of political reputation and possible demotion due to poor performance discourages management from colluding with large shareholders and aggressively expropriating minority shareholders. The problem of tunneling can be more severe in non-SOEs, where the incentive may be stronger for non-state owners. However, it also leaves greater room for improvement in corporate governance. There is a better chance that independent directors in non-SOEs notice more obvious loopholes and address them, provided they attend board meetings and obtain sufficient information. Thus, we propose our second hypothesis as follows:

H2 The effect of independent directors' attendance on tunneling is more pronounced in non-SOEs than in SOEs.

The State Council of China released *the Notice of the State Council on Approving and Forwarding CSRC's Opinions on Improving Quality of Listed Companies* (referred to as "the Notice" hereafter) on October 19, 2005. The promulgation of this document significantly enhances the supervision over the tunneling behavior of controlling shareholders and actual controllers. *The Notice* explicitly rules that controlling shareholders or actual controllers must not occupy listed companies' capital in various guises, such as borrowing loans from listed companies, providing guarantees, repaying debts or advancing money by listed companies. *The Notice* also aims to improve the supervision over behaviors of shareholders or actual controllers of listed companies. Specifically, it regulates that controlling shareholders or actual controllers should be urged to speed up the repayment of any occupied capital. External supervision may substantially alleviate the problem of tunneling in listed companies and therefore act as a substitute for the function of independent directors' attendance. Hence, the reinforcement of external supervision may weaken the supervisory role of independent directors' attendance over the tunneling behavior of controlling shareholders. Besides, the space for independent directors to alleviate tunneling is greater in non-SOEs than in SOEs, which means the space for external supervision to decrease tunneling is also greater in non-SOEs. As a consequence, the space for independent directors' attendance to alleviate tunneling is reduced to a greater extent in non-SOEs when stronger external supervision is in place, thus the substitution effect may be weaker in SOEs than in non-SOEs. In conclusion, we propose our third hypothesis as follows:

H3 The reinforcement of external supervision has a greater substitution effect for independent directors' attendance in non-SOEs than in SOEs.

Research Design

We use the following model to test our hypotheses:

$$Tun = \beta_0 + \beta_1 Dil + \beta_2 NSOE + \beta_3 Dil \times NSOE + \beta_4 Reg + \beta_5 Dil \times Reg + \beta_6 NSOE \times Reg + \beta_7 Dil \times NSOE \times Reg + ConVariables + \varepsilon, \quad (1)$$

where *Tun* measures the extent to which controlling shareholders extract funds from listed companies. Following Jiang et al. (2010), we define it as other receivables deflated by total assets. *Dil* is a measure of the probability that independent directors attend board meetings. It equals the ratio of the total number of times independent directors attend board meetings in person within a firm to the total number of times they are supposed to attend meetings. Larger *Dil* indicates

Table 1 Sample distribution

<i>Panel A: distribution by year</i>									
	2004	2005	2006	2007	2008	2009	2010	2011	Total
Non-SOEs	340	374	440	509	583	716	721	1,052	4,735
SOEs	902	907	899	895	907	962	947	977	7,396
Total	1,242	1,281	1,339	1,404	1,490	1,678	1,668	2,029	12,131
<i>Panel B: distribution by industry</i>									
Agriculture, forestry, animal husbandry, sideline occupations and fishery				295		Information technology			806
Mining				238		Wholesale and retail trade			742
Manufacturing				7,224		Real estate			572
Production and supply of electric power, gas and water				495		Social services			369
Construction				262		Communication and culture			108
Transportation and warehousing				484		Integrated industry			536

higher attending frequency. *Reg* is an indicator variable for the promulgation of *the Notice*. It equals 1 if the observation is from year 2006 to 2011, and 0 otherwise. Following extant literature, Model 1 controls for type of ownership (*NSOE*), ownership structure (*First*), legal environment of the district where the firm is founded (*Law*), firm size (*Size*), and financial position (*Lev*). CEO duality (*Dual*), board size (*Bsize*), board composition (*Indr*), and the financial background of independent directors (*Accr*) may also affect a firm's corporate governance, and are taken into consideration in Model 1. Industry fixed effect is also controlled for. Specifically, if a company is non-state owned, *NSOE* equals 1, and 0 otherwise. *First* measures the shareholding ratio of the largest shareholder. *Law* is an index to measure the level of legal system in the district where the firm is founded. The index is constructed and reported by Fan et al. (2011) based on the number of lawyers as a percentage of the population, the efficiency of local judicial systems, and the protection of property rights for each province or provincial level region. *Size* is computed as the logarithm of a firm's total assets. *Lev* is the leverage ratio and equals total liabilities divided by total assets. *Dual* equals 1 if the chairman of the board and the CEO are the same person, and 0 otherwise. *Bsize* equals the logarithm of the total number of directors on the board. *Indr* is the proportion of independent directors on the board. *Accr* is the percentage of independent directors with financial backgrounds to total number of independent directors.

Sample Selection and Descriptive Statistics

Our sample consists of A-share firms listed on the Chinese market during 2004–2011. The sample period starts from

2004 as this is the earliest year from which we are able to obtain data about independent directors' attendance. We exclude financial firms and observations with omitted variables and get a final sample with 12,131 firm-year observations. We use the index reported by Fan et al. (2011)¹ to measure the legal system. All other data are obtained from the China Stock Market and Accounting Research (CSMAR) database. We find extreme values of *Lev* in data processing, so we Winsorize *Lev* at 1 and 99 %.

Table 1 reports the sample distribution. The number of sample observations increases over the years, growing from 1,242 observations in 1999 to 2,029 observations in 2011. This is consistent with the development of China's stock market. 2,523 observations come from the 2004–2005 period, while 9,608 observations are from 2006–2011. The full sample is broken down into SOE and non-SOE sub-samples, with 7,396 and 4,735 observations, respectively. The observations for SOEs account for over 60 % of the full sample, which is consistent with the conditions in China, where most of the listed firms are controlled by the state. We can also see that the percentages of SOEs decreased from 72.6 % in 1999 to 48.2 % in 2011. This is an outcome of the strategic privatization of SOEs in China. Panel B reports the industry distribution of all sample firms. About 60 % of the observations are from the manufacturing industry.

Table 2 presents descriptive statistics of our sample. The mean of *Dil* is 0.941. This indicates that on average, there is a 6 % probability that independent directors are

¹ The legalization index reported by Fan et al. (2011) ends in 2009. Our sample period is 2004–2011, implying that we cannot obtain legalization index data for the 2010–2011 period. As the rankings of legalization level are quite stable, we use the legalization index of 2009 to proxy for the legislation index of this district in 2010–2011.

Table 2 Descriptive statistics

	Mean	Median	Minimum	Maximum	SD
<i>Panel A: full sample (N = 12,131)</i>					
<i>Dil</i>	0.941	0.967	0.167	1.000	0.082
<i>Tun</i>	0.049	0.017	0.000	0.999	0.100
<i>NSOE</i>	0.390	0.000	0.000	1.000	0.488
<i>Reg</i>	0.792	1.000	0.000	1.000	0.406
<i>First</i>	0.373	0.352	0.022	0.951	0.158
<i>Dual</i>	0.164	0.000	0.000	1.000	0.370
<i>Bsize</i>	2.203	2.197	1.099	2.944	0.207
<i>Indr</i>	0.359	0.333	0.083	0.800	0.052
<i>Accr</i>	0.320	0.333	0.000	1.000	0.189
<i>Law</i>	9.488	7.600	0.180	18.890	5.075
<i>Size</i>	21.509	21.377	14.158	28.283	1.238
<i>Lev</i>	0.506	0.504	0.056	1.567	0.241
<i>Panel B: pre-notice non-SOEs (N = 714)</i>					
<i>Dil</i>	0.908	0.938	0.167	1.000	0.110
<i>Tun</i>	0.103	0.040	0.000	0.950	0.161
<i>First</i>	0.332	0.294	0.061	0.800	0.134
<i>Dual</i>	0.155	0.000	0.000	1.000	0.363
<i>Bsize</i>	2.188	2.197	1.099	2.833	0.202
<i>Indr</i>	0.352	0.333	0.111	0.600	0.051
<i>Accr</i>	0.307	0.333	0.000	1.000	0.194
<i>Law</i>	6.619	5.460	1.530	12.840	2.825
<i>Size</i>	20.870	20.844	18.322	24.147	0.833
<i>Lev</i>	0.550	0.537	0.070	1.567	0.258
<i>Panel C: post-notice non-SOEs (N = 4,021)</i>					
<i>Dil</i>	0.962	1.000	0.333	1.000	0.062
<i>Tun</i>	0.048	0.014	0.000	0.978	0.104
<i>First</i>	0.328	0.299	0.022	0.951	0.146
<i>Dual</i>	0.284	0.000	0.000	1.000	0.451
<i>Bsize</i>	2.139	2.197	1.099	2.708	0.194
<i>Indr</i>	0.366	0.333	0.143	0.667	0.052
<i>Accr</i>	0.333	0.333	0.000	1.000	0.175
<i>Law</i>	11.146	9.070	0.180	19.890	5.352
<i>Size</i>	21.082	21.013	14.158	24.814	1.058
<i>Lev</i>	0.462	0.447	0.056	1.567	0.277
<i>Panel D: pre-notice SOEs (N = 1,809)</i>					
<i>Dil</i>	0.896	0.926	0.296	1.000	0.111
<i>Tun</i>	0.066	0.025	0.000	0.999	0.115
<i>First</i>	0.445	0.442	0.060	0.850	0.163
<i>Dual</i>	0.100	0.000	0.000	1.000	0.299
<i>Bsize</i>	2.262	2.197	1.609	2.944	0.215
<i>Indr</i>	0.343	0.333	0.083	0.600	0.046
<i>Accr</i>	0.305	0.333	0.000	2.000	0.195
<i>Law</i>	6.455	5.300	1.530	12.840	2.911
<i>Size</i>	21.386	21.313	18.477	26.979	1.011
<i>Lev</i>	0.503	0.507	0.056	1.567	0.207

Table 2 continued

	Mean	Median	Minimum	Maximum	SD
<i>Panel E: post-notice SOEs (N = 5,587)</i>					
<i>Dil</i>	0.946	0.964	0.250	1.000	0.071
<i>Tun</i>	0.037	0.015	0.000	0.968	0.077
<i>First</i>	0.387	0.382	0.036	0.936	0.157
<i>Dual</i>	0.099	0.000	0.000	1.000	0.299
<i>Bsize</i>	2.233	2.197	1.386	2.944	0.201
<i>Indr</i>	0.360	0.333	0.091	0.800	0.052
<i>Accr</i>	0.320	0.333	0.000	2.000	0.201
<i>Law</i>	9.643	7.390	0.180	19.890	5.052
<i>Size</i>	21.938	21.772	14.937	28.283	1.316
<i>Lev</i>	0.532	0.540	0.056	1.567	0.216

Dil equals the ratio of the total number of times independent directors attend board meetings in person within a firm to the total number of times they are supposed to attend meetings. *Tun* equals other receivables deflated by total assets. *NSOE* equals 1 if the company is non-state owned and 0 otherwise. *Reg* equals 1 if the observation is between 2006 and 2011 and 0 otherwise. *First* measures the shareholding ratio of the largest shareholder. *Dual* equals 1 if the chairman of the board and the CEO are the same person, and 0 otherwise. *Bsize* equals the logarithm of the total number of directors on the board. *Indr* is the proportion of independent directors on the board. *Accr* is the percentage of independent directors with financial backgrounds to total number of independent directors. *Law* is an index to measure the level of legal system in the district where the firm is founded. *Size* is the logarithm of firm's total assets. *Lev* is the leverage ratio and equals total liabilities divided by total assets

not present at meetings. The median (0.967) is below 1, implying that over a half of the firm-year observations in our sample report independent directors' absence. The minimum number is 0.167, showing that absence is very evident in some firms. The mean (median) of *Tun* is 0.049 (0.017), the minimum is 0 while the maximum is 0.999, and the standard deviation is 0.100. These figures demonstrate a large discrepancy in the degree of the tunneling problem among different firms. Tunneling appears to be extremely severe in some firms. The mean of *First* is 0.373, indicating that the largest shareholders hold 37.3 % of the total shares on average. The means of *Indr* and *Accr* are 0.359 and 0.320, showing that on average, 35.9 % of the board members are independent directors and 32.0 % of the independent directors have a financial background. We also report separately the descriptive statistics of four sub-samples. The mean of *Dil* for non-SOEs is 0.908 before the issuance of the Notice, and 0.962 after. In SOEs, the mean of *Dil* is 0.896 before the Notice and 0.946 after. This suggests that on average, the independent directors in non-SOEs are more likely to attend board meetings than their counterparts in SOEs, and the probability of independent directors' attendance increased after the release of the Notice. The mean of *Tun* is 0.103 before the Notice and 0.048 after for non-SOEs, while it is 0.066 before the Notice and 0.037 after for SOEs. Therefore, on average, the tunneling problem is more serious in non-SOEs and is alleviated after the release of the Notice.

Figures 1 and 2 demonstrate the trend of mean and median of *Tun*, respectively. Before the Notice, *Tun* shows no trend of decline in both SOEs and non-SOEs and *Tun* of

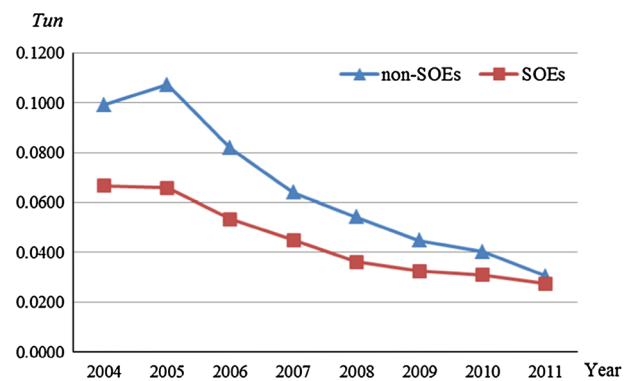
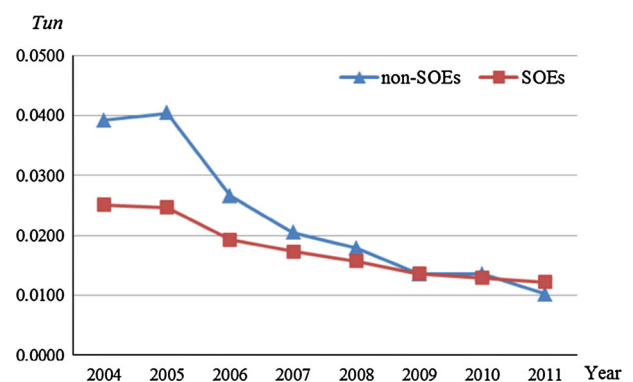
**Fig. 1** Trend analysis of *Tun* (mean)**Fig. 2** Trend analysis of *Tun* (median)

Table 3 Univariate tests

Panel A: means and medians of the sub-samples for <i>Dil</i> and <i>Tun</i>					
	Non-SOE sample		SOE sample		
	Pre-notice	Post-notice	Pre-notice	Post-notice	
<i>Dil</i>					
Mean	0.908	0.962	0.896		0.946
Median	0.938	1.000	0.926		0.964
<i>Tun</i>					
Mean	0.103	0.048	0.066		0.037
Median	0.040	0.014	0.025		0.015
Panel B: differences in mean and median between sub-samples for <i>Dil</i> and <i>Tun</i>					
	Pre-notice non-SOE–pre-notice SOEs		Post-notice non-SOE–post-notice SOEs		Pre-notice SOEs–post-notice SOEs
<i>Dil</i>					
Mean diff.	0.012	0.016	−0.054		−0.050
<i>t</i> value	2.45**	11.39***	−18.54***		−22.30***
Median diff.	0.012	0.036	−0.062		−0.038
<i>Z</i> value	2.31**	12.76***	−10.24***		−15.69***
<i>Tun</i>					
Mean diff.	0.037	0.011	0.055		0.029
<i>t</i> value	6.49***	5.84***	11.93***		12.16***
Median diff.	0.015	−0.001	0.026		0.010
<i>Z</i> value	4.96***	−0.35	11.29***		9.22***
Panel C: differences in mean and median between sub-samples for <i>ConVariables</i>					
	SOEs–non-SOEs		Mean diff	<i>t</i> value	<i>Z</i> value
	Mean diff	<i>t</i> value			
<i>First</i>	0.073	25.43***	0.097		23.35***
<i>Dual</i>	−0.165	−24.52***	−0.000		−23.93***
<i>Bsize</i>	0.094	25.03***	0.000		23.90***
<i>Indr</i>	−0.008	−8.49***	−0.000		−3.52***
<i>Accr</i>	−0.013	−3.74***	−0.000		−10.36***
<i>Law</i>	−1.599	−17.14***	−0.980		−13.08***
<i>Size</i>	0.753	34.20***	0.656		27.78***
<i>Lev</i>	0.049	11.06***	0.067		13.71***

Dil equals the ratio of the total number of times independent directors attend board meetings in person within a firm to the total number of times they are supposed to attend meetings. *Tun* equals other receivables deflated by total assets. *NSOE* equals 1 if the company is non-state owned and 0 otherwise. *Reg* equals 1 if the observation is between 2006 and 2011 and 0 otherwise. *First* measures the shareholding ratio of the largest shareholder. *Dual* equals 1 if the chairman of the board and the CEO are the same person, and 0 otherwise. *Bsize* equals the logarithm of the total number of directors on the board. *Indr* is the proportion of independent directors on the board. *Accr* is the percentage of independent directors with financial backgrounds to total number of independent directors. *Law* is an index to measure the level of legal system in the district where the firm is founded. *Size* is the logarithm of firm’s total assets. *Lev* is the leverage ratio and equals total liabilities divided by total assets

***, **, * Significance at 1, 5, 10 % levels, respectively

non-SOEs is higher than that of SOEs, which is consistent with our analysis. After *the Notice*, *Tun* decreases significantly, which indicates that the release of *the Notice* decreases tunneling. In addition, *Tun* of non-SOEs

decreases faster than that of SOEs. This also corresponds with our expectation.

In Table 3, we compare the probability of independent directors’ attendance and the extent of tunneling problem

Table 4 Correlation matrix

	<i>Dil</i>	<i>Tun</i>	<i>NSOE</i>	<i>Reg</i>	<i>First</i>	<i>Dual</i>	<i>Bsize</i>	<i>Indr</i>	<i>Accr</i>	<i>Law</i>	<i>Size</i>	<i>Lev</i>
<i>Dil</i>												
<i>Tun</i>	-0.127***											
<i>NSOE</i>	0.119***	0.058***										
<i>Reg</i>	0.264***	-0.141**	0.113***									
<i>First</i>	-0.046***	-0.147***	-0.225***	-0.131***								
<i>Dual</i>	0.046***	0.013	0.217***	0.067***	-0.069***							
<i>Bsize</i>	-0.151***	-0.091***	-0.221***	-0.093***	0.017*	-0.128***						
<i>Indr</i>	0.090***	-0.010	0.077***	0.136***	0.011	0.069***	-0.327***					
<i>Accr</i>	0.052***	0.019**	0.032***	0.041***	-0.015	0.036***	-0.194***	-0.073***				
<i>Law</i>	0.164***	-0.128***	0.154***	-0.302***	-0.008	0.105***	-0.059***	0.073***	-0.017*			
<i>Size</i>	0.019**	-0.281***	-0.297***	0.112***	0.265***	-0.142***	0.255***	0.052***	-0.056***	0.114***		
<i>Lev</i>	-0.088***	0.406***	-0.100***	-0.022**	-0.054***	-0.081***	0.041***	-0.002	-0.001	-0.120***	0.130***	

Dil equals the ratio of the total number of times independent directors attend board meetings in person within a firm to the total number of times they are supposed to attend meetings. *Tun* equals other receivables deflated by total assets. *NSOE* equals 1 if the company is non-state owned and 0 otherwise. *Reg* equals 1 if the observation is between 2006 and 2011 and 0 otherwise. *First* measures the shareholding ratio of the largest shareholder. *Dual* equals 1 if the chairman of the board and the CEO are the same person, and 0 otherwise. *Bsize* equals the logarithm of the total number of directors on the board. *Indr* is the proportion of independent directors on the board. *Accr* is the proportion of independent directors that have financial background. *Law* is an index to measure the level of legal system in the district where the firm is founded. *Size* is the logarithm of firm's total assets. *Lev* is the leverage ratio and equals total liabilities divided by total assets. Upper (lower) diagonal reports Spearman (Pearson) correlations

***, **, * Significance at 1, 5, 10 % levels, respectively

Table 5 Regression results

	Full sample		Pre-notice		Post-notice		Non-SOEs		SOEs	
	Estimate	t value	Estimate	t value	Estimate	t value	Estimate	t value	Estimate	t value
Intercept	0.629	26.55***	0.902	15.69***	0.524	23.11***	0.894	19.95***	0.578	23.76***
<i>Dil</i>	-0.093	-5.28***	-0.081	-3.58***	-0.056	-3.90***	-0.205	-6.62***	-0.098	-5.93***
<i>NSOE</i>	0.124	4.08***	0.084	2.17**	0.004	0.16				
<i>Dil*NSOE</i>	-0.124	-3.72***	-0.093	-2.19**	-0.002	-0.08				
<i>Reg</i>	-0.053	-2.41**					-0.199	-5.52***	-0.054	-2.64***
<i>Dil*Reg</i>	0.037	1.54					0.192	4.96***	0.034	1.54
<i>NSOE*Reg</i>	-0.137	-3.46***								
<i>Dil*NSOE*Reg</i>	0.138	3.25***								
<i>First</i>	-0.031	-5.98***	-0.038	-2.66***	-0.028	-5.23***	-0.044	-4.59***	-0.027	-4.46***
<i>Dual</i>	0.001	0.48	-0.010	-1.53	0.003	1.26	-0.001	-0.17	0.007	2.16**
<i>Bsize</i>	-0.022	-5.17***	-0.033	-2.99***	-0.016	-3.67***	-0.024	-3.00***	-0.024	-4.90***
<i>Indr</i>	0.019	1.18	-0.089	-1.91*	0.043	2.66***	-0.005	-0.19	0.012	0.66
<i>Accr</i>	-0.000	-0.08	0.015	1.30	-0.005	-1.21	-0.007	-0.92	0.002	0.33
<i>Law</i>	-0.000	-2.08**	-0.000	-0.25	-0.000	-2.90***	-0.001	-4.74***	0.001	2.58***
<i>Size</i>	-0.024	-33.07***	-0.037	-15.51***	-0.022	-30.93***	-0.031	-22.01***	-0.021	-25.12***
<i>Lev</i>	0.183	55.22***	0.279	28.42***	0.161	48.60***	0.198	39.19***	0.161	36.23***
Adj. R ²	0.310		0.350		0.291		0.384		0.244	
Number of Obs.	12,131		2,523		9,608		4,735		7,396	

The dependent variable is *Tun*. *Dil* equals the ratio of the total number of times independent directors attend board meetings in person within a firm to the total number of times they are supposed to attend meetings. *NSOE* equals 1 if the company is non-state owned and 0 otherwise. *Reg* equals 1 if the observation is between 2006 and 2011 and 0 otherwise. *First* measures the shareholding ratio of the largest shareholder. *Dual* equals 1 if the chairman of the board and the CEO are the same person, and 0 otherwise. *Bsize* equals the logarithm of the total number of directors on the board. *Indr* is the proportion of independent directors on the board. *Accr* is the percentage of independent directors with financial backgrounds to total number of independent directors. *Law* is an index to measure the level of legal system in the district where the firm is founded. *Size* is the logarithm of firm's total assets. *Lev* is the leverage ratio and equals total liabilities divided by total assets

***, **, * Significance at 1, 5, 10 % levels, respectively

among different sub-sample groups in panels A and B. The results show that both before and after the issuance of *the Notice*, the means of *Dil* are significantly larger in non-SOEs than those in SOEs. It suggests that independent directors are more likely to attend board meetings in non-SOEs than in SOEs. Non-SOEs also exhibit a larger *Tun* in both sub-sample periods than SOEs, implying a more severe tunneling problem in non-SOEs. The means of *Dil* are significantly larger after *the Notice* than those before it in both SOEs and non-SOEs, implying that the probability of independent directors' attendance improved substantially after *the Notice*. Specifically, the means of *Dil* in non-SOEs and SOEs increase by 0.054 and 0.050, respectively, and the untabulated statistical result shows that there is no significant difference in the change of *Dil* between non-SOEs and SOEs.² The means of *Tun* are significantly lower after *the Notice* than those before in both SOEs and non-SOEs, demonstrating that the release of

the Notice alleviates tunneling. We compare control variables between SOEs and Non-SOEs in panel C. *First*, *Bsize*, *Size*, and *Lev* are significantly larger in SOEs while *Dual*, *Indr*, *Accr*, and *Law* are significantly larger in non-SOEs, suggesting that SOEs have largest shareholders with higher shareholding ratios, larger boards, more assets, and higher leverage ratios, while there are greater possibility that chairman of the board and CEO are the same individual, higher ratios of independent directors on the board, higher ratios of independent directors with accounting background among all independent directors and better legal environment in non-SOEs.

Table 4 presents the correlations between variables. *Dil* and *Tun* are significantly and negatively related in both Pearson and Spearman analyses. The negative correlation implies that controlling shareholders are less likely to extract funds from the firm when independent directors are more diligent in attending board meetings. At the same time, *Dil* is positively related to *NSOE*, *Reg*, *Law*, *Dual*, *Indr*, and *Accr* and negatively related to *First*, *Bsize*, and *Lev*. This result suggests that independent directors are

² This means the potential heterogeneous behavioral responses problem in difference-in-difference approach is not severe in the paper.

Table 6 Robustness check (interaction terms of every *ConVariable* and *Reg* controlled)

	Estimate	<i>t</i> value
Intercept	0.902	20.02***
<i>Dil</i>	-0.081	-4.57***
<i>NSOE</i>	0.084	2.77***
<i>Dil*NSOE</i>	-0.093	-2.79***
<i>Reg</i>	-0.378	-7.36***
<i>Dil*Reg</i>	0.025	1.06
<i>NSOE*Reg</i>	-0.080	-2.04**
<i>Dil*NSOE*Reg</i>	0.091	2.15**
<i>ConVariables_i</i>	Controlled	
<i>Reg*ConVariables_i</i>	Controlled	
<i>F</i> value	131.48	
Adj. <i>R</i> ²	0.3262	
Number of obs.	12,131	

The dependent variable is *Tun*. *Dil* equals the ratio of the total number of times independent directors attend board meetings in person within a firm to the total number of times they are supposed to attend meetings. *NSOE* equals 1 if the company is non-state owned and 0 otherwise. *Reg* equals 1 if the observation is between 2006 and 2011 and 0 otherwise. *ConVariables* indicates all other control variables in model (1)

***, **, * Significance at 1, 5, 10% levels, respectively

more likely to attend meetings in non-SOEs, in environments with better legal systems, after *the Notice* was released, in firms with CEO duality, in firms where the proportion of independent directors on the board is higher, and in firms where a larger proportion of independent directors have a financial background. They are less likely to attend meetings in firms where the largest shareholders hold fewer shares, in firms with larger boards and in firms with higher leverage ratios.

Regression Results

Table 5 reports the regression results. In the results for the full sample, the estimated coefficient on *Dil* is significantly negative. This illustrates that before *the Notice*, the tunneling problem is less severe in SOEs where independent directors are more likely to attend board meetings. The estimated coefficient on *NSOE* is significantly positive, showing that tunneling is more severe in non-SOEs than in SOEs before *the Notice*. The coefficient estimate on *Dil*NSOE* is significantly negative, suggesting that before *the Notice*, the effect of independent directors' attendance on tunneling is more pronounced in non-SOEs than that in SOEs. The coefficient on *Reg* is significantly negative, indicating that *the Notice* substantially alleviates the problem of tunneling in SOEs with lower independent directors' attendance. *Dil*Reg* is not significantly

associated with tunneling, which implies that in SOEs, there is no significant difference in the effect of independent directors' attendance on tunneling before and after *the Notice*. *Diligence*NSOE*Reg* is positively related to tunneling, which shows that the release of *the Notice* exhibit a significant adverse effect on the association between independent directors' attendance and tunneling in non-SOEs; i.e., *the Notice* weakens the effect of independent directors' attendance on tunneling in non-SOEs.

To illustrate more clearly, the different effects that independent directors' attendance has on tunneling under different conditions, we separate the full sample in two ways. Firstly, we divide the full sample by the release of *the Notice*, and conduct regressions using observations before *the Notice* and after *the Notice*. The regression results are also presented in Table 5. Before *the Notice*, *Dil* and *Dil*NSOE* are both negatively associated with tunneling, showing that at this time independent directors' attendance reduces tunneling, and the effect is more significant in non-SOEs. After the release of *the Notice*, which promoted external supervision, *Dil* is still negatively associated with tunneling. However, the relationship between *Dil*NSOE* and tunneling is not significant, suggesting that the effect of independent directors' attendance on tunneling is not significantly different across different firm types after *the Notice*. We also divide our sample by firms' ownership types. In the sub-sample of non-SOEs, the estimated coefficient on *Dil* is significantly negative, showing that in non-SOEs, independent directors' attendance alleviates tunneling before the release of *the Notice*. However, the coefficient on *Dil*Reg* is significantly positive, suggesting that the release of *the Notice* weakens the role of independent directors' attendance in non-SOEs. In the sub-sample of SOEs, the estimated coefficient on *Dil* is still significantly negative, but is substantially less negative than that in non-SOEs. This result shows that before *the Notice*, independent directors' attendance in SOEs alleviates tunneling, but is not as effective as it is in non-SOEs. The estimated coefficient on *Dil*Reg* is not significant, implying that in SOEs, the release of *the Notice* does not substitute for the role of independent directors' attendance.³

Apart from the above tests, we also perform the following robustness checks.

³ A prerequisite for the validity of the difference-in-difference assumption is that the program is not implemented based on the pre-existing differences in outcomes. An important target of *the Notice* is to restrict tunneling and *the Notice* applies to all listed firms in China, no matter they are SOEs or non-SOEs. Therefore, *the Notice* is not implemented based on the pre-existing differences in *Tun* between non-SOEs and SOEs. Moreover, *the Notice* does not affect the ownership nature of firms, so our classification of non-SOEs and SOEs is not based on *the Notice*. Hence, the "targeting based on differences" problem is not serious in this paper.

Table 7 Robustness check [*Tun* substituted by $\ln(1 + Tun)$]

	Full sample		Pre-notice		Post-notice		Non-SOEs		SOEs	
	Estimate	<i>t</i> value	Estimate	<i>t</i> value	Estimate	<i>t</i> value	Estimate	<i>t</i> value	Estimate	<i>t</i> value
Intercept	0.520	27.67***	0.737	16.22***	0.439	24.29***	0.725	20.68***	0.484	24.73***
<i>Dil</i>	-0.073	-5.17***	-0.063	-3.53***	-0.047	-4.08***	-0.165	-6.81***	-0.076	-5.76***
<i>NSOE</i>	0.102	4.20***	0.070	2.29**	0.004	0.21				
<i>Dil*NSOE</i>	-0.102	-3.85***	-0.078	-2.33**	-0.003	-0.15				
<i>Reg</i>	-0.040	-2.31**					-0.157	-5.58***	-0.041	-2.50**
<i>Dil*Reg</i>	0.025	1.34					0.150	4.97***	0.023	1.29
<i>NSOE*Reg</i>	-0.110	-3.52***								
<i>Dil*NSOE*Reg</i>	0.112	3.30***								
<i>First</i>	-0.029	-7.05***	-0.036	-3.19***	-0.026	-6.19***	-0.039	-5.12***	-0.026	-5.37***
<i>Dual</i>	0.000	0.23	-0.007	-1.33	0.001	0.85	-0.001	-0.46	0.005	2.16**
<i>Bsize</i>	-0.018	-5.42***	-0.027	-3.16***	-0.014	-3.88***	-0.019	-3.03***	-0.020	-5.12***
<i>Indr</i>	0.017	1.31	-0.069	-1.88*	0.036	2.80***	0.001	0.03	0.011	0.73
<i>Accr</i>	-0.001	-0.31	0.010	1.12	-0.005	-1.36	-0.007	-1.24	0.001	0.31
<i>Law</i>	-0.000	-2.88***	-0.000	-0.54	-0.000	-3.65***	-0.001	-5.76***	0.000	2.36**
<i>Size</i>	-0.020	-34.03***	-0.030	-15.74***	-0.018	-31.89***	-0.025	-22.56***	-0.018	-25.86***
<i>Lev</i>	0.145	55.28***	0.217	27.87***	0.129	48.91***	0.158	39.80***	0.128	35.80***
Industry	Controlled		Controlled		Controlled		Controlled		Controlled	
<i>F</i> value	222.00		63.06		190.39		144.72		114.78	
Adj. <i>R</i> ²	0.3214		0.3512		0.3025		0.4004		0.2529	
Number of obs	12,131		2,523		9,608		4,735		7,396	

The dependent variable is $\ln(1 + Tun)$. *Dil* equals the ratio of the total number of times independent directors attend board meetings in person within a firm to the total number of times they are supposed to attend meetings. *NSOE* equals 1 if the company is non-state owned and 0 otherwise. *Reg* equals 1 if the observation is between 2006 and 2011 and 0 otherwise. *First* measures the shareholding ratio of the largest shareholder. *Dual* equals 1 if the chairman of the board and the CEO are the same person, and 0 otherwise. *Bsize* equals the logarithm of the total number of directors on the board. *Indr* is the proportion of independent directors on the board. *Accr* is the percentage of independent directors with financial backgrounds to total number of independent directors. *Law* is an index to measure the level of legal system in the district where the firm is founded. *Size* is the logarithm of firm's total assets. *Lev* is the leverage ratio and equals total liabilities divided by total assets

***, **, * Significance at 1, 5, 10% levels, respectively

Firstly, as there might be difference in the firm characteristics between SOEs and non-SOEs, we add in our model the interaction terms of every control variable and *Reg* (*Reg*ConVariables*) to control for the change of the effect of such difference on tunneling after *the Notice*. As Table 6 shows, after controlling for *Reg*ConVariables*, the coefficient estimates of *Dil* and *Dil*NSOE* are significantly negative, the coefficient on *Dil*NSOE*Reg* is significantly positive and the coefficient on *Dil*Reg* is insignificant. These findings are consistent with our hypotheses and keep our conclusions unchanged.

Secondly, we use $\ln(1 + Tun)$ as the dependent variable to substitute for *Tun* and reperform our analysis in Table 5. If the levels of *Tun* are quite distinct for non-SOEs and SOEs before *the Notice*, the conclusions may be very sensitive to the functional form used. According to Table 3, *Tun* is distinct for non-SOEs and SOEs before *the Notice*, so we use $\ln(1 + Tun)$ to substitute for *Tun* to test

the sensitivity of our conclusions to the functional form posited. Regression results are presented in Table 7. In the full sample, the coefficient estimates of *Dil* and *Dil*NSOE* are significantly negative, the coefficient on *Dil*NSOE*Reg* is significantly positive and the coefficient on *Dil*Reg* is insignificant. These are all consistent with our hypotheses. Regressions conducted using sub-samples also report the same results as shown in Table 5 of the original paper. Thus, it can be seen that using $\ln(1 + Tun)$ to substitute for *Tun* as the dependent variable does not change our conclusions.

Thirdly, we notice that if the difference-in-difference test using an alternative outcome that is not supposed to be affected by *the Notice* is non-zero, then it is likely that the difference-in-difference test for *Tun* is biased. Ang et al. (2000) argue that operating expense, to some extent, reflects the agency cost of managers. A very important feature of independent directors in corporate

Table 8 Robustness check (*Tun* substituted by *Operating Expense/Total Assets*)

	Estimate	<i>t</i> value
Intercept	0.247	28.92***
<i>Dil</i>	-0.021	-3.35***
<i>NSOE</i>	0.028	2.58**
<i>Dil*NSOE</i>	-0.035	-2.87***
<i>Reg</i>	-0.012	-1.48
<i>Dil*Reg</i>	0.011	1.27
<i>NSOE*Reg</i>	-0.021	-1.46
<i>Dil*NSOE*Reg</i>	0.019	1.22
<i>First</i>	-0.005	-2.59***
<i>Dual</i>	0.003	3.34***
<i>Bsize</i>	0.007	4.51***
<i>Indr</i>	0.010	1.74*
<i>Accr</i>	0.000	0.26
<i>Law</i>	0.001	13.55***
<i>Size</i>	-0.010	-36.58***
<i>Lev</i>	0.021	17.39***
Industry	Controlled	
F value	146.84	
Adj. R ²	0.2382	
Number of Obs.	12,131	

The dependent variable is *Operating Expense/Total Assets*. *Dil* equals the ratio of the total number of times independent directors attend board meetings in person within a firm to the total number of times they are supposed to attend meetings. *NSOE* equals 1 if the company is non-state owned and 0 otherwise. *Reg* equals 1 if the observation is between 2006 and 2011 and 0 otherwise. *First* measures the shareholding ratio of the largest shareholder. *Dual* equals 1 if the chairman of the board and the CEO are the same person, and 0 otherwise. *Bsize* equals the logarithm of the total number of directors on the board. *Indr* is the proportion of independent directors on the board. *Accr* is the percentage of independent directors with financial backgrounds to total number of independent directors. *Law* is an index to measure the level of legal system in the district where the firm is founded. *Size* is the logarithm of firm's total assets. *Lev* is the leverage ratio and equals total liabilities divided by total assets

***, **, * Significance at 1, 5, 10 % levels, respectively

governance system is that they reduce the agency cost of managers, so independent directors' attendance might affect *Operating Expense/Total Assets*. On the other side, *the Notice* does not impose any restriction on operating expense, so we expect that *Operating Expense/Total Assets* will not be influenced by *the Notice*. Therefore, we use *Operating Expense/Total Assets* to substitute for *Tun* to test the robustness of the findings as well as to further explore the role of independent directors' attendance in mitigating agency problems. Table 8 reports the result of this test. The estimated coefficients on *Dil* and *Dil*NSOE* are both significantly negative, indicating that independent directors' attendance reduces operating expense of the firm and this effect is more significant in

Table 9 Robustness check (*Tun* substituted by *CTR*, logistic regression)

	Estimate	Wald χ^2
Intercept	0.763	0.21
<i>Dil</i>	1.898	1.84
<i>NSOE</i>	0.939	0.17
<i>Dil*NSOE</i>	-1.322	0.29
<i>Reg</i>	2.288	2.21
<i>Dil*Reg</i>	-1.981	1.42
<i>NSOE*Reg</i>	2.142	0.71
<i>Dil*NSOE*Reg</i>	-2.147	0.61
<i>First</i>	-1.364	16.26***
<i>Dual</i>	-0.254	3.52*
<i>Bsize</i>	-0.041	0.02
<i>Indr</i>	0.343	0.13
<i>Accr</i>	-0.189	0.57
<i>Law</i>	-0.023	5.20**
<i>Size</i>	-0.262	34.77***
<i>Lev</i>	0.621	14.47***
Industry	Controlled	
-2 Log L	4046.99	
Number of obs.	12,131	

The dependent variable is *CTR*, *CTR* equals 1 when there is transfer of control and equals 0 otherwise. *Dil* equals the ratio of the total number of times independent directors attend board meetings in person within a firm to the total number of times they are supposed to attend meetings. *NSOE* equals 1 if the company is non-state owned and 0 otherwise. *Reg* equals 1 if the observation is between 2006 and 2011 and 0 otherwise. *First* measures the shareholding ratio of the largest shareholder. *Dual* equals 1 if the chairman of the board and the CEO are the same person, and 0 otherwise. *Bsize* equals the logarithm of the total number of directors on the board. *Indr* is the proportion of independent directors on the board. *Accr* is the percentage of independent directors with financial backgrounds to total number of independent directors. *Law* is an index to measure the level of legal system in the district where the firm is founded. *Size* is the logarithm of firm's total assets. *Lev* is the leverage ratio and equals total liabilities divided by total assets

***, **, * Significance at 1, 5, 10 % levels, respectively

non-SOEs. However, the coefficients on *Dil*Reg* and *Dil*NSOE*Reg* are insignificant. In addition, we also substitute for *Tun* by transfer of control (*CTR*). Transfer of control refers to the change of controlling shareholder or actual controller of the firm. *CTR* equals 1 when there is transfer of control, and *CTR* equals 0 otherwise. As *the Notice* does not involve any provisions on transfer of control and control right transfer mainly depends on shareholders, especially large shareholders, *CTR* is not likely to be influenced by *the Notice* and independent directors' attendance. Table 9 shows the regression result using *CTR* as the dependent variable. None of the estimated coefficients on *Dil*, *Dil*NSOE*, *Dil*NSOE*Reg* is significant, thus indicating that the difference-in-

Table 10 Robustness check (alternative control groups)

	(1)		(2)		(3)	
	Estimate	<i>t</i> value	Estimate	<i>t</i> value	Estimate	<i>t</i> value
Intercept	0.876	26.58***	0.486	16.82***	0.712	22.84***
<i>Dil</i>	-0.105	-4.87***	-0.036	-1.68*	-0.053	-2.49**
<i>NSOE</i>	0.099	2.90***	0.196	6.32***	0.165	5.31***
<i>Dil*NSOE</i>	-0.103	-2.74***	-0.189	-5.53***	-0.165	-4.87***
<i>Reg</i>	-0.068	-2.41**	0.000	0.01	-0.019	-0.73
<i>Dil*Reg</i>	0.048	1.57	-0.013	-0.46	0.001	0.03
<i>NSOE*Reg</i>	-0.129	-2.84***	-0.186	-4.71***	-0.172	-4.23***
<i>Dil*NSOE*Reg</i>	0.139	2.83***	0.184	4.32***	0.179	4.08***
<i>First</i>	-0.051	-7.80***	-0.024	-4.53***	-0.038	-6.80***
<i>Dual</i>	0.000	0.14	-0.001	-0.26	-0.002	-0.81
<i>Bsize</i>	-0.035	-6.48***	-0.012	-2.83***	-0.024	-5.18***
<i>Indr</i>	-0.008	-0.39	0.022	1.40	0.005	0.26
<i>Accr</i>	-0.004	-0.70	-0.002	-0.47	-0.007	-1.56
<i>Law</i>	-0.001	-2.73***	-0.001	-4.09***	-0.001	-4.21***
<i>Size</i>	-0.033	-29.65***	-0.021	-25.70***	-0.029	-28.40***
<i>Lev</i>	0.195	51.47***	0.164	47.09***	0.173	48.84***
Industry	Controlled		Controlled		Controlled	
<i>F</i> value	184.25		169.75		174.26	
Adj. <i>R</i> ²	0.3347		0.3166		0.3223	
Number of obs.	9,470		9,470		9,470	

The dependent variable is *Tun*. *Dil* equals the ratio of the total number of times independent directors attend board meetings in person within a firm to the total number of times they are supposed to attend meetings. *NSOE* equals 1 if the company is non-state owned and 0 otherwise. *Reg* equals 1 if the observation is between 2006 and 2011 and 0 otherwise. *First* measures the shareholding ratio of the largest shareholder. *Dual* equals 1 if the chairman of the board and the CEO are the same person, and 0 otherwise. *Bsize* equals the logarithm of the total number of directors on the board. *Indr* is the proportion of independent directors on the board. *Accr* is the percentage of independent directors with financial backgrounds to total number of independent directors. *Law* is an index to measure the level of legal system in the district where the firm is founded. *Size* is the logarithm of firm’s total assets. *Lev* is the leverage ratio and equals total liabilities divided by total assets. In column (1), 2,661 SOE observations with largest size of assets are deleted from the full sample; in column (2), 2,661 SOE observations with smallest size of assets are deleted from the full sample; and in column (3), 1,331 SOE observations with smallest size of assets as well as 1,330 SOE observations with largest size of assets are deleted from the full sample

***, **, * Significance at 1, 5, 10 % levels, respectively

difference test using *CTR* is not significantly non-zero. Together, these robustness checks enhance our confidence in the conclusion of this paper.

Since there are more SOE observations than non-SOE observations in our full sample, and considering that *Size* is significantly associated with *Tun*, and there is a great difference between SOEs and non-SOEs on *Size*, we construct three SOE groups as alternative control groups that are of same size with corresponding non-SOEs groups. The first method we use in selecting SOE observations to form a control group is to delete 2,661 SOE observations with largest size of assets and use the remaining 4,735 observations as a control group of non-SOEs. With this method, the mean of *Size* for SOEs is 21.06, while it is 21.05 for non-SOEs. *T* test shows there is no significant difference between the *Size* of SOEs and that of non-SOEs (*t* = 0.58). The regression result is shown in Column (1) of Table 10.

The second method is to delete 2,661 SOE observations with smallest size of assets and use the remaining 4,735 observations as a control group. With this method, the mean of *Size* for SOEs is 22.48 while it is 21.05 for non-SOEs, and t-test shows that *Size* is significantly greater in SOEs (*t* = 66.97). The regression result is presented in Column (2) of Table 10. In the third method, we delete 1,331 SOE observations with smallest size of assets as well as 1,330 SOE observations with largest size of assets and use the remaining 4,735 observations as a control group. With this method, the mean of *Size* for SOEs is 21.68 while it is 21.05 for non-SOEs, and t-test also shows that *Size* is significantly greater in SOEs (*t* = 36.64). The regression result is reported in Column (3) of Table 10. With each method, the estimated coefficients on *Dil* and *Dil*NSOE* are significantly negative, while the coefficient on *Dil*NSOE*Reg* is significantly positive and the coefficient on

Table 11 Robustness check (clustered by firm)

	Full sample		Pre-notice		Post-notice		Non-SOEs		SOEs	
	Estimate	<i>t</i> value	Estimate	<i>t</i> value	Estimate	<i>t</i> value	Estimate	<i>t</i> value	Estimate	<i>t</i> value
Intercept	0.629	12.50***	0.902	10.42***	0.524	11.49***	0.894	10.93***	0.578	10.34***
<i>Dil</i>	-0.093	-2.88***	-0.081	-2.72***	-0.056	-2.19**	-0.205	-3.98***	-0.098	-2.95***
<i>NSOE</i>	0.124	2.11**	0.084	1.55	0.004	0.08				
<i>Dil*NSOE</i>	-0.124	-1.99**	-0.093	-1.73*	-0.002	-0.05				
<i>Reg</i>	-0.053	-1.86*					-0.199	-3.54***	-0.054	-1.87*
<i>Dil*Reg</i>	0.037	1.20					0.192	3.25***	0.034	1.09
<i>NSOE*Reg</i>	-0.137	-2.12**								
<i>Dil*NSOE*Reg</i>	0.138	2.03**								
<i>First</i>	-0.031	-3.75***	-0.038	-2.21**	-0.028	-3.63***	-0.044	-3.59***	-0.027	-2.51**
<i>Dual</i>	0.001	0.29	-0.010	-1.27	0.003	0.73	-0.001	-0.11	0.007	1.26
<i>Bsize</i>	-0.022	-3.32***	-0.033	-2.55**	-0.016	-2.53**	-0.024	-2.01**	-0.024	-3.19***
<i>Indr</i>	0.019	0.70	-0.089	-1.40	0.043	1.69*	-0.005	-0.12	0.012	0.42
<i>Accr</i>	-0.000	-0.05	0.015	0.94	-0.005	-0.72	-0.007	-0.55	0.002	0.18
<i>Law</i>	-0.000	-1.25	-0.000	-0.19	-0.000	-1.76*	-0.001	-3.04***	0.001	1.53
<i>Size</i>	-0.024	-13.95***	-0.037	-9.77***	-0.022	-12.92***	-0.031	-10.33***	-0.021	-10.14***
<i>Lev</i>	0.183	13.66***	0.279	11.93***	0.161	11.66***	0.198	10.92***	0.161	8.49***
Industry	Controlled		Controlled		Controlled		Controlled		Controlled	
<i>F</i> value	210.83		62.59		180.23		135.07		109.59	
Adj. <i>R</i> ²	0.310		0.350		0.291		0.384		0.244	
Number of obs.	12,131		2,523		9,608		4,735		7,396	

The dependent variable is *Tun*. *Dil* equals the ratio of the total number of times independent directors attend board meetings in person within a firm to the total number of times they are supposed to attend meetings. *NSOE* equals 1 if the company is non-state owned and 0 otherwise. *Reg* equals 1 if the observation is between 2006 and 2011 and 0 otherwise. *First* measures the shareholding ratio of the largest shareholder. *Dual* equals 1 if the chairman of the board and the CEO are the same person, and 0 otherwise. *Bsize* equals the logarithm of the total number of directors on the board. *Indr* is the proportion of independent directors on the board. *Accr* is the percentage of independent directors with financial backgrounds to total number of independent directors. *Law* is an index to measure the level of legal system in the district where the firm is founded. *Size* is the logarithm of firm's total assets. *Lev* is the leverage ratio and equals total liabilities divided by total assets

***, **, * Significance at 1, 5, 10 % levels, respectively

*Dil*Reg* is insignificant. These findings are consistent with our hypotheses and keep our conclusions unchanged.

We also use clustered standard errors (clustered by firm) in the robustness check to address the potential clustering effect in the regression. Table 11 shows the results after clustering. In the full sample, the coefficient estimates of *Dil* and *Dil*NSOE* are significantly negative, the coefficient on *Dil*NSOE*Reg* is significantly positive and the coefficient on *Dil*Reg* is insignificant. These are all consistent with our hypotheses. Regressions conducted using sub-samples also report the same results as shown in Table 5. Thus, it can be seen that adjusting for the potential clustering effect does not change our conclusions.

Finally, although we attempt to address the problem of endogeneity by conducting a difference-in-difference analysis, there may still be a concern that the probability of independent directors' attendance might arise endogenously as a function of the degree of tunneling, which is a reversal of our hypothesis. To alleviate this problem, we conduct a two-stage least squares regression (2SLS) using the number of

board meetings (*NBM*), the average age (*Age*) of independent directors on the board, and lagged *Dil* (*Dillag*) as instrument variables. *NBM* equals the number of meetings divided by 100 while *Age* equals the average age of independent directors in the firm divided by 100. The number of board meetings and independent directors' age may affect their participation behavior. Constrained by the accessibility of data, we are unable to control for all of the potential factors affecting the probability of independent directors' attendance, so we use *Dillag* as a proxy of these factors and add it as an instrument variable.

Table 12 presents the result of the 2SLS test. In the first stage, we regress on the probability of independent directors' attendance (*Dil*). The coefficients on *NBM*, *Age*, and *Dillag* are all significant at the 1 % level, showing that higher probability of independent directors' attendance in the last year, more board meetings and higher independent directors' ages lead to a higher probability of independent directors' attendance in the current year. The coefficient of *NSOE* is significantly positive, showing that independent

Table 12 Robustness check (2SLS)

	First stage		Second stage	
	Estimate	t value	Estimate	t value
Intercept	0.630	34.97***	0.795	11.38***
<i>Dil</i>			-0.304	-4.14***
<i>NSOE</i>	0.005	3.30***	0.360	2.87***
<i>Dil*NSOE</i>			-0.370	-2.71***
<i>Reg</i>	0.012	5.57***	-0.212	-2.86***
<i>Dil*Reg</i>			0.212	2.63***
<i>NSOE*Reg</i>			-0.317	-2.30**
<i>Dil*NSOE*Reg</i>			0.327	2.19**
<i>First</i>	-0.004	-0.94	-0.026	-4.57***
<i>Dual</i>	-0.002	-0.82	0.000	0.05
<i>Bsize</i>	-0.040	-9.99***	-0.024	-4.94***
<i>Indr</i>	-0.022	-1.55	0.044	2.57**
<i>Accr</i>	0.005	1.43	-0.001	-0.23
<i>Law</i>	0.001	3.48***	0.000	-2.00**
<i>Size</i>	0.002	2.70***	-0.023	-29.33***
<i>Lev</i>	-0.012	-3.98***	0.172	47.19***
<i>NBM</i>	0.026	5.16***		
<i>Age</i>	0.036	3.40***		
<i>Dillag</i>	0.360	44.29***		
Adj. R ²	0.227		0.291	
Number of obs.	9,832		9,832	

The dependent variable in the first stage is *Dil*. *Dil* equals the ratio of the total number of times independent directors attend board meetings in person within a firm to the total number of times they are supposed to attend meetings. The dependent variable in the second stage is *Tun*. *Tun* equals other receivables deflated by total assets. *NSOE* equals 1 if a company is non-state owned and 0 otherwise. *Reg* equals 1 if the observation is between 2006 and 2011 and 0 otherwise. *First* measures the shareholding ratio of the largest shareholder. *Dual* equals 1 if the chairman of the board and the CEO are the same person, and 0 otherwise. *Bsize* equals the logarithm of the total number of directors on the board. *Indr* is the proportion of independent directors on the board. *Accr* is the percentage of independent directors with financial backgrounds to total number of independent directors. *Law* is an index to measure the level of legal system in the district where the firm is founded. *Size* is the logarithm of firm's total assets. *Lev* is the leverage ratio and equals total liabilities divided by total assets. *NBM* equals the number of meetings divided by 100. *Age* equals the average age of independent directors in the firm divided by 100. *Dillag* is one-year lagged *Dil*

***, **, * Significance at 1, 5, 10 % levels, respectively

directors are more likely to attend board meetings in non-SOEs than in SOEs. A possible reason is that state ownership obstructs the function of independent directors, thus demotivating them to attend meetings. *Reg* and *Law* are positively related to the probability of independent directors' attendance, showing that independent directors are more likely to attend board meetings after the release of the *Notice* and in better legal system environments. The coefficient of *Bsize* and *Indr* are significantly negative at 1 and

5 % levels, respectively. It indicates that independent directors are less likely to attend board meetings when the boards are larger in size and are comprised of more independent directors. This might be caused by "free riding" in larger boards. In the second stage, we regress on *Tun* using estimated *Dil* derived from the first stage. Both coefficients on *Dil* and *Dil*NSOE* are significantly negative. This result is consistent with our previous findings. The coefficient estimate on *Dil*NSOE*Reg* is positive, which also supports our results that the substitution effect is greater in non-SOEs than in SOEs.

Conclusion

Whether independent directors can effectively function in the corporate governance system is a controversial issue. For independent directors to effectively utilize their power, it is essential that they attend board meetings. However, this is largely ignored in previous literature, a fact that hinders our understanding of how independent directors function. This paper explores the effect of independent directors' attendance on the problem of tunneling. The results show that independent directors' attendance reduces tunneling, and that this effect is more pronounced in non-SOEs. The reinforcement of external supervision may substitute for the role of independent directors' attendance. This substitution effect is also more pronounced in non-SOEs. Together, we provide empirical evidence that independent directors' attendance at board meetings can play an important role in protecting investors, especially in non-SOEs and when external supervision is weak.

Our findings have implications both theoretically and institutionally. Theoretically, our results suggest that it is necessary to consider the conduct of independent directors when we discuss their role in corporate governance. This concurs with Roberts et al.'s (2005) proposal: "whilst board structure, composition and independence condition board effectiveness, it is the actual conduct of the non-executive vis-à-vis the executive that determines board effectiveness." We also provide some inputs that may be of use to regulators and policy makers in their attempts to increase the influence of independent directors. They can better prompt independent directors to fulfill their duties by encouraging their diligence. In fact, our results provide direct support for the current requirements on independent directors' attendance.

This paper proposes that independent directors' actions and conduct are also critical to their impact on corporate governance. The paper also attempts to address the endogenous problem in existing research on independent directors using a difference-in-difference approach. However, as with any study, there are limitations. A potential

concern with this paper is that our sample is derived from Chinese market only and may thus limit the generalizability of the findings. As the disclosure of independent directors' attendance is limited in other countries, we should be careful when generalizing the conclusions of this paper. Besides, we are unable to identify which meetings are independent directors absent with only data from database, so we cannot link independent directors' attendance with the specific topics discussed at the meeting, thus limiting our ability to more accurately study the role of independent directors' attendance in investor protection. Future research should obtain data from more countries, which may produce more generalizable results. Moreover, through multinational study, further investigation can be performed to see whether the effect of independent directors' attendance is different under different institutional backgrounds in different countries. Data permitting, follow-up studies may try to associate independent directors' attendance with corresponding topics discussed at board meetings. It will also be interesting to find out whether independent directors' attendance has an impact on other dimensions of corporate governance. Besides, future study may explore the influence of other behaviors and conducts of independent directors, such as their informal communication with executive directors, if data permit.

Acknowledgments We appreciate comments and suggestions from three anonymous reviewers. Huilong Liu and Liansheng Wu acknowledge financial support from the National Natural Science Foundation of China (Nos. 71202028, 71332007 and 71025003).

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