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Can material asset reorganizations affect acquirers' debt financing costs? – Evidence from the Chinese Merger and Acquisition Market☆

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ABSTRACT

In this paper, we investigate whether material asset reorganizations (MARs), a special form of merger and acquisition (M&A) transactions, can affect the acquirers' cost of debt financing. Further, we examine the effect of acquiring firms' accounting information quality on the cost of debt and on the association between MARs and debt costs. We predict that compared to conventional M&As, large-scale acquisitions through MARs can generate a much greater influx of assets from target firms. This raises the acquirers' asset collateral and thus reduces the cost of debt. Because the quality of accounting information is a key factor affecting the cost of debt, we suggest that it has a spillover effect on the debt-cost effect of MARs. Using M&A transactions by listed companies in the Chinese A-share market from 2008 to 2014 as our sample, we find that MARs are associated with a higher asset collateral and lower ex post cost of debt than conventional M&As. Furthermore, we show that the acquiring firms' accounting information quality has a significant negative effect on debt costs, and the negative association between MARs and the cost of debt is more pronounced when accounting information quality is higher.

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1. Introduction

Merger and acquisition (M&A) transactions are a widely discussed issue in research on capital markets. Earlier academic research mainly focuses on the motivation for conducting M&As, including obtaining business synergies, consolidating market position, and building a "commercial empire" (Jensen and Ruback, 1983; Mullin, 1995; Martynova and Renneboog, 2006). The recent literature focuses on whether M&A transactions create wealth value in stock markets, and explore the determinants of this value-creation (Zhang, 2003; Martynova and Renneboog, 2011; Cai and Sevilir, 2012; Tian et al., 2013; Chen et al., 2013a; Kravet, 2014; Mateev, 2017). However, there is little research on the economic consequences of M&As in debt markets. In this paper, we investigate whether and how material asset reorganizations (MARs),[1] a special form of M&A transactions, can affect acquirers' ex post debt financing costs.

The theoretical and empirical literature (e.g., Wang et al., 2014) shows that the cost of debt financing is directly related to borrowing firms' credit risk. Research also finds that creditors rely on the collateral and the quality of accounting information to reduce credit risk and manage loan protection (Chen et al., 2013b; Wang et al., 2014; Pan and Tian, 2016). The MAR is a special form of M&A and has a much higher magnitude than conventional M&A transactions. Thus, MAR implementation could mean that a large amount of assets flow to the acquirer from the target firm, enabling the acquirer to possess considerably greater asset collateral. This would reduce debt financing frictions, lowering the ex post cost of debt. In capital markets, accounting information serves as a crucial "bridge" between a corporation and its investors, because it reflects the firm's financial status, operating results and changes in cash flow. When the accounting information is of high quality, it indicates that the firm's true financial information is reflected to a large extent, so external investors can rely on financial statement numbers and use them to reduce information risk and make rational investment decisions. As a result, the firm's accounting information quality is negatively associated with its debt financing cost (Francis et al., 2005; Spiceland et al., 2016). In addition, when the acquiring firm's accounting information quality is higher, MAR implementation can more effectively reduce debt financing costs, because detailed acquisition information must be disclosed to meet China Securities Regulatory Commission (CSRC) requirements, and newly added asset collateral in the MAR transaction is incremental in perfect information environments.

In this paper, we focus on China's capital market because it provides an excellent setting for our research questions. First, the use of collateral to mitigate agency conflicts is more critical and widespread in emerging markets because the information environment is relatively opaque, and liquidation payoffs and competition between capital suppliers are lower than in developed markets (Chen et al., 2013b; Pan and Tian, 2016). Lu et al. (2008) and Chen et al. (2013b) argue that borrowing firms' accounting information quality can be another effective tool to alleviate debt agency problems in emerging markets, where laws, institutions, and enforcement efforts are generally weak. Collectively, the asset collateral and accounting information quality of borrowing firms are key factors that affect their debt financing cost in emerging markets (Wang et al., 2014). China has the largest emerging capital market. Unlike developed capital markets such as the United States and Europe, it still suffers from poor legal enforcement and weaker information circumstance, although it has grown tremendously, and the investor protection system is gradually being standardized (Li et al., 2013). Therefore, studying the debt-cost effect of asset collateral and accounting information quality in China's capital market is highly relevant and meaningful. Second, under pressure to transform and upgrade China's macro industrial structure, the Chinese government has enacted many policies to promote M&A activities in enterprises. Therefore, M&A transactions are increasing rapidly in the capital market, both in terms of the number of transactions and the size of each transaction (Han and Tang, 2017). These large-scale M&A

[1] According to the management regulation of material asset reorganizations (MARs) of listed companies issued by the China Securities Regulatory Commission (CSRC), a M&A transaction is identified as a MAR if it meets one of the following standards. (1) The total assets purchased by the acquirer account for over 50% of its year-end total assets of the audited consolidated financial statement in the latest fiscal year. (2) The sale income from the assets purchased by the acquirer in the latest fiscal year accounts for over 50% of its sale income of the audited consolidated financial statement in the same period. (3) The net assets purchased by the acquirer account for over 50% of its year-end net assets of the audited consolidated financial statement in the latest fiscal year, and the value of purchased net assets is more than 50 million RMB.

activities involve a substantial influx of assets and information disclosure, providing an appropriate scenario and sample to investigate the effect of asset collateral and accounting information quality on debt financing cost.

We use a sample of 2213 M&A transactions by listed companies in the Chinese A-share market from 2008 to 2014. We find that MARs have a significant negative effect on acquiring firms' ex post debt financing costs. The results are robust when various proxies for debt cost are used. Furthermore, we show that this association is driven by newly added assets and collateral, suggesting that MARs can improve acquiring firms' asset collateral, and subsequently reduce the cost of debt. Moreover, we provide direct evidence that acquiring firms' accounting information quality is negatively associated with their debt financing cost, which supports findings in the literature on the M&A lieu. In addition, we show that the effect of MARs on the cost of debt is more pronounced when acquiring firms' accounting information quality is higher, indicating that accounting information quality has a spillover effect on the debt-cost impact of MARs.

Our study makes several contributions to the literature. First, we contribute to the M&A literature by examining whether MAR transactions affect acquiring firms' ex post debt costs. Studies have explored the motivation for M&As and proposed several theories (e.g., business synergy, transaction costs, market power, agency problem). A growing body of recent literature discusses whether M&As can create value in stock markets, and the factors that determine this value-creation. However, there is little evidence on the consequences of M&A transactions in debt markets. In this paper, we investigate the association between MARs and acquirers' debt costs, and provide new insights into the economic outcomes of M&As.

Second, our paper adds to the literature on debt financing. Debt financing is an important and flexible channel for external corporate financing (Norden and van Kampen, 2013; Li et al., 2013). From a practical perspective, debt financing constitutes a large fraction of a firm's external financing, and bank loans are particularly important. Chinese researchers have focused more on the scale and maturity of debt financing, but have not paid as much attention to the cost of debt financing (Wei et al., 2012). The cost of debt is directly related to the firm's interest expense and net profit, and it affects the firm's business operations, investment activities and financing ability (Wei et al., 2012; Chen and Wang, 2016). It is thus important to study the cost of corporate debt financing. We focus on the Chinese M&A market, a typical emerging market, and analyze the effect of MARs on acquirers' debt financing costs. The conclusions of this paper enrich both the debt financing literature and M&A theory in emerging markets.

Finally, our study contributes to the corporate disclosure literature by examining the economic consequences of financial reporting quality, specifically the direct and indirect effects of financial accounting quality on debt costs. This question is important and relevant to both finance and accounting research because it addresses the functions that accounting serves in financial markets. In their literature review on corporate disclosure, Leuz and Wysocki (2016) point out that the economic consequences of financial reporting require further investigation. In this paper, we study the effect of accounting information quality on debt cost in China's M&A market, and show that acquirers' accounting information quality has a direct effect on debt cost and an indirect effect on the association between the MARs and debt costs. These conclusions will stimulate related research on the economic outcomes of financial accounting.

The remainder of this paper is organized as follows. Section 2 provides a literature review. Section 3 develops the hypotheses. Section 4 discusses our research design. Section 5 presents the results of our empirical tests, and Section 6 concludes the paper.

2. Literature review

This paper investigates how MARs and accounting information quality affect the debt financing costs of acquiring firms. In the following discussion we review two streams of literature pertinent to our research questions.

2.1. The motivation and value-creation of M&A transactions

Literature from the last few decades related to M&As mostly focuses on the motivation for M&As, exploring whether these transactions create value and the factors that determine this value-creation. Earlier studies

focus on examining the motivation for M&As and introduce theories such as efficiency theory (Jensen and Ruback, 1983), agency theory (Jensen and Mecking, 1976) and market power theory (Mullin, 1995). Efficiency theory states that M&A transactions are used to obtain synergies in areas such as management, marketing, operation and finance. From the perspective of agency conflicts, firm managers might conduct M&A transactions to earn private interests such as on-the-job consumption and promotion opportunities. Market power theory argues that firms can use M&As to weaken industrial competition and enhance the market power of their products to obtain monopoly profits. Yu and Wang (2015) show that the main motivations behind Chinese capital market firms' M&As are to eliminate losses, and allow for back door listing and delisting avoidance.

The more recent literature focuses on whether M&A transactions can create value in stock markets, and the factors that drive this value-creation. Empirical results show that M&A transactions can create positive abnormal returns for target firms. However, there is still uncertainty about value-creation for the acquirers' shareholders in developed markets (e.g., Sirower, 1997, Campa and Hernando, 2006; Martynova and Renneboog, 2011; Intrisano and Rossi, 2012; Mateev, 2017). Findings in the Chinese market indicate that M&As fail to create value for acquirers (Zhang, 2003; Li and Zhu, 2006). In recent years, a burgeoning literature has begun to explore the factors affecting this value-creation (or lack thereof), including the internal characteristics and external environment of the acquirers. Internal characteristics include ownership structure (Bhaumik and Selarka, 2012), board governance (Cai and Sevilir, 2012; Chen et al., 2013a; Wang and Hu, 2014), political associations (Liu et al., 2016), managers' characteristics (Chikh and Filbien, 2011; Wang, 2016; De Desar et al., 2016) and internal control (Zhao and Zhang, 2013). External environmental factors include government intervention (Wang and Gao, 2012), market-oriented systems (Wang and Nie, 2016), and industrial clusters (Li et al., 2016).

2.2. The determinants of debt financing costs

Debt financing is a vital part of a firm's external financing. It enables the firm to meet the capital demands of its business operation and to invest, but also facilitates and optimizes its corporate governance mechanisms, for instance by constraining the incentive for over-investment (Watts, 2003). However, the high cost of debt financing can aggravate the firm's interest burden, lower its profitability and exacerbate financing constraints, which consequently influence the firm's business operations and investment activities. Studies (e.g. Jiang, 2009; Chen et al., 2016; Chui et al., 2016) argue that the cost of debt financing is determined by firms' internal features (for instance financial reality, corporate governance, accounting information, internal control and audit opinion) and external environment (for instance government intervention, financial ecological condition and public pressure).

In this paper, we are particularly interested in the role of accounting information quality in lowering the cost of debt. Francis et al. (2005) find that when faced with borrowing firms' relatively poor accruals quality, which increases information risk and is detrimental for mapping accounting earnings into cash flows, creditors demand a higher capital risk premium. Their empirical result shows that firms with bad accruals quality are prone to paying higher debt costs than firms with good accruals quality, consistent with their prediction that accounting quality is priced by the debt market. Li and Wang (2011) find that the higher the quality of accounting information, the lower the information asymmetry and the cost of debt financing. Spiceland et al. (2016) show that firms' financial reporting quality is more important than strict debt covenants in lowering debt cost, although debt covenant design can help mitigate adverse information risk. In addition, Zhang (2008) finds that creditors provide capital with lower interest rates to more conservative borrowers, supporting the argument by Watts (2003) that accounting conservatism can enhance efficiency in the debt contracting process. Wang and Li (2016) also show that accounting conservatism can mitigate the agency problems between borrowing firms and creditors, and reduce creditors' monitoring costs, and thus has a negative effect on debt cost.

Based on the literature review, we identify several questions that require further examination. First, the literature on M&As has concentrated heavily on the motivations for M&A transactions, whether M&A transactions create value in the stock market and the factors that affect this value-creation. However, few studies have explored the economic outcomes of M&As in the debt market. Second, as Wei et al. (2012) point out,

alongside the scale and maturity of debt financing, the cost of debt financing is a key dimension in debt contracting. However, researchers have long overlooked this topic. There is also little evidence to date on the association between the cost of debt financing and MARs. Third, because accounting information serves as a critical channel for communication between the firm and its external decision makers, the quality of accounting information can be an important tool to mitigate information asymmetry and lower the cost of debt. In the Chinese market context, the CSRC requires the acquiring firm to disclose detailed acquisition information when conducting a MAR transaction. If the firm produces high-quality accounting information, the disclosed information should have a higher degree of credibility, which can strengthen the negative effect of an MAR transaction on the cost of debt. Accordingly, our paper addresses these previously unexplored questions by examining how MARs and accounting information quality affect acquirers' debt financing costs.

3. Hypothesis development

Debt financing is the predominate source of external funding for firms with capital demands. Because creditors are not involved in the day-to-day business operations of borrowing firms, the situation generates asymmetric information that results in a trade-off between creditors and debtors. For creditors, the concern is whether the borrowing firms can make repayments on the interest and principal in time. However, in the presence of information asymmetry, two primary imperfections arise: adverse selection (the borrowers' tendency to withhold value-relevant unfavorable information) and moral hazard (the borrowers have risk-shifting incentives and change the use of funds from creditors or the promised direction of corporate investment in debt contracting). Such conflicts will mean risk for creditors (Li and Wang, 2011).

To reduce this credit risk triggered by asymmetric information, the collateral has been extensively used in debt markets around the world. Bonfim (2005) demonstrates the key role of collateral in risk management. It can serve as a screening device to cope with adverse selection, or provides an incentive to reduce moral hazard. The argument about adverse selection focuses on ex ante private information. Studies show that because it is private information and not fully accessible to creditors, high-quality borrowing firms tend to voluntarily provide collateral to signal their low risk in the hope that they can obtain debt with lower interest rates (Jiménez et al., 2006). In terms of the moral hazard problem, studies find that observably riskier borrowers are more likely to be required to provide collateral (Boot et al., 1991; Han et al., 2009). Berger et al. (2011) provide empirical support for these arguments by showing that the ex post theory of collateral is relatively dominant, although both exist. Duarte et al. (2016) use data from Portugal and find that compared to borrowers with a high default risk, good borrowers are more likely to provide collateral as a signal to obtain lower interest rates. Furthermore, creditors require greater collateral and higher interest rates for riskier borrowers to safeguard their capital.

Debt agency problems in the Chinese capital market might be more severe due to the opaque information environment, lower liquidation payoffs and lower competition between capital suppliers (Chen et al., 2013b; Li and Wang, 2013; Pan and Tian, 2016). As a result, the use of collateral becomes more critical for obtaining debt financing with favorable interest rates. In recent years, several researchers in China have analyzed the role of collateral in firms' debt financing. Empirical results indicate that high-quality borrowers are more inclined to provide collateral to demonstrate their creditworthiness. In doing so, the adverse selection problem can be mitigated and firms can obtain lower interest rates. Alternatively, creditors require borrowing firms with low credit ratings to provide greater collateral and pay higher risk premiums to reduce moral hazard and protect their interests in case of a breach of the debt contract (Ping and Yang, 2009; Yin and Gan, 2011). Wang et al. (2014) show that the credit risk in China's debt market can be dispersed using asset collateral and accounting information quality.

MARs are usually regarded as a denotative extended pattern for firms to realize rapid expansion, because in MARs the magnitude of asset transaction is significantly larger than in conventional M&A activities. As a result, the successful implementation of a MAR is always likely to trigger the adjustment of business boundaries (Chang et al., 2014), and it generates tremendous asset flows from the target firm to the acquiring firm. More importantly, this flow enables the acquirer to possess greater asset collateral, and even more than if they had undertaken a conventional M&A transaction. As widely discussed in other studies (e.g., Han et al., 2009; Duarte et al., 2016) collateral is an important external mechanism to ensure creditors' benefits. It can restrain

the borrowing firms' moral hazard and thus reduce the risk premium demanded by creditors. At the same time, the collateral addresses adverse selection problems arising from the information gap between creditors and borrowers. Therefore, borrowing firms are more likely to pledge asset collateral as a signal of their low risk type to achieve lower debt financing cost. Overall, we suggest that acquiring firms conducting MARs are more likely to achieve lower cost debt financing. This leads to the following hypothesis:

H_{1a}. MAR transactions are negatively associated with acquirers' debt financing costs.

In MAR transactions it is difficult for acquiring firms to use their own cash to implement these activities, because the transaction amounts are extremely large. To address this problem, the acquiring firms adopt many methods (for instance they might issue stock publicly or privately, and absorb direct investment) to realize the acquisitions of target assets. To support enterprises to achieve industry transformation through MARs, the Chinese government has established many policies, such as *MAR Supervision Regulation of Listed Companies*, *the Applicable Suggestions on Articles 14 and 44 in MAR Supervision Regulation of Listed Companies–No. 12 Applicable Law to Securities and Futures*, *Revision of the Regulation Relating to MAR and Supporting Funds of Listed Companies, The Regulation of Issuing Shares to Purchase Assets in MAR*.[2] These policies and regulations have greatly encouraged enterprise participation in MAR transactions. Between 2007 and 2013, 76% of listed companies in China used stocks to complete their MARs, and funds raised through these stock issuances reached 887.426 billion RMB, accounting for 72% of the total MAR market asset transaction amount (Chang and Hou, 2015). Xu et al. (2016) show that 84% of acquiring firms in MAR transactions choose the private placement approach to raise funds, and the raised funds are more than the total transaction amount of the MARs. These studies indicate that acquirers undertaking MAR transactions obtain target assets but also acquire a sizeable quantity of assets through supporting funds. These newly added assets can be helpful in improving the acquirers' collateral size, which can mitigate the credit risk from information asymmetry and thus result in lower debt costs.

More specifically, because creditors do not have the same information as borrowers, the selection of creditworthy candidates could be difficult (Karapetyan et al., 2014). Nevertheless, creditors have recognized the risk-mitigation effect of collateral: it can help reduce their potential loss from defaults. Consequently, creditors provide a range of contracting terms so that high (low) quality borrowing firms choose secured (unsecured) debt at lower (higher) risk premiums (Chen et al., 2013b). At the same time, high-quality borrowers are more inclined to provide asset collateral and signal their creditworthiness, which is usually private information and imperfectly provided to creditors (Han et al., 2009; Duarte et al., 2016). Overall, the use of collateral is helpful to mitigate ex ante and ex post informational problems. The empirical literature has shown an inverse association between collateral and the cost of debt (Berger et al., 2011; Cerqueiro et al., 2016). Based on these studies, we predict that as a result of MAR implementation, a large amount of assets flow into acquiring firms. This enables the acquirers to gain greater collateral and reduce the cost of debt financing. Accordingly, we propose the following hypotheses:

H_{1b}. The newly added assets from MAR transactions are negatively associated with acquirers' debt financing costs.

H_{1c}. The newly added collateral from MAR transactions is negatively associated with acquirers' debt financing costs.

[2] When carrying out an MAR transaction, the listed acquiring firm could issue stocks to purchase target assets and at the same time raise part supporting funds to improve the integration performance of the acquisition project. If the proportion of these supporting funds does not exceed 100% of the total transaction amount, the MAR transaction should be approved by the M&A audit committee, and if it is more than 100%, it should be approved by issuance examination committee. Furthermore, the CSRC stipulates that to promote business or industrial integration and enhance synergy effects, the listed acquirer firm can issue stocks to purchase target assets for special objects excluding the controlling shareholder, the actual controller, or its related-party under the limited condition of no change in control right, but the number of issued stocks must be more than 5% of the total capital stock of the listed acquirer firm after stock issuance. If it is less than 5%, the total purchasing asset amount of the listed acquiring firms on the main board and small and medium-sized boards of the China capital market must be not less than 100 million RMB, and 50 million RMB on growth enterprises market board.

In debt financing, creditors lend capital to borrowing firms in return for promised principal and interest payments, and leave the control of operations to borrowing firms' shareholders and managers as long as the execution of debt contracting is satisfactory (Spiceland et al., 2016). The information asymmetry between creditors and borrowers is prevalent in debt markets because creditors lack reliable information about borrowers. As a result, creditors face informational problems such as adverse selection and moral hazard, which make it difficult to assess borrowers' investment projects and monitor opportunistic behaviors (García-Teruel et al., 2014). Thus, when creditors lend capital to borrowers they tend to rely on all available information to assess the borrowers' income-generating ability, the ability to fulfill interest and principal payment obligations in the future (Spiceland et al., 2016).

Accounting information is a primary source of information for creditors (Sengupta, 1998). High quality accounting information can more accurately reflect a firm's operational performance and financial status. Consequently, it allows creditors to evaluate the potential return of investment opportunities and monitor the use of their capital once committed in the debt market (Beyer et al., 2010).

Studies have shown that the quality of borrowers' accounting information can affect creditors' estimates of future cash flows, and debt repayments are serviced from these flows (Bharath et al., 2008). Creditors use this accounting information to estimate borrowers' expected future cash flows and assess their repayment ability. Reliable financial reporting is thus essential for borrowers to reduce the level of information asymmetry and mitigate adverse selection problems. Empirical studies have found that poorer borrowing firm accounting quality hinders the ability to map accounting earnings into cash flows and increases creditors' information risk, leading to a higher risk premium (e.g., Francis et al., 2005; Li and Wang, 2011). Because accounting earnings are a main source of cash flow and the control rights are shifted from borrowers to creditors when accounting-based debt covenants are violated, borrowing firms have incentives to conduct earnings management. Ma et al. (2015) document that creditors (especially banks) can discern borrowing firms' earnings quality using their accounting information. When the quality of accounting earnings is high, the possibility that borrowers have manipulated their earnings is low. The accounting earnings are thus reliable and the information risk faced by creditors is low. As a result, the higher the quality of accounting information provided by borrowers, the lower the debt cost demanded by creditors (Spiceland et al., 2016).

At the same time, high quality accounting information is positively associated with creditors' ability to monitor management activities, and can thus reduce managerial incentives to engage in value-destroying activities such as empire building. Accounting information is an important source of firm-specific information for external investors and is thus widely used by creditors to monitor borrowers (Costello et al., 2011). In summary, high quality accounting information is an important mechanism to communicate borrowers' information to creditors and to facilitate debt monitoring.

Building on the literature, our study focuses on the M&A setting and investigates the effects of accounting information quality on debt costs. We measure accounting quality using the magnitude of adverse operating accruals. Larger abnormal operating accruals suggest unexpected deviations between earnings and operating cash flows, which makes it harder for creditors to estimate future operating cash flows. Accordingly, we argue that high-quality accounting information about acquiring firms could mitigate debt agency problems by reducing information asymmetry (information risk). As a result, we assume that the higher the acquiring firms' accounting information quality, the lower the debt cost required by creditors.

H_2. The accounting information quality of acquirers is negatively associated with their debt financing cost.

According to the limited attention theory of the capital market, investors tend to screen firms when making investment decisions about a large body of companies due to limited time and personal stamina. They select investment portfolios from these screened firms. A MAR transaction involves a larger scale of asset acquisition than a conventional M&A, and thus has a significant influence on the acquiring firm's main business operations. In general, MAR transactions signal investment opportunities and thus attract investors' attention in capital markets.

Furthermore, the CSRC has stringent requirements for information disclosure by acquiring firms in MAR transactions. When announcing an MAR, the acquiring firm must provide an overview of the acquisition, which includes background and incentive, transaction content, target value estimate and whether the transaction is a related-party transaction or a backdoor listing. Moreover, the acquirer must provide information

about the target firm such as operating status, property control relationship, main business development, financial condition and target asset details. The acquirer must also reveal the potential influence of the MAR on its business operations, profitability, ownership structure and peer competition. Finally, the acquirer must mention risk factors that could exist in this transaction, and present the opinions of independent directors and audit opinions of independent financial consultants about the transaction.

If the acquisition disclosure in the MAR announcement is reliable, it saves external investors' information acquisition costs and reduces information asymmetry. As noted above, firms with high accounting quality tend to have a reputation for faithful and accurate disclosures. Creditors find it less likely that these firms will withhold adverse private information, and are more likely to consider them creditworthy candidates. In summary, we suggest that when acquiring firms' accounting information quality is high, it is helpful to strengthen creditors' confidence about the reliability of the acquisition information and newly added assets disclosed in the MAR transactions. This will further reduce the information asymmetry between acquirers and creditors, and enable creditors to more accurately analyze future investment returns, resulting in lower interest rates. We thus predict that acquiring firms' accounting information quality can reinforce the association between MARs and debt costs.

H_3. The negative association between MARs and debt costs is stronger for acquiring firms with higher accounting information quality.

4. Research design

4.1. Sample selection and date sources

Our paper uses the M&A transactions of listed companies in the Chinese A-share market between 2008 and 2014 as the initial research sample. Following other studies (e.g., Chen et al., 2013a; Kravet, 2014; Han and Tang, 2017), we use the following filter rules to select our sample. (1) Listed companies affiliated to the finance and insurance industry or labeled as ST and *ST are excluded. (2) Observations with missing variables or negative net assets are omitted. (3) In consideration of date availability, we only select the buyer in M&A transactions and the buyer is a listed company. (4) Given that M&As can affect the acquiring firm's business activities, we exclude transaction amounts lower than 10 million RMB. (5) Debt restructuring, corporate divestiture or asset replacement M&As are omitted. (6) If the acquiring firm conducts many M&A transactions in a single year, the amounts involved in each M&A transaction are added together to create an annual acquisition amount of the acquiring firm and are included as one observation.

The M&A data are sourced from the CSMAR Database, and the MAR data are obtained from the CSRC website and then manually checked and processed. In addition, financial indexes and information data of listed companies are sourced from the CSMAR and WIND databases. We collect 2213 sample observations involving 1188 listed companies in the A-share market. The sample distribution is shown in Table 1. To mitigate the effect of outliers on our research results, all continuous variables are winsorized at the extreme 1% of their distributions, a widely adopted approach in the empirical corporate finance and accounting literature.

Table 1
Sample distribution.

Year	M&A sample	Percentage of full sample (%)	MMA sample	Percentage of M&A sample (%)
2008	185	8.36	9	4.86
2009	173	7.82	8	4.62
2010	207	9.35	11	5.31
2011	338	15.27	11	3.25
2012	387	17.49	27	6.98
2013	424	19.16	32	7.55
2014	499	22.55	95	19.04
Total	2213	100	193	8.72

4.2. Variable measurement

4.2.1. Material asset reorganization

4.2.1.1. MMA. we view a M&A as a MAR transaction when it meets any one of the three conditions in the *MAR Supervision Regulation of Listed Companies* issued by the CSRC (see Section 1). Using the information announcement in the CSRC website, the *MMA* index is manually selected, which equals one when the M&A conforms to the MAR standard, and zero otherwise.

4.2.2. Newly added asset and collateral

4.2.2.1. ADDASSET. We use the change in total assets before and after M&A to estimate the added assets (*ADDASSET*). More specifically, *ADDASSET* index is calculated as the difference between the assets of the acquiring firm one year after and one year before M&A transaction, divided by the assets of the acquiring firm one year before M&A transaction.

4.2.2.2. ACOLLATER. With reference to previous literature (Hall, 2012; Norden and van Kampen, 2013), we use the change in net fixed assets before and after M&A to measure the added collateral (*ACOLLATER*). Specifically, *ACOLLATER* index is estimated as the difference between the net fixed assets of the acquiring firm one year after and one year before M&A transaction, divided by the net fixed assets of the acquiring firm one year before M&A transaction.

4.2.3. Cost of debt financing

4.2.3.1. DCOST. In the literature, credit ratings of borrowing firms and the average yield to debt maturity are always used to measure the cost of debt financing. However, it is difficult to obtain authoritative credit ratings and yield to maturity information for China's debt market. We therefore use interest expense as a proxy index *DCOST* to estimate borrowing companies' debt costs, consistent with previous studies (e.g., Jiang, 2009; Li and Liu, 2009). Specifically, *DCOST* is calculated as the interest expense divided by the total debt of the acquiring firm one year after M&A transaction.

4.2.4. Accounting information quality

Following Francis et al. (2005) and Huang et al. (2014), we use discretionary accruals calculated using the modified *DD* model developed by Dechow and Dichev in 2002 (hereafter *DD*) to measure the accounting information quality of listed companies, as follows:

$$DA_t = \alpha_0 + \alpha_1 * CFO_{t-1} + \alpha_2 * CFO_t + \alpha_3 * CFO_{t+1} + \alpha_4 * DCFO_t + \alpha_5 * DCFO_t * CFO_t + \theta_t \quad (1)$$

where DA_t is the ratio of total current accruals to the total assets of listed companies in year t, and the total current accruals is equal to net profit plus non-operating income less non-operating expense minus net operating cash flow. CFO_{t-1}, CFO_t and CFO_{t+1} are cash flow from operations in year *t–1*, *t* and $t + 1$ respectively, scaled by average total assets in year *t*. *DCFO* equals one if CFO_t is less than CFO_{t-1}, and zero otherwise.

4.2.4.1. ACCQ1. In other studies, the absolute residual value *ABS_DA* obtained from regression of model (1) is taken as the proxy variable for accounting information quality. If the *ABS_DA* value is greater, it indicates that the higher the unexpected deviations between earnings and operating cash flows, the lower the accounting information quality of listed companies. To simplify, we multiply *ABS_DA* by –1 to obtain a new continuous variable *ACCQ1*, so that the larger the *ACCQ1*, the higher the accounting information quality.

4.2.4.2. ACCQ2. To avoid the possible effects of *ABS_DA*'s outliers and measurement errors on our research results, with reference to the previous literature (e.g., Pittman and Fortin, 2004) we generate an indicator variable *ACCQ2* that is set to one if *ABS_DA* is less than the median of full sample observations, indicating that the accounting information quality is high, and zero otherwise.

4.2.5. Control variables

Following previous studies (Bhojraj et al., 2003; Anderson et al., 2004; Jiang, 2009), we select listed companies' financial characteristics including *SIZE*, *LEV*, *ROA*, *GROWTH*, *INTANG*, *RECEIVE* and corporate

Table 2
Variable definitions.

Variables	Definitions
DCOST	The cost of debt financing, calculated as the interest expense divided by the total debt of the acquiring firm one year after M&A transaction
MMA	An indicator variable, set to one if the acquiring firm implement a MAR transaction, and zero otherwise
ADDASSET	Newly added assets, calculated as the difference between the assets of the acquiring firm one year after and one year before M&A transaction, divided by the assets of the acquiring firm one year before M&A transaction
ACOLLATER	Newly added collateral, calculated as the difference between the net fixed assets of the acquiring firm one year after and one year before M&A transaction, divided by the net fixed assets of the acquiring firm one year before M&A transaction
ACCQ1	A measure of accounting information quality, calculated as the absolute residual from the regression result of model (1) multiplied by –1, suggesting that the higher the ACCQ1, the higher the accounting information quality
ACCQ2	A measure of accounting information quality, which equals one when the absolute residual calculated by model (1) is greater than the median of full sample observations, and zero otherwise
SIZE	The natural logarithm of total assets
LEV	The ratio of total debt to total assets
ROA	The ratio of net income to total assets
GROWTH	The growth rate of operation income
INTANG	The ratio of intangible assets to total assets
RECEIVE	The ratio of operation income to accounts receivable
DUAL	An indicator variable, set to one if the chairman and CEO positions are held by one person, and zero otherwise
SOE	An indicator variable, set to one if the firm belongs to a state owned enterprise, and zero otherwise
FISRT	The proportion of the largest shareholder

governance structure including *DUAL*, *FIRST* and *SOE* as control variables to exclude the effect on debt cost. In addition, we control year and industry fixed effects. All of the variable definitions in this paper are summarized in Table 2.

4.3. Empirical models

To avoid potential endogeneity problems between independent variables (e.g., *MMA*, *ACCQ1* and *ACCQ2*) and debt cost, and considering the hysteresis effect of the MAR, we follow other studies (e.g., Han and Tang, 2017) and choose the lagged debt cost $DCOST_{t+1}$ as the dependent variable in our model design.

Table 3
Descriptive statistics.

Variable	N	Mean	SD	Min	P25	P50	P75	Max
DCOST	2213	0.027	0.014	0.002	0.016	0.027	0.036	0.063
MMA	2213	0.087	0.282	0	0	0	0	1
ADDASSET	2202	0.938	0.994	−0.080	0.274	0.607	1.220	3.861
ACOLLATER	2202	0.572	0.831	−0.245	0.014	0.276	0.796	2.979
ACCQ1	2213	−0.028	0.022	−0.083	−0.039	−0.022	−0.011	−0.002
ACCQ2	2213	0.500	0.500	0	0	1	1	1
SIZE	2213	22.384	1.273	19.933	21.487	22.195	23.131	26.221
LEV	2213	0.538	0.178	0.113	0.403	0.544	0.678	0.901
ROA	2213	0.037	0.038	−0.086	0.015	0.032	0.057	0.169
GROWTH	2213	0.23	0.441	−0.473	0.009	0.153	0.338	2.885
INTANG	2213	0.049	0.047	0.001	0.016	0.036	0.065	0.186
RECEIVE	2213	29.966	52.792	1.641	3.886	8.124	24.072	210.205
DUAL	2213	0.202	0.402	0	0	0	0	1
SOE	2213	0.474	0.499	0	0	0	1	1
FIRST	2213	0.365	0.156	0.022	0.238	0.355	0.476	0.894

To test our hypotheses, we estimate the following regressions:

$$DCOST_{t+1} = c_1 + \alpha_1 * MMA_t + \beta_1' * CONTROL_t + \theta_1 \quad (2)$$

$$DCOST_{t+1} = c_2 + \alpha_2 * ADDASSET_{t+1} + \beta_2' * CONTROL_t + \theta_2 \quad (3)$$

$$DCOST_{t+1} = c_3 + \alpha_3 * ACOLLATER_{t+1} + \beta_3' * CONTROL_t + \theta_3 \quad (4)$$

$$DCOST_{t+1} = c_4 + \alpha_4 * ACCQ_t + \beta_4' * CONTROL_t + \theta_4 \quad (5)$$

$$DCOST_{t+1} = c_5 + \alpha_{51} * MMA_t + \alpha_{52} * ACCQ_t + \alpha_{53} * MMA_t * ACCQ_t + \beta_5' * CONTROL_t + \theta_5 \quad (6)$$

where the dependent variable is the lagged debt cost *DCOST*, and *CONTROL* represents a vector of control variables (e.g., *SIZE, LEV, ROA, GROWTH*, *INTANG*, *RECEIVE, DUAL*, *FIRST* and *SOE*), c is a constant, β' is estimated coefficient matrix of *CONTROL* and θ is regression residual. In model (2), α_1 is the estimated coefficient of independent variable *MMA*, and we expect α_1 to be significantly negative if H_{1a} is true. In model (3), α_2 is the estimated coefficient of independent variable *ADDASSET*. We expect α_2 to be significantly negative if H_{1b} is true. In model (4), α_3 is the estimated coefficient of independent variable *ACOLLATER*. We expect α_3 to be significantly negative if H_{1c} is true. In model (5), α_4 is the estimated coefficient of independent variable *ACCQ* measured by two proxy variables *ACCQ1* and *ACCQ2*. We expect α_4 to be significantly negative if H_2 is true. In model (5), we are interested in the estimated coefficient of interaction variable *MMA*ACCQ* and expect this coefficient α_{53} to be significantly negative if H_3 is true. All of the variable definitions are shown in Table 2.

Table 4
Association between debt cost and MAR transactions based on model (2).

Variable	(1) DCOST	(2) DCOST
MMA		−0.0026***
		(−2.58)
SIZE	−0.0009***	−0.0010***
	(−3.38)	(−3.79)
LEV	0.0084***	0.0087***
	(4.10)	(4.22)
ROA	−0.0528***	−0.0534***
	(−6.32)	(−6.40)
GROWTH	−0.0012*	−0.0010
	(−1.78)	(−1.56)
INTANG	0.0236***	0.0235***
	(3.80)	(3.79)
RECEIVE	−0.0000***	−0.0000***
	(−3.19)	(−3.29)
DUAL	−0.0008	−0.0008
	(−1.12)	(−1.13)
SOE	−0.0003	−0.0003
	(−0.55)	(−0.41)
FIRST	−0.0018	−0.0015
	(−0.95)	(−0.81)
YEAR	yes	yes
INDUSTRY	yes	yes
_cons	−0.1491	−0.2804
	(−0.49)	(−0.90)
R^2	0.1281	0.1307
AR^2	0.1237	0.1260
F	29.3948***	27.5675***
Obs	2213	2213

Note: t statistics in parentheses. ** $p < 0.05$.
* $p < 0.1$.
*** $p < 0.01$.

5. Empirical results

5.1. Descriptive statistics

Table 3 presents the descriptive statistics of our main variables. As in other studies (e.g., Zou and Adams, 2008; Jiang, 2009), the mean and median values of *DCOST* are approximately 2.7%. However, there is an obvious difference between quantile values that could be related to *MMA* and *AACQ*. The mean value of *MMA* is 0.087, which indicates that 8.7% of sample firms engaged in MAR transactions between 2008 and 2014, consistent with the total result of sample distribution in Table 1. The mean value of *SOE* and *DUAL* is 0.474 and 0.202 respectively, which shows that 47.4% of sample firms are state-owned enterprises and firms in which the chairman and CEO positions are held by on person account for 20.2% of the total sample. Descriptive results for other variables are similar to previous studies (e.g., Zou and Adams, 2008; Huang et al., 2014).

Table 5
Effects of the added asset and collateral on debt cost based on model (3) and (4).

Variable	(1) ADDASSET	(2) DCOST	(3) DCOST	(4) ACOLLATER	(5) DCOST	(6) DCOST
MMA	0.9710***		0.0003	0.3874***		−0.0017*
	(14.33)		(0.29)	(6.11)		(−1.69)
ADDASSET		−0.0026***	−0.0027***			
		(−9.10)	(−8.78)			
ACOLLATER					−0.0017***	−0.0016***
					(−5.29)	(−5.02)
SIZE	−0.1066***	−0.0010***	−0.0010***	−0.0230	−0.0007**	−0.0008***
	(−5.52)	(−3.78)	(−3.71)	(−1.28)	(−2.56)	(−2.81)
LEV	0.3144**	0.0117***	0.0117***	0.0210	0.0107***	0.0109***
	(2.22)	(5.86)	(5.84)	(0.16)	(5.29)	(5.38)
ROA	2.5287***	−0.0456***	−0.0455***	0.7833	−0.0504***	−0.0509***
	(4.47)	(−5.68)	(−5.66)	(1.48)	(−6.22)	(−6.29)
GROWTH	1.0107***	0.0005	0.0005	0.4536***	−0.0015	−0.0014
	(14.62)	(0.51)	(0.52)	(7.02)	(−1.50)	(−1.42)
INTANG	−0.0009**	−0.0000***	−0.0000***	−0.0001	−0.0000**	−0.0000**
	(−2.40)	(−2.72)	(−2.72)	(−0.15)	(−2.24)	(−2.26)
RECEIVE	0.0098	−0.0004**	−0.0004**	0.0043	−0.0004**	−0.0004**
	(0.91)	(−2.45)	(−2.45)	(0.42)	(−2.54)	(−2.55)
DUAL	0.1256***	−0.0000	−0.0000	0.1354***	−0.0001	−0.0001
	(2.60)	(−0.03)	(−0.02)	(3.00)	(−0.15)	(−0.18)
SOE	−0.0848**	−0.0021***	−0.0021***	−0.1339***	−0.0021***	−0.0021***
	(−1.97)	(−3.42)	(−3.43)	(−3.33)	(−3.46)	(−3.38)
FIRST	0.1001	−0.0031*	−0.0032*	0.2655**	−0.0031*	−0.0030*
	(0.79)	(−1.75)	(−1.76)	(2.25)	(−1.73)	(−1.65)
YEAR	yes	yes	yes	yes	yes	yes
INDUSTRY	yes	yes	yes	yes	yes	yes
_cons	2.6621***	0.0492***	0.0490***	0.4178	0.0342***	0.0361***
	(6.24)	(8.15)	(8.06)	(1.04)	(5.63)	(5.85)
R^2	0.2629	0.2520	0.2520	0.0788	0.2333	0.2344
AR^2	0.2538	0.2427	0.2424	0.0673	0.2238	0.2245
F	28.7191	27.1237	26.1471	6.8889	24.5188	23.7657
Obs	2202	2202	2202	2202	2202	2202

Note: *t* statistics in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

5.2. Mars and debt cost: The test results of H_{1a}, H_{1b} and H_{1c}

Table 4 presents the *OLS* regression results from model (2) above. In Column 1, we only consider the influence of control variables (e.g., *SIZE, LEV, ROA*) on the debt costs of acquiring firms. We observe a negative association between acquirer size and debt cost. Acquirers with greater financial leverage have higher debt costs, and profit ability is negatively associated with debt cost. Acquirers with a higher proportion of intangible assets have higher debt costs, and the faster the turnover of accounts receivable, the lower the debt costs. These empirical results are in line with financial facts and consistent with other studies (e.g., Zou and Adams, 2008; Wei et al., 2012). In Column 2, we include the independent variable *MMA* on the basis of Column 1 and find that the estimated coefficient of *MMA* is –0.0026, which is significant at the 1% level. This result shows that MARs have a significant negative effect on the acquiring firms' ex post debt costs after the effects of control variables are excluded and when year and industry fixed effects are controlled. This result indicates that MARs more effectively reduce acquirers' debt costs than conventional M&A transactions, so H_{1a} is verified.

Table 5 reports the *OLS* regression results from model (3) above. The estimated coefficient of *MMA* in Column 1 is 0.9710 and statistically significant at the 1% level, indicating that MARs have a positive effect on acquirers' newly added assets. The estimated coefficient of *ADDASSET* in Column 2 is –0.0026 and statistically significant at the 1% level, suggesting that the newly added assets have a negative effect on acquiring firms' debt costs. In Column 3, we include both *MMA* and *ADDASSET* for regression. The result shows that

Table 6
Association between debt cost and accounting information quality based on model (5).

Variable	(1) DCOST	(2) DCOST
ACCQ1	−0.0579***	
	(−4.57)	
ACCQ2		−0.0021***
		(−3.70)
SIZE	−0.0008***	−0.0009***
	(−2.98)	(−3.26)
LEV	0.0078***	0.0081***
	(3.80)	(3.97)
ROA	−0.0578***	−0.0563***
	(−6.89)	(−6.71)
GROWTH	−0.0012*	−0.0012*
	(−1.80)	(−1.79)
INTANG	0.0246***	0.0246***
	(3.98)	(3.97)
RECEIVE	−0.0000***	−0.0000***
	(−3.21)	(−3.39)
DUAL	−0.0009	−0.0009
	(−1.25)	(−1.26)
SOE	−0.0004	−0.0004
	(−0.60)	(−0.60)
FIRST	−0.0018	−0.0015
	(−0.96)	(−0.78)
YEAR	yes	yes
INDUSTRY	yes	yes
_cons	−0.2177	−0.1874
	(−0.71)	(−0.61)
R^2	0.1363	0.1335
AR^2	0.1316	0.1288
F	28.9251***	28.2401***
Obs	2213	2213

Note: *t* statistics in parentheses. ** $p < 0.05$.
* $p < 0.1$.
*** $p < 0.01$.

the estimated coefficient of *MMA* is statistically insignificant and the estimated coefficient of *ADDASSET* is statistically significant. Following the mediating effect test procedure proposed by Baron and Kenny (2002), we combine the results of Table 5 in Columns 1–3 with the proven hypothesis H_{1a}, and thereby conclude that the acquirers conducting MARs have more newly added assets than conventional M&As and thus reduce their debt financing costs. That is, MARs negatively affect acquiring firms' ex post debt cost by positively affecting newly added assets, so H_{1b} is verified.

This paper also verifies whether the decline in acquiring firms' debt cost is caused by the increase in collateral from the MARs. The test results from model (4) are presented in Table 5. In Column 4 the estimated coefficient of *MMA* is 0.3874 and significant at the 1% level. This result shows that the MARs have a positive effect on the acquirers' newly added collateral. The estimated coefficient of *ACOLLATER* in Column 5 is –0.0017 and significant at 1%, indicating that newly added collateral has a significant negative effect on the acquiring firms' debt costs. In addition, Column 6 shows that the estimated coefficients of *MMA* and *ACOLLATER* are statistically significant. Using the above test method of mediating effect, we can conclude that MAR transac-

Table 7
Moderating effect of the acquiring firms' accounting information quality based on model (6).

Variable	(1) DCOST	(2) DCOST	(3) DCOST	(4) DCOST
MMA	−0.0030***	−0.0057***	−0.0029***	−0.0004
	(−2.93)	(−3.46)	(−2.85)	(−0.31)
ACCQ1	−0.0607***	−0.0516***		
	(−4.78)	(−3.85)		
MMA*ACCQ1		−0.0853**		
		(−2.10)		
ACCQ2			−0.0022***	−0.0017***
			(−3.89)	(−2.88)
MMA*ACCQ2				−0.0060***
				(−2.99)
SIZE	−0.0009***	−0.0009***	−0.0010***	−0.0010***
	(−3.44)	(−3.37)	(−3.72)	(−3.65)
LEV	0.0080***	0.0077***	0.0084***	0.0079***
	(3.92)	(3.77)	(4.09)	(3.86)
ROA	−0.0588***	−0.0595***	−0.0572***	−0.0582***
	(−7.01)	(−7.10)	(−6.83)	(−6.95)
GROWTH	−0.0010	−0.0009	−0.0010	−0.0009
	(−1.54)	(−1.35)	(−1.54)	(−1.36)
INTANG	0.0246***	0.0243***	0.0246***	0.0243***
	(3.98)	(3.94)	(3.98)	(3.93)
RECEIVE	−0.0000***	−0.0000***	−0.0000***	−0.0000***
	(−3.32)	(−3.28)	(−3.50)	(−3.48)
DUAL	−0.0009	−0.0009	−0.0009	−0.0009
	(−1.27)	(−1.23)	(−1.28)	(−1.30)
SOE	−0.0003	−0.0003	−0.0003	−0.0003
	(−0.44)	(−0.50)	(−0.45)	(−0.55)
FIRST	−0.0015	−0.0015	−0.0012	−0.0012
	(−0.81)	(−0.80)	(−0.62)	(−0.62)
YEAR	yes	yes	yes	yes
INDUSTRY	yes	yes	yes	yes
_cons	−0.3701	−0.3699	−0.3343	−0.3303
	(−1.20)	(−1.20)	(−1.08)	(−1.07)
R^2	0.1396	0.1414	0.1367	0.1401
AR^2	0.1346	0.1359	0.1316	0.1347
F	27.4548***	25.8489***	26.7749***	25.5895***
Obs	2213	2213	2213	2213

Note: *t* statistics in parentheses. * $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

tions enable the acquirers to obtain greater newly added collateral than conventional M&As, and thus reduce debt financing costs. That is, MARs negatively affect acquiring firms' debt costs by partially affecting newly added collateral. This indicates that greater asset collateral from MARs is more likely to reduce the acquiring firms' debt costs, so H_{1b} is verified.

5.3. Acquiring firms' accounting information quality and debt costs: The test results of H_2

Table 6 shows the *OLS* regression results from model (5). In Column 1, the independent variable is *ACCQ1*, a continuous variable measuring the accounting information quality of acquiring firms. The estimated coefficient of *ACCQ1* is –0.0579 and statistically significant at the 1% level. In Column 2, the independent variable is *ACCQ2*, an indicator variable adjusting absolute residuals of model (1) by the median of full sample observations. The estimated coefficient of *ACCQ2* is –0.0021 and statistically significant at the 1%

Table 8
Robustness test: alternative measurement of debt cost following the practice of Zou and Adams (2008).

Variable	(1) DCOST2	(2) DCOST2	(3) DCOST2	(4) DCOST2	(5) DCOST2
MMA	−0.0024**			−0.0059***	−0.0003
	(−2.34)			(−3.52)	(−0.20)
ACCQ1		−0.0615***		−0.0537***	
		(−4.76)		(−3.93)	
ACCQ2			−0.0022***		−0.0019***
			(−3.94)		(−3.12)
MMA*ACCQ1				−0.0971**	
				(−2.35)	
MMA*ACCQ2					−0.0059***
					(−2.91)
SIZE	−0.0007***	−0.0005*	−0.0006**	−0.0006**	−0.0007**
	(−2.67)	(−1.86)	(−2.15)	(−2.23)	(−2.52)
LEV	0.0080***	0.0071***	0.0075***	0.0070***	0.0073***
	(3.84)	(3.42)	(3.59)	(3.36)	(3.48)
ROA	−0.0583***	−0.0631***	−0.0615***	−0.0648***	−0.0634***
	(−6.85)	(−7.38)	(−7.20)	(−7.59)	(−7.43)
GROWTH	−0.0007	−0.0008	−0.0008	−0.0005	−0.0006
	(−1.04)	(−1.25)	(−1.25)	(−0.81)	(−0.85)
INTANG	0.0211***	0.0222***	0.0223***	0.0219***	0.0219***
	(3.33)	(3.53)	(3.53)	(3.48)	(3.48)
RECEIVE	−0.0000***	−0.0000***	−0.0000***	−0.0000***	−0.0000***
	(−2.80)	(−2.73)	(−2.92)	(−2.78)	(−3.00)
DUAL	−0.0009	−0.0010	−0.0010	−0.0009	−0.0010
	(−1.18)	(−1.30)	(−1.31)	(−1.28)	(−1.35)
SOE	−0.0000	−0.0002	−0.0002	−0.0001	−0.0001
	(−0.07)	(−0.24)	(−0.25)	(−0.16)	(−0.21)
FIRST	−0.0023	−0.0025	−0.0022	−0.0022	−0.0019
	(−1.19)	(−1.32)	(−1.13)	(−1.17)	(−0.99)
YEAR	yes	yes	yes	yes	yes
INDUSTRY	yes	yes	yes	yes	yes
_cons	0.0683	0.1173	0.1484	−0.0262	0.0142
	(0.22)	(0.38)	(0.48)	(−0.08)	(0.05)
R^2	0.1226	0.1293	0.1265	0.1344	0.1326
AR^2	0.1178	0.1246	0.1218	0.1289	0.1271
F	25.6079***	27.2312***	26.5586***	24.3785***	24.0025***
Obs	2213	2213	2213	2213	2213

Note: *t* statistics in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

level. Overall, these results indicate that the accounting information quality of acquiring firms has a direct negative impact on the cost of debt after other determinants of debt cost and year and industry fixed effects are controlled. This finding indicates that acquiring firms with higher accounting information quality are more likely to obtain lower cost debt financing, so H_2 is verified.

5.4. Moderating effect of accounting information quality: The test results of H_3

Table 7 reports the *OLS* regression results from model (6). To test the robustness of H_{1a} and H_2, we simultaneously put *MMA* and *ACCQ* into the regression model. The results are presented in Columns 1 and 3 of Table 6. These results show that both MARs and accounting information quality have a statistically significant, negative effect on acquiring firms' debt costs, indicating that H_{1a} and H_2 are correct. In Columns 2 and 4 of Table 6 we introduce the interaction variables *MMA*ACCQ1* and *MMA*ACCQ2*. The results show that all of the estimated coefficients of these interaction variables are significantly negative. Specifically, the esti-

Table 9
Robustness test: alternative measurement of debt cost calculated by financial expense divided by total debt.

Variable	(1) DCOST3	(2) DCOST3	(3) DCOST3	(4) DCOST3	(5) DCOST3
MMA	−0.0027**			−0.0058***	−0.0006
	(−2.54)			(−3.34)	(−0.42)
ACCQ1		−0.0552***		−0.0488***	
		(−4.12)		(−3.45)	
ACCQ2			−0.0022***		−0.0018***
			(−3.69)		(−2.93)
MMA*ACCQ1				−0.0861**	
				(−2.01)	
MMA*ACCQ2					−0.0058***
					(−2.77)
SIZE	−0.0016***	−0.0014***	−0.0015***	−0.0015***	−0.0016***
	(−5.61)	(−4.86)	(−5.11)	(−5.22)	(−5.48)
LEV	0.0153***	0.0145***	0.0148***	0.0144***	0.0146***
	(7.07)	(6.68)	(6.83)	(6.65)	(6.73)
ROA	−0.0463***	−0.0504***	−0.0493***	−0.0522***	−0.0512***
	(−5.26)	(−5.69)	(−5.58)	(−5.89)	(−5.80)
GROWTH	−0.0008	−0.0009	−0.0009	−0.0006	−0.0006
	(−1.11)	(−1.35)	(−1.34)	(−0.92)	(−0.93)
INTANG	0.0293***	0.0304***	0.0305***	0.0301***	0.0302***
	(4.49)	(4.65)	(4.67)	(4.62)	(4.63)
RECEIVE	−0.0000***	−0.0000***	−0.0000***	−0.0000***	−0.0000***
	(−3.28)	(−3.20)	(−3.38)	(−3.27)	(−3.47)
DUAL	−0.0015*	−0.0015**	−0.0016**	−0.0015**	−0.0016**
	(−1.91)	(−2.02)	(−2.04)	(−2.01)	(−2.08)
SOE	−0.0004	−0.0005	−0.0005	−0.0004	−0.0005
	(−0.59)	(−0.77)	(−0.77)	(−0.67)	(−0.72)
FIRST	−0.0012	−0.0015	−0.0011	−0.0012	−0.0008
	(−0.62)	(−0.75)	(−0.58)	(−0.60)	(−0.42)
YEAR	yes	yes	yes	yes	yes
INDUSTRY	yes	yes	yes	yes	yes
_cons	0.1654	0.2367	0.2617	0.0799	0.1127
	(0.51)	(0.73)	(0.81)	(0.24)	(0.35)
R^2	0.1428	0.1468	0.1456	0.1516	0.1516
AR^2	0.1381	0.1422	0.1409	0.1462	0.1462
F	30.5378	31.5564	31.2323	28.0496	28.0504
Obs	2213	2213	2213	2213	2213

Note: *t* statistics in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

mated coefficient of $MMA^{*}ACCQ1$ in Column 2 is –0.0853, which is significant at the 5% level, and the estimated coefficient of $MMA^{*}ACCQ2$ in Column 4 is –0.0060, which is significant at the 1% level. These findings indicate that the quality of accounting information has an enhanced moderating effect in the relationship between MARs and debt cost. That is, when acquiring firms' accounting information quality is higher, the negative effect of MARs on ex post debt financing costs is stronger. Overall, we confirm that MAR transactions by acquiring firms with high accounting information quality have a stronger negative effect on the ex post cost of debt financing than MAR transactions by acquiring firms with low accounting information quality, so H_3 is verified.

5.5. Robustness tests

To further validate our research results, we conduct various robustness tests as follows. First, we acknowledge that our proxy for debt cost could be noisy. This paper therefore selects alternative measurements for the

Table 10
Robustness test: alternative measurement of ACCQ calculated by modified Jones matching performance model.

Variable	(1) DCOST	(2) DCOST	(3) DCOST	(4) DCOST
MMA			−0.0051***	−0.0005
			(−3.10)	(−0.38)
ACCQ3	−0.0282***		−0.0244**	
	(−2.89)		(−2.37)	
ACCQ4		−0.0023***		−0.0019***
		(−4.16)		(−3.33)
MMA*ACCQ3			−0.0539*	
			(−1.75)	
MMA*ACCQ4				−0.0056***
				(−2.84)
SIZE	−0.0009***	−0.0009***	−0.0010***	−0.0010***
	(−3.16)	(−3.22)	(−3.59)	(−3.65)
LEV	0.0079***	0.0079***	0.0079***	0.0077***
	(3.82)	(3.85)	(3.86)	(3.77)
ROA	−0.0546***	−0.0546***	−0.0560***	−0.0566***
	(−6.52)	(−6.56)	(−6.70)	(−6.80)
GROWTH	−0.0014**	−0.0013**	−0.0012*	−0.0011
	(−2.11)	(−2.04)	(−1.83)	(−1.64)
INTANG	0.0242***	0.0240***	0.0239***	0.0237***
	(3.90)	(3.89)	(3.86)	(3.84)
RECEIVE	−0.0000***	−0.0000***	−0.0000***	−0.0000***
	(−3.16)	(−3.24)	(−3.23)	(−3.36)
DUAL	−0.0009	−0.0009	−0.0009	−0.0010
	(−1.23)	(−1.21)	(−1.24)	(−1.33)
SOE	−0.0003	−0.0003	−0.0003	−0.0002
	(−0.56)	(−0.49)	(−0.43)	(−0.31)
FIRST	−0.0018	−0.0017	−0.0017	−0.0016
	(−0.99)	(−0.89)	(−0.89)	(−0.84)
YEAR	yes	yes	yes	yes
INDUSTRY	yes	yes	yes	yes
_cons	−0.1914	−0.2333	−0.3389	−0.3813
	(−0.63)	(−0.76)	(−1.09)	(−1.23)
R^2	0.1314	0.1349	0.1357	0.1412
AR^2	0.1267	0.1302	0.1302	0.1357
F	27.7316	28.5873	24.6482	25.8122
Obs	2213	2213	2213	2213

Note: t statistics in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

Table 11
Robustness test: longitudinal comparison in the debt cost effect of MARs.

Debt cost one year before MARs		Debt cost one year after MARs		Mean test (t value)
Mean value	Standard deviation	Mean value	Standard deviation	
0.0274	0.0011	0.0259	0.0011	1.2927*

Note: **$p < 0.05$, ***$p < 0.01$.
*$p < 0.1$.

cost of debt that result in modified dependent variables. Zou and Adams (2008) use the sum of interest expense and interest capitalized to total debt ratio as a proxy variable *DCOST2* for debt cost. We choose this alternative measurement *DCOST2* and rerun all hypothesis test models, and the results are reported in Table 8. Interest expenses are also an important component of firms' debt costs. However, debt costs also include debt financing fees and other financial expenses, which are all part of the firm's financial expenses. We therefore use the ratio of financial expense to total debt as a wide proxy variable *DCOST3* for debt cost, and the results are presented in Table 9. From these results in Tables 8 and 9, we find that our hypotheses are still supported, but not as strongly.

Next, we examine whether our findings are robust when an alternative proxy for accounting information quality is used that results in modified independent variables of H_2 and H_3. Other studies (e.g., Kothari et al., 2005; Pan and Yu, 2014) use a modified Jones matching performance model to calculate discretionary accruals and measure accounting information quality. Using this approach, we re-estimate the *ACCQ* of acquiring firms and set up two proxy indexes. These indexes are *ACCQ3* and *ACCQ4*. Similar to *ACCQ1* and *ACCQ2*, *ACCQ3* is a continuous variable calculated as the opposite of absolute residuals in a modified Jones matching performance model, and *ACCQ4* is an indicator variable adjusted by the median absolute residuals of the full sample. The test results are reported in Table 10. The conclusions drawn in this paper are not substantially affected, even though the significance of individual estimated coefficients are weaker. H_2 and H_3 are therefore robust.

Finally, we follow other studies (e.g., Han and Tang, 2017) and adopt the longitudinal comparison method to test our finding that MAR transactions can reduce acquiring firms' debt costs. The analysis result is displayed in Table 11. We find a significant downward trend in debt costs from one year before an acquiring firm's MAR transaction to one year after the transaction. Together with the results of our horizontal comparison analysis, we conclude that MAR implementation decreases acquiring firms' debt costs.

6. Conclusion

In this paper, we investigate whether MARs (as a special form of M&A transaction) are related to acquiring firms' debt financing costs. Using a sample of listed companies' M&A transactions in the Chinese A-share market, we find that MAR implementation can enable the acquirers to obtain a massive inflow of assets from target firms and gain significant asset collateral, and this can decrease the acquirers' debt financing costs. Our results help to reveal the economic consequences of M&A transactions and enrich the current literature on debt financing. This paper also examines the role of accounting information quality in the M&A market. We show that acquiring firms' accounting information quality has a significant negative effect on their debt financing costs. This result builds on studies that find a negative relationship between accounting information quality and debt costs. In addition, we find that the effect of MARs on the ex post cost of debt financing is stronger for acquiring firms that have higher quality accounting information. This result indicates the spillover effect of accounting information quality in the M&A setting, and helps to reveal the reinforcing mechanism of the MARs on debt cost.

Our paper sheds light on the consequences of M&A transactions in the debt market by investigating the association between MARs and debt costs with horizontal and longitudinal comparisons. At the same time, we provide direct evidence for the usefulness of accounting information, which has been subject to considerable debate in recent decades, by confirming the importance of the quality of accounting information in lowering the cost of debt financing. The results of our study show that acquirers' accounting information quality

directly affects debt financing costs, and also intensifies the negative relationship between MARs and debt cost. These findings provide valuable insights for managers in acquiring firms, because the results that by improving the quality of their accounting information, acquirers can lower the cost of debt financing. More specifically, to reduce debt financing costs, acquiring firms should actively improve their financial reporting quality rather than conduct earnings manipulation, and should decrease information risk and financial friction. Acquiring firms conducting MAR transactions also need to improve the quality of their accounting information and further decrease information asymmetry in capital markets if they desire lower-cost debt financing.

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Does independent directors' monitoring affect reputation? Evidence from the stock and labor markets☆

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ABSTRACT

Using novel data on independent directors' opinions in China, we investigate the stock and labor market effects prompted by independent directors publicly saying "no" to major board decisions. We find that the market reacts negatively to modified director opinions, but positively to firms interlocked with the directors who said "no." We further find substantial turnover and decline in board seats after independent directors issue modified opinions. Overall, we identify a dilemma in China whereby the labor market does not reward vigilant directors for standing up to firm insiders, although investors add a premium to effective board monitoring.

1. Introduction

The reputation-related consequences of independent directors are an issue of considerable public and academic interest. Independent directors are widely believed to play an important role in corporate governance. Fama and Jensen (1983) suggest that independent directors can make distinct contributions in aligning managers with the interests of stockholders. The most significant incentive for independent directors to pursue

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effective board monitoring is to develop their reputations as decision experts. Although Fama and Jensen (1983) indicate that independent directors' reputations hold positive value, it is difficult to empirically evaluate such reputations, as firms rarely disclose the activities of individual directors in the boardroom. Therefore, many studies have inferred the value of independent directors' reputations by investigating the stock or director labor market responses in the wake of extraordinary events. For example, firms with insider-dominated boards are more likely to confront financial distress (Gilson, 1990; Harford, 2003), report earnings restatements (Srinivasan, 2005), face class-action lawsuits (Fich and Shivdasani, 2007) and announce director turnovers (Fahlenbrach et al., 2010; Agrawal and Chen, 2011). Most of these studies have found that on average investors react negatively to these adverse signals of weak board monitoring and that independent directors suffer reputational penalties if they do not vigilantly monitor top management. Although this line of research provides insights into the ex post settling-up mechanism of directors' labor market, it is limited in its efforts to impute these corporate failures to poor board monitoring by independent directors (Richardson, 2005). More importantly, in the vast majority of firms that do not face these crises, direct evidence of how independent directors help to oversee boards remains scant.

We exploit a unique dataset of independent directors' monitoring efforts to uncover the corresponding effect on independent directors' reputations and career prospects. China's market regulator, the China Securities Regulatory Commission (CSRC), requires independent directors to publicly disclose their opinions on important managerial decisions. Such directors are expected to say "no" in board meetings if they believe that a board proposal is not in the interests of shareholders. Furthermore, an independent director's opinion not only serves as a signal to the external market regarding his/her monitoring efforts, but also may give directors legal relief from potential lawsuits. Thus, the unique disclosure of independent directors' monitoring activities in the Chinese market sheds light on the "black box" of board function.

We use this context to investigate the consequences of the board disputes that arise when independent directors say "no." First, we study whether Chinese investors value independent directors' monitoring efforts. We expect the market to interpret independent directors standing up to firm insiders about any detected irregularities as negative news, as modified opinions disclose board disputes that may be unobservable otherwise. Our focus is the analysis of the stock market reaction to independent directors' opinions regarding director-interlocked firms. Under the reputation hypothesis, the market should respond positively to firms interlocked with directors who say "no," given that the announcement of a modified director opinion signals effective monitoring by the opinion-issuing directors. In contrast, the endogenous hypothesis predicts a negative market response to director-interlocked firms, as firms that share the same independent directors may reveal problems that are similar to those of the opinion-receiving firms. Second, to examine the wealth effects of individual independent directors, we analyze the changes in board seats for opinion-receiving firms and other director-interlocked firms. If independent directors develop a reputation for independent monitoring by saying "no" to controlling shareholders or top executives, then according to Fama and Jensen (1983) they are more likely to keep their board seats in director-interlocked firms or gain more board seats after they issue negative comments on corporate decisions.

We find that firms receiving modified director opinions sustain negative cumulative abnormal returns (CARs), whereas interlocked firms exhibit positive returns around the announcements of modified independent director opinions. There is also a significant turnover for independent directors who say "no" in opinion-receiving firms subsequent to the issuance of modified independent directors' opinions. Contrarily, the evidence shows that these directors tend to lose more directorships. Our findings are to some extent consistent with the director reputation hypothesis, which suggests that Chinese investors value effective monitoring conducted by independent directors. In the long run, however, vigilant directors are not rewarded for their reputation of effective monitoring, as Fama and Jensen (1983) suggest. One possible explanation is that Chinese firms may self-select lax monitoring for easy managerial control and manipulation.

Our study is closely related to Jiang et al. (2016), who examine the association between independent directors' propensity to issue modified opinions and their career concerns and media coverage. Our study differs from Jiang et al. (2016) in two important ways. First, our results shed light on the dilemma that although investors value effective board oversight, independent directors' monitoring efforts are not rewarded by the director labor market in China, where controlling shareholders often determine who can sit on the board. Second, our findings help differentiate the alternative hypotheses proposed by Fich and Shivdasani (2007) by

showing that the market may react differently in opinion-receiving firms and director-interlocked firms when an independent director says "no."

We contribute to the literature in several ways. First, we help disentangle the three hypotheses proposed by Fich and Shivdasani (2007). In contrast to most previous studies of director reputation, we evaluate Chinese independent directors' reputations by focusing on their modified opinions of corporate decisions, a positive signal of effective monitoring. Using this novel data, we abstract the legal liability hypothesis and conduct a cleaner test to differentiate between director reputation and the endogenous hypotheses.

Second, we clarify the role of independent directors' reputations in emerging markets. In a related study, Tang et al. (2013) find that independent directors' opinions help to mitigate the agency costs of listed Chinese firms. Our analysis complements this finding by showing that although the stock market values effective board oversight, vigilant directors do not receive rewards from the director labor market in China, by which controlling shareholders can determine who is invited to the board.

Third, our findings in the Chinese context may have implications for regulators who intend to improve the transparency and effectiveness of board governance. As the majority of firms in emerging markets are dominated by controlling shareholders, which may determine the slate of directors, the director labor market therein may drive out independent directors who dare to stand up to firm insiders in board meetings. Without concurrent improvement in market institutions and governance structures, such as in the procedure for nominating and selecting directors, the expected effect of disclosing independent directors' opinions can hardly be sustained in the long run.

This paper continues as follows. Section 2 introduces the institutional background and develops the hypotheses. Section 3 describes the sample and variables. Sections 4 and 5 provide the results. Section 6 presents the robustness checks. Section 7 concludes the paper.

2. Institutional background and hypothesis development

2.1. Institutional background

In response to the great expectations for the improvement of corporate governance and the mitigation of tunneling among controlling shareholders, the independent director system was introduced in China in the 1990s. In the *Guidelines for the articles of association of listed companies* (CSRC, 1997), the CSRC suggests for the first time that listed firms appoint independent directors at their discretion. Following this suggestion, quite a few Chinese firms began to establish board positions for independent directors, particularly firms seeking to list in overseas markets. However, a wave of financial scandals in the late 1990s in firms that had appointed independent directors triggered public outcry about the effectiveness of independent monitoring in China.[1] The independent director system was criticized as being a "flower vase" in the boardroom, merely decorative and of little use in improving corporate governance.

To rebuild market confidence in independent board monitoring, the CSRC published the *Guiding opinion on establishing an independent director system in listed companies* in 2001, mandating greater transparency in the monitoring of board and managerial decisions (CSRC, 2001). According to the 2001 opinion, by mid-2003, all listed Chinese firms were expected to have set up an independent director system, under which a minimum of one third of the board directors would be independent directors. Notably, the Chinese regulator imposes an additional disclosure requirement that differs from the board regulations in other major capital markets. Listed Chinese firms should disclose any events or transactions that independent directors believe may affect the interests of minority shareholders, such as the nomination, appointment and dismissal of directors and senior executives; the remuneration of directors and senior executives; material inter-corporate loans to shareholders and other affiliated entities; and other issues stipulated in company charter provisions. In addition, the 2001 CSRC opinion classifies independent directors' opinions into two major categories: the standard clean opinion and the modified director opinion, comprising qualified and adverse opinions and disclaimers of

[1] For example, a listed department store, Zhengzhou Baiwen (stock ID: 600898), which had appointed independent directors as early as 1995, was found guilty of numerous financial scandals in 2001. Mr. Jiahao Lu, the former independent director of Zhengzhou Baiwen, received public censure from the CSRC and was fined RMB100,000 for his negligence in overseeing the fraudulent firm.

opinion. If independent directors disagree on a particular corporate issue, then the firm should disclose their views separately.

Following the 2001 CSRC opinion, the independent directors of listed Chinese firms began to publicly comment on issues that were important to the firms they served. In the first couple of years, no independent directors issued negative opinions on corporate decisions. It was not until 2004 that modified independent director opinions emerged, when the CSRC gave independent directors the additional power to oversee controlling shareholders and senior executives. For example, according to a CSRC circular (CSRC, 2005), independent directors have the right to employ an independent accounting firm to inspect any doubtful corporate decisions, if all of the firm's independent directors believe an audit is necessary.

2.2. Literature review

Independent directors' monitoring of managers is widely considered one of the most important functions of corporate boards in protecting shareholder interests. Fama and Jensen (1983) propose that the most direct incentive for independent directors to make independent judgments on managerial decisions is to establish their reputations as monitoring experts. They predict that independent directors who effectively oversee their serving boards may be rewarded with additional board seats.

An extensive literature examines the consequences of effective monitoring and the characteristics of independent directors. For example, more independent directors on a board is associated with stronger CEO turnover and performance sensitivity (Weisbach, 1988; Conyon and He, 2011), decreased negative market reaction to announcements of tender offers for bidding firms (Byrd and Hickman, 1992) and increased positive market reaction to announcements of poison pills (Brickley et al., 1994). Several recent studies have documented mixed evidence on the monitoring role of independent directors. Duchin et al. (2010) and Faleye et al. (2011) point out that too strong a presence of independent monitoring may undermine corporate performance. Fahlenbrach et al. (2010) provide evidence that independent directors with executive expertise do not affect the appointing firm's operating performance, decision making or managerial compensation. Almost all of the studies in this camp have evaluated the effectiveness of independent monitoring based on the documented associations. Few studies have directly examined the independent monitoring efforts of independent directors, as firms rarely disclose disputes that occur inside of the boardroom.

Another growing body of literature infers the value of independent directors by investigating observable corporate events. Srinivasan (2005) finds that independent directors, particularly those serving on audit committees, are more likely to leave the firms that restate their earnings and subsequently lose their board seats at other firms. Fich and Shivdasani (2007) examine the market reaction to the announcement of lawsuits and director turnover in firms interlocked with fraud-tainted independent directors. They find a negative abnormal stock return associated with fraud announcements in director-interlocked firms. Moreover, independent directors generally retain their board seats in sued firms, but lose significant directorships in interlocking firms. Both studies explain the decline of directorships for fraud-affiliated independent directors as reputational penalties. However, independent directors may be innocent in the context of financial fraud, as they may uncover the fraud and hence should not be held accountable (Richardson, 2005), or they may be unaware of the fraud due to limited information from management (Fich and Shivdasani, 2007). More importantly, although the evidence reported in these two studies is consistent with the reputation hypothesis, Fich and Shivdasani (2007) also point out that it is difficult to exclude two other distinct, but not mutually exclusive, explanations for the negative market reaction and decline in directorships. The endogenous hypothesis predicts that firms with similar board structures and operating environments tend to appoint independent directors with similar attributes. A lawsuit announcement signals that director-interlocked firms are susceptible to similar financial fraud and independent directors may voluntarily reduce their other directorships to focus their monitoring efforts on the sued firms. The other is the litigation hypothesis, under which the market is concerned that fraud-tainted independent directors may not be able to devote enough time and effort to monitoring director-interlocked firms. As a result, independent directors choose to hold fewer board seats to reduce the potential litigation risk.

2.3. Hypothesis development

The director opinion data from the Chinese stock market provide a good opportunity to conduct cleaner tests on the monitoring and reputational roles of independent directors. Following Tang et al. (2013), we measure independent board monitoring as the issuance of modified director opinions. Of the three hypotheses proposed by Fich and Shivdasani (2007), the litigation hypothesis is of less concern in our study. According to Article 113 of China's Company Law, directors who participate in adopting a board resolution are held liable for any violation of law or regulation resulting from the resolution. "However, if a director is proven to have expressed his objection to the vote on such resolution and his objection was recorded in the minutes, then the director may be exempted from liability" (Standing Committee of National People's Congress, 2005). Anecdotal evidence also suggests that an independent director may be exempted from the CSRC's enforcement action if he/she has said "no" to a board resolution that violates law or market regulation and causes losses to the firm.[2] As litigation risk is low for independent directors who say "no" in board meetings, we only consider the testable implications of the other two competing hypotheses (reputation and endogenous) concerning the role of independent directors, as presented by Fich and Shivdasani (2007).

To distinguish between the reputation and endogenous hypotheses, we first examine the market reaction associated with directors' opinion announcements in director-interlocked firms. If Chinese investors value independent directors' active monitoring efforts, then the reputation hypothesis predicts that the market will react positively to the issuance of modified director opinions for firms interlocked with the independent directors who say "no" in board meetings. Under the endogenous monitoring hypothesis, firms with similar firm and governance characteristics tend to select independent directors with similar attributes. If a modified director opinion serves as a signal of board disputes to the market, investors may suspect that the director-interlocked firm has problems similar to those of the opinion receivers. Therefore, the endogenous hypothesis predicts a negative market reaction associated with the announcement of modified director opinions in director-interlocked firms.

Second, we investigate the changes in independent directors' board seats in interlocking firms. Fama and Jensen (1983) point out that the most direct incentive for independent directors is to establish good labor market reputations. Those who perform effective board monitoring are likely to be rewarded with additional board seats, whereas those who perform poorly will suffer board seat losses. Srinivasan (2005) and Fich and Shivdasani (2007) find evidence consistent with the prediction of reputational loss for fraud-tainted independent directors. We believe an independent director can establish a good reputation for independent monitoring by issuing a modified director opinion. Thus, we predict that the possibility of losing directorships at other firms is negatively associated with independent directors' issuance of modified opinions. In contrast, the endogenous hypothesis argues that independent directors may voluntarily cut their board seats to reduce their workloads or to protect their reputations when they anticipate or detect adverse events (Yermack, 2004; Fich and Shivdasani, 2007; Fahlenbrach et al., 2010). In this context, we predict a decline in independent directorships following announcements of modified director opinions.

We also examine whether independent directors can retain their board seats in the firms they serve if they say "no" in board meetings. Shivdasani and Yermack (1999) argue that CEOs may prefer lax monitoring and thus consider poor monitors as attractive candidates for their boards. Alternatively, directors may voluntarily leave poorly performing firms at a high rate to reduce the damage to their reputations, limit legal liability or avoid the higher workload that boards usually undertake when performance decreases (Vafeas, 1999). Based on these two arguments, we predict that independent directors are more likely to lose board seats in the firms they serve if they issue modified director opinions.

[2] In the notorious financial fraud case of Xinjiang Tunhe (stock ID: 600073), the firm's two independent directors, Mr. Houwen Du and Mr. Jie Wei, resigned from their board seats in June 2004. The board directors and top executives were later punished by the CSRC for the firm's false statement in its 2003 annual report, with the exception of Mr. Du, who was proven to have said "no" in previous board meetings in April 2004 (Li, 2004).

3. Data and sample description

3.1. Data sources

The data for this study come from the China Stock Market Accounting Research (CSMAR) database. The initial sample covers all 23,805 independent director opinions announced between January 2005 and December 2010, inclusive. First, we exclude the following observations: (a) opinions not coded by the database (CSMAR item c05002b = .); (b) opinions coded as "other type" (CSMAR item c05002b = 7), as they cannot be directly classified as either clean or modified; (c) opinions on Chinese companies' "share trading reform" (CSMAR item c04002b = 12), as this is not a normal operating business decision; and (d) repetitive observations. We obtain 18,634 independent director opinions after the first screening procedure. Second, we manually identify 70 additional modified independent director opinions from the original independent director announcements classified by the CSMAR database either as missing (adding 55 cases) or obscurely as "other type" (adding 15 cases). Third, we require each observation to have the necessary CSMAR data on market capitalization, the independent directors' bio data, financial statements, corporate governance variables and necessary daily price data to compute CARs. To be consistent with the literature, we also exclude firms operating in the finance industry. Overall, 10,142 independent director opinions meet the selection criteria, of which 138 are modified director opinions. The sample includes 1429 distinct firms receiving independent director opinions and 1298 distinct director-interlocked firms.

3.2. Sample description

Table 1 presents the sample's descriptive statistics. Panel A shows the yearly distribution of independent director opinions and the firms that receive them. From 2005 to 2010, 138 modified director opinions were issued, accounting for 1.36% of the total director opinions. The number of modified director opinions range from a low of 2 in 2008 and 2009 to a high of 67 in 2006. During the sample period, on average, 2.66% firms received modified independent director opinions.

Panel B of Table 1 presents the breakdown of modified independent director opinions by corporate issues. We group the 11 types of business decisions coded by the CSMAR database into three major types: (1) opinions on personnel and compensation issues, (2) opinions on financial reporting and auditing issues and (3) opinions on major operating issues other than personnel, compensation, financial reporting and auditing issues, such as related-party transactions, guaranteed loans and mergers and acquisitions. Note that an independent director's opinion may involve multiple corporate events. The most frequent single event discussed in modified director opinions is guaranteed loans. Financial reports, related-party transactions and personnel issues are other events frequently discussed by independent directors. Of the 145 events disclosed in the modified director opinions, 18 involved personnel and compensation issues, 28 involved financial reporting and auditing issues and 99 involved other major operating decisions.

We also examine the degree of severity of independent director opinions in Panel C of Table 1. The majority of director opinions are standard and account for 98.62% of the total opinions. Abstention, adverse and disagreement opinions are the top three modified opinions in the sample period, accounting for 0.45%, 0.35% and 0.27% of the total number of director opinions, respectively.

4. Market reactions to modified independent director opinions

In this section, we examine whether Chinese investors value independent director opinions after controlling for opinion characteristics, corporate governance factors, financial statement variables and a set of director characteristics.

4.1. Variable descriptions

We use CAR_EVNTFIRM to measure the 3-day CARs around the dates of independent director opinions in opinion-receiving firms. The market model is used to measure the daily abnormal returns:

Table 1
Sample of independent director opinions.

Panel A: Yearly distribution

Year	No. of director opinions				No. of firms receiving director opinions			
	Clean	Modified	Total	% of modified	Clean	Modified	Total	% of modified
2005	1956	48	2004	2.40%	854	47	901	5.22%
2006	1545	67	1612	4.16%	807	54	861	6.27%
2007	1638	13	1651	0.79%	793	13	806	1.61%
2008	1736	2	1738	0.12%	641	2	643	0.31%
2009	1750	2	1752	0.11%	648	2	650	0.31%
2010	1379	6	1385	0.43%	786	6	792	0.76%
Total	10,004	138	10,142	1.36%	4529	124	4653	2.66%

Panel B: Events related to modified independent director opinions

Category of events	CSMAR code	Frequency		
		Clean	Modified	Total
Personnel and compensation	Personnel (1)	2661	15	2992
	Compensation (2)	313	3	
Financial reporting and auditing	Financial reports (3)	594	24	767
	Auditing (7)	145	4	
Operating issues	Related-party transactions (4)	4907	22	7999
	Guaranteed loans (5)	1290	35	
	Merger and acquisitions (6)	207	12	
	Changes in ownership (8)	498	9	
	Financing (9)	421	0	
	Disposal of assets (10)	85	4	
	Miscellaneous events (11)	492	17	
Total		11,613	145	11,758

Panel C: Category of independent director opinions

Category of opinions		CSMAR code	Frequency	Share of total
Clean	Unqualified opinion	1	10,002	98.62%
Modified	Qualified opinion	2	22	0.22%
	Adverse opinion	3	35	0.35%
	Disclaimer of opinion	4	10	0.10%
	Abstention	5	46	0.45%
	Disagreement	6	27	0.27%
Total			10,142	100.00%

This table presents the summary statistics for independent director opinions from 2005 to 2010.

$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt})$, where R_{mt} is proxied by the CSMAR value-weighted return. The model is estimated over a period of 256 to 7 days before the opinion announcement date, requiring a minimum estimation period of 120 days. Market reaction is defined as $CAR = \sum_t^T AR_{it}$. Alternatively, we use CAR_LOCKEDFIRM to measure the market reaction in director-interlocked firms to modified independent director opinions.

In Panel A of Table 2, we report the results for the full sample. Consistent with Tang et al. (2013), we find that the market reacts negatively when firms announce receiving modified director opinions. The 3-day CARs are systematically negative and significantly different from zero. The mean (median) of the CAR is −1.04% (−0.97%), suggesting that the firms suffer additional value decline due to the information released in modified director opinions. Both the t-statistics for the mean differences and the z-statistics from the Wilcoxon tests indicate that firms receiving modified director opinions exhibit significantly negative stock returns compared with firms reporting clean director opinions.

Panel A also presents the market reaction results for director-interlocked firms. As predicted by the reputation hypothesis, the firms that are interlocked with independent directors who issue modified reports expe-

Table 2
Univariate analysis of the cumulative abnormal returns around directors' opinion announcement dates.

Panel A: Full sample

Sample	Modified opinion	No.	Mean	Cross-sect. t	Patell t	Median	Sign rank test	% positive
Opinion-receiving firms	0	10,004	0.14%	2.49**	5.16***	−0.22%	−3.86***	48.07%
	1	138	−1.04%	−2.15**	−2.67**	−0.97%	−2.38**	39.86%
	Diff (1–0)		−1.18%			−0.75%		
			(−2.45**)			(−2.31**)		
Director-interlocked firms	0	22,008	−0.08%	−2.41	−1.28	−0.33%	−11.11	46.26%
	1	224	0.31%	0.94	1.05	0.26%	0.94	53.13%
	Diff (1–0)		0.39%			0.60%		
			(1.18)			(1.47)		

Panel B: Earnings announcement around the independent director opinion announcement dates

Director opinion	Opinion-receiving firms Any earnings announcement news?			Director inter-locked firms Any earnings announcement news?		
	NO	YES	Total	NO	YES	Total
0	5462	4542	10,004	20,317	1691	22,008
	54.60%	45.40%	100.00%	92.32%	7.68%	100.00%
1	64	74	138	198	26	224
	46.38%	53.62%	100.00%	88.39%	11.61%	100.00%
Total	5526	4616	10,142	20,515	1717	22,232
	54.49%	45.51%	100.00%	92.28%	7.72%	

Panel A presents the summary statistics for the market reaction to independent director opinions from 2005 to 2010. The CAR variables are defined in Appendix A. The t-statistics and Wilcoxon-Z statistics of the mean and median differences are reported in parentheses. *** and ** denote significance at the 1% and 5% levels, respectively.
Panel B presents the contingency table that displays independent director opinions and earnings announcements. We define earnings announcement news if the firm also announces earnings in the 3-day (−1 to +1) window of the independent director's opinion announcement.

rience positive market reactions. The mean and median of the 3-day CARs for interlocking firms are 0.31% and 0.26%, respectively, and the mean and median CARs for firms that are interlocked with independent directors who issue clean opinions are significantly negative. Panel A also shows that although the average CARs are positive, 46.87% of firms that are interlocked with directors who issue modified opinions experience negative stock returns.

We then condition the CAR analysis on possible confounding earnings announcement effects. We define a concurrent earnings announcement event if it is announced within the same (−1, +1) window as an independent director's opinion announcement. Panel B of Table 2 shows that 45.51% of directors' opinions are accompanied by a quarterly, interim or annual earnings announcement. Only 7.72% of director-interlocked firms publish their own earnings within the 3-day period surrounding interlocking directors' opinion announcements. In the following section, we test whether these confounding earnings announcements affect the market reaction to independent director opinions.

We perform the empirical analysis by partitioning the full sample into opinion-receiving and director-interlocked firms. Specifically, we use the indicator variable MDO_EVNTFIRM to differentiate between firms that receive modified independent director opinions and those that receive clean independent director opinions. Similarly, in the subsample of interlocking firms, we use MDO_LOCKEDFIRM to identify firms that are interlocked with directors who issue modified independent director opinions.

We control for the following variables in the analyses of market returns. First, following Bai et al. (2004), Larcker et al. (2007) and Dey (2008), who document agency conflicts between controlling shareholders and minority shareholders, we examine four individual governance variables to construct a governance index and to capture the agency costs of controlling shareholders: (1) BLOCK, set to 1 if the percentage of ownership held by the largest shareholder is higher than the median and 0 otherwise; (2) CONTROL DISPERSION,

set to 1 if the control rights is greater than the cash flow rights and 0 otherwise; (3) LESSINSTIHLD, set to 1 if the percentage of ownership held by institutional investors is less than the median and 0 otherwise; and (4) DUALITY, set to 1 if the firm's chairman also holds the CEO position and 0 otherwise. The CGINDEX is the sum of these four indicator variables, ranging from 0 to 4. A higher CGINDEX suggests more severe entrenchment among controlling shareholders.

A set of control variables related to the determinants of issuing independent director opinions identified by Tang et al. (2013) are also included in the regression of market reactions. As the market reacts differently to independent director opinions on different corporate decisions (Tang et al., 2013), we use three indicator variables to identity whether the event is related to personnel, financial or operating decisions (ISSUE_PERSONNEL, ISSUE_FINANCIAL or ISSUE_OPERATING, respectively). We use firm size (FIRMSIZE) and market-to-book ratio (M/B) to capture the expected stock return (Fama and French, 1992) and return on assets (ROA) to control sample firms' operating performance. To control financial risk, we include indicator variables, namely ST to identify the firms that are accorded by the CSRC as receiving "special treatment" (Jiang and Wang, 2008) and MAO to identify firms that receive modified audit opinions. The percentage of board members who are independent directors (%INDBOARD) and have chairman and CEO duality (DUALITY) are also included following Fama and Jensen (1983), Brickley et al. (1994) and Hermalin and Weisbach (2003). As institutional investors can alleviate agency costs (Bushee, 1998; Chung et al., 2002; Cornett et al., 2007; Yuan et al., 2008; Yao et al., 2010), we include institutional shareholdings (INSTIHLD). We also consider firm-level director information in the regression analysis, such as the presence of female independent directors on the board (IFFEMALE) and the average age, tenure, director compensation and board seats of independent directors (MAGE, MTENURE, MPAY and MDIRECTORSHIPS, respectively). We control for factors such as whether any opinion-issuing independent directors sit in the compensation or audit committees (IFCOMPCOMM and IFAUDCOMM, respectively) or have financial or executive expertise (IFFINEXPT and IFEXEEXPT, respectively; e.g., DeFond et al., 2005; Larcker et al., 2007; Adams and Ferreira, 2009; Gul et al., 2011; Srinidhi et al., 2011; Lin et al., 2012). In the subsample of director-interlocked firms, we add additional variables to the regression of market reactions. Following Fich and Shivdasani (2007), we control for whether interlocked firms are in the same industry (SAMEINDUSTYR) and whether an opinion-receiving firm receives a modified audit opinion (MAO_EVNTFIRM).

To control for the confounding effects of concurrent earnings announcements, we also construct two variables, EARNNEWS and EARNSUR, to measure whether there is an earnings release near the director's opinion announcement and the magnitude of the earnings surprise. We summarize each of our variable definitions in Appendix A.

4.2. Market reaction for opinion-receiving firms

To ensure that the market reaction to the independent director opinions documented in Table 2 is not biased due to correlated omitted variables, we estimate the following pooled cross-sectional regression using the opinion-receiving sample as follows

$$\begin{aligned} CAR\_EVNTFIRM_i = {} & \alpha_0 + \alpha_1 MDO\_EVNTFIRM_i + \alpha_2 CGINDEX_i + \alpha_3 MDO\_EVNTFIRM * CGINDEX_i \\ & + \alpha_4 FIRM\ SIZE_i + \alpha_5 M/B_i + \alpha_6 ROA_i + \alpha_7 ST_i + \alpha_8 MAO_i + \alpha_9 EARNNEWS_i \\ & + \alpha_{10} EARNSURP_i + \alpha_{11} BOARD\ SIZE_i + \alpha_{12} \%INDBOARD_i + \alpha_{13} DUALITY_i \\ & + \alpha_{14} INSTIHLD_i + \alpha_{15} FIRM\ AGE_i + \alpha_{16} IFFEMALE_i + \alpha_{17} MAGE_i + \alpha_{18} MTENURE_i \\ & + \alpha_{19} MPAY_i + \alpha_{20} MDIRECTORSHIPS_i + \alpha_{21} IFCOMPCOMM_i + \alpha_{22} IFAUDCOMM_i \\ & + \alpha_{23} IFFINEXPT_i + \alpha_{24} IFEXEEXPT_i + \sum_{J=1}^{J} YEAR + \sum_{K=1}^{K} PROPOSAL + \varepsilon_i \end{aligned}$$

where all of the variables are defined in Appendix A. Following Jiang et al. (2016), we include proposal-fixed effects to control for the endogeneity that may arise from possibly omitted explanatory variables.

Table 3 outlines the descriptive statistics of control variables for exploiting market reaction to independent directors' opinions. Panel A of Table 3 shows several significant mean differences in control variables between firms receiving clean director opinions and those receiving modified opinions. Notable differences are that the firms receiving modified opinions display, on average, poorer accounting performance, less institutional shareholdings, smaller firm size and greater likelihood of receiving modified audit opinions. Furthermore, compared with firms receiving clean director opinions, firms with directors who say "no" to controlling shareholders or managers are more likely to appoint independent directors who are younger, have more executive expertise and are more likely to sit in audit committees. In terms of median differences, the results are similar.

Panel A of Table 4 presents the multivariate analysis of abnormal returns using the sample of opinion-receiving firms. Consistent with Tang et al. (2013), the regression in Column (1) indicates that, as expected, there is a significantly negative association between MDO_EVNTFIRM and the abnormal return around directors' opinion announcements. Columns (2) to (4) of Panel A present the regression results based on the subsamples of different opinion affairs. Column (4) shows that the estimated coefficient of MDO_EVNTFIRM is significantly negative when independent directors say "no" on operating issues. Although the coefficients of MDO_EVNTFIRM are not statistically significant on personnel issues in Column (2) and financial issues in Column (3), the sign of the coefficients is negative and consistent with the prediction. As for the control variables, EARN NEWS and INSTIHLD have significant effects on the abnormal returns when independent directors issue opinions.

4.3. Market reaction for director-interlocked firms

In this section, we conduct similar tests to those described in the previous section for firms interlocked with directors who issue opinions:

$$\begin{aligned} CAR\_LOCKEDFIRM_i = {} & \beta_0 + \beta_1 MDO\_LOCKEDFIRM_i + \beta_2 CGINDEX_i + \beta_3 MDO\_LOCKEDFIRM \\ & * CGINDEX_i + \beta_4 CAR\_EVNTFIRM_i + \beta_5 FIRM\ SIZE_i + \beta_6 M/B_i + \beta_7 ROA_i + \beta_8 ST_i \\ & + \beta_9 MAO_i + \beta_{10} EARNNEWS_i + \beta_{11} EARNSURP_i + \beta_{12} BOARD\ SIZE_i \\ & + \beta_{13} \%INDBOARD_i + \beta_{14} FIRM\ AGE_i + \beta_{15} INSTIHLD_i + \beta_{16} SAMEINDUSTRY_i \\ & + \beta_{17} IFFEMALE_i + \beta_{18} MAGE_i + \beta_{19} MTENURE_i + \beta_{20} MPAY_i \\ & + \beta_{21} MDIRECTORSHIPS_i + \beta_{22} COMPCOMM\_EVNTFIRM_i \\ & + \beta_{23} AUDCOMM\_EVNTFIRM_i + \beta_{24} IFCOMPCOMM_i + \beta_{25} IFAUDCOMM_i \\ & + \beta_{26} IFFINEXPT_i + \beta_{27} IFEXEEXPT_i + \sum_{J=1}^{J} YEAR + \sum_{K=1}^{K} PROPOSAL + \varepsilon_i \end{aligned}$$

where all of the variable are defined in Appendix A. Proposal-fixed effects are included to control for the endogeneity that may arise from possibly omitted explanatory variables.

Panel B of Table 3 reveals a number of differences between firms interlocked with directors issuing clean reports and those interlocked with directors issuing modified reports. Firms interlocked with directors issuing modified director opinions are more likely to report poorer accounting performance, be smaller and have fewer independent directors or less institutional shareholding. Moreover, firms interlocked with directors who say "no" tend to appoint independent directors with shorter tenure, lower pay, more executive expertise and less experience in compensation and audit committees in their interlocking firms. The median differences are similar.

Panel B of Table 4 presents the regression results for CARs using the interlocking firms, which reveal a significantly positive association between CARs and the variable of interest, MDO_LOCKEDFIRM, which is set to 1 if the firm is interlocked with an independent director who issues a modified opinion and 0 otherwise. The coefficient of MDO_LOCKEDFIRM is 0.015 in Column (1), which means that the firm value increases by 1.5% if the firm interlocks with MDO independent directors. The result supports the prediction of the repu-

Table 3
Descriptive statistics of the variables in the cumulative abnormal return analysis.

Panel A: Opinion-receiving firms

Variables	Firms receiving clean director opinions (n = 10,004)		Firms receiving modified director opinions (n = 138)		T-stat for tests of mean differences	Z-stat from Wilcoxon two-sample test
	Mean	Median	Mean	Median		
Event characteristics						
ISSUE_PERSONNEL	0.297	0.000	0.167	0.000	3.330***	3.329***
ISSUE_FINANCIAL	0.073	0.000	0.239	0.000	−7.333***	−7.314***
ISSUE_OPERATING	0.789	1.000	0.775	1.000	0.386	0.386
Firm characteristics						
CGINDEX	1.614	2.000	1.703	2.000	−1.148	−1.128
FIRM SIZE	21.556	21.467	21.201	21.045	3.853***	4.042***
M/B	3.273	2.338	2.571	1.770	2.818***	3.313***
ROA	0.041	0.039	−0.037	0.007	14.046***	10.197***
ST	0.020	0.000	0.123	0.000	−8.376***	−8.347***
MAO	0.035	0.000	0.225	0.000	−11.609***	−11.533***
EARN NEWS	0.454	0.000	0.536	1.000	−1.926*	−1.926*
EARN SURP	0.032	0.017	−0.131	−0.030	5.637***	6.410***
INSTIHLD	5.424	1.571	1.845	0.034	5.030***	9.161***
FIRMAGE	7.637	8.000	8.710	9.000	−2.945***	−3.002***
Board characteristics						
BOARD SIZE	2.225	2.197	2.257	2.197	−1.750*	−1.961*
%INDBOARD	0.355	0.333	0.346	0.333	2.139**	1.278
DUALITY	0.140	0.000	0.116	0.000	0.814	0.814
Director characteristics						
IFFEMALE	0.351	0.000	0.362	0.000	−0.278	−0.278
MAGE	51.387	51.000	48.607	48.583	4.925***	4.920***
MTENURE	3.290	3.000	2.910	3.000	3.487***	3.293***
MPAY (RMB1000)	44.853	40.000	43.764	40.000	0.490	0.279
LOG MPAY	10.592	10.597	10.589	10.597	0.067	0.279
MDIRECTORSHIPS	1.721	1.667	1.720	1.583	0.006	0.573
IFCOMPCOMM	0.272	0.000	0.225	0.000	1.245	1.245
IFAUDCOMM	0.270	0.000	0.203	0.000	1.777*	1.777*
IFFINEXPT	0.851	1.000	0.804	1.000	1.543	1.543
IFEXEEXPT	0.508	1.000	0.674	1.000	−3.868***	−3.865***

Panel B: Director-interlocked firms

Variables	Firms interlocked with directors issuing clean director opinions (n = 22,008)		Firms interlocked with directors issuing modified director opinions (n = 224)		T-stat for tests of mean differences	Z-stat from Wilcoxon two-sample test
	Mean	Median	Mean	Median		
Event characteristics						
ISSUE_PERSONNEL	0.301	0.000	0.196	0.000	3.398***	3.398***
ISSUE_FINANCIAL	0.072	0.000	0.295	0.000	−12.627***	−12.582***
ISSUE_OPERATING	0.788	1.000	0.710	1.000	2.826***	2.825***
CAR_EVNTFIRM	0.001	−0.003	−0.010	−0.007	2.926***	2.761***
Firm characteristics						
CGINDEX	1.521	1.000	1.580	2.000	−0.998	−1.211
FIRM SIZE	21.791	21.674	21.410	21.350	4.963***	4.608***
M/B	3.172	2.277	2.428	1.692	3.840***	6.289***
ROA	0.041	0.038	0.021	0.026	4.929***	4.952***
ST	0.020	0.000	0.045	0.000	−2.531**	−2.531**

(*continued on next page*)

Table 3 (*continued*)

Panel B: Director-interlocked firms						
Variables	Firms interlocked with directors issuing clean director opinions (n = 22,008)		Firms interlocked with directors issuing modified director opinions (n = 224)		T-stat for tests of mean differences	Z-stat from Wilcoxon two-sample test
	Mean	Median	Mean	Median		
MAO	0.033	0.000	0.049	0.000	−1.374	−1.373
EARN NEWS	0.077	0.000	0.116	0.000	−2.189**	−2.189**
EARN SURP	0.027	0.014	−0.007	0.004	1.607	2.910***
INSTIHLD	6.264	1.935	2.754	0.037	5.536***	7.445***
FIRMAGE	8.498	9.000	8.049	8.000	1.626	1.640
SAME INDUSTRY	0.158	0.000	0.094	0.000	2.626***	2.625***
Board characteristics						
BOARD SIZE	2.259	2.197	2.269	2.197	−0.744	−0.866
%INDBOARD	0.357	0.333	0.348	0.333	2.606***	2.549**
DUALITY	0.108	0.000	0.094	0.000	0.705	0.705
Director characteristics						
IFFEMALE	0.309	0.000	0.295	0.000	0.459	0.459
MAGE	51.789	51.333	49.852	49.000	4.636***	4.875***
MTENURE	3.409	3.250	3.025	3.000	4.397***	4.286***
MPAY	10.686	10.779	10.569	10.597	3.792***	4.060***
MDIRECTORSHIPS	2.232	2.200	2.218	2.000	0.297	0.363
IFCOMPCOMM	0.288	0.000	0.259	0.000	0.954	0.954
IFAUDCOMM	0.290	0.000	0.223	0.000	2.194**	2.194**
COMPCOMM_EVNTFIRM	0.284	0.000	0.196	0.000	2.882***	2.882***
AUDCOMM_EVNTFIRM	0.284	0.000	0.188	0.000	3.196***	3.195***
IFFINEXPT	0.848	1.000	0.857	1.000	−0.395	−0.395
IFEXEEXPT	0.477	0.000	0.549	1.000	−2.139**	−2.138**

Panel A shows the summary statistics for the variables used in the abnormal return analysis based on the opinion-receiving firms. Panel B shows the summary statistics for the sample of director-interlocked firms. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively. All of the variables are defined in Appendix A.

tation hypothesis. The coefficient of the interaction term between MDO_LOCKEDFIRM and CGINDEX is negative and significant at the 10% level, suggesting that the market reaction to modified opinion in interlocked firms tends to be less positive when the firms are heavily influenced by controlling shareholders. The coefficients of several control variables are also significant. For example, consistent with Fama and French (1992), the market-to-book ratio (M/B) is significantly negative. The coefficients of the abnormal return of opinion-receiving firms are significantly positive, which reveals stock synchronization between event firms and interlocking firms. Moreover, when we divide the sample into three parts according to the opinion affairs, the regression results are shown in Columns (2) to (4). We find that the coefficients of MDO_LOCKEDFIRM are almost similar to those in Column (1), although the coefficients lose their statistical significance in Columns (2) and (4).

5. Board seats and modified independent director opinions

In this section, we examine whether modified independent director opinions affect their board positions.

5.1. Variable description

We use the indicator variable RETAIN_EVNTFIRM (RETAIN_LOCKEDFIRM) to measure director turnover in opinion-receiving firms (director-interlocked firms) and set it to 1 if a director appears in the

Table 4
Multivariate analysis of cumulative abnormal returns.

Panel A: Analysis of cumulative abnormal returns for firms receiving independent director opinions

VARIABLES	(1) CAR_EVNTFIRM	(2) CAR_EVNTFIRM	(3) CAR_EVNTFIRM	(4) CAR_EVNTFIRM
CONSTANT	−0.022	−0.003	−0.022	−0.012
	(−1.341)	(−0.088)	(−0.239)	(−0.601)
MDO_EVNTFIRM	−0.020*	−0.068	−0.004	−0.024*
	(−1.915)	(−1.492)	(−0.149)	(−1.826)
CGINDEX	0.001	0.001	0.007	0.000
	(1.059)	(0.336)	(1.578)	(0.529)
MDO_EVNTFIRM × CGINDEX	0.006	0.038	−0.013	0.007
	(1.074)	(1.416)	(−0.823)	(0.918)
FIRM SIZE	0.000	−0.002	−0.001	−0.000
	(0.344)	(−1.213)	(−0.173)	(−0.259)
M/B	−0.000	−0.001	−0.002*	−0.000
	(−1.269)	(−1.277)	(−1.674)	(−1.248)
ROA	0.008	−0.020	0.013	0.008
	(0.725)	(−0.861)	(0.189)	(0.557)
ST	−0.006	0.003	−0.013	−0.006
	(−1.360)	(0.215)	(−0.663)	(−1.021)
MAO	−0.005	−0.005	−0.007	−0.003
	(−1.172)	(−0.767)	(−0.599)	(−0.643)
EARN NEWS	−0.008***	−0.009**	−0.022*	−0.009***
	(−4.182)	(−2.201)	(−1.711)	(−3.866)
EARN SURP	−0.001	−0.003	−0.012	0.000
	(−0.280)	(−0.523)	(−1.075)	(0.039)
BOARD SIZE	−0.001	0.001	0.009	−0.002
	(−0.202)	(0.195)	(0.536)	(−0.437)
%INDBOARD	0.013	0.046	0.002	0.010
	(1.004)	(1.616)	(0.023)	(0.617)
DUALITY	−0.002	0.001	−0.007	−0.002
	(−0.978)	(0.132)	(−0.727)	(−0.766)
INSTIHLD	0.000***	0.001***	0.001*	0.000*
	(2.587)	(2.664)	(1.707)	(1.910)
FIRM AGE	0.000	−0.000	0.001	0.000
	(0.142)	(−0.735)	(1.130)	(1.221)
IFFEMALE	−0.000	0.001	−0.005	−0.000
	(−0.001)	(0.297)	(−0.885)	(−0.104)
MAGE	0.000	0.000	0.000	−0.000
	(0.089)	(0.923)	(0.037)	(−0.451)
MTENURE	0.000	0.001	0.003	0.000
	(0.427)	(1.126)	(1.128)	(0.593)
MPAY	0.001	0.001	0.001	0.002
	(1.007)	(0.379)	(0.232)	(1.070)
MDIRECTORSHIPS	0.000	−0.000	−0.004	0.000
	(0.051)	(−0.078)	(−0.796)	(0.220)
IFCOMPCOMM	−0.001	0.001	−0.016	−0.001
	(−0.421)	(0.161)	(−0.928)	(−0.357)
IFAUDCOMM	0.002	−0.005	0.004	0.003
	(0.744)	(−0.869)	(0.236)	(0.714)
IFFINEXPT	0.002	0.002	−0.000	0.004**
	(1.241)	(0.576)	(−0.024)	(2.000)
IFEXEEXPT	0.002	0.001	−0.002	0.001
	(1.318)	(0.348)	(−0.299)	(0.906)
YEAR DUMMY	Yes	Yes	Yes	Yes
PROPOSAL FIXED EFFECTS	Yes	Yes	Yes	Yes
Observations	10,142	2992	767	7999
Adj. R^2	0.076	0.063	0.102	0.079

(*continued on next page*)

Table 4 (*continued*)

Panel B: Analysis of cumulative abnormal returns for director-interlocked firms

VARIABLES	(1) CAR_LOCKEDFIRM	(2) CAR_LOCKEDFIRM	(3) CAR_LOCKEDFIRM	(4) CAR_LOCKEDFIRM
CONSTANT	0.009	−0.030	−0.036	0.011
	(0.845)	(−1.622)	(−0.837)	(0.953)
MDO_LOCKEDFIRM	0.015**	0.016	0.029*	0.003
	(1.974)	(0.928)	(1.697)	(0.338)
CGINDEX	0.001*	0.002**	0.002	0.000
	(1.763)	(2.208)	(1.213)	(0.995)
MDO_LOCKEDFIRM × CGINDEX	−0.008*	−0.007	−0.018**	−0.004
	(−1.752)	(−0.642)	(−2.289)	(−0.736)
CAR_EVNTFIRM	0.024***	0.007	−0.023	0.023***
	(3.417)	(0.484)	(−0.748)	(2.925)
FIRM SIZE	−0.001**	0.000	−0.001	−0.001***
	(−2.133)	(0.372)	(−0.569)	(−2.649)
M/B	−0.001***	−0.000	−0.001**	−0.001***
	(−3.474)	(−0.390)	(−1.970)	(−3.518)
ROA	0.001	0.013	−0.017	0.003
	(0.104)	(0.959)	(−0.599)	(0.351)
ST	−0.002	0.000	−0.018*	−0.002
	(−0.674)	(0.056)	(−1.879)	(−0.572)
MAO	−0.001	−0.002	0.006	0.000
	(−0.579)	(−0.413)	(0.768)	(0.139)
EARN NEWS	−0.002*	−0.003	−0.002	−0.002
	(−1.674)	(−1.076)	(−0.579)	(−1.045)
EARN SURP	−0.001	−0.003	−0.000	−0.002
	(−1.097)	(−1.242)	(−0.090)	(−1.333)
BOARD SIZE	−0.002	0.001	−0.011	−0.003
	(−1.046)	(0.249)	(−1.544)	(−1.318)
%INDBOARD	−0.010	0.001	0.002	−0.006
	(−1.420)	(0.083)	(0.064)	(−0.784)
FIRM AGE	0.000	−0.000	0.001***	0.000
	(0.819)	(−0.304)	(2.831)	(0.694)
INSTIHLD	−0.000	−0.000**	−0.000	−0.000
	(−1.309)	(−2.090)	(−0.169)	(−0.810)
SAME INDUSTRY	−0.000	−0.001	0.000	−0.001
	(−0.372)	(−0.716)	(0.073)	(−0.496)
IFFEMALE	0.000	0.001	−0.003	0.000
	(0.426)	(0.722)	(−1.122)	(0.437)
MAGE	0.000	0.000	−0.000	0.000
	(1.138)	(0.459)	(−0.882)	(0.129)
MTENURE	−0.000	0.001*	−0.000	−0.000
	(−0.917)	(1.788)	(−0.231)	(−1.195)
MPAY	0.001	0.001	0.008**	0.002**
	(1.518)	(0.744)	(2.340)	(2.317)
MDIRECTORSHIPS	−0.001	0.000	−0.002	−0.001
	(−1.125)	(0.268)	(−1.037)	(−1.306)
COMPCOMM_EVNTFIRM	0.001	0.001	0.010	0.003
	(0.583)	(0.207)	(0.897)	(1.302)
AUDCOMM_EVNTFIRM	−0.002	−0.001	−0.012	−0.004*
	(−1.134)	(−0.311)	(−1.124)	(−1.912)
IFCOMPCOMM	−0.002	−0.004	−0.011	−0.002
	(−1.249)	(−1.066)	(−1.513)	(−1.188)
IFAUDCOMM	0.002	0.003	0.015**	0.002
	(1.119)	(0.975)	(2.001)	(1.370)
IFFINEXPT	0.001	0.002	0.009**	0.001
	(1.328)	(0.897)	(2.393)	(1.380)

(*continued on next page*)

Table 4 (*continued*)

Panel B: Analysis of cumulative abnormal returns for director-interlocked firms

VARIABLES	(1) CAR_LOCKEDFIRM	(2) CAR_LOCKEDFIRM	(3) CAR_LOCKEDFIRM	(4) CAR_LOCKEDFIRM
IFEXEEXPT	0.001	0.000	0.001	0.000
	(1.223)	(0.073)	(0.295)	(0.620)
YEAR DUMMY	Yes	Yes	Yes	Yes
PROPOSAL FIXED EFFECTS	Yes	Yes	Yes	Yes
Observations	22,232	6668	1661	17,491
Adj. R^2	0.103	0.114	0.081	0.103

Panel A of Table 4 presents the regression results for the 3-day CARs around opinion announcement from 2005 to 2010 for firms receiving independent director opinions. The dependent variable is CAR_EVNTFIRM. Columns (2) to (4) present the regression results based on the sub-samples of different opinion affairs, including personnel issues in Column (2), financial issues in Column (3) and operating issues in Column (4).

Panel B of Table 4 presents the regression results for the 3-day CARs around opinion announcement from 2005 to 2010 for director-interlocked firms. The dependent variable is CAR_LOCKEDFIRM. Columns (2) to (4) present the regression results based on the sub-samples of different opinion affairs, including personnel issues in Column (2), financial issues in Column (3) and operating issues in Column (4).

Robust standard errors clustered at the firm level are used to compute the t-statistics. The t-statistics reported in parentheses are two tailed. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively. All of the variables are defined in Appendix A.

Table 5
Univariate analysis of retaining directorships.

Panel A: Change in directorships for individual independent directors who issued modified opinions from 2005 to 2010

No. of directorships	No. of years relative to issuing modified director opinion		
	0	+1	+2
1	195	145	106
2	55	43	32
3	24	25	16
4	13	12	13
5	5	5	6
6	2	1	0
Average directorship	1.59	1.31	1.02
% of independent directors holding more than one board seat	33.67%	29.25%	22.79%

Panel B: Frequency of director opinions vs. retaining directorships

No. of pinion announcements by individual directors	Retaining directorships in opinion-receiving firms			Retaining directorships in interlocked firms		
	No	Yes	Total	No	Yes	Total
Clean opinions	22,175	19,035	41,210	12,355	11,617	23,972
	53.81%	46.19%	100.00%	51.54%	48.46%	100.00%
Modified opinions	218	134	352	96	127	223
	61.93%	38.07%	100.00%	43.05%	56.95%	100.00%
Total	22,393	19,169	41,562	12,451	11,744	24,195
Chi-square	9.265***			6.376**		

This table provides information about the board positions of independent directors who issued modified opinions from 2005 to 2010. Year 0 is the year in which the director's opinion is announced.

second year's directors list following the year he/she announces his/her opinion. Given the need to check directors' turnover rates over 2 years, we collect a subsample of 294 individual independent directors who issued modified director opinions from 2005 to 2010. We also examine any changes in board seats subsequent to the issuance of independent director opinions. We define CHGSEATS as the mean changes in board seats for the 2 years following the issuance of a director's opinion. RETCHGSEATS measures the mean changes

Table 6
Descriptive statistics of directorship analysis.

Panel A: Summary statistics for the sample of opinion-receiving firms

Variables	Firms receiving clean director opinions (n = 13,423)		Firms receiving modified director opinions (n = 269)		T-stat for tests of mean differences	Z-stat from Wilcoxon two-sample test
	Mean	Median	Mean	Median		
Directorship variables						
RETAIN_EVNTFIRM	0.584	1.000	0.457	0.000	4.190***	4.188***
CHGSEATS	−0.144	0.000	−0.247	0.000	2.199**	2.057**
RETCHGSEATS	−0.075	1.000	−0.148	1.000	2.386**	2.147**
GAINSEATS	0.158	0.000	0.095	0.000	2.439**	2.177**
Event characteristics						
CAR_EVNTFIRM	−0.001	−0.005	−0.013	−0.012	3.075***	3.000***
ISSUE_PERSONNEL	0.276	0.000	0.130	0.000	5.309***	5.304***
ISSUE_FINANCIAL	0.133	0.000	0.186	0.000	−2.542**	−2.542**
ISSUE_OPERATING	0.821	1.000	0.840	1.000	−0.828	−0.828
Firm characteristics						
FIRM SIZE	21.455	21.355	21.138	21.045	4.723***	4.882***
M/B	2.987	2.056	2.779	1.767	1.180	1.954*
ROA	0.032	0.032	−0.024	0.011	13.266***	10.580***
ST	0.026	0.000	0.115	0.000	−8.942***	−8.916***
MAO	0.049	0.000	0.216	0.000	−12.273***	−12.206***
FIRM AGE	8.064	8.000	7.944	8.000	0.476	0.560
CG INDEX	1.503	1.000	1.494	1.000	0.159	0.196
Board characteristics						
BOARD SIZE	2.260	2.197	2.264	2.197	−0.292	−0.025
%INDBOARD	0.357	0.333	0.350	0.333	2.322**	1.251
CEO TURNOVER	0.339	0.000	0.539	1.000	−6.861***	−6.850***
Director characteristics						
FEMALE	0.114	0.000	0.100	0.000	0.696	0.696
AGE	51.078	49.000	47.729	45.000	5.217***	5.583***
TENURE	3.046	3.000	2.758	3.000	2.952***	2.493**
MTENURE_INDIVIDUAL	3.099	3.000	2.825	3.000	3.116***	2.689***
IFTERM2	0.658	1.000	0.651	1.000	0.251	0.251
ABSENCE	0.067	0.000	0.099	0.000	−4.031***	−3.088***
PAY	10.535	10.584	10.503	10.491	0.959	1.133
MPAY_INDIVIDUAL	10.593	10.597	10.504	10.519	1.730*	1.746*
DIRECTORSHIPS	1.707	1.000	1.669	1.000	0.556	0.394
COMPCOMM	0.208	0.000	0.208	0.000	0.010	0.038
AUDCOMM	0.195	0.000	0.186	0.000	0.355	0.355
FINEXPT	0.294	0.000	0.361	0.000	−2.830***	−2.380**
EXEEXPT	0.208	0.000	0.286	0.000	−3.113***	−3.112***

Panel B: Summary statistics for the sample of director-interlocked firms

Variables	Firms interlocked with directors issuing clean director opinions (n = 10,979)		Firms interlocked with directors issuing modified director opinions (n = 268)		T-stat for tests of mean differences	Z-stat from Wilcoxon two-sample test
	Mean	Median	Mean	Median		
RETAIN_LOCKEDFIRM	0.584	1.000	0.615	1.000	−0.815	−0.815
Event characteristics						
CAR_EVNTFIRM	−0.001	−0.005	−0.007	−0.008	1.356	1.321
CAR_LOCKEDFIRM	0.000	−0.004	0.005	0.007	−1.304	−1.917*

(*continued on next page*)

Table 6 (*continued*)

Panel B: Summary statistics for the sample of director-interlocked firms

Variables	Firms interlocked with directors issuing clean director opinions (n = 10,979)		Firms interlocked with directors issuing modified director opinions (n = 268)		T-stat for tests of mean differences	Z-stat from Wilcoxon two-sample test
	Mean	Median	Mean	Median		
ISSUE_PERSONNEL	0.297	0.000	0.178	0.000	3.402***	3.398***
ISSUE_FINANCIAL	0.119	0.000	0.241	0.000	−4.835***	−4.825***
ISSUE_OPERATING	0.788	1.000	0.782	1.000	0.187	0.187
Firm characteristics						
FIRM SIZE	21.523	21.410	21.245	21.157	3.240***	2.904***
M/B	2.960	1.988	2.481	1.654	1.958*	3.526***
ROA	0.033	0.031	0.012	0.023	4.114***	3.219***
ST	0.026	0.000	0.040	0.000	−1.172	−1.172
MAO	0.048	0.000	0.080	0.000	−1.961**	−1.961**
FIRM AGE	8.507	9.000	7.655	8.000	2.750***	2.711***
CGINDEX	1.453	1.000	1.529	2.000	−1.140	−1.477
Board characteristics						
BOARD SIZE	2.257	2.197	2.263	2.197	−0.426	−0.299
%INDBOARD	0.357	0.333	0.348	0.333	2.397**	2.105**
CEO TURNOVER	0.331	0.000	0.414	1.000	−2.271**	−2.270**
Director characteristics						
FEMALE	0.078	0.000	0.098	0.000	−0.953	−0.953
AGE	51.025	50.000	47.862	46.000	4.333***	4.522***
TENURE	3.130	3.000	3.144	3.000	−0.107	−0.567
PAY	10.611	10.597	10.520	10.564	2.342**	2.776***
DIRECTORSHIPS	2.826	3.000	3.351	3.000	−5.988***	−5.489***
COMPCOMM	0.215	0.000	0.167	0.000	1.465	1.359
AUDCOMM	0.218	0.000	0.155	0.000	1.980**	1.980**
COMPCOMM_EVNTFIRM	0.208	0.000	0.115	0.000	2.856***	2.796***
AUDCOMM_EVNTFIRM	0.212	0.000	0.098	0.000	3.653***	3.649***
FINEXPT	0.373	0.000	0.448	0.000	−2.021**	−0.020
EXEEXPT	0.145	0.000	0.207	0.000	−2.263**	−2.262**

Panel A shows the summary statistics for the variables used in the directorship analysis based on the sample of opinion-receiving firms. Panel B shows the summary statistics for the sample of director-interlocked firms. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively. All of the variables are defined in Appendix A.

in board seats divided by the number of board seats in the year of opinion issuance. GAINSEATS is the net gain of new seats the independent director secures subsequent to saying "no." The variable is set to 0 if the director does not gain any new seats.

Panel A of Table 5 presents the changes in directorships held by the 294 individual independent directors. Year zero refers to the modified opinion's announcement year. The average directorships decrease persistently, from 1.59 directorships in year zero to 1.02 directorships in year two. In year zero, 33.67% of directors hold more than one board seat, and this ratio decreases by more than 10–22.79% in year two.

Our main variables of interest are the indicator variables that differentiate between the independent directors who say "no" in the opinion-receiving (MDO_DIR) and director-interlocked (MDO_LOCKEDDIR) firms.

As discussed in Section 4, we control for several variables that the literature has shown to influence directorships at both the firm and director levels. First, we include CGINDEX in the regression to control for the entrenchment effects of large shareholders. As independent director turnover is highly related to CEO turnover, we also include an indicator of CEO turnover in the analysis (Fich and Shivdasani, 2007).

Second, the regression also includes a set of director-specific attributes, including indicator variables such as whether the independent director is female (Adams and Ferreira, 2009; Gul et al., 2011; Srinidhi et al., 2011),

Table 7
Probability of retaining board seats.

Panel A: Probability of retaining board seats in firms receiving independent director opinions

VARIABLES	(1) RETAIN_EVNTFIRM	(2) RETAIN_EVNTFIRM
CONSTANT	2.559***	2.287**
	(2.735)	(2.429)
MDO_DIR	−0.649***	−0.796**
	(−3.303)	(−2.078)
CGINDEX		0.095***
		(2.729)
MDO_DIR × CGINDEX		0.105
		(0.486)
CAR_EVNTFIRM	−0.053	−0.017
	(−0.111)	(−0.035)
ISSUE_PERSONNEL	0.004	0.004
	(0.053)	(0.049)
ISSUE_FINANCIAL	−0.003	0.004
	(−0.029)	(0.049)
ISSUE_OPERATING	−0.222**	−0.220**
	(−2.348)	(−2.311)
FIRM SIZE	0.081**	0.085**
	(2.233)	(2.354)
M/B	0.016	0.019
	(0.923)	(1.102)
ROA	0.957*	1.004*
	(1.755)	(1.848)
ST	−0.109	−0.126
	(−0.555)	(−0.647)
MAO	−0.289**	−0.292**
	(−2.026)	(−2.059)
FIRM AGE	0.052***	0.054***
	(5.901)	(6.092)
BOARD SIZE	−0.082	−0.042
	(−0.504)	(−0.260)
%INDBOARD	−1.685**	−1.689**
	(−2.369)	(−2.384)
CEO TURNOVER	−0.289***	−0.294***
	(−4.395)	(−4.478)
FEMALE	0.047	0.048
	(0.653)	(0.656)
AGE	−0.004	−0.004
	(−1.535)	(−1.621)
ABSENCE	−0.643***	−0.650***
	(−3.407)	(−3.441)
TENURE	−0.726***	−0.726***
	(−26.708)	(−26.730)
IFTERM2	0.185***	0.182***
	(2.636)	(2.597)
PAY	−0.039	−0.044
	(−0.591)	(−0.661)
DIRECTORSHIPS	−0.022	−0.021
	(−1.007)	(−0.967)
COMPCOMM	0.095	0.097
	(1.564)	(1.595)
AUDCOMM	0.043	0.044
	(0.625)	(0.637)
FINEXPT	0.114**	0.112**
	(2.507)	(2.459)

(*continued on next page*)

Table 7 (*continued*)

Panel A: Probability of retaining board seats in firms receiving independent director opinions

VARIABLES	(1) RETAIN_EVNTFIRM	(2) RETAIN_EVNTFIRM
EXEEXPT	−0.108*	−0.106*
	(−1.844)	(−1.811)
YEAR DUMMY	YES	YES
INDUSTRY DUMMY	YES	YES
Observations	13,692	13,692
Pseudo R^2	0.181	0.182

Panel B: Probability of retaining board seats in director-interlocked firms

VARIABLES	(1) RETAIN_ LOCKEDFIRM	(2) RETAIN_ LOCKEDFIRM	(3) RETAIN_ LOCKEDFIRM	(4) RETAIN_ LOCKEDFIRM	(5) RETAIN_ LOCKEDFIRM
CONSTANT	1.214	1.153	1.149	1.146	1.153
	(1.120)	(1.054)	(1.051)	(1.046)	(1.054)
MDO_LOCKEDDIR	0.244	0.875**	0.841*	0.881**	0.956**
	(1.255)	(1.989)	(1.899)	(1.986)	(2.159)
CGINDEX		0.022	0.022	0.022	0.022
		(0.503)	(0.499)	(0.503)	(0.509)
MDO_LOCKEDDIR × CGINDEX		−0.405*	−0.414*	−0.404*	−0.419*
		(−1.845)	(−1.872)	(−1.844)	(−1.895)
CAR_EVNTFIRM	0.099	0.105	0.091	0.107	0.116
	(0.191)	(0.203)	(0.175)	(0.206)	(0.222)
CAR_LOCKEDFIRM	−0.417	−0.444	−0.442	−0.440	−0.446
	(−0.672)	(−0.713)	(−0.711)	(−0.708)	(−0.718)
ISSUE_PERSONNEL	−0.061	−0.057	−0.057	−0.057	−0.058
	(−0.626)	(−0.590)	(−0.587)	(−0.590)	(−0.594)
ISSUE_FINANCIAL	0.036	0.036	0.036	0.035	0.035
	(0.382)	(0.378)	(0.385)	(0.373)	(0.368)
ISSUE_OPERATING	−0.052	−0.046	−0.045	−0.047	−0.045
	(−0.471)	(−0.419)	(−0.404)	(−0.422)	(−0.409)
SAME INDUSTRY	−0.021	−0.020	−0.032	−0.020	−0.018
	(−0.203)	(−0.190)	(−0.301)	(−0.190)	(−0.173)
MDO_LOCKEDDIR × SAME INDUSTRY			0.538		
			(0.959)		
FIRM SIZE	0.035	0.035	0.035	0.035	0.035
	(0.855)	(0.839)	(0.842)	(0.837)	(0.838)
FIRM AGE	0.040***	0.041***	0.041***	0.041***	0.041***
	(3.748)	(3.815)	(3.806)	(3.815)	(3.816)
M/B	0.012	0.012	0.012	0.012	0.012
	(0.798)	(0.810)	(0.809)	(0.817)	(0.814)
ROA	0.462	0.485	0.485	0.481	0.477
	(0.707)	(0.741)	(0.741)	(0.734)	(0.728)
ST	0.004	0.006	0.009	0.016	0.008
	(0.017)	(0.025)	(0.036)	(0.063)	(0.034)
MDO_LOCKEDDIR × ST				−0.186	
				(−0.311)	
MAO	−0.381**	−0.383**	−0.386**	−0.383**	−0.347**
	(−2.252)	(−2.261)	(−2.273)	(−2.262)	(−1.992)
MDO_LOCKEDDIR × MAO					−0.684
					(−1.204)
BOARD SIZE	0.222	0.232	0.233	0.233	0.229
	(1.123)	(1.165)	(1.171)	(1.169)	(1.152)
%INDBOARD	−2.347***	−2.342***	−2.342***	−2.342***	−2.364***
	(−2.746)	(−2.739)	(−2.740)	(−2.740)	(−2.765)

(*continued on next page*)

Table 7 (*continued*)

Panel B: Probability of retaining board seats in director-interlocked firms

VARIABLES	(1) RETAIN_ LOCKEDFIRM	(2) RETAIN_ LOCKEDFIRM	(3) RETAIN_ LOCKEDFIRM	(4) RETAIN_ LOCKEDFIRM	(5) RETAIN_ LOCKEDFIRM
CEO TURNOVER	−0.389***	−0.388***	−0.388***	−0.388***	−0.389***
	(−5.191)	(−5.180)	(−5.176)	(−5.173)	(−5.186)
FEMALE	0.010	0.013	0.015	0.012	0.013
	(0.082)	(0.107)	(0.122)	(0.104)	(0.104)
AGE	0.003	0.003	0.003	0.003	0.003
	(0.810)	(0.783)	(0.799)	(0.782)	(0.766)
ABSENCE	−1.013***	−1.014***	−1.017***	−1.015***	−1.014***
	(−3.887)	(−3.901)	(−3.906)	(−3.901)	(−3.903)
TENURE	−0.783***	−0.783***	−0.784***	−0.783***	−0.783***
	(−21.714)	(−21.758)	(−21.758)	(−21.760)	(−21.721)
IFTERM2	0.204**	0.206**	0.205**	0.206**	0.204**
	(2.209)	(2.230)	(2.223)	(2.231)	(2.208)
PAY	0.096	0.098	0.097	0.098	0.099
	(1.248)	(1.261)	(1.250)	(1.267)	(1.273)
DIRECTORSHIPS	−0.058*	−0.059*	−0.059*	−0.059*	−0.060*
	(−1.756)	(−1.807)	(−1.805)	(−1.808)	(−1.837)
COMPCOMM_EVNTFIRM	−0.004	−0.004	−0.004	−0.004	−0.006
	(−0.043)	(−0.041)	(−0.040)	(−0.042)	(−0.058)
COMPCOMM	0.122	0.119	0.118	0.119	0.117
	(1.153)	(1.124)	(1.121)	(1.125)	(1.111)
AUDCOMM_EVNTFIRM	−0.008	−0.010	−0.010	−0.010	−0.009
	(−0.084)	(−0.102)	(−0.107)	(−0.104)	(−0.096)
AUDCOMM	−0.030	−0.028	−0.030	−0.028	−0.028
	(−0.274)	(−0.252)	(−0.268)	(−0.253)	(−0.253)
FINEXPT	0.040	0.041	0.040	0.042	0.043
	(0.521)	(0.538)	(0.522)	(0.541)	(0.558)
EXEEXPT	−0.050	−0.056	−0.053	−0.056	−0.057
	(−0.448)	(−0.499)	(−0.473)	(−0.499)	(−0.508)
YEAR DUMMY	YES	YES	YES	YES	YES
INDUSTRY DUMMY	YES	YES	YES	YES	YES
Observations	5294	5294	5294	5294	5294
Pseudo R^2	0.213	0.214	0.214	0.214	0.214

Panel C: Probability of retaining board seats in firms receiving modified independent director opinions

VARIABLES	(1) RETAIN_EVNTFIRM	(2) RETAIN_EVNTFIRM
CONSTANT	−0.732	−2.172
	(−0.231)	(−0.662)
MDO_DIR	−0.486*	−0.687
	(−1.771)	(−1.416)
CGINDEX		0.206
		(1.197)
MDO_DIR × CGINDEX		0.184
		(0.700)
CAR_EVNTFIRM	−0.983	−0.743
	(−0.474)	(−0.359)
ISSUE_PERSONNEL	−0.128	−0.078
	(−0.409)	(−0.241)
ISSUE_FINANCIAL	0.505*	0.552*
	(1.826)	(1.933)
ISSUE_OPERATING	0.553	0.581*
	(1.601)	(1.657)

(*continued on next page*)

Table 7 (*continued*)

Panel C: Probability of retaining board seats in firms receiving modified independent director opinions

VARIABLES	(1) RETAIN_EVNTFIRM	(2) RETAIN_EVNTFIRM
FIRM SIZE	−0.004	0.022
	(−0.036)	(0.194)
M/B	−0.062	−0.060
	(−1.340)	(−1.305)
ROA	1.590	1.494
	(0.906)	(0.851)
ST	−0.655	−0.751
	(−1.345)	(−1.535)
MAO	0.142	0.080
	(0.329)	(0.186)
FIRM AGE	0.044	0.044
	(1.101)	(1.101)
BOARD SIZE	−0.238	−0.110
	(−0.375)	(−0.167)
%INDBOARD	−1.081	−0.743
	(−0.450)	(−0.303)
CEO TURNOVER	−0.641**	−0.681***
	(−2.532)	(−2.585)
FEMALE	−0.077	−0.087
	(−0.269)	(−0.299)
AGE	−0.005	−0.003
	(−0.457)	(−0.326)
ABSENCE	−1.606***	−1.671***
	(−2.582)	(−2.703)
TENURE	−0.657***	−0.668***
	(−8.269)	(−8.158)
IFTERM2	−0.412*	−0.385
	(−1.681)	(−1.524)
PAY	0.432*	0.449*
	(1.846)	(1.877)
DIRECTORSHIPS	0.015	−0.002
	(0.144)	(−0.017)
COMPCOMM	0.392	0.416
	(1.428)	(1.543)
AUDCOMM	0.014	−0.000
	(0.048)	(−0.001)
FINEXPT	−0.190	−0.194
	(−0.943)	(−0.954)
EXEEXPT	−0.188	−0.210
	(−0.834)	(−0.910)
YEAR DUMMY	YES	YES
INDUSTRY DUMMY	YES	YES
Observations	859	859
Pseudo R^2	0.236	0.243

Panel D: Probability of retaining board seats in interlocked firms with directors who issue modified independent director opinions

VARIABLES	(1) RETAIN_LOCKEDFIRM	(2) RETAIN_LOCKEDFIRM
CONSTANT	−7.095	−7.487
	(−1.524)	(−1.617)
MDO_LOCKEDDIR	0.696*	1.416**
	(1.900)	(2.099)

(*continued on next page*)

Table 7 (*continued*)

Panel D: Probability of retaining board seats in interlocked firms with directors who issue modified independent director opinions		
VARIABLES	(1) RETAIN_LOCKEDFIRM	(2) RETAIN_LOCKEDFIRM
CGINDEX		−0.017
		(−0.066)
MDO_LOCKEDDIR × CGINDEX		−0.471
		(−1.284)
CAR_EVNTFIRM	−0.893	−1.059
	(−0.465)	(−0.495)
CAR_LOCKEDFIRM	3.449	2.946
	(1.295)	(1.073)
ISSUE_PERSONNEL	−0.687	−0.661
	(−1.579)	(−1.516)
ISSUE_FINANCIAL	−0.085	−0.085
	(−0.229)	(−0.218)
ISSUE_OPERATING	−0.609	−0.486
	(−1.542)	(−1.198)
SAME INDUSTRY	−0.008	0.007
	(−0.021)	(0.017)
FIRM SIZE	0.139	0.129
	(0.820)	(0.767)
FIRM AGE	0.053	0.068
	(1.258)	(1.526)
M/B	0.054	0.054
	(1.000)	(1.026)
ROA	−3.354	−3.463
	(−1.236)	(−1.320)
ST	−1.113	−0.998
	(−1.170)	(−1.059)
MAO	−0.660	−0.828
	(−0.890)	(−1.126)
BOARD SIZE	−0.233	−0.278
	(−0.333)	(−0.363)
%INDBOARD	−0.296	−0.243
	(−0.076)	(−0.061)
CEO TURNOVER	−0.050	−0.016
	(−0.149)	(−0.047)
FEMALE	−0.561	−0.506
	(−0.946)	(−0.824)
AGE	0.002	0.001
	(0.106)	(0.060)
ABSENCE	−3.406***	−3.515***
	(−3.136)	(−3.255)
TENURE	−0.858***	−0.882***
	(−5.274)	(−5.251)
IFTERM2	−0.149	−0.123
	(−0.420)	(−0.342)
PAY	0.692**	0.758**
	(2.270)	(2.349)
DIRECTORSHIPS	0.222*	0.227*
	(1.672)	(1.676)
COMPCOMM_EVNTFIRM	0.256	0.232
	(0.479)	(0.419)
COMPCOMM	−0.139	−0.233
	(−0.298)	(−0.488)
AUDCOMM_EVNTFIRM	−0.697	−0.691
	(−1.167)	(−1.128)

(*continued on next page*)

Table 7 (*continued*)

Panel D: Probability of retaining board seats in interlocked firms with directors who issue modified independent director opinions		
VARIABLES	(1) RETAIN_LOCKEDFIRM	(2) RETAIN_LOCKEDFIRM
AUDCOMM	0.718	0.742
	(1.189)	(1.210)
FINEXPT	−0.452	−0.424
	(−1.355)	(−1.210)
EXEEXPT	−0.421	−0.568
	(−0.993)	(−1.180)
YEAR DUMMY	YES	YES
INDUSTRY DUMMY	YES	YES
Observations	328	328
Pseudo R^2	0.257	0.266

Panel A of Table 7 presents the logistic regressions of retaining a board seat in opinion-receiving firms in the 2 years following the issuance of independent director opinions from 2005 to 2010. The dependent variable is RETAIN_EVNTFIRM. Panel B of Table 7 presents the logistic regressions of retaining a board seat in the sample of director-interlocked firms. The dependent variable is RETAIN_LOCKEDFIRM.

Robust standard errors clustered at the firm level are used to compute the z-statistics. The z-statistics reported in parentheses are two tailed. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively. All of the variables are defined in Appendix A.

COMPCOMM and AUDCOMM if the director sits on the compensation committee or audit committee (Davidson et al., 1998; Srinivasan, 2005) and FINEXPT and EXEEXPT if the director has any financial or executive expertise (DeFond et al., 2005). Other variables include director tenure (TENURE), whether some directors are serving their second term on the board (IFTERM2), director pay (PAY) and the number of board positions held as an independent director (DIRECTORSHIPS). Following Fich and Shivdasani (2007), we also consider whether the director is a compensation or audit committee member in an opinion-receiving firm (COMPCOMM_EVNTFIRM and AUDCOMM_EVNTFIRM, respectively) in the analysis of retaining directorships in interlocking firms. When investigating the changes in the board seats of individual directors, we calculate board meeting absence (ABSENCE), mean director remuneration (MPAY_INDIVIDUAL) and mean tenure (MTENURE_INDIVIDUAL) for each individual director. Table 6 reports the descriptive statistics of the control variables in the directorship analysis.

5.2. Probability of retaining directorships in opinion-receiving firms

In this section, we examine whether independent directors retain board seats after they issue opinions on corporate decisions. We first estimate the following regression:

$$\begin{aligned} Prob(RETAIN\_EVNTFIRM_i = 1) &= \gamma_0 + \gamma_1 MDO\_DIR_i + \gamma_2 CGINDEX_i + \gamma_3 MDO\_DIR * CGINDEX_i \\ &+ \gamma_4 CAR\_EVNTFIRM_i + \gamma_5 ISSUE\_PERSONNEL_i + \gamma_6 ISSUE\_FINANCIAL_i \\ &+ \gamma_7 ISSUE\_OPERATING_i + \gamma_8 FIRM\ SIZE_i + \gamma_9 M/B_i + \gamma_{10} ROA_i + \gamma_{11} ST_i \\ &+ \gamma_{12} MAO_i + \gamma_{13} FIRM\ AGE_i + \gamma_{14} BOARDSIZE_i + \gamma_{15} \%INDBOARD_i \\ &+ \gamma_{16} CEO\ TURNOVER_i + \gamma_{17} FEMALE_i + \gamma_{18} AGE_i + \gamma_{19} ABSENCE_i \\ &+ \gamma_{20} TENURE_i + \gamma_{21} IFTERM2_i + \gamma_{22} PAY_i + \gamma_{23} DIRECTORSHIPS_i \\ &+ \gamma_{24} COMPCOMM_i + \gamma_{25} AUDCOMM_i + \gamma_{26} FINEXPT_i + \gamma_{27} EXEEXPT_i \\ &+ \sum_{J=1}^{J} YEAR + \sum_{K=1}^{K} INDUSTRY + \varepsilon_i \end{aligned}$$

where all of the variables are defined in Appendix A.

Panel A of Table 7 presents the logistic regression results of retaining directorships. Column (1) reveals a significantly negative association between retaining a board seat in an opinion-receiving firm and MDO_DIR, which suggests that directors who say "no" are more likely to leave opinion-receiving firms than the cohort that is friendly with the management on the board.

When the CGINDEX and its interaction with MDO_DIR are included in the regression, the coefficient of the interaction term is negative but not statistically significant, whereas the coefficient of MDO_DIR is still statistically significant. As expected, the estimated coefficients of FIRM SIZE and ROA are significantly positive, implying that independent directors are more likely to retain their board positions in firms that are bigger and perform better. The TENURE variable has negative effects on board positions, consistent with the Chinese practice that the tenure of an independent director cannot exceed 6 years. The coefficient of IFTERM2 is statistically significant, which implies that if some other independent directors are in their second term, the independent director who issues opinions is more likely to retain his/her board seats.

5.3. Probability of retaining directorships in director-interlocked firms

To test the probability of retaining directorships in director-interlocked firms, we use the following regression to analyze the sample of directors in interlocking firms:

$$\begin{aligned} Prob(RETAIN\_LOCKEDFIRM_i = 1) = {} & \delta_0 + \delta_1 MDO\_LOCKEDDIR_i + \delta_2 CGINDEX_i \\ & + \delta_3 MDO\_LOCKEDDIR * CGINDEX_i + \delta_4 CAR\_EVNTFIRM_i \\ & + \delta_5 CAR\_LOCKEDFIRM_i + \delta_6 ISSUE\_PERSONNEL_i \\ & + \delta_7 ISSUE\_FINANCIAL_i + \delta_8 ISSUE\_OPERATING_i \\ & + \delta_9 SAMEINDUSTRY_i + \delta_{10} MDO\_LOCKEDDIR \times SAMEINDUSTRY_i \\ & + \delta_{11} FIRM\ SIZE_i + \delta_{12} FIRM\ AGE_i + \delta_{13} M/B_i + \delta_{14} ROA_i \\ & + \delta_{15} ST_i + \delta_{16} MAO_i + \delta_{17} BOARD\ SIZE_i + \delta_{18} \%INDBOARD_i \\ & + \delta_{19} CEO\ TURNOVER_i + \delta_{20} FEMALE_i + \delta_{21} AGE_i + \delta_{22} ABSENCE_i \\ & + \delta_{23} TENURE_i + \delta_{24} IFTERM2_i + \delta_{25} PAY_i + \delta_{26} DIRECTORSHIPS_i \\ & + \delta_{27} COMPCOMM\_EVNTFIRM_i + \delta_{28} COMPCOMM_i \\ & + \delta_{29} AUDCOMM\_EVNTFIRM_i + \delta_{30} AUDCOMM_i + \delta_{31} FINEXPT_i \\ & + \delta_{32} EXEEXPT_i + \sum_{J=1}^{J} YEAR + \sum_{K=1}^{K} INDUSTRY + Varepsilon_i \end{aligned}$$

Column (1) in Panel B of Table 7 shows that the estimated coefficient of MDO_LOCKEDDIR is positive but not statistically significant. When the governance index (CGINDEX) and its interaction with modified opinions (MDO_LOCKEDDIR) are included in the regression, MDO_LOCKEDDIR is significantly positive, indicating that an independent director who says "no" is more likely to retain his/her directorship in an interlocked firm. Interestingly, the interaction item in Column (2) is significantly negative, suggesting that an independent director who says "no" is more likely to lose his/her directorship in an interlocked firm if the firm is heavily influenced by the controlling shareholder.

To investigate the possibility of directors voluntarily reducing board seats in interlocked firms to manage litigation risk, when subjected to similar risk exposure in the same industry, we expand the equation to include the interaction item SAME INDUSTRY × MDO_LOCKEDDIR. We also check whether the main results hold by incorporating the interaction between financial difficulty and directors saying "no" in interlocked firms. Column (3) of Table 7 shows that SAME INDUSTRY is negatively associated with the likelihood of retaining directorship in director-interlocked firms, although the estimated coefficient is not significant. The interaction of SAME INDUSTRY is positive and insignificant, suggesting that directors who say "no" do not intend to reduce board seats in interlocked firms operating in the same industry. Columns (4) and

(5) of Panel B show that the ST dummy is not significant but MAO is significantly negative, consistent with the alternative explanation that directors tend to reduce board seats when interlocked firms receive a modified audit report. However, we do not find evidence that directors who say "no" tend to cut their seats in interlocked firms.

Several control variables are important in determining whether board seats are retained in interlocked firms. Independent directors who serve in firms with longer listing histories and without CEO turnovers are more likely to retain board seats. If the firms have a lower percentage of independent directors or if the independent directors have shorter tenure, the probability of retaining directorships in director-interlocked firms increases.

The remainder of the analysis in Table 7 examines the probability of retaining a director who said "no" in other firms versus the probability of retaining other directors. Panel C presents the analysis of retaining board seats in firms receiving independent directors' opinions. As indicated in Column (1), the coefficient of MDO is significantly negative, suggesting that directors are more likely to leave the incumbent seat after they say "no" than directors who never say "no" in firms receiving modified opinions. Panel D of Table 7 presents the results using a sample of firms interlocked with directors who sit in firms receiving modified opinions. The indicators of SAME INDUSTRY, ST and MAO are all insignificant, indicating that the alternative explanation, that is, that directors tend to reduce board seats in interlocked firms to manage litigation risk, may not be a big concern. On the contrary, outspoken directors may even benefit by retaining their seats in the interlocked firms.

5.4. Changes in directorships following the issuance of modified director opinions

In this section, we track the change in directorships over a 2-year period following independent directors' issuance of director opinions. We estimate the following regression to analyze the reputation consequences of independent directors, with the dependent variables being CHGSEATS, RET CHGSEATS and GAINSEATS, all of which measure the changes in directorships in different ways (all of the variables are defined in Appendix A):[3]

$$
\begin{aligned}
&CHGSEATS_i/RET\ \ CHGSEATS_i/GAINSEATS_i/CHGTASEATS_i/CHGMVSEATS_i\\
&/CHGSALESEATS_i/CHGPAYSEATS_i = \theta_0 + \theta_1 MDO\_DIR_i + \theta_2 CAR\_EVNTFIRM_i\\
&+ \theta_3 ISSUE\_PERSONNEL_i + \theta_4 ISSUE\_FINANCIAL_i + \theta_5 ISSUE\_OPERATING_i + \theta_6 AGE_i\\
&+ \theta_7 FEMALE_i + \theta_8 ABSENCE_i + \theta_9 MTENURE\_INDIVIDUAL_i + \theta_{10} IFTERM2\_INDIVIDUAL_i\\
&+ \theta_{11} MPAY\_INDIVIDUAL_i + \theta_{12} DIRECTORSHIPS_i + \theta_{13} FINEXPT_i + \theta_{14} EXEEXPT_i\\
&+ \sum_{J=1}^{J} YEAR + \sum_{K=1}^{K} INDUSTRY + \varepsilon_i
\end{aligned}
$$

According to the reputation hypothesis, we expect to find a positive relation between changes in board seats and modified independent director opinions. Table 8 reports the regression results for the three specifications. Contrary to the prediction of the reputation hypothesis, the results in Columns (1) to (3) show that MDO_DIR's estimated coefficients are negative and highly significant, implying that effective board monitoring is not rewarded through additional board appointments. Consistent with our expectation, the coefficient of AGE is significantly negative at the 1% level. MPAY_INDIVIDUAL is positively related to CHGSEATS, RET CHGSEATS and GAINSEATS, which indicates that independent directors with higher pay tend to have more board positions in the future. The estimated coefficient of FINEXPT is positive and significant, implying that independent directors with accounting expertise tend to have more board positions, which is consistent with the Chinese regulation that listed companies should appoint at least one independent director with an accounting background (CSRC, 2001).

[3] We do not control for firm-specific characteristics in the change in directorship regressions, as we are investigating the change in the total board seats held by an independent director after he/she issues an opinion.

Table 8
Change in directorships for independent directors who issued opinions.

Panel A: Change in directorships for independent directors who issued opinions

VARIABLES	(1) CHGSEATS	(2) RET CHGSEATS	(3) GAINSEATS
Constant	0.083	−0.071	−0.137*
	(0.656)	(−0.794)	(−1.824)
MDO_DIR	−0.125***	−0.087***	−0.041**
	(−3.426)	(−3.509)	(−2.421)
CAR_EVNTFIRM	0.085	0.043	0.074
	(0.876)	(0.647)	(1.354)
ISSUE_PERSONNEL	−0.005	−0.000	0.012
	(−0.317)	(−0.028)	(1.326)
ISSUE_FINANCIAL	−0.021	−0.015	−0.018*
	(−1.307)	(−1.408)	(−1.957)
ISSUE_OPERATING4	−0.022	−0.009	−0.002
	(−1.231)	(−0.710)	(−0.217)
AGE	−0.005***	−0.003***	−0.003***
	(−7.179)	(−8.397)	(−8.668)
FEMALE	−0.030	−0.016	−0.034***
	(−1.447)	(−1.228)	(−2.686)
ABSENCE	0.010	0.023	0.027
	(0.137)	(0.488)	(0.627)
MTENURE_INDIVIDUAL	−0.086***	−0.077***	−0.006
	(−11.434)	(−16.907)	(−1.461)
IFTERM2_INDIVIDUAL	−0.047**	0.016	−0.036***
	(−2.033)	(1.240)	(−2.810)
MPAY_INDIVIDUAL	0.049***	0.036***	0.034***
	(4.176)	(4.473)	(4.892)
DIRECTORSHIPS	−0.141***	−0.015***	0.026***
	(−10.903)	(−3.603)	(5.422)
FINEXPT	0.108***	0.072***	0.068***
	(5.993)	(7.124)	(6.289)
EXEEXPT	−0.116***	−0.075***	−0.068***
	(−7.493)	(−7.507)	(−8.098)
YEAR DUMMY	Yes	Yes	Yes
INDUSTRY DUMMY	Yes	Yes	Yes
Observations	15,667	15,667	15,667
Adj. R^2	0.103	0.0754	0.0552

Panel B: Change in weighted directorships for independent directors who issued opinions

VARIABLES	(1) CHGTASEATS	(2) CHGMVSEATS	(3) CHGSALESEATS	(4) CHGPAYSEATS
Constant	−0.015	1.488***	0.104	0.960***
	(−0.080)	(9.308)	(0.510)	(9.801)
MDO_DIR	0.099	0.113	0.078	0.019
	(1.414)	(1.544)	(0.639)	(0.579)
CAR_EVNTFIRM	0.123	0.028	0.222*	0.028
	(1.095)	(0.276)	(1.650)	(0.498)
ISSUE_PERSONNEL	0.033*	0.043**	0.011	0.003
	(1.650)	(2.470)	(0.587)	(0.296)
ISSUE_FINANCIAL	−0.015	0.008	0.033*	−0.027***
	(−0.914)	(0.492)	(1.687)	(−3.056)
ISSUE_OPERATING	0.061***	0.055***	0.046**	0.018*
	(2.695)	(2.709)	(2.061)	(1.792)
AGE	0.000	−0.001	−0.000	−0.000
	(0.459)	(−0.847)	(−0.159)	(−0.204)
FEMALE	−0.077***	−0.023	−0.036	−0.014
	(−3.243)	(−1.007)	(−1.400)	(−1.308)

(*continued on next page*)

Table 8 (*continued*)

Panel B: Change in weighted directorships for independent directors who issued opinions

VARIABLES	(1) CHGTASEATS	(2) CHGMVSEATS	(3) CHGSALESEATS	(4) CHGPAYSEATS
ABSENCE	−0.046	0.046	−0.035	0.071*
	(−0.616)	(0.604)	(−0.418)	(1.882)
MTENURE_INDIVIDUAL	−0.029***	−0.015*	−0.030***	−0.007
	(−3.254)	(−1.869)	(−3.153)	(−1.630)
IFTERM2_INDIVIDUAL	−0.013	0.008	−0.022	−0.045***
	(−0.618)	(0.395)	(−0.878)	(−3.923)
MPAY_INDIVIDUAL	0.018	−0.036**	0.022	−0.085***
	(1.102)	(−2.455)	(1.158)	(−9.098)
DIRECTORSHIPS	0.013	0.003	−0.007	0.026***
	(1.302)	(0.326)	(−0.650)	(6.975)
FINEXPT	0.049**	0.035**	0.033	0.017**
	(2.198)	(2.013)	(1.542)	(2.080)
EXEEXPT	−0.012	−0.004	0.005	0.005
	(−0.605)	(−0.247)	(0.240)	(0.542)
YEAR DUMMY	Yes	Yes	Yes	Yes
INDUSTRY DUMMY	Yes	Yes	Yes	Yes
Observations	10,857	10,834	10,848	10,760
Adj. R^2	0.0147	0.469	0.0166	0.0439
F test	3.648	220.9	3.143	8.309

This table presents the pooled regression results for the change in directorships in the 2 years following independent director opinions from 2005 to 2010. The dependent variables for the OLS regressions are CHGSEATS, RET CHGSEATS and GAINSEATS in Panel A and CHGTASEATS, CHGMVSEATS, CHGSALESEATS and CHGPAYSEATS in Panel B.
Robust standard errors clustered at the director level are used to compute the t-statistics. The t-statistics reported in parentheses are two tailed. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively. All of the variables are defined in Appendix A.

It is conceivable that directors who say "no" may gain from their reputations by sitting in boards of larger firms despite holding fewer board seats. Panel B of Table 8 sheds light on this possibility by examining changes in the weighted average of directorships using firms' total assets, market caps, sales and total director pay in the analysis regressions of directorship changes. The results indicate that the indicator of a director who says "no" is positive and not statistically significant in all of the regressions across a variety of weighted averages of directorships. Although the coefficients are not significant, we cannot rule out the prediction that directors who say "no" may be rewarded with seating on the boards of larger firms.

6. Sensitivity tests

6.1. Alternative event window specification

We also use additional event windows to calculate the CARs around opinion announcements, including (0, +1) and (0, +2). The results are qualitatively the same when we use the CARs on alternative event windows.

6.2. Endogeneity concern

To avoid choice-based sample bias in our empirical test (Doyle et al., 2007), our main results are based on the unmatched sample of firms that received modified director opinions and those with clean director opinions. To mitigate the endogeneity concern that may arise from any omitted variables that are correlated with market reaction/director turnover and the probability of an independent director saying "no," we take an instrumental variable approach in robustness tests to incorporate the determinants of independent directors' issuance of modified opinions. In the firm-level analysis, the first instrument we use is MDIRINCENTIVE, measured as the natural logarithm of the sum of the total assets of the firms in which the independent directors

Table 9
Sensitivity tests on endogeneity.

Panel A: Sensitivity tests on the cumulative abnormal returns for director-interlocked firms

	(1) First stage		(2) Second stage
VARIABLES	MDO_LOCKEDFIRM	MDO_LOCKEDFIRM × CGINDEX	
CONSTANT	0.237	0.995	0.010
	(0.074)	(0.322)	(0.896)
INSTRUMENT VARIABLES:			
MDIRINCENTIVE	−0.481***	−0.522***	
	(−3.216)	(−3.247)	
MPROFESSOR	−0.461*	−0.510*	
	(−1.855)	(−1.947)	
SAMEPLACE	−0.251	−0.270	
	(−0.907)	(−0.941)	
MDO_LOCKEDFIRM			0.302*
			(1.813)
CGINDEX			0.001*
			(1.736)
MDO_LOCKEDFIRM × CGINDEX			−0.446**
			(−2.523)
CAR_EVNTFIRM	−4.270	−3.860	0.074***
	(−1.523)	(−1.359)	(9.233)
FIRM SIZE	0.250*	0.247	−0.001**
	(1.756)	(1.580)	(−2.224)
M/B	0.064	0.054	−0.001***
	(1.226)	(0.895)	(−3.440)
ROA	−0.601	−0.394	0.001
	(−0.500)	(−0.289)	(0.172)
ST	0.200	0.253	−0.001
	(0.479)	(0.589)	(−0.225)
MAO	−0.536	−0.431	−0.001
	(−1.446)	(−1.196)	(−0.516)
EARN NEWS	0.567**	0.636***	−0.003*
	(2.422)	(2.784)	(−1.944)
EARN SURP	0.104	−0.006	−0.002**
	(0.333)	(−0.017)	(−2.027)
BOARD SIZE	0.292	0.425	−0.001
	(0.653)	(0.864)	(−0.774)
%INDBOARD	−0.060	0.370	−0.013*
	(−0.034)	(0.190)	(−1.817)
FIRMAGE	0.010	0.010	0.000
	(0.367)	(0.356)	(1.081)
INSTIHLD	−0.026	−0.038*	−0.000*
	(−1.343)	(−1.715)	(−1.686)
SAME INDUSTRY	−0.549*	−0.480	−0.001
	(−1.909)	(−1.632)	(−1.177)
IFFEMALE	−0.135	−0.279	−0.000
	(−0.751)	(−1.397)	(−0.034)
MAGE	−0.019	−0.024	−0.000
	(−1.140)	(−1.482)	(−0.012)
MTENURE	−0.098	−0.118	−0.000
	(−1.206)	(−1.344)	(−1.079)
MPAY	0.037	0.056	0.002*
	(0.197)	(0.294)	(1.897)
MDIRECTORSHIPS	0.263**	0.300**	−0.001
	(2.112)	(2.351)	(−1.115)
COMPCOMM_EVNTFIRM	0.314	0.331	0.000
	(0.959)	(0.951)	(0.012)

(*continued on next page*)

Table 9 (*continued*)

Panel A: Sensitivity tests on the cumulative abnormal returns for director-interlocked firms

	(1) First stage		(2) Second stage
VARIABLES	MDO_LOCKEDFIRM	MDO_LOCKEDFIRM × CGINDEX	
AUDCOMM_EVNTFIRM	−0.331	−0.417	−0.002
	(−1.026)	(−1.197)	(−0.892)
IFCOMPCOMM	1.092**	0.719	−0.002
	(2.154)	(1.465)	(−0.846)
IFAUDCOMM	−0.936*	−0.546	0.002
	(−1.920)	(−1.140)	(0.924)
IFFINEXPT	0.157	0.197	0.002*
	(0.724)	(0.878)	(1.817)
IFEXEEXPT	0.247	0.136	0.001
	(1.448)	(0.804)	(0.822)
YEAR DUMMY	Yes	Yes	Yes
PROPOSAL FIXED EFFECTS	Yes	Yes	Yes
Observations	21,381	21,381	21,381
Pseudo R^2/Adj. R^2	0.132	0.133	0.013

Panel B: Sensitivity tests on the probability of retaining board seats in director-interlocked firms

	(1) First stage		(2) Second stage
VARIABLES	MDO_LOCKEDDIR	MDO_LOCKEDDIR × CGINDEX	
CONSTANT	6.932*	6.937*	1.636
	(1.926)	(1.943)	(1.408)
INSTRUMENT VARIABLES: DIRINCENTIVE	−0.588***	−0.581***	
	(−2.683)	(−2.642)	
PROFESSOR	−0.326*	−0.377**	
	(−1.771)	(−1.994)	
SAMEPLACE	−0.406	−0.438	
	(−1.401)	(−1.501)	
MDO_LOCKEDDIR			2.327
			(0.595)
CGINDEX			0.005
			(0.113)
MDO_LOCKEDDIR × CGINDEX			−3.815
			(−0.846)
CAR_EVNTFIRM	−1.761	−0.987	0.162
	(−0.562)	(−0.312)	(0.298)
CAR_LOCKEDFIRM	3.184**	2.522	−0.607
	(1.995)	(1.491)	(−0.944)
ISSUE_PERSONNEL	−0.677*	−0.635	−0.093
	(−1.690)	(−1.581)	(−0.899)
ISSUE_FINANCIAL	0.608*	0.572*	0.078
	(1.896)	(1.725)	(0.803)
ISSUE_OPERATING4	−0.507	−0.344	−0.068
	(−1.352)	(−0.885)	(−0.580)
SAME INDUSTRY	−0.390	−0.326	−0.040
	(−1.249)	(−1.007)	(−0.372)
FIRM SIZE	0.262**	0.232	0.029
	(1.982)	(1.515)	(0.683)
FIRMAGE	−0.042	−0.038	0.041***
	(−1.287)	(−1.190)	(3.737)
M/B	0.048	0.039	0.012
	(1.287)	(0.841)	(0.793)
ROA	−2.515**	−2.770**	0.282
	(−2.187)	(−2.291)	(0.422)

(*continued on next page*)

Table 9 (*continued*)

Panel B: Sensitivity tests on the probability of retaining board seats in director-interlocked firms

	(1) First stage		(2) Second stage
VARIABLES	MDO_LOCKEDDIR	MDO_LOCKEDDIR × CGINDEX	
ST	−0.428	−0.595	−0.077
	(−0.757)	(−1.006)	(−0.312)
MAO	−0.070	−0.089	−0.359**
	(−0.206)	(−0.256)	(−2.087)
BOARD SIZE	−0.227	−0.246	0.244
	(−0.482)	(−0.504)	(1.199)
%INDBOARD	−1.973	−1.487	−2.118**
	(−1.049)	(−0.739)	(−2.406)
CEO TURNOVER	0.180	0.259	−0.388***
	(1.036)	(1.505)	(−5.008)
IFFEMALE	0.272	0.212	−0.010
	(0.592)	(0.464)	(−0.078)
AGE	−0.029*	−0.028*	0.002
	(−1.958)	(−1.886)	(0.467)
ABSENCE	−0.421	−0.240	−0.996***
	(−0.699)	(−0.364)	(−3.744)
MTENURE	0.108	0.081	−0.785***
	(1.242)	(0.919)	(−21.155)
IFTERM2	−0.162	−0.163	0.186**
	(−0.692)	(−0.654)	(1.968)
PAY	−0.110	−0.079	0.083
	(−0.504)	(−0.371)	(1.060)
DIRECTORSHIPS	0.617***	0.553***	−0.053
	(4.408)	(4.304)	(−1.416)
IFCOMPCOMM_EVNTFIRM	−0.066	−0.064	−0.032
	(−0.187)	(−0.168)	(−0.315)
IFCOMPCOMM	0.082	0.101	0.080
	(0.267)	(0.327)	(0.758)
IFAUDCOMM_EVNTFIRM	−0.604*	−0.595*	−0.019
	(−1.886)	(−1.770)	(−0.186)
IFAUDCOMM	−0.068	−0.102	0.003
	(−0.214)	(−0.328)	(0.031)
IFFINEXPT	0.060	0.083	0.043
	(0.304)	(0.418)	(0.556)
IFEXEEXPT	0.358	0.069	−0.040
	(1.325)	(0.250)	(−0.329)
YEAR DUMMY	Yes	Yes	Yes
INDUSTRY DUMMY	Yes	Yes	Yes
Observations	5105	5105	5105
Pseudo R^2	0.202	0.192	0.216

Panel C: Sensitivity tests on the change in directorships for independent directors who issued opinions

	(1) First stage	(2) Second stage		
VARIABLES	MDO_DIR	CHGSEATS	RET CHGSEATS	GAINSEATS
Constant	4.995***	0.201	0.051	−0.081
	(2.640)	(1.547)	(0.551)	(−1.053)
INSTRUMENT VARIABLES: DIRINCENTIVE	−0.394***			
	(−5.096)			
PROFESSOR	−0.106			
	(−0.775)			
MDO_DIR		−1.321***	−1.324***	−0.613***
		(−4.251)	(−6.243)	(−3.891)
CAR_EVNTFIRM	−3.463***	−0.004	−0.050	0.031
	(−3.108)	(−0.040)	(−0.735)	(0.550)

(*continued on next page*)

Table 9 (*continued*)

Panel C: Sensitivity tests on the change in directorships for independent directors who issued opinions

	(1) First stage	(2) Second stage		
VARIABLES	MDO_DIR	CHGSEATS	RET CHGSEATS	GAINSEATS
ISSUE_PERSONNEL	−0.831***	−0.022	−0.017	0.004
	(−4.570)	(−1.298)	(−1.523)	(0.451)
ISSUE_FINANCIAL	0.490***	−0.003	0.003	−0.009
	(2.983)	(−0.184)	(0.271)	(−0.982)
ISSUE_OPERATING	−0.210	−0.030*	−0.017	−0.006
	(−1.100)	(−1.651)	(−1.334)	(−0.550)
AGE	−0.016**	−0.005***	−0.004***	−0.003***
	(−2.366)	(−7.643)	(−9.354)	(−9.008)
FEMALE	−0.239	−0.035*	−0.021	−0.036***
	(−1.113)	(−1.673)	(−1.599)	(−2.866)
ABSENCE	1.381**	0.049	0.063	0.048
	(2.424)	(0.673)	(1.325)	(1.112)
MTENURE_INDIVIDUAL	−0.181**	−0.088***	−0.079***	−0.007*
	(−2.141)	(−11.725)	(−17.305)	(−1.760)
IFTERM2_INDIVIDUAL	0.355*	−0.041*	0.021*	−0.033***
	(1.897)	(−1.782)	(1.695)	(−2.598)
MPAY_INDIVIDUAL	0.145	0.047***	0.034***	0.033***
	(1.056)	(4.005)	(4.203)	(4.753)
DIRECTORSHIPS	0.233***	−0.141***	−0.015***	0.026***
	(2.792)	(−10.965)	(−3.746)	(5.381)
FINEXPT	0.129	0.112***	0.076***	0.070***
	(0.916)	(6.211)	(7.538)	(6.475)
EXEEXPT	0.287*	−0.108***	−0.066***	−0.063***
	(1.788)	(−6.906)	(−6.583)	(−7.598)
YEAR DUMMY	Yes	Yes	Yes	Yes
INDUSTRY DUMMY	Yes	Yes	Yes	Yes
Observations	15,667	15,667	15,667	15,667
Pseudo R^2/Adj. R^2	0.134	0.104	0.078	0.056

This table presents the results of the sensitivity tests on endogeneity. Panel A presents the sensitivity tests on the 3-day CARs around opinion announcement from 2005 to 2010 for director-interlocked firms. The dependent variables for the first-stage logit regression are MDO_LOCKEDFIRM and MDO_LOCKEDFIRM × CGINDEX and the dependent variable for the second-stage OLS regression is CAR_LOCKEDFIRM. Panel B presents the sensitivity tests on the probability of retaining board seats in director-interlocked firms. The dependent variables for the first-stage logit regressions are MDO_LOCKEDDIR and MDO_LOCKEDDIR × CGINDEX and the dependent variable for the second-stage regression is RETAIN_LOCKEDFIRM. Panel C presents the sensitivity tests on the change in directorships for independent directors who issued opinions. The dependent variable for the first-stage logit regression is MDO_DIR and the dependent variables for the second-stage OLS regression are CHGSEATS, RET CHGSEATS and GAINSEATS.
Robust standard errors clustered at the firm level (Panels A and B) and at the director level (Panel C) are used to compute the t-statistics (z-statistics) for the OLS (logit) regressions. The t-statistics (z-statistics) reported in parentheses are two tailed. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively. All of the variables are defined in Appendix A.

hold board seats. Masulis and Mobbs (2014) argue that firm size is a natural source of director reputation incentives, given that larger firms afford a director greater visibility, prestige, compensation and likelihood of obtaining additional directorships. Accordingly, directorships in firms of different sizes create differential incentives to monitor senior management closely. We expect the reputation incentives of independent directors to affect their propensity to say "no." The second instrument in the firm-level analysis is MPROFESSOR, the percentage of independent directors who are university faculty members. Francis et al. (2013) find that academic directors are effective monitors and play an important governance role through their advising and monitoring functions. The third instrument we use in the firm-level analysis is SAMEPLACE, an indicator set to 1 if any independent director lives in the same city as the serving firm, as Alam et al. (2014) find that geographic distance between directors and corporate headquarters is related to information acquisition and board decisions. In the director-level analysis, the instruments are the natural logarithm of the total assets of the firms in

which the independent director holds board seats (DIRINCENTIVE); the indicator, which is set to 1 if the independent director is a faculty member (PROFESSOR); and SAMEPLACE. In the first stage, we add the instrument to the logit model to estimate an independent director's propensity to issue a modified opinion, with all independent variables from the second stage serving as control variables. As there are three groups of tests, including market reaction, retaining directorships and change in directorships, three sets of first-stage regressions are presented in Table 9.

Next, we use the predicted probability from the first stage to replace the MDO indicators in the second-stage regressions. As MDO*CGINDEX appears in the CAR regression and the tests on retaining directorships, MDO*CGINDEX is also estimated in the first stage and the predicted value is included in the second-stage regressions. As we primarily focus on the reputation of or endogenous hypothesis for the independent director, we focus only on the tests for interlocked firms.

Table 9 presents additional regressions with instrument variables. In the first-stage regressions in Panels A to C of Table 9, the director incentive variable appears to be negatively correlated with the director's propensity to issue modified opinions, which is inconsistent with Masulis and Mobbs (2014). One possible explanation is that independent directors with more board seats may tend to keep silent in board meetings, as they have more to lose when standing up to corporate insiders. Panel A of Table 9 reports the results of the market reaction to director opinions in interlocked firms. As expected, the instrumented MDO_LOCKEDFIRM variable is significantly positively associated with CARs, and the instrumented MDO_LOCKEDFIRM*CGINDEX variable is significantly negatively associated with CARs. Panels B and C of Table 9 show the tests for the probability of retaining board seats and the change in directorships. Although the probability of retaining board seats in director-interlocked firms is not significant, we find qualitatively similar results that the instrumented MDO_DIR is negatively associated with the change in directorships in the 2 years subsequent to issuing modified director opinions. The preceding sensitivity tests show that our main results in Sections 4 and 5 are robust.

6.3. Interlocking firms that also received modified independent director opinions

If some interlocking firms in our sample also received modified independent director opinions on a date close to the event date, the results in Table 7 that pertain to retaining board seats in director-interlocked firms may be biased to our findings.[4] To address this concern, we conduct a sensitivity test by excluding the interlocking firms that also received modified independent director opinions within a 5-year event window ($t-2$ to $t+2$) and rerun the regressions in Panels B and D of Table 7. In so doing, we delete 21 distinct interlocking firms and lose 132 board-year observations. The results remain qualitatively the same.

7. Conclusions

We examine the stock and labor market effects associated with independent directors' issuance of director opinions in the Chinese market. We find that the market reacts negatively to modified director opinions, but that director-interlocked firms exhibit positive stock returns around the opinion announcement dates. We further find that independent directors are more likely to lose directorships after they issue modified opinions and less likely to gain new board appointments after they say "no" in board meetings. Our findings suggest that although the disclosure of independent board monitoring is informative after controlling for alternative explanations in previous studies, the reputation of independent monitoring does not reward individual independent directors by increasing their future directorships. Overall, we enrich the director reputation literature by examining the consequences of independent directors' active monitoring of the stock market and labor market. Although our results are based on a small sample of modified opinions of independent directors in China, they may have important implications for the regulators of emerging markets, where independent directors play a crucial role in protecting the interests of minority shareholders.

[4] We thank the reviewer for bringing this point to our attention.

Appendix A. Variable definitions

Dependent variables	
Abnormal return analysis	
CAR_EVNTFIRM	Three-day (−1 to +1) cumulative abnormal returns (CARs) around the announcement of the independent director's opinion on the opinion-receiving firm
CAR_LOCKEDFIRM	Three-day (−1 to +1) CARs around the announcement of the independent director's opinion on the director-interlocked firm
Director turnover analysis	
RETAIN_EVNTFIRM	Indicator variable that equals 1 if the independent director retains a board seat within 2 years of the opinion-receiving firm following the issuance of the independent director's opinion, and 0 otherwise
RETAIN_LOCKEDFIRM	Indicator variable that equals 1 if the independent director retains a board seat in the 2 years following the issuance of the independent director's opinion in his/her director-interlocked firm, and 0 otherwise
CHGSEATS	Mean change in board seats in the 2 years following the issuance of the director's opinion
RET CHGSEATS	Mean change in board seats in the 2 years following the issuance of the director's opinion, divided by the number of board seats in the year of opinion issuance
GAINSEATS	Number of board seats gained by the independent director in the 2 years following the director opinion issuance. The variable equals 0 if no new seats are gained
CHGTASEATS	Natural logarithm of (the average of the total assets of all serving firms/the average number of directorships in the 2 years following the issuance of the director's opinion) minus the natural logarithm of (the sum of the total assets of all serving firms/the total number of directorships in the year of director opinion issuance)
CHGMVSEATS	Natural logarithm of (the average market value of all serving firms/the average number of directorships in the 2 years following the issuance of the director's opinion) minus the natural logarithm of (the sum of the market values of all serving firms/the total number of directorships in the year of director opinion issuance)
CHGSALESEATS	Natural logarithm of (the average of the total sales of all serving firms/the average number of directorships in the 2 years following the issuance of the director's opinion) minus the natural logarithm of (the sum of the sales of all serving firms/the total number of directorships in the year of director opinion issuance)
CHGPAYSEATS	Natural logarithm of (the average director pay of all serving firms/the average number of directorships in the 2 years following the issuance of the director's opinion) minus the natural logarithm of (the sum of the director pay of all serving firms/the total number of directorships in the year of director opinion issuance)
Treatment variables	
Abnormal return analysis	
MDO_EVNTFIRM	Indicator variable that equals 1 if the firm receives a modified independent director opinion, and 0 otherwise

MDO_LOCKEDFIRM	Indicator variable that equals 1 if the firm is interlocked with an independent director who issues a modified director opinion, and 0 otherwise
Director turnover analysis	
MDO_DIR	Indicator variable that equals 1 if the independent director issues a modified director opinion, and 0 otherwise
MDO_LOCKEDDIR	Indicator variable that equals 1 if the independent director issues a modified director opinion to the director-interlocked firm, and 0 otherwise
Control variables	
Event characteristics	
ISSUE_PERSONNEL	Indicator variable that equals 1 if the independent director's opinion is issued toward a board resolution on personnel issues (e.g., appointing or discharging top executives and managerial compensation), and 0 otherwise
ISSUE_FINANCIAL	Indicator variable that equals 1 if the independent director's opinion is issued toward a board resolution on financial reporting and auditing issues, and 0 otherwise
ISSUE_OPERATING	Indicator variable that equals 1 if the director's opinion is on operating issues other than personnel, financial reporting and auditing issues, and 0 otherwise
Firm and board characteristics	
FIRM SIZE	Natural logarithm of total assets
M/B	Market value of equity/book value of equity
ROA	Net income/total assets
ST	Indicator variable that equals 1 if the firm is given special treatment status, and 0 otherwise
MAO	Indicator variable that equals 1 if the firm receives a modified audit opinion, and 0 otherwise
FIRM AGE	Number of years the firm's stock has traded on the Shanghai or Shenzhen stock exchange
EARN NEWS	Indicator variable that equals 1 if the firm announces earnings in the same window (-1 to + 1) as the independent director's opinion, and 0 otherwise
EARN SURP	Most recently announced earnings minus the earnings four quarters ago, divided by the market value of equity
SAME INDUSTRY	Indicator variable that equals 1 if the director-interlocked firm is in the same industry as the opinion-receiving firm, and 0 otherwise
BLOCK	Indicator variable that equals 1 if the percentage of ownership held by the largest shareholder is more than the median, and 0 otherwise
CONTROL DISPERSION	Indicator variable that equals 1 if the ultimate controlling shareholder's control rights do not equal the shareholder's ownership, and 0 otherwise
INSTIHLD	Percentage of ownership in the firm held by institutional investors
LESSINSTIHLD	Indicator variable that equals 1 if the percentage of ownership held by institutional investors is less than the median, and 0 otherwise
DUALITY	Indicator variable that equals 1 if the chairman of the board is also the CEO, and 0 otherwise
CGINDEX	Composite index calculated by summing up BLOCK, CONTROL DISPERSION, LESSINSTIHLD and CEO DUALITY (ranging from 0 to 4)
CEO TURNOVER	Indicator variable that equals 1 if the CEO or chairman leaves the office in the 2 years following the director opinion announcement, and 0 otherwise

BOARD SIZE	Natural logarithm of the number of board members
%INDBOARD	Percentage of the board members who are independent directors
Director characteristics	
FEMALE	Indicator variable that equals 1 if the independent director is female, and 0 otherwise
IFFEMALE	Indicator variable that equals 1 if at least one independent director of a company is female, and 0 otherwise
TENURE	Years of service as an independent director on the firm's board
MTENURE	Mean years of service as an independent director for all independent directors on the firm's board
MTENURE_INDIVIDUAL	Mean years of service as an independent director across all of his/her board positions as an independent director
IFTERM2	Indicator variable that equals 1 if at least one independent director has served the firm for more than 3 years, and 0 otherwise
IFTERM2_INDIVIDUAL	Indicator variable that equals 1 if an independent director has served for more than 3 years in any of his/her serving firms, and 0 otherwise
AGE	Age of the independent director
MAGE	Mean age of all independent directors on the firm's board
PAY	Natural logarithm of annual director remuneration
MPAY	Natural logarithm of mean annual director remuneration for all independent directors on the firm's board
MPAY_INDIVIDUAL	Natural logarithm of mean annual director remuneration for an independent director across all of his/her serving firm boards as an independent director
ABSENCE	Percentage of absences to total number of board meetings
DIRECTORSHIPS	Number of board seats held by a person in all of his/her serving companies as an independent director
MDIRECTORSHIPS	Mean number of board seats held by all independent directors on the firm's board
COMPCOMM	Indicator variable that equals 1 if the opinion-issuing director is a member of the firm's compensation or nomination committee, and 0 otherwise
COMPCOMM_EVNTFIRM	Indicator variable that equals 1 if the interlocked independent director is a member of the opinion-receiving firm's compensation or nomination committee, and 0 otherwise
IFCOMPCOMM	Indicator variable that equals 1 if any opinion-issuing director sits on the compensation committee of the board, and 0 otherwise
AUDCOMM	Indicator variable that equals 1 if the opinion-issuing director is a member of the firm's audit committee, and 0 otherwise
IFAUDCOMM	Indicator variable that equals 1 if any opinion-issuing director sits on the audit committee of the board, and 0 otherwise
AUDCOMM_EVNTFIRM	Indicator variable that equals 1 if the interlocked independent director is a member of the opinion-receiving firm's audit committee, and 0 otherwise
FINEXPT	Indicator variable that equals 1 if the opinion-issuing director has financial expertise, and 0 otherwise
IFFINEXPT	Indicator variable that equals 1 if any independent directors of the firm have financial expertise, and 0 otherwise
EXEEXPT	Indicator variable that equals 1 if the opinion-issuing director has executive expertise, and 0 otherwise
IFEXEEXPT	Indicator variable that equals 1 if any independent directors of the firm have executive expertise, and 0 otherwise

Instrument variables	
MDIRINCENTIVE	Natural logarithm of the sum of the total assets of the firms in which the independent directors hold board seats
DIRINCENTIVE	Director incentive measured as the natural logarithm of the total assets of all of his/her serving firms
MPROFESSOR	Percentage of independent directors who are university faculty members
PROFESSOR	Indicator variable that equals 1 if the independent director is a university faculty member, and 0 otherwise
SAMEPLACE	Indicator variable that equals 1 if any independent director lives in the same city as the serving firm, and 0 otherwise

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Executive turnover in China's state-owned enterprises: Government-oriented or market-oriented?

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ABSTRACT

Executive turnover is important in the governance of state-owned enterprises (SOEs). Herein, we focus on the executive turnover of China's SOEs, and the implementation of related evaluation mechanisms under different levels of government intervention. We collect executive turnover data of listed Chinese SOEs from 1999 to 2012, and find that about half of the SOE executives leave office within two terms, which is in line with government recommendations. Moreover, we find that more than a third of executives leave after less than one term, and nearly 20% after more than two terms, highlighting the uncertainty and unpredictability of executive appointments in SOEs. We also find that the executive evaluation mechanism for SOEs is implemented differently under different levels of government intervention. SOEs under weak intervention, such as those controlled indirectly by governments, controlled with low shareholdings, from non-regulated industries or in the Eastern regions, prefer the market-oriented evaluation method, which places more weight on executives' economic performance. In contrast, those under strong intervention prefer the government-oriented evaluation method, which is characterized by policy burden.

1. Introduction

In private enterprises with ownership and management separation, shareholders aiming for wealth maximization tend to design compensation incentive contracts and job-dismissing schemes that reward good

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managers and punish or fire the bad ones (Jensen and Meckling, 1976). In this single-task scenario, the principal designs incentive contracts that are compatible with the agent's goal to avoid conflict of interests (Alchian and Demsetz, 1972; Grossman and Hart, 1983). However, state-owned enterprises (SOEs) have multiple objectives, including economic, political and social goals, such as the value maintenance and appreciation of state-owned assets, maintaining social stability and conforming to macroeconomic regulations and controls (Lin and Li, 1997, 2004). However, these goals are often conflicting, which mean that the government needs to design reasonable incentive contracts to motivate SOE executives to focus their efforts on different goals. Focusing on different goals implies different outcomes and differing levels of corporate governance efficiency (Holmstrom and Milgrom, 1991).

Numerous studies have examined the relationship between manager turnover and performance among Chinese SOEs (Firth et al., 2006; Kato and Long, 2006a, 2006b; Chang and Wong, 2009; Song and Song, 2005; Jiang et al., 2014) based on the Western CEO turnover literature (Coughlan and Schmidt, 1985; Warner et al., 1988; Dedman, 2002; Defond and Hung, 2004; Neumann and Voetmann, 2005). However, few studies have examined the relationship between executive turnover and political performance among SOEs. Liao et al. (2009) use extra employment as a moderator variable to study its effect on the executive turnover-performance sensitivity of SOEs and examine the role that policy burden plays in the executive performance evaluation of SOEs. However, political performance is more than a moderator of evaluation. Bai and Tao (2006) take SOEs as multiple-task agents with political and economic goals, which is also emphasized by the "Measures for Comprehensive Evaluation of the Leadership in the Central Enterprises" (2009). Moreover, Lin and Li (1998, 2004) study the strategic and social policy burdens of SOEs, whereas Liao et al. (2009) only consider the social burden. We consider both of these factors in this paper. Lastly, the performance evaluation of SOE executives can be structurally different due to the different levels of government intervention, which are influenced by preferences of the government principals and the institutional environment. Therefore, it is necessary to test the executive turnover-performance relationship among SOEs in different settings.

This paper focuses on the executive turnover of China's SOEs and the implementation of the related evaluation mechanisms under different levels of government intervention. We examine data on Chinese state-owned listed firms' executive turnover from 1999 to 2012. First, we find that about half of the SOE executives leave office within two terms, in line with the "Interim Provisions on Business Performance Evaluations for Persons-in-Charge at Central Enterprises" (2003, 2006, 2009, 2012), more than a third leave after less than one term and nearly 20% leave after more than two terms, which highlights the uncertainty and unpredictability of executive appointments in SOEs. Second, the executive evaluation mechanism for SOEs is implemented differently under different levels of government intervention. SOEs under weak intervention, such as those controlled indirectly by the government, controlled with low shareholdings, from non-regulated industries or in the Eastern regions, prefer the market-oriented evaluation method, which places more weight on executives' economic performance than on political performance. In contrast, those under strong intervention prefer the government-oriented evaluation method, which is characterized by policy burden.

Our paper is the first to thoroughly describe the executive turnover of Chinese state-owned listed firms. We make several contributions to the literature. First, we provide basic data for studying the managerial market and corporate governance of SOEs in the Chinese capital market. Second, we empirically test the theoretically important question of how multi-task incentive contracts work under different levels of government intervention (Holmstrom and Milgrom, 1991). Finally, we show how SOE executives are evaluated and appointed, which helps us understand the relationship between SOE executive turnover and the managerial market, and shed light on the SOE marketization reform in China.

The remainder of this paper is organized as follows. Section 2 introduces the institutional background of SOE executive turnover in China, especially in relation to the changes in the SOE executive selection and evaluation mechanism. We also review the literature, present our theoretical analysis and develop our hypotheses in this section. In Section 3, we discuss the sample, variable measurement and research design. Section 4 presents the empirical results and robustness checks. Section 5 concludes the paper.

2. Institutional background and hypothesis development

2.1. Institutional background

The reform of Chinese SOEs began with the delegation of power and benefits (1979–1992), and then gradually shifted to the institutional innovation stage (after 1993) as the level of marketization increased. At the same time, the SOE executive appointment mechanism became non-administrative. Before 1992, the people in charge of enterprises that were owned by the state were appointed by government departments directly. The government officials participated in the production and operation of the enterprises that matched their administrative level, known as "red-crown businessmen." In 1992, the state council promulgated the "Regulation on Transforming the Operating Mechanism of Industrial Enterprises Owned by the Whole People." The provisions of Article 42 of the regulation state that "the government and relevant departments make appointment decision or approval of director of the enterprise (appointment and dismissal) as well as reward and punishment, in accordance with the statutory conditions and procedures." After 1993, as the SOE marketization reform deepened, the Central Committee of the Communist Party of China issued the "Decision of the Central Committee of the Communist Party of China on Some Issues concerning the Improvement of the Socialist Market Economy," which suggested that SOEs carry out the reform of the enterprise system and the joint-stock system, and established a modern corporate governance mechanism. The method of selecting SOE leaders was changed to a new combination of organizational recommendation and market recruitment, thereby complying with the principle of party managing cadres and the mechanism of employing corporate managers through the market. Documents such as "The Decision of the Central Committee of The Communist Party of China on Major Issues Concerning the Reform and Development of State-Owned Enterprises" issued in 1999, "The Basic Code for Establishing Modern Enterprise System in Large and Medium-Sized State-Owned Enterprises (for Trial Implementation)" in 2000, and the "Reform Outline for Deepening Leaders Personnel system" in 2000, all emphasized the above selection mechanism. Although the documents encouraged the development of diversified ways of introducing business talent, SOE executives continued to be selected in an administrative manner and stressed the principle of party managing cadres at this stage (1992–2000).

After the establishment of the State-Owned Asset Supervision and Administration Commission (SASAC) of the State Council in 2003, the supervisory power over SOEs shifted to the newly established SASACs from the various established departments, such as the Ministry of Finance, the Economic and Trade Commission, the Commission for Discipline Inspection and the Party Committee Organization Department. As the actual controllers of the SOEs, the SASACs at all levels took charge of personnel, affairs and assets directly. The "Interim Measures for the Supervision and Administration of State-Owned Assets of the Enterprises" issued in 2003 and "Law of the People's Republic of China on the State-Owned Assets of Enterprises" issued in 2008, both emphasized that the SASACs had the power to appoint or dismiss, or suggest the appointment or dismissal of executives of SOEs. In particular, the appointment of central SOE executives was divided into two parts, with the Organization Department of the Central Committee appointing and evaluating the Party Secretary, Chairman and CEO of the 53 large central SOEs with the help of the Enterprise Leaders No. 1 Management Bureau of SASAC, and the Party Committee Organization Department of SASAC taking charge of the other executives. The Enterprise Leaders No. 2 Management Bureau of SASAC is tasked with appointing and evaluating executives from other central SOEs besides the 53 large firms, including the Party Secretary, Chairman, CEO, vice-presidents and other senior managers. The senior executives of local SOEs are under the mutual control of the local SASAC and local Party Committee Organization Department.

To promote the reform of the SOE executive selection and appointment mechanism, SASAC issued the "Notice for Accelerating the Open Recruitment of Managers and Going on Duty on a Competitive Bases in Central SOEs" in 2004, which promoted the recruitment of managerial talent in a market-oriented manner. Based on the open recruitment practices and the competition for office in 2003 and 2004, SASAC tried to make a trade-off between the party-oriented management principle and market-oriented recruitment practice, thereby turning the bureaucratic appointment practice into a market-dominated recruitment and probationary practice. By 2013, together with the Organization Department of the Central Committee, SASAC had organized eight recruitments, offered 145 positions in central SOEs in executives and successfully recruited 140 managers. More details of the recruitments are shown in Table 1.

Table 1
Summary of the open recruitments of executives for central SOEs by the SASAC.

Year	Details	Executives recruited
2003	First Open Recruitment: Vice Presidents & Chief Accountants	7
2004	More Posts: Vice Presidents & Chief Accountants	23
2005	First Open Recruitment of Presidents: Presidents & Vice Presidents & Chief Accountants	25
2006	First Open Recruitment Overseas: Vice Presidents & Chief Accountants & Chief Legal Counsels	26
2007	First Open Recruitment of Executives for Central SOEs Located in HK: Presidents & Chief Accountants & Chief Legal Counsels	22
2008	Two Recruitments: Presidents + Vice Presidents & Chief Accountants & Chief Legal Counsels	22
2010	First Large-Scale Recruitment of Presidents: Presidents + Vice Presidents & Chief Accountants & Chief Legal Counsels & High-Level Scientific Administration Talents	20

The transformation of the SOE executive selection and appointment mechanism indicates that market-oriented recruitment is now the trend. However, bureaucratic appointment and dismissal is still a major part of the executive selection process in large SOEs, especially those directly controlled by SASAC. The notices of SOE executive appointment or dismissal issued by local SASACs and the local Party Committee Organization Department present the same scenario.[1]

The marketization reform of SOEs has led to the executive evaluation mechanism becoming performance-oriented, and more details of these changes are shown in Table 2 (Appendix A). After 2003, SASAC promulgated a series of "Interim Provisions on Business Performance Evaluations for Persons-in-Charge at Central Enterprises" (2003, 2006, 2009, 2012), which set the principles and rules for assessing the operational performance of executives in central SOEs, and the local SASACs adopted similar methods based on these documents. The local SASACs at different levels assess executives' annual operational performance and performance during their service term according to the letter of liabilities for operational performance signed every year and the year when the executive took office. This method is different from that practiced in the past. For example, the "Rules of Awards and Punishments on the Factory Managers (Managers) for State-owned Enterprises" issued in 1994 evaluated factory managers based on their political quality and capabilities for planning consistent with the planned economy, rather than their competitive and strategic capabilities for operations and management consistent with a market economy. Although economic performance is an important factor in the current evaluation process, political performance is still taken into consideration. Thus, the evaluation of SOE executives is not fully market-oriented. The tenure of SOE executives is uncertain because the SASACs are in charge of executive appointments and dismissals and can transfer executives to other posts at any time when needed. That is, the three-year service term assessment is an evaluation method rather than a tenure contract, and its implementation is not that credible.

Furthermore, most SOE executives have an administrative rank, which enables them to act as a government official according to the "Working Regulations on the Selection and Appointment of the Party and Government Leaders" (1995, 2002, 2014) and "Provisions of the Exchange among the Party and Government Leaders" (1999, 2006). Hence, the exit mechanism that is used to restrict the moral hazards of SOE executives does not work efficiently. Unless there are serious violations of laws and discipline, the vast majority of SOE executives remain in the regime for their entire lives, in a general form of "jobs for life." To provide a better understanding, Table 3 gives some examples of SOE executives who have become government officials.

2.2. Theoretical analysis and hypothesis development

The governance of SOE executives is a multi-dimensional topic involving numerous significant factors, such as turnover and compensation. The SASACs evaluate executives' political and economic performance, and decide the appropriate rewards and punishments based on the executives' behavior during their service term

[1] Refer to the websites: http://renshi.people.com.cn/n1/2016/0415/c139617-28280141.html; http://www.sx-dj.gov.cn/admin/pub_newsshow1.asp?id=1127601&chid=100196.

Table 3
Examples of executives becoming government officials for central SOEs in 2013.

Name	Previous post	Current post	Political identity
XIAO GANG (肖钢)	Chairman of Bank of China	Chairman of China Securities Regulatory Commission	Member of Central Committee
LOU JIWEI (楼继伟)	Chairman of China Investment Corporation	Minister of Ministry of finance	Member of Central Committee
ZHANG GUOQING (张国清)	CEO of China North Industries Group Corporation	Deputy Secretary of Chongqing Municipal Committee	Member of Central Committee
XU DAZHE (许达哲)	CEO of China Aerospace Science and Industry Corporation	Deputy Minister Ministry of Industry and Information Technology	Member of Central Committee
MA XINGRUI (马兴瑞)	CEO of China Aerospace Science and Technology Corporation	Deputy Secretary of the Guangdong provincial Party committee	Member of Central Committee
CAO GUANGJING (曹广晶)	Chairman of China Three Gorges Corporation	Vice Governor of Hubei Province	Alternate Member of Central Committee
ZHANG XIWU (张喜武)	Chairman of SHENHUA Group	Deputy Party Secretary of the SASAC of the State Council	Alternate Member of Central Committee

("Interim Provisions on Business Performance Evaluations for Persons-in-Charge at Central Enterprises" (2003, 2006, 2009, 2012)). Compared with the compensation incentives, executive turnover is more fundamental. Different posts mean different degrees of power for resource allocation due to the different control rights. Some executives may be promoted to a controlling shareholder's company or government department, while others may be demoted to a subsidiary (Chen et al., 2010; Yang et al., 2013; Liu and Xiao, 2015; Zhang et al., 2015). In fact, the appointment and dismissal of SOE executives can be seen as an implicit promise or call (put) option by the SASACs, similar to the stock options held by executives, whose value depends on the performance during their service term. Tenure measures the time in which an SOE executive waits to receive a promotion or demotion, which reflects how the controlling shareholders govern the corporation. With a short tenure, the principal can make rapid personnel adjustments based on performance to reduce further losses owing to the agency problem. However, the agent may also seek short-term success to obtain instant benefits if the expected tenure is short. Alternatively, the agent may work ineffectively if the tenure is long, bringing about "no big achievements, no small mistakes."

Different from the CEO turnover of private firms, the appointment and dismissal of SOE executives are uncertain events that are influenced by multiple factors (Wang, 2001). This uncertainty can be verified by factors such as the unpredictable nature of personnel mobilization and the inconsistent implementation of the evaluation mechanism in SOEs.

As agents of state-owned assets, SOE executives should, in principle, operate legally and effectively, complete the evaluation targets and achieve the value maintenance and appreciation of state-owned assets.[2] However, because governments at different levels control the appointment and removal of the SOE executives under their jurisdiction, executives need to achieve political and economic objectives. These political tasks include the various policy burdens that SOEs bear, such as having to adhere to the macroeconomic control and strategic planning of the national economy, help avoid unemployment and maintain social stability. SOE executives have to bear both the political and economic tasks, which can result in their promotion or demotion, with the former occurring implicitly and the latter explicitly (Yang et al., 2013). Moreover, political tasks tend to deviate from firms' value targets and conflict with their profits, thereby increasing the information noise in the SOE executive evaluation process. Therefore, the SASACs need to make a trade-off between the economic and political performance of SOE executives, as represented in the following functional relationship:

$$Leave = f(EB, PB|\theta_1, \theta_2, \theta_3, \theta_4, \theta_5 \ldots) \quad (1)$$

[2] Refer to Article 8 of Chapter 1 of the "Law of the People's Republic of China on the State-Owned Assets of Enterprises" (2008).

where *EB* represents executives' economic performance, *PB* represents political performance and θ_i ($i = 1, 2, 3, 4, 5\ldots$) represent the different degrees of marketization of the economy, which change the weights of EB and PB in the assessment. The different market conditions also signify different levels of government intervention, and different competitive and regulatory environments (Fan et al., 2003). Whether SOEs are run by central or local governments, controlled directly or indirectly by the SASACs, controlled with high holdings or low holdings, from regulated industries or non-regulated industries or located in the Midwestern or Eastern regions, all face different levels of government intervention and competitive environments (Cao et al., 1999; Bai and Tao, 2006; Xia and Chen, 2007; Xin and Tan, 2009). Thus, structural differences need to be taken into account when evaluating the performance of SOE executives. That is, different weights need to be given to executives' economic and political performance in different situations.

As supervisor of the central SOEs, SASAC of the State Council is more independent than the local SASACs. In addition, because central SOEs draw significant attention due to their huge assets and economic status, SASAC of the State Council is more likely to strictly evaluate the performance of the SOE executives under its jurisdiction in accordance with the provisions when making personnel decisions. In contrast, local government officials are encouraged to assign political tasks to SOE executives as policy burdens to achieve their political goals. Local SOE executives have incentives to develop political connections to bear the policy burden, and cater to the political preferences of their superiors to accumulate promotion capital (Huang, 2003, 2004; Zhou, 2007). Hence, local government officials are likely to collude with SOE executives to achieve their own promotion benefits, thereby rendering the performance appraisal process invalid.

Considering other government intervention scenarios, Xia and Chen (2007) point out that China's decentralization reform, including the economic decentralization of the central government and local governments, and the decentralization of local governments and enterprises, has changed the manner in which governments control SOEs. According to the "Seize the Big and Free the Small" and "Strategic Adjustment" reform strategies for SOEs, the government strengthened its control of the economy by taking direct holdings and high proportions of ownership of select SOEs that are large-scale, strategically important, from regulated industries or are economic lifelines, such as the military and the petrochemical industries. At the same time, the government has relaxed its control of SOEs that are small-scale or from competitive industries by taking indirect holdings and a low proportion of ownership. This phenomenon is more common in the Eastern regions, which have a high degree of marketization. The local governments in the East took the initiative to relax their control of SOEs by reducing the level of government intervention in the SOEs under its jurisdiction, thus reducing the amount of information noise in the performance evaluation process, increasing the efficiency of executives' efforts and performance and reducing the agency problem. In the Eastern regions, where the non-state-owned economy is relatively active, private firms and foreign firms can also provide information to the local SASACs and increase the effectiveness of incentive contracts, thus further reducing the uncertainty (Lin and Li, 1997, 2004; Chen et al., 2010).

Accordingly, we predict that the relationship between executive turnover and performance among SOEs is different under different levels of government intervention and different market scenarios, such as the actual controllers having different backgrounds, shareholdings by different controlling parties and in different proportions and different industries and regions.

H1. Under weak government intervention, economic performance is more important relative to political performance in the executive evaluation process in SOEs.

That is, we predict that under strong government intervention, in which executives are driven by the personal promotion incentives of government officials, political performance is a more important factor in the managerial evaluation of SOEs and the SASACs prefer the bureaucratic selection procedure.

The weak government intervention scenario includes central SOEs, local SOEs indirectly controlled or owned with low holdings by governments and local SOEs located in the Eastern regions. The strong government intervention scenario includes local SOEs, especially those directly controlled or owned with high holdings by government, and local SOEs located in the Central and Western regions. Thus,

H1a. The political performance of executives is more important in local SOEs than in central SOEs.

H1b. The political performance of executives is more important in local SOEs directly controlled by the government than those indirectly controlled.

H1c. The political performance of executives is more important in local SOEs with high government holdings than those with low holdings.

H1d. The political performance of executives is more important in local SOEs in regulated industries than those in competitive industries.

H1e. The political performance of executives is more important in local SOEs located in the Central and Western regions than those in the Eastern regions.

Based on the above analysis, we analyze the turnover frequency and tenure distribution of SOE executives, and the managerial evaluation of SOEs under different levels of government intervention, to identify the three main characteristics of the current appointment and dismissal incentive mechanisms for SOEs, namely the uncertainty of executive turnover, the unpredictable nature of personnel mobilization and the inconsistency of the implementation of the evaluation mechanism in SOEs.

3. Research design

3.1. Sample selection and data sources

This paper focuses on the executive turnover of Chinese SOEs. We collect our sample in three steps. First, we determine the primary sample firms. To ensure consistent and pure observations and consider the changes of corporate control rights, we choose the A-share companies listed on the Shanghai and Shenzhen stock exchanges from 2003 to 2012 that were consistently state-owned for 10 years.[3] Second, based on this SOE sample, we collect the personal information of executives from the China Stock Market and Accounting Research (CSMAR) database and annual reports dating back to 1999. We presume that the SOEs in our sample before 2003 are also consistently SOEs.[4] Thus, we observe the executive turnover of SOEs from 1999 to 2012. Here, the executives consist of Chairmen, CEOs and Party Secretaries (abbreviated "the Heads"). Finally, we use the same method to determine the sample of NSOEs, which we use as our control group. By comparing the differences in turnover frequency, tenure distribution and turnover-performance of executives in SOEs and NSOEs, we are able to ascertain the nature of the executive turnover in SOEs under the current incentive mechanism.

In the literature, the propensity score matching approach based on the classification of industry and assets is usually used to determine the control group. In our paper, we use panel data on firms that are non-state-owned for 10 or more consecutive years as our matching sample, compared with SOEs that are state-owned for 10 or more consecutive years. This approach has two advantages. First, it avoids the sample insufficiency problem in the traditional matching method. Second, it makes the comparison between SOEs and NSOEs more effective. Because executives are motived by different evaluation and incentive schemes in SOEs and NSOEs, we distinguish the treatment group and control group by property rights rather than industry and scale. Table 4 shows the industry distributions of SOEs and NSOEs, which are structurally similar, thus alleviating concerns about industrial differences. Later, we compare the differences in scale between SOEs and NSOEs.

To accurately describe the turnover frequency, tenure distribution, and turnover-performance sensitivity of SOE executives, we screen the data as follows: (1) remove executives who left office in 1999; (2) remove

[3] Since 2003, China's listed companies have begun to disclose the controlling shareholder. As of 2004, according to "Standards for the Contents and Formats of Information Disclosure by Companies Offering Securities to the Public No. 2 – Contents and Formats of Annual Reports" issued by the CSRC, listed companies began to disclose the actual controller.

[4] Prior to 2003, transfers of the control rights of listed companies were strictly controlled. Thus, in this paper, we assume that the nature of corporate property rights during 1999–2002 was in line with that of year 2003, for the personal information of executives is dated back to 1999.

Table 4
Industry distribution of SOEs and NSOEs.

Industry	SOEs		NSOEs	
	Frequency	Percentage	Frequency	Percentage
Agriculture, Forestry, and Fishing	12	1.76	4	1.78
Mining	21	3.09	2	0.89
Manufacturing-Food, Beverage	32	4.71	10	4.44
Manufacturing-Textile, Clothing, Fur	13	1.91	14	6.22
Manufacturing-Wood, Furniture	–	–	1	0.44
Manufacturing-Papermaking, Printing	11	1.62	1	0.44
Manufacturing-Petroleum, Chemical, Product, Rubber	76	11.18	18	8.00
Manufacturing-Electronics	21	3.09	9	4.00
Manufacturing-Metal, non-Metal	64	9.41	14	6.22
Manufacturing-Equipment manufacturing, Electric machinery	103	15.15	28	12.44
Manufacturing-Pharmaceutical, Biologicals	38	5.59	24	10.67
Manufacturing-Others	2	0.29	1	0.44
Utilities	45	6.62	4	1.78
Construction	12	1.76	3	1.33
Transportation, Warehousing	43	6.32	1	0.44
Information Technology	32	4.71	15	6.67
Wholesale and Retail Trades	57	8.38	14	6.22
Real Estate	42	6.18	35	15.56
Service	20	2.94	12	5.33
Media	11	1.62	2	0.89
Other	25	3.68	13	5.78
Total	680	100	225	100

executives who took office after 2010, and remained in office until 2012[5] and (3) remove firms from the financial industry. In the end, the NSOE sample consists of 17,175 executive-year observations of 3885 executives from 608 NSOEs, among which 2705 left prior to 2012, accounting for 69.63% of the total, and the remaining 30.37% were in office until 2012. The NSOE sample consists of 5186 executive-year observations of 1227 executives from 225 SOEs, among which 838 left prior to 2012, accounting for 68.3% of the total. Together, these figures indicate that about 70% of the executives in the SOE and NSOE samples experienced at least one change of position. More details of the turnover are shown in the empirical section.

Table 4 shows the industry distribution of SOEs and NSOEs based on the "Guidelines for the Industry Classification of Listed Companies" issued by the China Securities Regulatory Commission (CSRC) in 2001. Ranking the industries based on their proportion from large to small, we find that SOEs and NSOEs have a similar industry distribution, overlapping by 67%. Thus, the industrial distribution of SOEs and NSOEs is sufficiently systematically consistent to meet our research requirements. The overlapping industries of SOEs and NSOEs include "Manufacturing-Food, Beverage (C0)," "Manufacturing-Petroleum, Chemical Products, Rubber (C4)," "Manufacturing-Metal, non-Metal (C6)," "Manufacturing-Equipment Manufacturing, Electric Machinery (C7)," "Manufacturing-Pharmaceutical, Biologicals (C8)," "Information Technology (G)," "Wholesale and Retail Trades (H)" and "Real Estate (J)."

3.2. Model specification and variable measurement

Based on the laws and regulations concerning the executive evaluation of central SOEs issued by SASAC of the State Council from 2003 to 2012, and following Liao et al. (2009), Liao and Zhang (2012), Ding and Song

[5] We remove the following from the sample: executives who left in 1999, and those that took office after 2010 but did not leave prior to 2012. For the former, we could not confirm the time they took office and their tenure because of missing data. For the latter, considering the requirements for executive tenure of SASAC and "The Company Law of the PRC," that executives be evaluated once in three years and directors every three years, we removed this group due to the lack of observations.

(2011), Yang et al. (2013) and Liu and Xiao (2015), we use the binary ordered logit model to examine the different implementations of the executive evaluation mechanism in SOEs. The model is as follows:

$$Leave = \beta_0 + \beta_1 Performance + \beta_2 Policy + \beta_3 Size + \beta_4 Leverage + \beta_5 Growth + \beta_6 Indep + \beta_7 Age60 + \beta_8 Age + \beta_9 Tenure + \beta_{10} MARKET + Year + \varepsilon \quad (2)$$

where *Leave* is a dummy variable that equals 1 if the executive leaves, and 0 if he or she is in office; and *Performance* measures the economic performance of SOE executives, which equals ROE adjusted by the industry median according to the "Interim Provisions on Business Performance Evaluations for Persons-in-Charge at Central Enterprises" (2003, 2006, 2009, 2012) and the literature. We use other profit variables to carry out the sensitivity test.

Policy in model (2) measures the political performance of SOE executives in relation to the policy burden. We calculate *Policy* following Lin and Li (2004) and Bai and Lian (2014). We build model (3) to estimate the optimal capital intensity for SOEs, and obtain the policy burden by calculating the deviation between the actual capital intensity and the optimal one determined by economic factors. Positive errors from model (3) indicate the strategic burden, which originates from the extra investment in comparatively competitive industries spurred by local economic growth (Qian and Roland, 1998).

Negative errors indicate the social burden, which originates from the extra employment in SOEs. We use the absolute form of errors μ to measure the policy burden (*Policy*) of SOEs.

$$INTENC_t = \gamma_0 + \gamma_1 Size_{t-1} + \gamma_2 Debt_{t-1} + \gamma_3 Growth_{t-1} + \gamma_4 ROA_{t-1} + \gamma_5 Capital_{t-1} + District + Year + Industry + \mu \quad (3)$$

where $INTENC_t$ represents the capital intensity, measured by employment per million assets in t year, $Size_{t-1}$ represents the size in $t-1$ year, $Debt_{t-1}$ represents the capital structure in $t-1$ year, $Growth_{t-1}$ represents the growth in $t-1$ year, ROA_{t-1} represents the profit in $t-1$ year, $Capital_{t-1}$ represents the tangibility in $t-1$ year and *District*, *Year* and *Industry* are dummies.

The other variables in model (2) are *Size*, which represents size measured by the logarithm of assets; *Leverage* represents financial leverage measured by the debt ratio and *Growth* represents sales growth. All of these variables are controlled for firm specific characteristics. *Indep* is the ratio of independent directors on the board, which controls for corporate governance (Zhao et al., 2007; Laux, 2008). *Age60* is a dummy variable that equals 1 if the executive is older than 60, otherwise 0. *Age* measures the age of executives and *Tenure* represents their service time. These variables control for the personal characteristics of executives.

Lastly, we control for institutional factors that signify different levels of government intervention, namely, *Market*, which comprises the variables *Level*, *Direct*, *Control*, *Monopoly* and *District*, which measure the different dimensions of government intervention. Here, *Level* is an ordinal variable representing the administrative level of SOEs, which equals 1 if a firm is a central SOE, 2 if a firm is a provincial SOE and 3 if a firm is a municipal SOE or an SOE below the municipal level. Due to the promotion tournament, local SOEs face more intervention than central SOEs (Zhang et al., 2015). *Direct* equals 1 if an SOE is controlled directly, and 0 if an SOE is controlled indirectly, for which the control chains are more than two. Fan et al. (2013) find that local governments are inclined to place the SOEs they want to relax control at the bottom of the pyramid structure. *Control* equals 1 if an SOE is controlled no less than 30%, and 0 if an SOE is controlled less than 30%. The higher the holdings, the stronger the government intervention. *Monopoly* is an industry dummy that equals 1 if an SOE is in a regulated industry, and 0 if an SOE is in a non-regulated industry. Following Xin and Tan (2009) and Xia and Chen (2007), we classify industries in relation to national security, natural monopoly, public goods and services and high technology, such as the mining (B), petroleum, chemical products and rubber (C4), metal and non-metal (C6), utilities (D) and information technology (G) sectors. *District* is a dummy for region that equals 1 if a firm is located in the Eastern regions, and 0 if a firm is located in the Central and Western regions. *Level*, *Direct* and *Control* represent the different types of government intervention, which are arranged endogenously, whereas *Monopoly* and *District* represent the different market environments, such as the different managerial markets and different levels of government intervention, which are exogenous, that directly influence the effectiveness and efficiency of the SOE executive evaluation mechanism.

Table 5
The executive turnover of SOEs and NSOEs.

Year	SOEs			NSOEs		
	Executives	Departures	Percentage	Executives	Departures	Percentage
1999	567	–	–	154	–	–
2000	918	184	20.04%	262	70	26.72%
2001	1028	192	18.68%	306	91	29.74%
2002	1104	204	18.48%	354	80	22.60%
2003	1307	215	16.45%	389	65	16.71%
2004	1301	242	18.60%	399	67	16.79%
2005	1296	223	17.21%	407	78	19.16%
2006	1321	199	15.06%	403	76	18.86%
2007	1316	177	13.45%	391	56	14.32%
2008	1347	191	14.18%	408	58	14.22%
2009	1363	210	15.41%	414	46	11.11%
2010	1399	197	14.08%	419	48	11.46%
2011	1423	157	11.03%	435	40	9.20%
2012	1485	314	21.14%	445	63	14.16%
Total	17,175	2705	15.75%	5186	838	16.16%

To examine the different implementations of the SOE executive evaluation mechanism under different market conditions, we regress model (2) by groups of *MARKET*, which comprises five groups: (1) Group one: central SOEs vs provincial SOEs vs municipal SOEs and SOEs below the municipal level; (2) Group two: local SOEs with indirect holdings vs local SOEs with direct holdings; (3) Group three: local SOEs with low holdings vs local SOEs with high holdings; (4) Group four: local SOEs from non-regulated industries vs local SOEs from regulated industries and (5) Group five: local SOEs located in the Eastern regions vs local SOEs located in the Central and Western regions. More details of the results are shown in the following tables. Moreover, to mitigate the effects of outliers, we winsorize the continuous variables at the 1% level in both tails.

4. Empirical results

4.1. The turnover frequency and tenure distribution

In this paper, we aim to ascertain the characteristics of the executive appointment and dismissal mechanism of SOEs. We first describe executives' turnover frequency and tenure distribution.

In the previous part, we briefly summarized the turnover of SOEs and NSOEs. That is, 70% of executives left office between 2000 and 2012,[6] whereas 30% remained in office until 2012, and there were no obvious differences between the treatment group and control group. Table 5 presents the turnover frequency, which shows that on average, about 15.75% of SOE executives leave office each year, slightly lower than the 16.16%/year in NSOEs.[7] Also, the executive turnover before 2003 is higher than that after 2003.

Later, we examine the tenure distribution of SOE executives compared with that of NSOE executives based on the turnover data to further confirm our assumption about the uncertainty of the executive appointments in SOEs.

For SOEs, the overall median tenure of executives is four years, with executives who remain in office staying for six years and executives who leave office leaving after three years on average. For NSOEs, the overall

[6] We choose 2012 as the endpoint of our observation for a number of reasons. First, according to the "Interim Provisions on Business Performance Evaluations for Persons-in-Charge at Central Enterprises" (2003, 2006, 2009, 2012), SOE executives get evaluated every three years, and the evaluations can be divided into several periods after the establishment of SASAC, that is, 2003–2006, 2007–2009 and 2010–2012. Second, 2012 is the new start of the SOE reform after the Eighteenth National Congress of the Communist Party of China decided to trial a mixed ownership reform. At the same time, the anti-corruption work inside the SOE system was in full swing, and a large number of SOE executives were sacked. Because these exogenous shocks brought about structural changes in the executive turnover, we chose 2012 as a watershed.

[7] The results remain unchanged after eliminating executives leaving due to retirement, illness or other reasons.

Table 6
The tenure distribution of executives from SOEs and NSOEs.

Tenure distribution	All			Departure			Stay		
	SOEs	NSOEs	Difference	SOEs	NSOEs	Difference	SOEs	NSOEs	Difference
Short tenure (0, 3)	26.12	33.28	−7.00***	37.22	52.82	−15.30***	0	0	–
Normal tenure (3, 7)	53.49	46.11	7.30***	51.15	41.82	9.20***	59.01	53.42	5.60**
Long tenure (7, +)	20.39	20.61	−0.30	11.63	5.36	6.20***	40.99	46.58	−5.60**

* Statistical significance at the 10% level.
** Statistical significance at the 5% level.
*** Statistical significance at the 1% level.

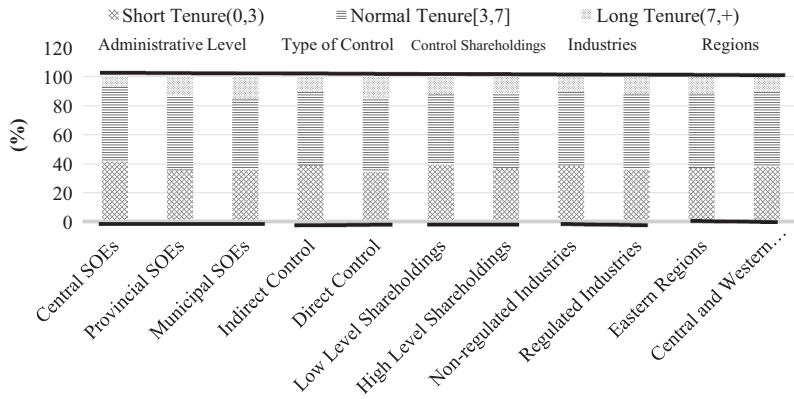

Figure 1-1. The tenure distribution of SOE executives leaving office (70%).

median tenure of executives is three years, with executives who remain in office staying for seven years and executives who leave office leaving after two years on average. Furthermore, we set the tenure as short if the service time of an executive is less than three years, normal if the service time is not more than seven years but not less than three years and long if the service time is more than seven years. We make the above classifications according to the "Company Law of the People's Republic of China (2005)," "Interim Provisions on Business Performance Evaluations for Persons-in-Charge at Central Enterprises" (2003, 2006, 2009, 2012) and "Civil Servant Law of the People's Republic of China" (2005), which outline the requirements for tenure, such as "each term of office for directors shall not exceed 3 years," a "three-year evaluation mechanism" and "no more than two terms of office for Party and Government leaders."

Table 6 presents the structural differences in tenure distribution between SOEs and NSOEs. Overall, the tenure distribution of SOEs and NSOEs is similar. The normal tenure accounts for 50%, whereas the short and long account for 30% and 20%, respectively, for both SOEs and NSOEs. However, the above distribution changes when we distinguish those leaving from those remaining. For the executives who remain in office, the normal tenure comprises 59.01% in SOEs, which is more than the 53.42% in NSOEs. For the executives who leave office, the normal tenure comprises 51.15% in SOEs, while the short tenure is 52.82% in NSOEs. By comparison, executives in NSOEs change more frequently than those in SOEs, which indicates that the turnover-performance relationship in NSOEs is probably more sensitive.

Thus far, we have compared the turnover frequency and tenure distribution of SOEs with those of NSOEs. Next, we examine the turnover of SOE executives by the different groups. Figs. 1-1 and 1-2 show the tenure distribution under different levels of government intervention, types of control, industries and regions. There are five scenarios from left to right: the first corresponding to SOEs of different administrative levels, the second the different types of control, the third the level of shareholdings, the fourth from different industries and the fifth from different regions.

Fig. 1-1 shows the tenure of SOE executives who leave office, in which the tenure distribution is similar across the different subsamples. That is, the majority leave after a normal period of tenure, and the minority

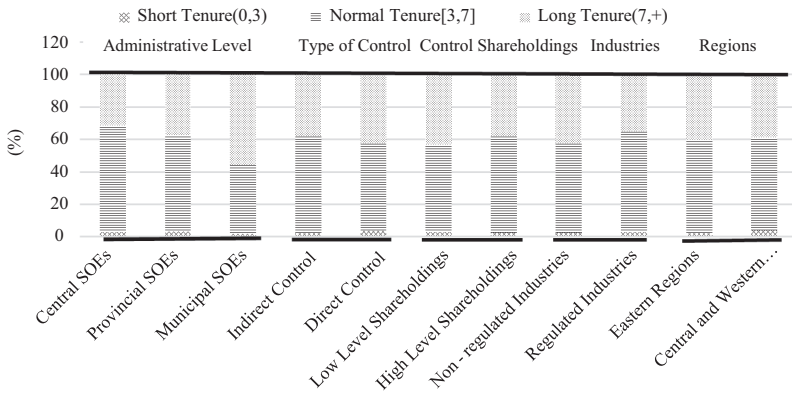

Figure 1-2. The tenure distribution of SOE executives remaining in office (30%).

after a long tenure. Taking government intervention into account, we find that executives from SOEs under weak government intervention, such as central SOEs, local SOEs indirectly controlled, SOEs controlled with lower holdings and those from non-regulated industries or the Eastern regions, are more likely to stay in office for a shorter term than those from SOEs under strong intervention. Taking the first scenario as an example, the average tenure in local SOEs is 3.84, which is higher than 3.43 for central SOEs. Fig. 1-2 shows the tenure of SOE executives who remain in office, in which the normal tenure accounts for a relatively high proportion in SOEs with a high degree of marketization, whereas the figures are the opposite for long tenure.

Overall, the turnover figures for SOE executives show that compared with NSOEs, SOE executives change positions less frequently. Moreover, there are structural differences among the SOEs. Specifically, the weaker the government intervention, the higher the executive turnover and the shorter the tenure of executives. Next, we examine the turnover-performance sensitivity.

4.2. Univariate analysis

Based on the above turnover figures, we next examine the implementation of the SOE executive evaluation mechanism. We first conduct univariate tests, and then regressions. We then compare the results of SOEs and NSOEs, and the subsamples of SOEs, such as central SOEs and local SOEs, local SOEs with different types of control and levels of government shareholdings and local SOEs from different industries or regions, to determine how the incentive mechanism of executive turnover works.

Table 7-1 shows the results of the univariate tests among the different groups. The first column shows the mean difference of executives' economic performance adjusted by the industry median and the second corresponds to executives' political performance, measured by the policy burden calculated based on model (3). Panel A lists the mean differences between executives remaining in office and those leaving office in NSOEs as the control group. Panel B consists of five parts, which list the mean difference of executives in SOEs from different perspectives. In consideration of the different scenarios of government intervention, we divide the SOEs into five groups. Panel B-1 corresponds to group one, classified by administrative level and consists of central SOEs, provincial SOEs, municipal SOEs and SOEs below the municipal level. To avoid the structural differences between central and local SOEs influencing the other groups, Panels B-2 to B-5 are for local SOEs.

Taking the left column first, the mean differences are all significantly positive, from Panel A to Panel B-5, executives who remain in office perform better than those who leave office, regardless of whether they are in SOEs or NSOEs, or the level of government intervention. However, there are some significant differences. The mean difference in Panel A is 0.03, far higher than that for SOEs. Because the CEO and Chairman of an NSOE have no room for promotion, an executive leaving office usually means he or she has been fired or demoted internally, excluding those who depart due to retirement, illness or death. Table 7-1 shows that executives who leave office in NSOEs perform worse relative to those who remain in office, thus meeting our expectations. In Panel B, the mean difference in tenure between executives who remain in office and those who leave

Table 7-1
Univariate tests of the differences in economic and political performance between executives who remain in office and those who leave office.

	ROA-adjusted by industry median (t value)	Policy burden (t value)
Panel A	*Stay-departure*	
NSOEs	0.030***	0.010
Panel B	*Stay-departure*	
Panel B-1: Administrative level		
Central SOEs	0.006***	0.066
Provincial SOEs	0.003**	−0.108***
Municipal SOEs and SOEs below the municipal level	0.009***	−0.075*
Panel B-2: Type of control-local SOEs		
Indirect control	0.005***	−0.056*
Direct control	0.005***	−0.210***
Panel B-3: Government shareholdings-local SOEs		
Low level shareholdings	0.009***	0.037
High level shareholdings	0.004***	−0.150***
Panel B-4: industries-local SOEs		
Non-regulated industries	0.009***	−0.020
Regulated industries	−0.001	−0.171***
Panel B-5: Regions-local SOEs		
Eastern regions	0.003**	−0.088**
Central and western regions	0.008***	−0.157***

* Statistical significance at the 10% level.
** Statistical significance at the 5% level.
*** Statistical significance at the 1% level.

Table 7-2
The nature of the departure of SOE executives.

Nature of departure		Frequency	Percentage
State	Demotion	112	12.35
	Transfer	157	17.31
	Promotion	345	38.04
Others	Retirement, illness, or death	172	18.96
	NSOEs or non-profit organization	11	1.21
Unknown	Unknown	110	12.13

office is relatively larger in SOEs under weaker government intervention. The right column shows the figures for political performance. The mean difference is insignificant in Panel A, whereas in Panel B, the mean difference of the policy burden is significantly negative in SOEs under strong government intervention, such as local SOEs, SOEs directly controlled by SASACs, SOEs controlled with high shareholdings, and SOEs from regulated industries and those from the Central and Western regions, which validates our conjectures.

We also collect the nature of the SOE executives' departure to better understand the above findings. The results are shown in Table 7-2. Those demoted, transferred or promoted, account for 12.35%, 17.31% and 38.04% of the total departures respectively, which indicates that about 52% of SOE executives leave without being demoted. Hence, we predict that the executives who leave office are those inclined to obtain promotion capital by bearing the policy burden in SOEs under strong government intervention.

In conclusion, on the whole, executives who remain in office perform better than those who leave office in terms of economic performance, while the opposite is the case in terms of political performance. Furthermore, these figures differ in relation to different levels of government intervention, with the evaluation of executives demonstrating structural differences among SOEs. Specifically, SOEs under weak government intervention

Table 8-1
Descriptive statistics.

Variable	SOEs			NSOEs		
	Obs.	Mean	Std. dev.	Obs.	Mean	Std. dev.
Performance	17,112	−0.01	0.06	5180	−0.01	0.09
Policy	15,976	1.09	1.52	4788	0.85	1.07
Size	17,132	6.96E+09	1.68E+10	5180	2.73E+09	4.91E+09
Leverage	17,112	0.50	0.20	5180	0.53	0.33
Growth	16,634	0.23	0.56	5000	0.28	0.86
Indep	17,006	0.30	0.13	5132	0.31	0.13
Age60	17,175	0.24	0.43	5186	0.09	0.29
Age	16,019	49.30	6.73	5186	45.79	7.48
Tenure	17,175	7.42	4.03	5186	7.96	4.67
Direct	17,175	0.33	0.47	–	–	–
Control	17,175	0.70	0.46	5186	0.38	0.49
Monopoly	17,175	0.42	0.49	5186	0.20	0.40
Level	17,175	Central SOEs – 29.21%; provincial SOEs – 46.46%; municipal SOEs, etc. – 24.33%		–	–	
District	17,175	Western regions – 18.72%; central regions – 18.5%; eastern regions – 62.78%		5186	Western regions – 18.72%; central regions – 18.5%; eastern regions – 62.78%	

prefer the market-oriented evaluation method, while the policy burden is more important when evaluating the executives of SOEs under strong intervention. Later, we control for other variables to further confirm our findings by regression.

4.3. Regression results

4.3.1. Descriptive statistics and correlations

Table 8-1 shows the descriptive statistics of SOEs and NSOEs, in which NSOEs are the control group. With respect to firm characteristics, the average of *Performance* is 0.01 for both SOEs and NSOEs in our sample, but it seems that it is more variable in NSOEs, for which the SD is 0.09. SOEs clearly bear a greater policy burden (1.09) than NSOEs, as expected. The differences between the other financial variables for SOEs and NSOEs, such as *Leverage*, *Growth* and *Indep* are small, but the size of SOEs is much larger than NSOEs. With respect to personal characteristics, the average of *Age60* is 24% for executives from SOEs, which is higher than that for NSOEs. Similarly, the average of *Age* is 49.3 for SOEs, higher than 45.79 for NSOEs. That is, on average, the executives of SOEs are older than those of NSOEs, which may be attributable to the personnel regulations for SOEs. As for *Tenure*, there is little difference between SOEs and NSOEs. *Direct*, *Control*, *Monopoly*, *Level* and *District* are proxies for government intervention. As Table 8-1 shows, about 33% of the SOEs in our sample are controlled directly, 70% are controlled with high shareholdings, 42% are from regulated industries and more than half are located in the Eastern regions. About one-third of SOEs are central SOEs, and nearly half are provincial SOEs. We also test the correlations between the coefficients, and the results suggest that multicollinearity should not be a concern. The correlation matrix is not shown here due to lack of space. The results are available from the authors on request.

4.3.2. Regression results

We compare SOEs with NSOEs and SOEs under strong government intervention with SOEs under weak intervention, to test the hypotheses in the second section, and the results are shown in Tables 8-2–8-4.

Table 8-2 shows the regression results for NSOEs and SOEs including central SOEs, provincial SOEs, municipal SOEs and SOEs below the municipal level. In column (1), *Performance* is significantly negative, which is consistent with the literature (Zhao et al., 2007; Jiang et al., 2014), and indicates that the executive turnover mechanism works effectively in Chinese NSOEs. Similar to column (1), *Performance* is significantly negative in column (2), but *Policy* is insignificant, indicating that the executive turnover mechanism also works in SOEs. Moreover, dividing SOEs into central SOEs and local SOEs, we find that the coefficients of

Table 8-2
Executive turnover, firm performance and policy burden: NSOEs vs SOEs.

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable: *Leave* (departure = 1, stay = 0)					
	NSOEs	SOEs	Central SOEs	Local SOEs	Provincial SOEs	Municipal SOEs, etc.
Performance	**−1.324****	**−1.535*****	−1.362	**−1.714*****	**−1.689****	**−2.700****
	(−2.28)	(−2.93)	(−1.44)	(−2.68)	(−2.23)	(−2.08)
Policy	−0.064	0.021	0.017	**0.042***	**0.046***	0.009
	(−1.21)	(1.21)	(0.52)	(1.92)	(1.82)	(0.20)
Size	−0.041	−0.117***	−0.241***	−0.023	−0.080**	0.198***
	(−0.89)	(−4.63)	(−5.66)	(−0.73)	(−2.12)	(2.99)
Leverage	−0.074	−0.069	−0.044	−0.107	−0.309	0.245
	(−0.48)	(−0.46)	(−0.15)	(−0.60)	(−1.50)	(0.69)
Growth	−0.022	−0.076	−0.047	−0.090*	−0.119**	0.005
	(−0.43)	(−1.63)	(−0.44)	(−1.74)	(−2.09)	(0.04)
Indep	−0.464	−2.106***	−4.410***	−1.207**	−1.487**	−1.481*
	(−0.60)	(−4.54)	(−4.69)	(−2.27)	(−2.22)	(−1.67)
Age60	–	0.896***	0.772***	0.957***	0.927***	1.088***
	–	(10.28)	(4.32)	(9.42)	(7.24)	(6.25)
Age	0.871***	3.934***	4.297***	3.847***	3.904***	4.129***
	(2.72)	(17.81)	(9.79)	(14.58)	(11.96)	(8.64)
Tenure	−2.922***	−3.768***	−3.749***	−3.797***	−3.477***	−4.683***
	(−22.54)	(−47.35)	(−25.71)	(−39.70)	(−31.44)	(−22.93)
Level	–	0.01	–	–	–	–
	–	(0.28)	–	–	–	–
Direct	–	−0.052	−0.022	−0.077	−0.076	−0.085
	–	(−0.96)	(−0.19)	(−1.30)	(−0.98)	(−0.84)
Control	−0.222**	0.055	0.365***	−0.058	−0.021	−0.083
	(−2.43)	(1.03)	(3.39)	(−0.92)	(−0.26)	(−0.81)
Monopoly	–	0.05	−0.246**	0.153**	0.102	0.226**
	–	(0.94)	(−2.49)	(2.39)	(1.27)	(2.03)
District	−0.106**	−0.041	−0.053	−0.044	−0.116**	0.06
	(−2.02)	(−1.31)	(−0.87)	(−1.17)	(−2.33)	(0.94)
Cons	6.089***	−3.004***	−2.197	−4.403***	−3.770***	−8.598***
	(3.85)	(−3.14)	(−1.15)	(−3.88)	(−2.78)	(−3.94)
Year	Yes (industry simultaneously)	Yes	Yes	Yes	Yes	Yes
N	4274	14,706	4175	10,531	6925	3606
Pseudo R^2	0.454	0.475	0.488	0.475	0.460	0.516
Chi2	706.55***	2929.67***	842.96***	2125.42***	1412.2***	700.55***

Notes: *t*-values are reported in parentheses.
* Statistical significance at the 10% level.
** Statistical significance at the 5% level.
*** Statistical significance at the 1% level.

Performance and *Policy* are both insignificant, as shown in column (3). However, we cannot confirm that the evaluation mechanism for executives in central SOEs is invalid. The executive turnover in SOEs involves demotion, promotion and regular job transfer, which correspond to good and bad performance. Yang et al. (2013) and Liu and Xiao (2015) find that executives with good performance during their service term get promoted, and those with bad performance are demoted. As a dependent variable, *Leave* only includes two states, remaining in office and leaving office, with no further differentiation of executives' departure.

In the future, we could further differentiate the departure types to confirm the features of executive appointment or dismissal in central SOEs. Hence, the regression results in column (3) are acceptable, and do not affect the conclusion of our paper. In column (4), the coefficient of *Performance* is −1.714 and that of *Policy* is 0.042, and both are statistically significant, indicating that executive turnover in local SOEs is driven by economic and political performance, especially in provincial SOEs. Different from the results in column (1), in column (6), *Performance* is −2.7 and significantly negative, and *Policy* is 0.009 but insignificant. Whether the executive turnover in municipal SOEs and SOEs below the municipal level is driven by economic performance or by the

Table 8-3
Executive turnover, firm performance and policy burden: Different Types of Control.

Variable	(6)	(7)	(8)	(9)
	Dependent variable: *Leave* (departure = 1, stay = 0)			
	Indirect control	Direct control	Low level shareholdings	High level shareholdings
Performance	**−1.387***	**−2.533***	**−2.596****	**−1.406***
	(−1.94)	(−1.86)	(−2.22)	(−1.81)
Policy	−0.008	**0.093*****	0.072	**0.046***
	(−0.25)	(3.13)	(1.39)	(1.90)
Size	−0.013	0.007	0.233***	−0.089**
	(−0.30)	(0.12)	(3.17)	(−2.38)
Leverage	−0.078	−0.069	−0.57	0.012
	(−0.37)	(−0.21)	(−1.64)	(0.06)
Growth	−0.075	−0.132	−0.171	−0.073
	(−1.22)	(−1.29)	(−1.56)	(−1.21)
Indep	−1.027	−1.884**	−2.158**	−0.861
	(−1.49)	(−2.23)	(−2.19)	(−1.35)
Age60	0.696***	1.427***	0.035	1.288***
	(5.58)	(7.74)	(0.19)	(10.17)
Age	3.113***	5.379***	5.744***	3.304***
	(9.67)	(11.08)	(11.42)	(10.42)
Tenure	−3.855***	−3.834***	−4.714***	−3.495***
	(−31.03)	(−24.60)	(−22.56)	(−31.97)
Level	−0.047	−0.139	−0.101	−0.115
	(−0.59)	(−1.36)	(−0.94)	(−1.46)
Direct	–	–	0.298***	−0.217***
	–	–	(2.59)	(−3.01)
Control	0.157**	−0.554***	–	–
	(2.01)	(−4.96)	–	–
Monopoly	0.299***	−0.047	0.343***	0.127*
	(3.64)	(−0.45)	(2.61)	(1.70)
District	0.111**	−0.259***	−0.118	−0.029
	(2.26)	(−4.23)	(−1.51)	(−0.65)
Cons	−1.981	−9.936***	−14.030***	−1.52
	(−1.41)	(−4.47)	(−6.05)	(−1.07)
Year	Yes	Yes	Yes	Yes
N	6659	3872	3329	7202
Pseudo R^2	0.483	0.483	0.519	0.467
Chi2	1306.31***	845.82***	691.34***	1468.88***

Notes: *t*-values are reported in parentheses.
* Statistical significance at the 10% level.
** Statistical significance at the 5% level.
*** Statistical significance at the 1% level.

policy burden at the expense of firm performance needs to be examined in relation to different types of executive turnover. Combining the above figures with the incomplete statistics for the nature of executive departure in Table 7-2, we can conclude that in local SOEs with strong intervention relative to central SOEs, executives have a motivation to partially sacrifice economic performance to achieve promotion capital by bearing political tasks such as policy burden, thus indicating some of the bureaucratic features of the executive appointment and dismissal mechanism.

Next, to further test our hypotheses, we group local SOEs into several groups by type of control and shareholdings, industries and regions. We then conduct regressions. The regression results are shown in Tables 8-3 and 8-4. Here, columns (6), (8), (10) and (12) correspond to SOEs under weak government intervention, in which the coefficient of *Performance* is significantly negative and that of *Policy* is insignificant. That is, local SOEs indirectly controlled or owned with low holdings by government, or local SOEs located in the Eastern regions, prefer a market-dominated evaluation method based on executives' economic performance. In columns (7), (9), (11) and (13), which correspond to SOEs under strong government intervention, the coefficient of *Policy* is significantly positive and that for *Performance* is negative with little significance. The results imply

Table 8-4
Executive turnover, firm performance and policy burden: Different Industries/Regions.

Variable	(10)	(11)	(12)	(13)
	Dependent variable: *Leave* (departure = 1, stay = 0)			
	Non-regulated industries	Regulated industries	Eastern regions	Central and western regions
Performance	**−2.225****	−0.843	**−1.964****	−0.881
	(−2.42)	(−0.96)	(−2.56)	(−0.76)
Policy	0.023	**0.060****	0.005	**0.133*****
	(0.60)	(2.33)	(0.20)	(2.91)
Size	0.065	−0.102**	0.057	−0.204***
	(1.35)	(−2.17)	(1.36)	(−3.75)
Leverage	0.143	−0.091	−0.201	0.18
	(0.57)	(−0.35)	(−0.93)	(0.58)
Growth	−0.129*	−0.034	−0.118*	−0.099
	(−1.87)	(−0.41)	(−1.80)	(−1.15)
Indep	−0.88	−2.319**	−2.170***	0.118
	(−1.40)	(−2.29)	(−3.17)	(0.14)
Age60	0.887***	1.150***	0.569***	1.771***
	(6.70)	(6.97)	(4.54)	(10.07)
Age	4.715***	2.544***	4.328***	2.957***
	(13.55)	(6.11)	(13.09)	(6.70)
Tenure	−4.164***	−3.273***	−3.741***	−3.995***
	(−32.31)	(−22.49)	(−31.09)	(−24.27)
Level	−0.064	−0.096	0.028	−0.216**
	(−0.78)	(−0.93)	(0.35)	(−2.06)
Direct	0.005	−0.174	−0.037	−0.178
	(0.06)	(−1.50)	(−0.47)	(−1.58)
Control	0.068	−0.206**	−0.160**	0.061
	(0.83)	(−2.22)	(−2.07)	(0.59)
Monopoly	–	–	0.077	0.390***
	–	–	(0.92)	(3.69)
District	−0.041	−0.125**	–	–
	(−0.78)	(−2.17)	–	–
Cons	−8.814***	2.08	−7.741***	2.259
	(−5.60)	(1.13)	(−5.23)	(1.15)
Year	Yes	Yes	Yes	Yes
N	6412	4119	6616	3915
Pseudo R^2	0.503	0.443	0.468	0.502
Chi2	1337.87***	810.58***	1357.18***	832.6***

Notes: *t*-values are reported in parentheses.
* Statistical significance at the 10% level.
** Statistical significance at the 5% level.
*** Statistical significance at the 1% level.

that local SOEs directly controlled or owned with high holdings by the government, and local SOEs located in the Central and Western regions, prefer a bureaucratic evaluation method based on executives' political performance. We also test the differences between the coefficients of *Performance* and *Policy* according to the groups in Tables 8-3 and 8-4. The results show that the sensitivity of turnover-performance (*Performance*) is not significantly different between the groups, but the coefficients of *Policy* differ significantly between the groups.[8]

[8] We conduct coefficient difference tests of *Performance* and *Policy* among the different groups based on Tables 8-2–8-5 (sensitivity test). In Table 8-2, the results indicate that the coefficient difference of *Policy* is statistically significant at the 10% level between NSOEs and SOEs, while it is partially significant among central SOEs and local SOEs, provincial SOEs, municipal SOEs and SOEs below the municipal level. In Tables 8-3 and 8-4, the coefficient difference of *Policy* is statistically significant at the 5% level between SOEs with indirect holdings and SOEs with direct holdings, and between SOEs located in the Eastern regions and SOEs in the Central and Western regions. In Table 8-5, the coefficient difference of *Policy* is statistically significant at the 10% level between SOEs under weak government intervention and SOEs under strong government intervention.

Table 8-5
Sensitivity test.

Variable	(14)	(15)
	Dependent variable: *Leave* (departure = 1, stay = 0)	
	Interven ⩽ 2	Interven > 2
Performance	**−1.594****	**−2.254***
	(−2.19)	(−1.69)
Policy	0.025	**0.095*****
	(0.84)	(2.88)
Size	0.036	−0.048
	(0.84)	(−0.80)
Leverage	−0.148	0.154
	(−0.72)	(0.39)
Growth	−0.146**	−0.006
	(−2.35)	(−0.06)
Indep	−1.610***	−1.125
	(−2.69)	(−1.01)
Age60	0.445***	2.534***
	(3.82)	(10.38)
Age	4.373***	2.244***
	(14.23)	(4.11)
Tenure	−3.933***	−3.540***
	(−34.21)	(−19.35)
Level	−0.046	−0.074
	(−0.63)	(−0.58)
Direct	0.098	−0.320**
	(1.22)	(−2.04)
Control	−0.011	−0.402
	(−0.15)	(−1.64)
Monopoly	0.299***	−0.006
	(3.37)	(−0.04)
District	0.04	−0.333***
	(0.75)	(−3.84)
Cons	−7.268***	2.092
	(−5.20)	(0.84)
Year	Yes	Yes
N	7653	2878
Pseudo R^2	0.482	0.494
Chi2	1569.51***	585.62***

Notes: *t*-values are reported in parentheses.
* Statistical significance at the 10% level.
** Statistical significance at the 5% level.
*** Statistical significance at the 1% level.

4.3.3. Sensitivity test

We examine the different implementations of the executive evaluation mechanism in SOEs under different levels of government intervention distinguished by the administrative level, type of control, shareholdings by SASACs, industries and districts. Although the above classifications are intrinsically consistent (Xia and Chen, 2007; Xin and Tan, 2009; Fan et al., 2013), there may be large deviations among the subsamples, such as SOEs located in Eastern regions, which include those under different types of government control, and levels of shareholdings and from different industries, which may lead to endogenous interference to the results when regressing by groups. To reduce the measurement errors caused by a single packet, we design a comprehensive variable *Interven*, where $Interven = Direct + ControlDummy + Monopoly + District$. Here, *Interven* is an ordinal variable ranging from 0 to 4. The median of *Interven* is 2, and we take a result as representing the weak government intervention group if *Interven* is no more than the median, and the strong intervention group if it is above the median. The regression results are shown in Table 8-5. In column (14), the coefficient

of *Performance* is significantly negative, whereas *Policy* is insignificant, which implies an inclination toward market-dominated evaluations among SOEs in the weak intervention group. In column (15), the coefficient of *Performance* is slightly significant, and *Policy* is significantly positive, which implies an inclination toward bureaucratic evaluation among SOEs in the strong intervention group, that is, "weak performance and strong policy burden." Our results are consistent with previous evidence.

5. Conclusion

According to the theoretical framework of institutional economics, institutional arrangements determine the level of participation. Executives, especially the Chairman and CEO, influence the operational performance and market value of firms to a large extent. Incentive mechanisms concerning executive turnover can influence the behavior of executives, which affects firm value. As a result, it is necessary to examine the institutional changes and executive turnover of SOEs to better understand the behavior of SOEs and explain their performance.

In this paper, we collect the executive turnover data of Chinese listed SOEs from 1999 to 2012. Based on the current regulations, we find that about half of executives leave office within two terms, which is in line with the "Interim Provisions on Business Performance Evaluations for Persons-in-Charge at Central Enterprises" (2003, 2006, 2009, 2012). However, more than a third of executives leave office in less than one term, and about 20% of executives serve more than two terms, which highlights the uncertainty and unpredictability of executive appointments in SOEs. Second, the executive evaluation mechanism for SOEs is implemented differently according to the different levels of government intervention. The executive turnover in SOEs with weak intervention by local governments, such as those controlled indirectly or with low government shareholdings and those from non-regulated industries and the Eastern regions, tends to be market-oriented and determined by economic performance. In contrast, the SOEs under strong government intervention prefer to conduct government-oriented executive evaluations that focus on political performance in relation to different policy burdens.

Our findings are of theoretical and practical importance. We are the first to empirically examine the implementation of multi-task incentive contracts under different government intervention scenarios. Our evidence on executive turnover in Chinese SOEs supplements the literature. Moreover, our findings have implications for policy-makers, as they add to the knowledge of corporate governance in Chinese SOEs, deepen our understanding of the economic and political behavior of SOE executives and suggest that the authorities should optimize the existing institutions.

It is imperative to reform the bureaucratic selection mechanism of SOE executives, along with the mixed ownership trial of SOEs, and practice the classified management of SOEs. The authorities need to break the current uniformity of policy implementation by reallocating governance power between SOEs and governments according to the different types and levels of control, and using different methods to select executives, such as bureaucratic selection or market recruitment. On this basis, the SASACs could further popularize explicit incentive contracts in SOEs in competitive industries by clearly defining the rights and duties of SOE executives, enabling the professionalization of SOE executives, and thus furnishing a solid platform for the market-dominated selection and evaluation of SOE executives.

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Appendix A

See Table 2.

Table 2
The transition of the incentive mechanism of SOE executive appointment and dismissal.

Year	Policies, laws & regulations	Content	Awards vs punishment	Office-term evaluation	Facts
1992–2002	"Rules of Awards and Punishment on the Factory Managers (Managers) for State-owned Enterprises" (1994); "Trial Measures for Evaluating the Value Maintenance and Appreciation of State-owned Enterprises" (1994) "Measures for the Implementation of Salary-based Incentive Mechanism for State-owned Enterprise Managers (Trial)" (1999); "Rules for evaluating the performance of State—owned Enterprise Capital" (1999); "The Decision of the Central Committee of The Communist Party of China on Major Issues Concerning The Reform and Development of State-Owned Enterprises" (1999)	1. Ideological and political performance including work ethics, obeying laws and rules and following major decisions made by the Party and state. 2. The accomplishment of targets such as profits, tax, ROE and labor productivity. 3. The value maintenance and appreciation of state-owned assets	1. The reward and punishment of SOE executives are conducted by governments at different levels. 2. Factory managers who perform badly even causing operational loss will be monetarily and administratively punished, such as having their bonus stopped, being fired or demoted, or even sued by judiciary authorities	Contract	The majority of SOE executives are appointed by the superior authority rather than by open recruitment, or other market recruiting practices
	"The Basic Code for Establishing Modern Enterprise System in Large and Medium-Sized State-Owned Enterprises (for Trial Implementation)" (2000); "Standards of Corporate Governance for Listed Companies" (2002)	Score and rate according to the basic indicator and revised indicator: profits, operation, leverage and growth by the efficacy coefficient method together with subjective judgment	Try to establish compensation an incentive mechanism based on managers' performance to attract talent	No explicit provisions	
2003–2012	"Interim Regulations on Supervision and Management of State-owned Assets of Enterprises" (2003); "Notice for Accelerating the Open Recruitment of Managers and Going on Duty on a Competitive Bases in Central SOEs" (2004); "Measures for Comprehensive Evaluation of the Leadership of the Central Enterprises"(2009); "Interim Provisions on Business Performance Evaluations for Persons-in-Charge at Central Enterprises" (2003, 2006, 2009, 2012)	1. Assess the operational performance of persons in charge of enterprises combining the annual assessment with the service term assessment, to make sure the consequential assessment is unified with the procedural appraisal, and the assessment result linked with the awards and punishments. 2. The indices of assessment of annual operational performance shall include basic indices (the indices of the total amount of annual profits and of the net asset earnings ratio) and categorized indices. 3. The assessment of service term operational performance shall include basic indices (The growth of state-owned assets and the average annual sales growth in three years) and categorized indices	1. Executives with assessment results of A-level or B-level will be given long-term incentives besides a deferred performance salary; those with C-level only get a deferred performance salary; those with D-level or E-level probably get demoted or fired besides a deferred performance salary deduction	Office-Term Evaluation: 2004–2006; 2007–2009; 2010–2012	1. SOEs attempt to recruit managers in a market manner according to the "Notice for Accelerating the Open Recruitment of Managers and Going on Duty on a Competitive Bases in Central SOEs" (2004). 2. The number of executives appointed by authorities is declining according to documents provided by the Chinese Entrepreneur Survey System

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Religious atmosphere and the cost of equity capital: Evidence from China

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ABSTRACT

The cost of equity capital (ICC) is a crucial component of investment decisions and corporate performance evaluations. This study explores the effect of a region's religious atmosphere on ICC and finds that ICC tends to be lower when stronger religious atmosphere is created. We further use the mediation effect method to clarify the specific channel through which religious atmosphere reduces ICC, and find that earnings quality, corporate investment efficiency and corporate social responsibility partially mediate the effect of religious atmosphere on ICC. Moreover, the relationship between religious atmosphere and ICC is more pronounced in firms with stronger external law environments and higher audit quality, indicating that formal institutions and religious tradition complement each other.

1. Introduction

The impact of formal legal and governmental institutions on the accounting and auditing behavior of listed firms has been a central concern of capital market accounting research. Recently, more and more researchers have begun to emphasize the importance of informal institutional arrangements and their effect on economic growth (North, 1990; Williamson, 2000; Allen et al., 2005). Informal institutional arrangements are the norms or unconsciously accepted standards that are rooted in a culture; they include, but are not restricted to, ethics, values, religions and customs (Helmke and Levitsky, 2004). Relevant literatures have made various elaborations in this fields. Lacker (2013) and Chen (2015) find that social networks can relieve financial constraints

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and increase investment and management efficiency. Bunkanwanicha et al. (2013) and Xu et al. (2015) note that marriages and divorces have a great impact on the stock prices and returns of family firms. Gul et al. (2011) and Li and Liu (2012) find that gender diversified boards of directors can drive up investment efficiency and the informativeness of stock prices and reduce the risk of stock price crashes. As an important part of human culture, religion has also attracted researchers' attention. With the development of religious economic theory and research paradigms, the study of religious culture has become an emerging field in corporate governance at home and abroad (Hilary and Hui, 2009; Dyreng et al., 2012; McGuire et al., 2012; Chen et al., 2013; Du, 2013; Du et al., 2014a, 2014b).

The geographical proximity of religious structures is usually used to measure the strength of religious influence (Malloy, 2005; Betler, 2008; Chen, 2013; Du, 2013). Chen et al. (2013) and Du (2013) use the number of Buddhist and Taoist temples within a given radius of a Chinese listed firm as a proxy for the intensity of the religious atmosphere. Using this proxy and quasi-firm-level religious data of Chinese firms from the 2007–2014 period, we focus on the impact of religious atmosphere on a firm's cost of equity capital. We find that listed firms located in areas with stronger religious atmosphere enjoy a lower cost of equity capital. In order to further clarify the channel how religious atmosphere reduces the cost of equity capital, based on mediation effect method (Wen, 2004), we prove that religious atmosphere reduces the cost of listed firms' equity capital by improving the quality of accounting information and investment efficiency and by increasing the performance of corporate social responsibility. Moreover, the negative impact of religious atmosphere on listed firms' cost of equity capital is more pronounced in firms with more stringent external legal environments and higher auditing quality, which suggests that there is a complementary relationship between the internal and external formal institutional arrangements of a firm (referred to as formal institutions) and religious tradition (referred to informal institutions).

Our study makes several contributions to the literature. First, we emphasize and expand the understanding of the economic consequences of religious atmosphere. Prior studies have focused on how religion affects a wide range of corporate governance mechanisms, investment decisions, principal-agent problems and stock price collapse risk (Callen et al., 2011, Dyreng et al., 2012; McGuire et al., 2012; Chen et al., 2013; Du et al., 2014a, 2014b; Callen and Fang, 2015), but little attention has been paid to the economic consequences, especially the effect on the cost of equity capital. Our study enriches the literature on the economic consequences of religious atmosphere. Second, we expand the literature on religious economics in emerging markets. Previous studies of the consequences of religious atmosphere have been conducted in developed countries such as the USA, and the religion has been Christian; this study is conducted in a developing country, China, where Buddhism is the largest religion, closely followed by Taoism. Buddhism and Christianity, as Chinese and Western religions, have different ideas about God, the nature of good and evil, repentance, the ultimate goal of life, precepts and artistic traditions (Yao, 2004; Zhu, 2010; Shi and Chen, 2014; Chen and Fei, 2015). The Chinese capital market is undergoing a key stage in its economic transformation; it currently lacks fully established formal institutions and efficient law enforcement, which makes it very important to investigate how the informal institutions such as religious culture affects firms' behaviors and what are the economic consequences of this process. Our study provides a more comprehensive understanding of the role of religion in China. Third, we supplement the literature on the relationship between informal institutional arrangements (religious atmosphere) and formal institutional arrangements. Our research shows that there is a complementary effect rather than a substitution effect between these informal and formal institutional arrangements, which further supports the arguments of Chen et al. (2013) on the economic consequences of religion. Fourth, we enrich and expand the application of geographical proximity as a proxy for religious influence in the context of China. Most previous studies of religious economics have been conducted in developed markets and they usually measure religious atmosphere at the state (county) levels. In this study, we measure religious atmosphere at the corporate level, which means that we not only more accurately catch the religious atmosphere of a listed firm, we also alleviate the possible cross-sectional self-correlation problem (Malloy, 2005; Butler, 2008; Du, 2013).

The remainder of this paper is organized as follows. Section 2 reviews the literature and describes the theoretical analysis and research hypothesis. Section 3 details the research design. Section 4 summarizes the statistics and the empirical results. Section 5 concludes the paper.

2. Literature review and hypothesis development

2.1. Literature review and theoretical analysis

Today, many people believe that religion does not play an important role in Chinese social life for two reasons: first, atheism is taken for granted in China, because the country is governed by the Chinese Communist Party, and second, different from the western religions, Chinese religions (including Buddhism and Taoism) are diffuse, and most believers do not pay regular homage. As religious sites are also served as tourist attractions, it is difficult to separate pilgrims from other visitors (Yang, 2007). Accordingly, it is necessary to first review Chinese religious traditions, the status quo and recent trends. China has a long history of religious pluralism. Buddhism was introduced to China during the Western Han Dynasty (206BCE – A.D. 24), and Taoism is more than 1900 years old. Thus, there can be no doubt that religion has had a far-reaching influence on various aspects of Chinese culture such as aesthetics, politics, literature, philosophy and medicine. Although political struggles during the 1949–1976 period caused a significant decrease in religious activities, long-repressed religious beliefs have been liberated since the reform and opening up policy, and the influence of religion has gradually expanded.

In recent years, Chinese leaders have realized that religion can rectify the moral deficiencies caused by rapid economic growth, and they have affirmed the importance of religion in various forms. For example, President Xi Jinping met with the Grand Master Hsing Yun (Abbot of Foguangshan Temple) in February 2014 and highly praised his book *Bai Nian Fo Yuan.* In 2015, Premier Li Keqiang made a splendid statement on religious culture in his report on the government work during the NPC and CPPCC sessions and advocated the comprehensive implementation of ''respecting the freedom of religious belief and giving full play to religious believers' positive role.'' In fact, religious activity throughout China has grown beyond expectations in the past four decades. According to Chen (2003), there are about 16,000 Buddhist temples and 10,000 Taoist temples in China. Another statistics made by the World Value Survey (WVS) shows that around 11% of Chinese people are religious believers. In addition, according to the 2011 annual official report *Religion Blue Book: Report on Religions in China*, approximately 185 million Chinese hold Buddhist beliefs. Yang (2010) argues that these figures might significantly underestimate religious beliefs for several reasons. First, thousands of Buddhists, known as secular disciples, pray at home in a conservative tradition. Second, giving the persecution during the Cultural Revolution, many believers are still reluctant to openly acknowledge their religious beliefs. Moreover, the poor are more likely to seek the spiritual comfort of religious belief because of the unacceptable disparity between the rich and the poor. Clearly, religion plays a vital role in China, and it is important to study the influence of religion on the Chinese capital market.

What role does religion play in human behaviors? Previous studies have provided abundant evidence that religion exerts a non-negligible impact on the behavior of individuals. First, the overwhelming majority of religions stress restraint over personal selfish desires (Conroy and Emerson, 2004). Unlike the frictions and conflicts between foreign religions, Taoism and Buddhism, as indigenous religions, influence each other and have become integrated. The basic ideas of Taoism, such as ''Recognize the Essence and Resist Private Desires'' and Buddhism's ''Past and Present, Causal Reincarnation'' and ''Four Noble Truths (the Truth of Suffering, the Origin of Suffering, the Distinction of Suffering, the Path of Liberation)'' strengthen believers' self-restraint and stress the importance of ethics and morals. Second, religion has a significant impact on individuals' attitudes toward risk. According to Miller and Hoffmann (1995), Ferguson (2009), religious believers possess a strong aversion to uncertainty. Using micro-data on Chinese residents, Pan and Zhong (2016) find that Chinese families with Buddhist beliefs have higher rates of saving and lower debt levels than non-Buddhists. Although the term ''risk'' is not directly expressed in religious ideology, Taoism's ideas of ''avoiding all harm and keeping out of trouble throughout one's whole life'' and Buddhism's idea of ''loss of one's life makes one beyond redemption'' both indicate a risk-adverse perspective. Moreover, religion can stimulate an individual's altruism (e.g., donations). For instance, Buddhist doctrines encourage ''delivering all living creatures from torment,'' ''the cultivation of love'' and ''benefiting oneself and others.'' These quotations illustrate that religion promotes a social trust mechanism based on mutual assistance (Li et al., 2008; Ruan and Liu, 2011). Hence, it is no exaggeration to say that religious beliefs shape individuals' values. In real social interactions, it is difficult to directly observe whether an individual possesses religious beliefs, as religious beliefs are not exactly equal to

religious practices or behaviors. Specifically, those who have religious beliefs do not necessarily publicly perform religious behaviors, and performing some religious practices and behaviors does not necessarily mean that one has religious beliefs. However, according to the theory of social norms, local ethics and morality exert a subtle influence on all of the individuals who live in a community. Therefore, in areas where the religious atmosphere is relatively strong, religious doctrines will become an important part of local ethics. Religious believers in areas with stronger religious atmosphere are affected by religious ethics when they are immersed in local morals. This gradually results in the formation of regional ethical codes based on religion. The above effect influences not only individuals' behavior but also organizations' decisions. In this study, we are interested in whether the influence of religion is reflected in the cost of equity capital.

2.2. Hypothesis development

2.2.1. Religious atmosphere and cost of equity capital

As an alternative to the market, a firm can be seen as a group of contracts. Due to bounded rationality, speculation and asset specificity, a firm's internal contracts cannot be as complete as those in the market. If different subjects do not have the same resources and information, the powerful party (parties) will exploit the less powerful. Due to the high risk of agency problems caused by moral hazard and adverse selection in this environment, investors will claim a higher risk premium.

According to the theory of social norms (Cornwall et al., 1986; Sunstein, 1996), every individual in an organization, whether he or she is a religious believer or not, will inevitably be affected by the religious norms in the surrounding environment. Therefore, religion has a direct influence on individuals and an indirect influence on organizations' attitudes and behaviors (Hilary and Hui, 2009; Chen et al., 2013; Du, 2013). Religious culture plays a role in shaping an organization's "cognitive map" and provides the values and codes of conduct that are followed by individuals. The basic principles of Taoism, "Recognize the Essence and Resist Private Desires," and of Buddhism, "Past and Present, Causal Reincarnation," strengthen individuals' restraint and ethical behavior, which in a business environment helps prevent and rectify damage to others' interests, improve the quality of earnings information and guarantee the accuracy of the measurement of all of the subjects' input and income. Ample evidence shows that earnings quality has a direct impact on the cost of equity capital (Botosan and Plumlee, 2002; Jong-Hag and Woo-Jong, 2014; Romilda and Stefania, 2014; Kima et al., 2015; Hao and Wang, 2015). Religious culture also exerts a kind of social control over individuals' behavior in an organization. Principles of Buddhism such as the doctrines of the Three Universal Characteristics (all sensations are suffering, all phenomena are impermanent and all Dharma are not self) and Four Unlimited Hearts (kindness, compassion, happiness, willingness) advocates the resisting of individual's opportunistic behavior and overconfidence, which helps strengthen risk management and increase investment efficiency, thus reducing potential risks and reducing ICC. In addition, Buddhism's emphasis on "delivering all living creatures from torment" and "benefiting oneself and others" and Taoism's emphasis on "saving individuals from suffering, emergency and poverty" encourage mutual assistance and an environment of benign trust, thus enhancing investors' confidence in a firm shaped by a higher religious atmosphere and consequently reducing its cost of equity financing. Based on this discussion, we propose the following hypothesis.

Hypothesis 1. The ICC tends to be lower when stronger religious atmosphere is created at the registered location of a listed firm.

2.2.2. Paths through which religious atmosphere reduces a firm's ICC

According to the hierarchical theory of social institutions proposed by Williamson (2000), informal institutions such as religion and culture which is redeemed as basic rules of social operation, can exert a deep and thorough influence on society. In this study, the effect of religious atmosphere on the cost of equity capital is shown to operate through the following three channels, although it is not limited to them.

The first channel is effectively improving a firm's earnings quality. As an informal institutional arrangement, religious culture helps to shape a firm's internal governance mechanisms, enhancing the constraints on management opportunism. As a result, the firm's performance meets investors' expectations and increases their confidence, thus reducing the firm's cost of equity capital. Existing literatures show that firms headquar-

tered in areas with strong religious social norms generally demonstrate a much higher quality of accreditation, greater voluntary information disclosure and a lower probability of restatement or violation of accounting standards (Callen et al., 2011; Dyreng et al., 2012; McGuire et al., 2012; Chen et al., 2013; Du et al., 2014b). A large number of studies have shown that higher earnings quality helps to reduce the cost of equity financing (Botosan and Plumlee, 2002; Jong-Hag and Woo-Jong, 2014; Kima et al., 2015). Thus, religious atmosphere improves oversight of financial information and decreases the risk of intentional or unintentional financial reporting misstatements. Accordingly, a firm can increase the authenticity and accuracy of earnings, reduce investors' misestimates of cash flows due to information asymmetry and reduce the covariance in investors' estimates of cash flows between the firm and others, which can lower the cost of equity capital.

The second channel works by strengthening a firm's risk management procedures and improving the efficiency of its decision making. A growing body of research on how religious atmosphere affects firms' attitudes toward risk suggests that individuals with religious beliefs or firms in environments with a stronger religious atmosphere possess a higher level of risk aversion. Miller and Hoffman (1995) find that religion is negatively correlated with attitude toward risk for individuals, as those with religious beliefs generally are exhibited disgust with uncertainty. Using individual-level data, Osoba (2003) further finds that risk-averse individuals go to church more frequently than risk-seeking individuals. Shu et al. (2012), Bernile et al. (2017), as well as Sunder et al. (2017) argue that it is more likely for risk-seeking individuals to take risks at organization level. If religious atmosphere has a negative impact on individuals' willingness to take risks, there should be evidence for a corresponding pattern in organizational behavior. The above prediction has been supported by a number of studies. Hillary and Hui (2009) argue that firms located in counties with higher levels of religiosity display lower levels of risk exposure and associated lower investment rates and less growth. Omer et al. (2016) claim that auditors in areas with stronger religious atmosphere are more likely to issue non-standard audit opinions when dealing with uncertainty arising from legal proceedings. Callen and Fang (2015) state that firms headquartered in areas with stronger religious atmosphere might be reluctant to adopt aggressive accounting policies and more likely to execute a stable investment strategy, which helps reduce the risk of a stock price crash. Therefore, by enhancing a firm's stringency, religious atmosphere generates a more positive investor response toward investment and financing decisions, thus reducing the cost of equity capital.

The third channel through which religious atmosphere affects the cost of equity capital is by encouraging social responsibility. You et al. (2011) and Stephen et al. (2017) find that the accumulation of social capital is of great significance to the growth of a firm. The more sufficient social capital entrepreneurs possess, the higher price investors are willing to pay for their firms. Religion promotes the accumulation of social capital and individuals can access abundant social capital by participating in activities organized by religious groups. Higher religious atmosphere gives firms easier access to abundant social capital and beneficial social resources (El Ghoul et al., 2012). Guiso et al. (2003), Renneboog and Spaenjers (2012) and Ruan (2011) argue that religion supports the accumulation of social capital, especially by encouraging the taking of social responsibility. To some extent, increasing trust can increase market participation, arouse an active response in the capital market and drive up stock liquidity, all of which help to reduce the cost of equity capital (Yakov et al., 2015). In addition, religious atmosphere can promote social capital accumulation through its institutional attributes, which may indirectly affect the cost of equity capital. According to Brammer (2007), Li et al. (2013) and Zhou and Hu (2014), religion increases the frequency and intensity of firms' donations and their fulfillment of other social responsibilities. Thus, stock liquidity can be further increased and the cost of equity capital decreased. Based on these above channels, three hypotheses are proposed.

H2a. Earnings quality partially plays an intermediary role in the effect of religious atmosphere on the reduction of the cost of equity capital.

H2b. Efficiency of decision making partially plays an intermediary role in the effect of religious atmosphere on the reduction of the cost of equity capital.

H2c. Corporate social responsibility partially plays an intermediary role in the effect of religious atmosphere on the reduction of the cost of equity capital.

3. Research design

3.1. Model construction

To test Hypothesis 1, we construct the following model:

$$M1: ICC_{i,t} = \beta_0 + \beta_1 RELIGION_{i,t} + \beta_2 IC_{i,t} + \beta_3 H - LAW_{i,t} + \beta_4 BIG10_{i,t} + \beta_5 FIRST_{i,t} + \beta_6 BETA_{i,t} + \beta_7 DTURN_{i,t} + \beta_8 SDRETURN_{i,t-1} + \beta_9 SIZE_{i,t-1} + \beta_{10} LEV_{i,t-1} + \beta_{11} ROE_{i,t-1} + \beta_{12} MTB_{i,t} + \beta_{13} AGE_{i,t} + \beta_{14} SOE_{i,t} + \varepsilon.$$

The dependent variable is the cost of equity capital (*ICC*), and the main independent variable is the religious atmosphere, *RELIGION*. The measures of the two variables are described in Section 3.2. The coefficient *β1* of the variable *RELIGION* indicates the influence of religious atmosphere on the cost of equity capital. According to the above analysis, we predict a negative correlation between *RELIGION* and *ICC*.

To further clarify the specific path through which religious atmosphere reduces the cost of equity capital, we use Wen's (2004) method for testing the intermediary effect. We combine the following models M2 and M3 with model M1 to test the intermediary effect:

$$M2: MESOMERIC_{i,t} = \beta_0 + \beta_1 RELIGION_{i,t} + \beta_2 CONTROL\_VARIALBES + \varepsilon$$

and

$$M3: ICC_{i,t} = \beta_0 + \beta_1 RELIGION_{i,t} + \beta_2 MESOMERICIC_{i,t} + \beta_3 SIZE_{i,t-1} + \beta_4 LEV_{i,t-1} + \beta_5 FIRST_{i,t} + \beta_6 BETA_{i,t} + \beta_7 DTURN_{i,t} + \beta_8 SDRETURN_{i,t-1} + \beta_9 MTB_{i,t} + \beta_{10} AGE_{i,t} + \beta_{11} SOE_{i,t} + \varepsilon.$$

In M2 and M3, *MESOMERIC* is the mediating variable. Based on Hypotheses 2a, 2b and 2c, accounting information quality (*DA*), corporate social responsibility (*CSR*) and investment efficiency (*OVERINV*) are selected as the intermediary variables. We select the modified Jones model (Dechow et al., 1995) and take the residual *DA* as the proxy for accounting information quality. We use Richardson's (2006) model of investment efficiency to calculate the residual *OVERINV* as a proxy for investment efficiency. Finally, we use a firm's voluntarily disclosure of a corporate social responsibility report (*CSR*) as a proxy for corporate social responsibility.

3.2. Variable measurement

3.2.1. Cost of equity capital

The cost of equity capital is one of the core concepts of corporate financial management. It is not only used to determine the source of funding and in financial planning, but also as the main standard for evaluating investment projects, business performance and company value. However, the difficulty in measuring the cost of equity capital and the complexity of the influencing factors make it a tricky problem. The measurement of the cost of equity capital is divided into *ex-ante* measurements of *ICC* and *ex-post* measurements of *ICC*. Numerous studies have shown that the *ex-post* measurements of *ICC* are often inaccurate (Gebhardt, Lee and Swaminathan; 2001; Easton, 2004; Hou et al., 2012; Mao and Ye, 2012; Hao and Wang, 2015). The common *ex-ante* methods of measuring ICC are the Gordon growth model, the residual income model and the abnormal earnings growth model. As they are based on different theoretical foundations, the measurement results of each method are different. To reduce the estimation error caused by using one single model, we follow Hail and Leuz (2006) and Hou et al. (2012) in using the following five *ex-ante* methods for measuring *ICC* (all of them have a significant positive correlation at the 1% level; see Appendix B), and we take the mean of the five indicators as an alternative indicator of the cost of equity capital:

$$r_{PEG} = \sqrt{(EPS_2 - EPS_1)/P_0}; \tag{1}$$

$$r_{MPEG} = \sqrt{(EPS_2 + r_{MPEG} \times DPS_1 - EPS_1)/P_0}; \tag{2}$$

$$P_0 = \sum_{i=1}^{T-1} \frac{DPS_i}{(1 + r_{EPR})} + \frac{EPS_T}{r_{EPR}(1 + r_{EPR})^{T-1}}; \tag{3}$$

$$P_0 = BV_0 + \sum_{i=1}^{3} \frac{FROE_i - r_{GLS}}{(1 + r_{GLS})^t} BV_{t-1} + \sum_{i=4}^{T-1} \frac{FROE_i - r_{GLS}}{(1 + r_{GLS})^t} BV_{t-1} + \frac{FROE_i - r_{GLS}}{r_{GLS}(1 + r_{GLS})^{T-1}} BV_{T-1}; \tag{4}$$

and

$$r_{OLN} = A + \sqrt{A^2 + \frac{EPS_1}{P_0} \times \left[\frac{EPS_2 - EPS_1}{EPS_1} - (r - 1)\right]}. \tag{5}$$

Model (1) is the PEG model, where *EPS* is the earnings per share and P_0 is the initial stock price. Model (2) is the MPEG model, where *DPS* is the dividend per share with the consideration of the cash dividend. Model (3) is the EPR model, and *T* takes a value of 1, which means the cost of equity capital is calculated based on the forecast data of one year and the current stock price. Model (4) is the GLS model, where *BV* is the book value of net assets per share and *FROE* is the expected return rate on net assets. *T* takes 12; that is, from the fourth year, the company's expected return on net assets (*FROE*) is equal to the industry average returns on net assets (*ROE*), and from the 12th year, the return on the net assets of the company is equal to the cost of the equity capital. Model (5) is the OJN model, where $A \equiv (\gamma\text{-}1 + DPS_i/P_0)/2$ and $\gamma\text{-}1 = g_p$, indicating the long-term growth rate of earnings per share, which takes 2%. Due to the insufficient coverage of domestic analysts' earnings forecasts and the subjective nature of forecasts, we use the method given in Hou et al. (2012) to estimate a mixed cross-section regression model, M0, and use the estimated coefficients and the actual value of the firm to obtain the forecast earnings.

$$M0: E_{j,t+\tau} = \alpha_0 + \alpha_1 FV_{j,t} + \alpha_2 SIZE_{j,t} + \alpha_3 DIV_{j,t} + \alpha_4 DD_{j,t} + \alpha_5 E_{j,t} + \alpha_6 LOSS_{j,t} + \alpha_7 ACC_{j,t} + \varepsilon_{j,t+\tau}.$$

E is earnings before the deduction of additional items. *FV* is the company's value; given the liquidity of domestic stock, it is equal to Negotiable shares × Market value + Non-negotiable shares × Book value + Book value of the debt. *SIZE* is the total assets; *DIV* is the dividend payment; *DD* is a dummy variable that equals 1 for dividend payers, and 0 otherwise; *LOSS* is a dummy variable that equals 1 for firms with negative earnings, and 0 otherwise; and *ACC* refers to the total accruals, which is equal to the operation's net profit – net cash flow. All the independent variables are measured as of year *t*.

Given the potential overweighting of firms with extreme earnings in the estimation of Eq. M0, we winsorize earnings and other continuous variables each year at the 1st and 99th percentile. For each firm *i* and each year *t* in our sample, we compute the earnings forecasts for up to five years into the future by multiplying the independent variables at year *t* by the coefficients of the pooled regression estimated using the previous 10 years of data. In addition, to estimate a firm's earnings forecasts, we only require the firm to have non-missing values for the independent variables in year *t*. As a result, the survivorship bias is kept to a minimum. The regression results of model M0, given in Appendix A, show that the coefficients of the independent variables are in line with prior research (Hou et al., 2012; Hao and Wang, 2015), and all of them are highly significant. The R^2 is also very high, which suggests that it is reasonable to use M0 to forecast the earnings.

3.2.2. Measurement of religious atmosphere

There are four methods to empirically measure the influence of religion: (a) the number of religious believers divided by the total population in a county (Hilary and Hui, 2009; Dyreng et al., 2012); (b) the ratio of residents' who participate in religious practices (e.g., praying in church) in a county (McGuire et al., 2012); (c) the number of religious sites in a county (Dyreng et al., 2012); and (d) the number of religious sites within a certain distance of a firm (Chen et al., 2013; Du, 2013). To meet acceptable standards of objectivity, reliability and availability and to alleviate the endogeneity problem, we follow previous studies (Chen et al., 2013; Du, 2013) and use the number of monasteries (temples) within a certain radius of a firm as a proxy for the

influence of religion in that area. We manually collect all of the longitude and latitude data for the 161 national major Buddhist monasteries and Taoist temples (140 Buddhist monasteries and 21 Taoist temples) listed in the *Report of Identification of Major Temples of Buddhism and Taoism in the Han Region*, which was released by the Religious Affairs Bureau of the State Council on 9 April 1983. We then define religious atmosphere at the corporate level as follows. First, we manually collect the registered address of each firm's headquarters and of each religious monastery (temple), and determine its latitude and longitude using Google Earth maps. Second, we calculate the distance between each firm and the religious temples in four steps.

a. We confirm the longitude and latitude of the firm's headquarters (religious temple), λ_F and Φ_F (λ_R and Φ_R), where the angle between the firm's headquarters and the temple through the center of the earth and the earth's surface is θ. Then,

$$\cos\theta = \sin\Phi_R \times \sin\Phi_F + \cos\Phi_R \times \cos\Phi_F \times \cos(\lambda_R - \lambda_F).$$

b. The radius formula is as follows:

$$Radius = \frac{40075.04}{360} \times \frac{180}{\pi}.$$

c. The distance between the firm's headquarters and the religious temple is

$$Distance = rad \times \left(\frac{\pi}{2} - \arctan\left(\frac{\cos\theta}{\sqrt{1-\cos^2\theta}}\right)\right).$$

d. We then calculate the distance using only the area of mainland China (thus, the three special administrative regions, Hong Kong, Macau and Taiwan are excluded):

$$\sqrt{\frac{961.03 \times 10^4}{3.14 \times 31}} \approx 271.71,$$

where 961.03×10^4 denotes the area of mainland China (unit: km^2), 3.14 denotes the circumference ratio and 31 denotes the number of provinces, municipalities and autonomous regions in mainland China.

Based on the above calculation, we first use 200 km as the benchmark for defining the religious influence variable, *RELIGION*. As a robustness test, we extend the distance to 300 km (*RELIGION2*).

A firm-level measure of religious atmosphere has an advantage over country-level and region-level measures (Wines and Napier, 1992; Du, 2013). If a monastery (temple) is located at the junction of two or more provinces, its influence it not restricted to the province it is located in. Province-level proxies fail to capture this characteristic, whereas firm-level proxies are not limited by administrative boundaries, as they are measured as the distance between a firm and a monastery (temple).

Table 1 reports the distribution of major monasteries (temples) in various provinces and municipalities in the Han area. The table shows the number of Buddhist monasteries and Taoist temples in each province. The highest numbers of major temples are found in Anhui, Fujian, Shānxi, Shǎnxi, Zhejiang and Jiangsu; moderate numbers of temples are found in Beijing, Hebei and Guangdong, and only a few temples are found in Shanghai, Tianjin, Qinghai, Gansu and Hainan. Combined with the provinces' marketization ranking, it is clear that the provincial religious influence variable and the level of provincial marketization share low multi-collinearity.

Table 1
Distribution of major temples by province.

Province	Anhui	Beijing	Fujian	Guangdong	Guizhou	Hebei	Henan
Major temples	14	8	14	7	2	2	3
Province	Zhejiang	Chongqing	Hubei	Hu'nan	Jilin	Hainan	Jiangsu
Major temples	14	3	7	6	3	0	14
Province	Jiangxi	Liaoning	Shandong	Shānxi	Shǎnxi	Shanghai	Sichuan
Major temples	5	4	4	14	13	5	12
Province	Tianjin	Yunnan	Heilongjiang	Qinghai	Gansu		
Major temples	1	5	1	0	0		

In addition, following Romilda and Stefania (2014), Kima et al. (2015) and Hao and Wang (2015), we further control for governance in the internal and external environments, including internal control effectiveness (*IC*), external legal environment (*MKT*), auditor reputation (*BIG10*) and the largest shareholder holding ratio (*FIRST*). We also control for corporate related risks, including the market risk (*BETA*), stock liquidity (*DTURN*) and stock return volatility (*SDRETURN*), and company fundamentals indicators, including stock price level (*MTB*), company size (*SIZE*), solvency (*LEV*), profitability (*ROE*) and age (*AGE*). The variables definitions are given in Table 2.

3.3. Data sources and sample selection

Our study takes A-share listed companies from the 2007–2014 period as the initial sample. In the sample selecting process, we exclude the following observations: (1) firms in the banking, insurance and other financial industries; (2) firms whose latitude and longitude cannot be determined or those with missing variables; (3) firms registered in five minority ethnic areas including Ningxia, Guangxi, Inner Mongolia, Tibet and Xinjiang (*The Report on Determining the Nationally Important Temples of Buddhism and Taoism in Han Nationality Region* only lists Buddhist temples in the Han nationality region); and (4) firms with less than three estimated results from Eqs. (1)–(5). After the above observations are removed, we obtain 6014 valid samples. All of the continuous independent variables are winsorized at the 1% and 99% levels. The financial data are from the CSMAR (China Stock Market and Accounting Research) database. The religious atmosphere (*RELIGION*)

Table 2
Variable definitions.

Variable	Variable Definition
ICC	Average cost of equity capital calculated by five prediction models
RELIGION	Natural logarithm of the number of Buddhist monasteries and Taoist temples within a 200 km radius of a listed firm's registered address
IC	Logarithmic treatment of the *Index of Internal Control of Chinese Listed Companies* published annually by Dibo Corporation
MKT	A dummy variable that equals 1 if the firm's headquarters is located in one of the top 10 Marketization Index provinces, and 0 otherwise;
BIG10	Equal to 1 if the auditing firm is one of the top 10 largest accounting firms according to CICPA in the previous year, otherwise 0
FIRST	Shareholding ratio of the largest shareholder of the listed company
BETA	Market model estimate of BETA, based on stock returns and market returns for the 60 months to the end of the previous year (which requires at least 24 observations)
DTURN	The average turnover of the company on the same day
SDRETURN	The standard deviation of the daily stock returns of the company in the previous year
MTB	Book value to market value ratio of year-end net assets
SIZE	The natural logarithm of the company's total assets at the end of the year
LEV	The company's total liabilities to total assets ratio at the end of the year
ROE	Return on net assets of the company in the year; that is, net profit/net assets
AGE	Logarithm of the listed age plus 1
SOE	If the company is a state-owned enterprise, the value is 1, otherwise 0

data are hand-collected. The data for *BIG10* are taken from the official website of the Chinese Institute of Certified Public Accountants (www.cicpa.org.cn), which publicly issues accounting firms' annual rankings. The internal control (*IC*) data are from the *Index of Internal Control of Listed Companies in China* published annually by the Di Bo Company, and the corporate social responsibility (*CSR*) data are from the *Corporate Social Responsibility Report* by Running & Loving Global Consulting Co. Ltd. The economic and demographic data at the provincial level are obtained from the China Statistical Yearbooks.

4. Empirical results and analysis

4.1. Descriptive statistics

Table 3 reports the descriptive statistics of the variables after the winsorizing process. The variables are generally in accordance with a normal distribution and show some certain variation over the sample period. The mean *ICC* of the sample firms is 0.077, with a standard deviation of 0.04. The 25% and 75% quantile are 0.047 and 0.099, respectively, which suggests that there is a significant difference in the cost of equity capital for different firms. The mean of *RELIGION* at the corporate level is 2.077, with standard deviation 0.922. The 25% and 75% quantiles suggest there is a big variation in the influence of religious atmosphere. The average level of the internal control index is 6.47, with a small standard deviation. Nearly 60% of the sample firms are headquartered in areas with a good legal environment, 65% are state-owned enterprises and 37.1% use one of the top 10 audit firms. Moreover, the average shareholding of the largest shareholder is 34.8%; the 25% and 75% quantiles of this variable are 22.6% and 46.3%, respectively, which suggests that the percentage of shares held by the biggest shareholder varies across firms. The standard deviations of the other indicators are small, indicating that there might be no significant differences.

4.2. Religious atmosphere and cost of equity capital

Hypotheses 1 predicts that the religious atmosphere will be negatively correlated with ICC. Table 4 shows the regression results of M1 with industry fixed effects, year fixed effects and the clustering effect at the firm level. In columns 1–3, the results of the mixed OLS model, FGLS random effects model and MLE random effects model all show a significant negative correlation between religious atmosphere (*RELIGION*) and the cost of equity capital (*ICC*) at the 1% level, indicating that religious atmosphere helps a company reduce the cost of equity capital. Thus, Hypothesis 1 is supported. For the control variables, the effectiveness of internal control (*IC*), the auditor reputation (*BIG10*) as well as the holding of the largest shareholder *FIRST* are all negatively correlated with the cost of equity capital at the 1% level, which confirms the role of internal and

Table 3
Descriptive statistics.

Variables	Mean	St. Dev	P25	P50	P75	Min	Max
ICC	0.077	0.040	0.047	0.070	0.099	0.009	0.205
RELIGION	2.007	0.922	1.386	2.197	2.833	0	3.332
IC	6.470	0.148	6.412	6.510	6.554	5.809	6.773
MKT	0.594	0.491	0	1	1	0	1
BIG10	0.371	0.483	0	0	1	0	1
FIRST	0.348	0.153	0.226	0.325	0.463	0.0811	0.755
BETA	1.053	0.234	0.919	1.067	1.190	0.434	1.655
DTURN	0.025	0.017	0.012	0.021	0.035	0.002	0.078
SDRETURN	0.032	0.010	0.025	0.030	0.038	0.015	0.072
MTB	3.479	3.084	1.589	2.508	4.133	0.577	16.35
SIZE	21.89	1.303	21.00	21.78	22.64	19.03	25.73
LEV	0.545	0.196	0.407	0.558	0.688	0.118	0.944
ROE	0.024	0.124	0.014	0.042	0.078	−0.550	0.230
AGE	2.528	0.423	2.398	2.639	2.833	0.693	3.219
SOE	0.653	0.472	0	1	1	0	1

Table 4
Religious atmosphere and the cost of equity capital.

VARIABLES	(1) Mixed OLS ICC	(2) FGLS ICC	(3) MLE ICC
RELIGION	−0.002***	−0.003***	−0.003***
	(0.006)	(0.003)	(0.003)
BETA	0.008***	0.012***	0.012***
	(0.001)	(0.000)	(0.000)
SDRETURN	0.012	0.022***	0.022**
	(0.123)	(0.007)	(0.014)
DTURN	−0.642***	−0.831***	−0.842***
	(0.000)	(0.000)	(0.000)
MTB	−0.000***	−0.000***	−0.000***
	(0.001)	(0.000)	(0.000)
LNIC	−0.051***	−0.048***	−0.048***
	(0.000)	(0.000)	(0.000)
FIRST	−0.032***	−0.029***	−0.029***
	(0.000)	(0.000)	(0.000)
SIZE	0.003***	0.000	−0.001
	(0.000)	(0.923)	(0.908)
LEV	0.035***	0.038***	0.038***
	(0.000)	(0.000)	(0.000)
ROE	−0.002	−0.001	−0.001***
	(0.318)	(0.284)	(0.000)
AGE	−0.001***	−0.002***	−0.002***
	(0.000)	(0.000)	(0.000)
BIG10	−0.006***	−0.007***	−0.007***
	(0.000)	(0.000)	(0.000)
MKT	0.000	0.003	0.003
	(0.850)	(0.120)	(0.134)
SOE	0.003**	0.004***	0.005***
	(0.050)	(0.005)	(0.004)
Constant	0.358***	0.411***	0.414***
	(0.000)	(0.000)	(0.000)
LM Test		1152.47***	891.56***
F/Wald/LR chi^2	47.10***	847.77***	1569.13***
Industry/Year	YES	YES	YES
Adj_R^2	0.211	0.198	
Observations	6014	6014	6014

All of the variables are defined in Table 2. The numbers in parentheses are robust p-levels clustered by firm. *Represent the 10% significance level, for two-tailed tests.
*** Represent the 1% significance level, for two-tailed tests.
** Represent the 5% significance level, for two-tailed tests.

external corporate governance mechanisms in reducing the cost of the firm's equity capital (Romilda and Stefania, 2014; Kima et al., 2015; Hao and Wang, 2015). Other control variables, such as market risk (*BETA*), stock liquidity (*DTURN*), stock return volatility (*SDRETURN*), market to book ratio (*MTB*), solvency (*LEV*), profitability (*ROE*) and age (*AGE*), all pass the significance test and the results are consistent with our expectations. *SIZE* is significantly positive in the mixed OLS model, which is contrary to our expectation. We further test the individual effects. The results of the LM test (Breusch and Pagan, 1979) show that the mixed OLS model is rejected. Due to space limitations, the following tables report only the regression results of the MLE random effects model.

Table 5
How religious atmosphere reduces ICC: Intermediary effect analysis.

Panel A			MESOMERIC = DA
	(1)	(2)	(3)
	ICC	DA	ICC
RELIGION	−0.0028***	−0.001**	−0.0027***
	(0.003)	(0.038)	(0.002)
DA			0.091***
			(0.000)
Control variables	YES	YES	YES
Industry/Year	YES	YES	YES
F value	855.39***	4549.2***	1234.4***
Adj_R^2	0.199	0.707	0.263
Observations	6,014	6,014	6,014
Panel B			MESOMERIC = CSR
	(4)	(5)	(6)
	ICC	CSR	ICC
RELIGION	−0.0029***	0.012**	–0.0028***
	(0.003)	(0.033)	(0.002)
CSR			−0.004**
			(0.028)
Control variables	YES	YES	YES
Industry/Year	YES	YES	YES
F value	890.22***	346.29***	896.84***
Adj_R^2	0.190	0.156	0.201
Observations	5,397	5,397	5,397
Panel C			MESOMERIC = OVERINV
	(7)	(8)	(9)
	ICC	OVERINV	ICC
RELIGION	−0.0029***	−0.001*	−0.0028***
	(0.002)	(0.051)	(0.002)
OVERINV			0.021**
			(0.027)
Control variables	YES	YES	YES
Industry/Year	YES	YES	YES
F value/Wald chi^2	890.22***	63.42***	903.73***
Adj_R^2/Pseudo R^2	0.190	0.015	0.192
Observations	5692	5692	5692

All of the variables are defined in Table 2. The numbers in parentheses are robust p-levels clustered by firm.
*** Represent the 1% significance level, for two-tailed tests.
** Represent the 5% significance level, for two-tailed tests.
* Represent the 10% significance levels, for two-tailed tests.

4.3. Channel analysis: How religious atmosphere reduces ICC

Tables 5 reports the results on the analysis of the channels through which religious atmosphere reduces ICC. The analyses are based on the intermediary effect method (Wen, 2004). In columns (1), (4) and (7), the values for religious atmosphere (*RELIGION*) are all negatively correlated with the cost of equity capital at the 1% level; in columns (2), (5) and (8), religious atmosphere is shown to significantly reduce discretionary accruals (*DA*), increase the probability of corporate social responsibility disclosure (*CSR*) and restrain over-investment behavior (*OVERINV*). These results show that it is necessary to further test the mediating effect of accounting quality (*DA*), corporate social responsibility (*CSR*) and investment efficiency (*OVERINV*) on the relationship between religious atmosphere and the cost of equity capital. In columns (3), (6) and (9), discre-

tionary accruals (*DA*), overinvestment (*OVERINV*) and the disclosure of social responsibility reports (*CSR*) are all significantly and positively correlated with the cost of equity capital at the 1%, 5% and 5% levels, respectively. Religious atmosphere (*RELIGION*) is still negatively correlated with the cost of equity capital at the 1% level, but the coefficient of *RELIGION* is reduced to a certain extent when the above intermediary variables are added to the model, showing that the quality of accounting information (*DA*), corporate social responsibility (*CSR*) and investment efficiency (*OVERINV*) mediate the effect of religious atmosphere on the cost of equity capital. Religious atmosphere may also influence the behavior of listed companies through other channels (e.g., by affecting the choice of accounting firms) that affect the cost of equity capital. This remains to be further researched.

4.4. Religion and formal institutional arrangements: Alternatives or complements?

An institution is defined by a series of rules that are followed by its members. These rules include not only formal institutional arrangements such as laws, government regulations and economic contract arrangements, but also informal institutional arrangements such as religious culture, ethics, values and ideologies (North, 1990). Williamson (2000) argues that an institution can be divided into four levels. The first level consists of informal institutions such as religion, culture and custom, which form the basis of the institutional structure. The second level includes formal political and legal institutional arrangements. The third level is composed of contracts and governance structures, which are also formal institutional arrangements. The fourth level is market-oriented institutional arrangements such as resource allocation and employment, prices and quantities. According to the hierarchical theory of social institutions, the higher the level of the institution, the more stable the institution. In general, participants seek institutional protection from the highest functioning level. When the function of one institution is weak and normal operations cannot be guaranteed, for sustainability, market participants will seek protection at a lower-level of institutional arrangement. When formal institutional arrangements fail, high-level informal institutional arrangements can effectively substitute for formal institutions. If formal governance mechanisms are weak and their social function cannot be guaranteed, religion, as an informal institution, will make up for the deficiency in the formal institution (McGuire et al., 2012; Du, 2013).

Of course, there might also be a complementary relationship between religious and formal governing mechanisms. That is, the role of religion might be enhanced when the formal governing mechanism functions effectively. For example, if formal institutional arrangements are visualized as a circle and informal institutional arrangements are visualized as a square drawn around the circle, the scope of informal institutional arrangement may decrease as the radius of the circle (formal institutional arrangement) increases, but it will never disappear. In other words, due to institutional friction and transaction costs, the formal institutional arrangements always leave a role for informal institutional arrangements. According to the flight attendant theory (Davis et al., 1997), managers as "flight attendants" are motivated to pursue their own self-interest. However, their religious tradition may prompt them to work harder and to strengthen corporate governance, improve the quality of corporate accounting information and reduce information asymmetry, thereby reducing financing costs and increasing the company's value.

After verifying that the religious atmosphere of listed firms can significantly reduce the cost of equity capital, we further discuss the relationship between the informal institution (religion) and the formal institution (market level, audit quality). We examine whether these different governance mechanisms are complementary, mutually substitutable or irrelevant to the effect of religious atmosphere on the cost of equity capital. The role of religion in corporate governance may be weak in areas with a higher level of marketization (high-quality audit firms). In areas with low marketization (low-quality audit firms), the role of religion in corporate governance may both highlight and make up for deficiencies in the formal institutions (El Ghoul et al., 2012; Du, 2013). In contrast, Chen et al. (2013) holds that in areas with higher levels of marketization, a religious atmosphere strengthens people's internal ethics and morality and spurs them to enhance internal and external governance mechanisms and improve the quality of accounting information. Furthermore, in areas with high levels of marketization, the risk-adverse orientation of religious traditions may further strengthen management's more conservative accounting and investment decisions. Furthermore, informal institutional arrange-

Table 6
Religious atmosphere, formal institutional arrangements and the cost of equity capital.

VARIABLES	(1) ICC	(2) ICC MKT = 0	(3) ICC MKT = 1	(4) ICC	(5) ICC BIG10 = 0	(6) ICC BIG10 = 1
RELIGION	−0.001	−0.001	−0.004***	−0.001	−0.001	−0.003***
	(0.582)	(0.417)	(0.000)	(0.334)	(0.359)	(0.000)
*RELIGION*MKT*	−0.003*					
	(0.092)					
*RELIGION*BIG10*				−0.004***		
				(0.008)		
BETA	0.008***	−0.001	0.012***	0.008***	−0.008***	−0.011***
	(0.001)	(0.686)	(0.000)	(0.001)	(0.002)	(0.002)
SDRETURN	0.013	0.001	0.033**	0.012	−0.021**	−0.033*
	(0.104)	(0.957)	(0.031)	(0.104)	(0.030)	(0.087)
DTURN	−0.640***	−0.597***	−0.681***	−0.637***	−0.220***	−0.219***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MTB	−0.000***	−0.000***	−0.001***	−0.000***	−0.000***	−0.000*
	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.072)
LNIC	−0.052***	−0.052***	−0.047***	−0.051***	−0.052***	−0.055***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FIRST	−0.034***	−0.027***	−0.038***	−0.034***	−0.034***	−0.029***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
SIZE	0.003***	0.006***	0.001	0.003***	0.006***	0.005***
	(0.000)	(0.000)	(0.397)	(0.000)	(0.000)	(0.000)
LEV	0.035***	0.031***	0.039***	0.035***	0.031***	0.029***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROE	−0.002	−0.001**	−0.010***	−0.002	−0.007***	−0.000
	(0.325)	(0.032)	(0.000)	(0.325)	(0.000)	(0.167)
LISTAGE	−0.001***	−0.001***	−0.001***	−0.001***	0.000	−0.000*
	(0.000)	(0.001)	(0.000)	(0.000)	(0.747)	(0.057)
BIG10	−0.006***	−0.004**	−0.006***	0.003		
	(0.000)	(0.014)	(0.000)	(0.452)		
MKT	0.006			0.000	−0.000	−0.001
	(0.105)			(0.787)	(0.904)	(0.660)
SOE	0.003*	0.004**	0.002	0.003*	0.003***	−0.001
	(0.057)	(0.019)	(0.118)	(0.063)	(0.009)	(0.698)
Constant	0.360***	0.310***	0.387***	0.359***	0.276***	0.312***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Coefficient diff. (chi^2)			2.76* (p = 0.096)			3.20* (p = 0.073)
Industry/Year	YES	YES	YES	YES	YES	YES
LR chi^2/F Value	1581.87***	53.87***	81.81***	1582.45***	64.97***	33.53***
R-squared	0.2118	0.2244	0.2297	0.2127	0.4103	0.3790
Observations	6014	2434	3580	6014	3776	2238

All of the variables are defined in Table 2. The numbers in parentheses are robust p-levels clustered by firm.
*** Represent the 1% significance level, for two-tailed tests.
** Represent the 5% significance level, for two-tailed tests.
* Represent the 10% significance levels, for two-tailed tests.

ments and formal institutional arrangements may also have complementary effects on the cost of equity capital.

Table 6 provides the results of the analyses of the influence of religious atmosphere on the cost of equity capital under two formal institutional arrangements. In columns (1) and (4), *RELIGION*MKT* and *RELIGION*BIG10* are significantly negatively correlated at the 10% and 1% levels, respectively, showing that when the formal institutions function effectively, the effect of religious atmosphere is not diminished, but rather enhanced. Columns (2)–(3) and columns (5)–(6) further provide the grouped regression results based on marketization and auditor reputation. The coefficient of religious atmosphere is much smaller in the sample with a stronger

external legal environment and the sample with higher audit quality. The SUE (Seemly Unrelated Estimation) test shows that the chi^2 between columns (2) and (3) is 2.76 and the chi^2 between columns (5) and (6) is 3.2, suggesting that there are statistically significant differences between different formal institutions. Based on the above findings, religious atmosphere, as an informal institution, complements rather than substitutes for formal institutional arrangements in the determination of the cost of equity capital of listed firms in China.

4.5. Robustness test

To ensure the reliability of our conclusions, we conduct the following robustness tests: (a) we use the original value of the cost of cost of equity capital in models (1)–(5) as the dependent variable, and rerun the regression; and (b) we set 300 km as the radius for religious atmosphere (*RELIGION2*) at the firm level, and rerun the regression. As shown in Panels A and B in Table 7, the coefficient of *RELIGION* (*RELIGION2*) is still negatively related to the cost of equity capital. Overall, the results of the robustness tests are statistically indistinguishable from those in the main tests. Therefore, the findings in Table 7 support the hypothesis that religion is negatively associated with the cost of equity capital.

4.6. Endogeneity

The implicit assumption of our model is that the decision to locate a listed company's headquarters at its registered address is exogenous; in fact, there may be endogenous factors. Hilary and Hui (2009) and El Ghoul et al. (2012) find that decisions about a company's location are influenced by factors such as taxation, labor costs, raw materials, suppliers and customers. Similarly, the choice of a listed company's registered address should be exogenous, and therefore not affected by the cost of equity capital. Nevertheless, following El Ghoul et al. (2012) and Du et al. (2014a), we use Heckman's two-stage regression method to control for possible endogeneity problems. In the first stage, we control for *COLLEGE,* represented by the natural logarithms of the number of universities in the firm's province; *TAX,* represented by the natural logarithm of tax revenue at the provincial level; *POP*, represented by the natural logarithm of the province's population; *GDP*, repre-

Table 7
Robustness test.

			Panel A: Alternate measurements of the cost of equity capital		
	(1)	(2)	(3)	(4)	(5)
VARIABLES	MPEG	GLS	OJN	EPR	PEG
RELIGION	−0.002**	−0.001**	−0.003***	−0.001*	−0.002***
	(0.012)	(0.049)	(0.006)	(0.064)	(0.005)
Control variables	YES	YES	YES	YES	YES
Industry/Year	YES	YES	YES	YES	YES
Wald chi^2	821.51***	2421.30***	767.04***	1186.63***	779.09***
Adj_R^2	0.195	0.410	0.194	0.351	0.213
Observations	6014	6014	6014	6014	6014
			Panel B: Alternate measurements of religious atmosphere (Within 300 KM)		
	(1)	(2)	(3)	(4)	(5)
VARIABLES	MPEG	GLS	OJN	EPR	PEG
RELIGION2	−0.002***	−0.001**	−0.003***	−0.001*	−0.002***
	(0.007)	(0.042)	(0.002)	(0.084)	(0.002)
Control variables	YES	YES	YES	YES	YES
Industry/Year	YES	YES	YES	YES	YES
Wald chi^2	821.89***	2420.84***	767.94***	1185.96***	780.54***
Adj_R^2	0.195	0.410	0.195	0.351	0.213
Observations	6014	6014	6014	6014	6014

All of the variables are defined in Table 2. The numbers in parentheses are robust p-levels clustered by firm.
*** Represent 1% significance level, for two-tailed tests.
** Represent 5% significance level, for two-tailed tests.
* Represent 10% significance level, for two-tailed tests.

Table 8
Heckman's two-stage regression.

VARIABLES	(1) RELIGION	(2) RELIGION2	(3) ICC	(4) ICC
COLLEGE	4.388***	10.745***		
	(0.000)	(0.000)		
POPULATION	−2.515***	−6.348***		
	(0.000)	(0.000)		
GDP	6.795***	9.880***		
	(0.000)	(0.000)		
GROWTH	−1.159	−11.042***		
	(0.631)	(0.004)		
LNTAX	1.135***	1.515***		
	(0.000)	(0.000)		
DISTANCE	−2.352***	−3.852***		
	(0.000)	(0.000)		
TRANSPORT	−3.233***	−4.532***		
	(0.000)	(0.000)		
RELIGION			−0.003***	
			(0.002)	
RELIGION2				−0.003***
				(0.001)
IMR			−0.014**	−0.009**
			(0.021)	(0.025)
Control variables	YES	YES	YES	YES
Industry/Year	YES	YES	YES	YES
Wald chi^2/F	3051.45***	3628.50***	41.87***	42.51***
Adj_R^2	0.336	0.404	0.212	0.212
Observations	6014	6014	6014	6014

All of the variables are defined in Table 2. The numbers in parentheses are robust p-levels, clustered by firm.
*** Represent the 1% significance level, for two-tailed tests.
** Represent the 5% significance level, for two-tailed tests.
* Represent the 10% significance level, for two-tailed tests.

sented by the natural logarithm of provincial per capita; *GROWTH*, represented by the growth rate of provincial GDP per capita; *TRANSPORT*, represented by the natural logarithm of the provincial railway mileage; and *DISTANCE*, represented by the natural logarithm of the distance (in kilometers) between a listed firm and the nearest financial center (e.g., Beijing, Shanghai or Shenzhen in China). In the second stage, we control for all of the variables. Table 8 reports the regression results of Heckman's two-stage treatment. After controlling for the potential factors, the religious atmosphere *RELIGION* (*RELIGION2*) is still significantly negative at the 1% level. Thus, our conclusions are robust.

5. Conclusions

According to Allen et al. (2005), it is difficult to explain the rapid growth of China's economy given the relatively weak formal institutions. We construct quasi-firm-level religious variables using a digital map and explore the impact of religious atmosphere on the cost of equity capital for listed companies. Our research expands the study of religious economies in emerging markets. The empirical results show that firms registered in areas with stronger religious atmosphere enjoy a lower cost of equity capital. Moreover, this relationship is more pronounced in subsamples with stronger external legal environments and higher auditing quality, indicating that formal institutional arrangements and religious traditions are to some degree complementary. In addition, to further clarify the specific path through which religious atmosphere reduces the cost of equity capital, we use Wen's (2004) method of intermediary effect to verify that religious atmosphere reduces the cost of equity capital by influencing the quality of accounting information, investment decisions and the disclosure of social responsibility. Our study helps market practitioners to understand the role of religion in emerging markets and provides new micro-empirical evidence from China that may affect religious policy.

Our study, of course, has limitations, which may indicate future research directions. First, methods for effectively and reasonably measuring religious traditions need further development. Although this study uses quasi-firm-level religious variables based on geographic proximity, these variables have some limitations. For example, in some areas that have a strong religious atmosphere (such as Guangdong Province), only a small number of temples have been rated as "major temples," indicating that the religious atmosphere variable does not fully reflect the actual religious beliefs in that area. Furthermore, field surveys need high inputs and are characterized by weak data replicability, which creates enormous challenges for accurate measurements of religious atmosphere. Second, we find that our selected mediation variables only partially explain the channels through which religion affects the cost of equity capital of listed companies, indicating that religion may also affect the behavior of listed firms through other channels (such as the choice of accounting firms) and thus affect the cost of equity capital indirectly. Finally, we only explore the influence of local religions on the cost of equity capital; we do not study the influence of other religions in China such as Islam, Christianity or Catholicism on the cost of equity capital. More detailed studies of the comparative influence of different religions on the cost of equity capital are needed.

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Appendix A: Estimation of expected earnings

	(1)	(2)	(3)
Dependent variables	E_{t+1}	E_{t+2}	E_{t+3}
FV	0.049***	0.023***	0.027**
	(0.000)	(0.007)	(0.011)
SIZE	−0.009**	0.012**	0.010*
	(0.036)	(0.046)	(0.082)
DPS	0.226***	0.136**	0.133**
	(0.000)	(0.018)	(0.045)
DD	0.049***	0.049***	0.039***
	(0.000)	(0.000)	(0.007)
E	0.653***	0.548***	0.449***
	(0.000)	(0.000)	(0.000)
LOSS	0.145***	0.116***	0.058**
	(0.000)	(0.000)	(0.020)
ACC	−0.601***	−0.673***	−0.623***
	(0.000)	(0.000)	(0.000)
Constant	−0.861***	−0.697***	−0.690***
	(0.000)	(0.000)	(0.000)
Industry/Year	YES	YES	YES
Observations	13,204	10,809	8436
R-squared	0.515	0.442	0.345

The numbers in parentheses are robust p-levels clustered by firm. All of the variables are defined in Table 2.

*** Represent 1% significance level, for two-tailed tests.

** Represent 5% significance level, for two-tailed tests.

* Represent 10% significance level, for two-tailed tests.

Appendix B: Pearson correlations among five *ex-ante* measures of ICC

	GLS	PEG	OJN	MPEG	EPR
GLS	1				
PEG	0.2506***	1			
OJN	0.2815***	0.9728***	1		
MPEG	0.2998***	0.9745***	0.9964***	1	
EPR	0.6623***	0.1319***	0.1998***	0.2057***	1

All of the variables are defined in Table 2. ***, ** and * represent the 1%, 5% and 10% significance levels, respectively, for two-tailed tests.

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