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Overemployment, executive pay-for-performance sensitivity and economic consequences: Evidence from China

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ABSTRACT

Using a sample of state-owned enterprises (SOEs) listed on the Shanghai and Shenzhen Stock Exchanges during the 1999–2009 period, we investigate the effects of overemployment on executives' pay-for-performance sensitivity (PPS) and analyze how the behavior of firms with high/low PPS affects the number of surplus employees. We find the existence of a redundant workforce significantly weakens PPS and the role of accounting measures in performance assessment. In contrast to prior literature, we find that higher PPS is associated with a stronger incentive to lay off redundant employees and to limit future employee numbers. We also find that weaker government intervention strengthens managerial control over the future size of the workforce. Finally, our findings suggest that a heavier government policy burden on SOEs leads to lower tax rates and more government gains.

1. Introduction

The separation of ownership and control is the main cause of agency problems. Performance-related compensation contracts (pay for performance) can link executives' personal interests with those of the corporation and maximize the benefits for both executives and shareholders. Pay for performance is thus considered one of

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the main mechanisms for coordinating managers' behavior and shareholders' goals (Jensen and Meckling, 1976; Jensen and Murphy, 1990). The determination of reasonable compensation contracts thus constitutes a core research subject in corporate governance, especially in the case of China. Such contracts also have a considerable impact on the successful evolution and development of state-owned enterprises (SOEs).

Accounting performance is often used to evaluate executive performance, largely because of the observability and relatively high degree of correlation between accounting performance and managerial effort (Watts and Zimmerman, 1986). Numerous studies have concentrated on the relationship between executive compensation and performance (Murphy, 1985, 1999; Jensen and Murphy, 1990; Tosi et al., 2000). Those examining the relationship between executive compensation and the performance of China's listed companies (Wei, 2000; Li, 2000; Liu et al., 2003; Zhang et al., 2003; Du and Zhai, 2005; Du and Wang, 2007), however, have failed to reach a consistent conclusion. The reason for the lack of consensus could be that, without exception these studies were all based on the same implicit logical premise, that is, that attractive compensation should be strongly related to corporate performance. However, such a premise omits the possible correlation between performance and executive effort. Is maximum accounting performance the only goal of the shareholders of China's listed firms? Does accounting performance reflect executive effort and the degree of that effort? Is it possible that political targets limit the effectiveness of accounting performance-based compensation contracts among China's listed companies? What kind of behavior do corporate executives exhibit to maximize personal benefits in the face of different types of government intervention? All of these questions deserve in-depth analysis and the search for their answers provides the motivation for the current study.

During China's transition from a planned to a market economy, the decentralization of political power increased the residual claims and control of the business operations of local government (including corporations). Such factors as employment, economic development, social stability, fiscal surplus, the loan orientation of state-owned commercial banks, personal career promotion and rent-seeking opportunities all boosted the desire of local governments to maintain influence over local enterprises (Chen, 2003). The appointment and regulation of executives reflected local governments' need to maintain the control rights of local SOEs and the aim of such control was often to make these SOEs better serve these governments' political objectives.

Lin and Li (2004) suggests that China's SOEs bear the policy burdens of social functions, such as limiting layoffs and boosting employee welfare. Regional employment, social harmony and stability remain the main objectives of local government and constitute the promotion criteria for government officials. As a result, local government officials try to boost employment by forcing local enterprises to limit layoffs and hire more personnel. However, as Boycko et al. (1996) point out, privatization has raised the cost of such government intervention so high that the number of redundant, i.e., superfluous, employees is being reduced in private corporations. Hence, SOEs have become a prime tool by which government attempts to achieve its political goals. One of the results of government intervention has been an increase in redundant manpower in SOEs. The less influence the market has, the more serious the degree of local protectionism and government intervention (Fan and Wang, 2010). When subject to government intervention, SOEs face multiple objectives. Accordingly, executive efforts to meet political targets, such as boosting local employment to satisfy local government officials, will not be reflected in accounting performance. In addition, the accounting performance of SOEs usually reflects the financial subsidies given by the government as compensation for the policy-related losses that stem from employing a surplus labor force and is thus not merely the result of executive effort, which reduces the influence of incentives. The existence of multiple endogenous targets for SOEs renders a one-sided emphasis on compensation-related incentives for financial performance inappropriate in many cases (Xin et al., 2007). In other words, SOEs' multiple objectives increase the cost of separating management effort and performance, which may reduce the effectiveness of performance-based compensation contracts. This paper starts from overemployment and explores whether the existence of a large number of redundant employees reduces the pay-for-performance sensitivity (PPS) of state-owned listed companies. It further examines whether executive compensation is sensitive to corporate performance and how the degree of market development influences the future growth of employee numbers.

We find the presence of surplus manpower significantly reduces executive PPS. Firms with greater PPS sensitivity have stronger motivation to control the growth of employee numbers in the future and the interaction between a dummy variable for PPS and present surplus employees is significantly negatively associated with employee growth during time $t+1$. In addition, compared with their counterparts in regions with a less

developed market, companies in regions with a highly developed market have stronger incentives to control future growth in employee numbers, with the interaction of market index and present surplus employment significantly negatively associated with employee growth during time $t + 1$.

The potential contributions of this paper are as follows. (1) The surplus employment caused by government political intervention weakens our ability to evaluate executive effort and this decrease in PPS increases agency problems to a certain extent. (2) The findings of this study help us to better understand the role played by the Chinese government in the economic transition process and help to deepen our understanding of the country's institutional background. (3) Assuming that managers have the motivation to maximize their own benefits, closely tying management compensation to corporate performance could serve to control the number of superfluous employees, thereby conflicting with the political goals of local government, a finding that provides a new perspective on the mutual interests of corporate executives and government officials and a fresh explanation for the factors influencing employment in China.

The remainder of the paper is organized as follows. Section 2 presents a review of the literature, including that on the policy burden of SOEs, executive compensation and PPS. Section 3 covers China's institutional background, theoretical analysis and hypothesis development. Section 4 presents our research design, Section 5 descriptive statistics and Section 6 the results. Section 7 concludes the paper with a summary of our findings and a discussion of the study's limitations.

2. Literature review

2.1. The policy burden of SOEs

Both domestic and foreign scholars have carried out in-depth research on the policy burden of SOEs. Shleifer and Vishny (1994) posit that the poor performance of these enterprises stems largely from government officials' attempts to achieve political goals through the SOEs under their control, for example, by imposing objectives other than value-maximization, such as the hiring of more employees to win votes. Boycko et al. (1996) and Bai et al. (2000) believe the key factor in the poor performance of SOEs is agency problems, with government officials rather than executives in control and one of the main objectives of the former being to improve employment figures. As long as government officials use SOEs to resolve employment problems, these enterprises will suffer from overemployment. Donahue (1989) shows that, under the same conditions, public corporations hire 20–30% more employees than private companies in the US Frydman et al. (1999) find a decrease in labor productivity to predict an increase in future unemployment among private companies, but they find no such relationship among SOEs, in which political pressure prevents layoffs. Dewenter and Malatesta (2001) find that workforce size, standardized by assets and sales, to be larger in public than private companies and to decrease after privatization.

Researchers have engaged in in-depth research on the economic consequences of overemployment in China. Lin and Tan (1999) and Li and Li (2004), for example, suggest that the existence of a "policy burden" stems from a catch-up strategy that leads to investment in capital-intensive industries or industry sectors that lack comparative advantages and provide fewer employment opportunities. China has an abundant labor force and to mitigate unemployment the government asks SOEs to shoulder the social responsibility, i.e., policy burden of hiring more employees regardless of actual need. Zeng and Chen (2006) find that overemployment does indeed exist in SOEs and that local SOEs have a greater policy burden than their centralized counterparts. Li and Liang (1998) attribute the main cause of SOE losses to the continued employment of non-productive employees, noting that SOEs do not engage in layoff actions after suffering losses. Xu et al. (2005) find the decision rights of SOE executives with regard to firing to be significantly associated with improved performance. The findings of their study show the labor-related policy costs of SOEs to be particularly high and the decision rights of SOE executives to be particularly important to SOE performance. Zeng and Chen (2006) consider the economic consequences of overemployment, finding that the presence of superfluous employees and high salaries together lead to high labor costs for SOEs. Xue and Bai (2008) demonstrate that the greater the size of the surplus labor force in an SOE, the lower the average wage and the poorer the enterprise's performance. They also find that SOEs in regions with a higher unemployment rate hire more employees surplus to their requirements and that the government gives more fiscal subsidies to SOEs with a larger excess workforce.

Although considerable research has been carried out on the factors inducing SOEs to hire excess labor and the economic consequences thereof, very few studies have investigated the impact of political intervention-based overemployment on executive incentives and responses to such employment. This gap in the literature motivates this study.

2.2. Executive pay-for-performance sensitivity

Jensen and Murphy (1990) is a classic study on PPS in US listed firms. They find the PPS of these firms to be too low, rendering executive incentives relatively weak. They suggest the constraints of public and private political power as the main reason for the situation. Tosi et al. (2000) and Murphy (1985, 1999) subsequently conducted additional research on PPS, finding company size, ordinary employees, unions, consumer groups, and political pressure from Congress and the media to affect the relationship between compensation and performance.

Researchers investigating executive PPS in Chinese listed companies have drawn different conclusions. For example, Wei (2000), Li (2000) and Chen (2003) find no significant correlation between executive compensation and firm performance in these companies. However, more recent research has suggested a significant relationship between the two (Zhang et al., 2003; Du and Zhai, 2005; Du and Wang, 2007; Xin and Tan, 2009). As SOEs have multiple objectives, the higher authorities evaluate the managers of these enterprises not only on the basis of firm performance, but also on their fulfillment of political objectives (Bai et al., 2006; Bai and Xu, 2005). Accordingly, some researchers have shifted their attention to the influence of administrative intervention on executive PPS. Liu et al. (2007), for example, find that the greater the government intervention in business, the smaller the role of accounting measures in performance evaluation and the weaker the correlation between accounting performance and managerial incentives. Xin and Tan (2009) propose the marketization process, degree of industry protection, political background of executives and level of government control as the key factors affecting the effectiveness of executive compensation contracts. Gu et al. (2010) find that stronger government control reduces PPS. Cao et al. (2010) report the cash flow rights ownership of the ultimate controller of SOEs to have a significantly positive impact on executive compensation-accounting performance sensitivity. Wang and Xiao (2011) suggest tunneling through connected transactions as one reason for the decrease in PPS in China. In these more recent studies,[1] the factors affecting executive PPS are researched at the system level, which is consistent with the overall theme of our research. However, we focus on the multitasking nature of SOEs and propose overemployment as the medium by which government intervention affects PPS. Government intervention and the degree of marketization are relatively abstract concepts. Determining how and through what channels they affect PPS requires further analysis. In this paper, we focus on the specific impacts on an enterprise of government intervention or the degree of marketization, such as the mandatory hiring of superfluous personnel, and analyze how they affect executive PPS. Moreover, in contrast to the prior literature, we consider overemployment as a variable reflecting a preference for government political objectives.

As the PPS of an individual firm is difficult to measure with accuracy, few studies have examined the economic consequences of such sensitivity. Abowd (1990) employs a dummy variable for PPS and finds that if current compensation is sensitive to performance, then executives are encouraged to work hard to improve future performance. Here, we apply Abowd's (1990) dummy variable method to examine the influence on senior executive behavior of overemployment in enterprises with different degrees of PPS.

3. Institutional background, theoretical analysis and hypothesis development

3.1. Institutional background

Overemployment is associated with planned economies and is a characteristic of the SOEs operating in these economies, which tend to operate a highly centralized employment system. The basic mode of operation

[1] We thank a reviewer for pointing us toward the latest literature.

is that the government controls the number of jobs and the wage level in SOEs, with neither employers nor employees having any say in the matter. To maintain social stability, the government strictly limits layoffs for economic reasons, thus transferring the policy burden of the social-welfare and financial system from government to business. In the transition from a planned to a market economy, China's employment system has undergone gradual reform, from uniform distribution under the traditional planned economic system to a market-oriented employment system that adapts to market requirements. However, the size of the workforce in SOEs remains subject to government intervention for a number of reasons. First, the employees of SOEs receive an income that in monetary terms is much less than the value of their labor, with an implicit contract guaranteeing continued employment compensating for the low wages (Chen and Lu, 2003). Even if they operate a contract labor system, enterprises cannot freely terminate employees upon contract expiration or if their positions become redundant. Second, corporate downsizing is also limited by a series of government policies. For example, in 1992 an ordinance mandating the transformation of the operating mechanism of state-owned industrial enterprises gave them the right to employ labor, but strictly limited their ability to engage in economic layoffs. The Labor Law of 1994 states that "when the employer is undergoing a period of statutory consolidation before bankruptcy or is experiencing serious production and management difficulties and downsizing is urgently needed," it should provide "a report to the local labor administrative department concerning its labor reduction program and including the views of the union or all employees, and listen to the views of the labor administrative department." Such language makes it clear that the ability of SOEs to reduce their labor force is at the discretion of local government (Zeng, 2007).

More recent policies do allow SOEs to lay off staff and increase efficiency, and accordingly, excess employment in these enterprises is gradually being reduced. However, the scale and speed of layoffs are still strictly controlled by the government. Enterprises with good returns, even if they have surplus staff, can rarely obtain permission for layoffs. Their only option is to transfer surplus staff within the enterprise (Chen and Lu, 2003). Particularly since the financial crisis of 2008, all levels of government have proposed restrictions on layoffs. For example, in November 2008, the Chongqing State Owned Assets Supervision and Administration Commission (SASAC) stated that layoffs would be strictly controlled in SOEs.[2] In February 2009, the Ministry of Human Resources and Social Security, All-China Federation of Trade Unions and China Enterprise Confederation jointly issued "Guidance on the Response to the Current Economic Situation and Maintain Stable Labor Relations," which "takes the lead in [ensuring] no layoffs in state-owned enterprises." It is clear that regardless of changes in the employment system, the inevitable outcome of the government's emphasis on maintaining a large workforce in SOEs and restricting layoffs is overemployment. Before the reform of the SOE payment structure, executive pay was not linked to corporate performance, but rather was based on a range of non-financial indicators, including the region in which the enterprise operated, industry sector, political level (central or local), firm size and the job type and qualifications of the individual. Following SOE reform, SOEs in Shanghai began to establish an annual salary system, in which managers' salaries comprise a fixed component (base salary) that was paid monthly and linked to the average salary of workers and a changeable component (risk compensation) that was paid at the end of the year and is based on both the basic salary of corporate managers and business performance for the year. Although these enterprises continued to have many non-financial objectives, they began to base their compensation on financial indicators. Following the SASAC's issuance of "Interim Measures for the Performance Evaluation of Persons in Charge of Central Enterprises" in 2003, in June 2004 it issued "Interim Measures for the Compensation Management of Persons in Charge of Central Enterprises." The latter document stipulates that salaries in central enterprises consist of a base salary, performance pay and long-term incentive pay, and proposes specific measures to link salaries to performance.

To maximize its own interests, the government has the motivation and ability to intervene in SOEs in a number of respects. First, it has the incentive to carry out administrative interventions, such as mandating employment and avoiding large-scale layoffs, as the regional employment situation is a key indicator by which local government officials are assessed for promotion. Furthermore, a high unemployment rate and large-scale layoffs are thought to bring crime, labor protests and other forms of social unrest, and social stability is

[2] According to a Chongqing Evening News report entitled "State-owned enterprises in Chongqing control layoffs strictly to ensure staff increase salary 10% in the year" (November 20, 2008).

believed to be the most important factor in economic growth. Investors (particularly foreign investors) are often highly sensitive to social stability. Hence, to maintain social stability, government officials have strong incentives to force SOEs to hire excess labor and/or to prevent them from engaging in widespread layoffs during the restructuring process (Xue and Bai, 2008). Second, control of SOEs still lies in the hands of government officials, affording the government the ability to intervene in these enterprises. For example, the government still exerts substantial influence over access to key resources, such as approval for initial public offerings (IPOs) and equity financing, and the appointment of SOE senior executives is still completely under central or local government control (Liu, 2001). Therefore, the government still has the ability to force SOEs to internalize its own goals. The foregoing analysis makes it clear that China's SOEs are forced to bear the policy burden of government-mandated overemployment. Because of regional differences in the promotion of market-oriented reforms, however, local government actions differ by region.

3.2. Hypothesis development

The reform of the executive compensation system has seen greater emphasis gradually placed on the relationship between such compensation and SOE performance, with the SOE sector gradually being introduced to such market-oriented innovations as performance-based pay (Xin, 2007). Increasing the sensitivity of performance to salary is considered an important way to resolve agency problems. If both the government as principal and executives as agents pursue utility maximization, then we have reason to believe that the latter will not act according to the interests of the former. Guaranteeing that the two have mutual interests and overcoming the problem of moral hazard requires a proper contract that limits any deviation of the agent's interests and behavior from those of the principal. In a situation of asymmetric information, the agent's behavior is unobservable by the principal, which can only see related variables decided by the agent's actions and other exogenous random factors. Hence, agency theory proposes performance-based compensation contracts, and accordingly, a high degree of PPS may be an effective contractual means of resolving agency problems. If so, then what conditions should the performance measurement standards in these contracts meet? Banker and Datar (1989) suggests that basic performance evaluation should be as sensitive as possible to a manager's actual actions, which should reflect firm performance as reflected in accounting measures. However, in the case of China's SOEs, government intervention can reduce the precision and accuracy of accounting-based measures of managerial effort.

SOEs have a similar structure to government agencies and are responsible in large part for carrying out the government's political tasks. In the political promotion and evaluation system for local government officials, political considerations such as the unemployment rate and regional stability play a vital role in addition to such important economic indicators as gross domestic product (GDP), thus encouraging these officials to consider SOEs an important tool by which to reduce unemployment and ensure stability (Shleifer and Vishny, 1994). As a result, SOEs are forced to retain more surplus labor than their counterparts in the private sector (Zeng and Chen, 2006), which increases their operating costs and reduces management flexibility and the input–output ratio, meaning the executives of these firms often get half the results for twice the effort. Given the effect of a largely redundant workforce, it is difficult indeed for SOE executives to improve firm performance through effort alone (Bai et al., 2000; Xue and Bai, 2008). The issue of moral hazard may also be relevant here, that is, the rational manager's chosen production q is always less than optimal production q^*, which reduces the extent of his or her effort. Because of information asymmetry, however, the government cannot distinguish the losses that result from the policy burden it imposes on enterprises from those due to managerial ineptitude or moral hazard. Hence, it is very difficult for the government to penalize executives for poor accounting performance.

It is interesting that despite the great policy burden that SOEs bear, we see few collapses or bankruptcies, probably because these enterprises also play a game with the government, fighting for or enjoying a policy "yield." At the same time the government plays the role of plunderer, it also offers a helping hand (Calomiris et al., 2010; Friedman et al., 2003). Given the policy burden the government places on SOEs for political gain, it would not be in the government's interest to allow these enterprises to collapse. Accordingly, it also adopts a preferential policy toward SOEs. Xue and Bai (2008) find, for example, that the government gives more financial subsidies to SOEs with a greater excess workforce. Lin's (2004) research shows that when the policy

burden is borne by SOEs, the government finds it necessary to compensate them for the resulting losses to ensure their survival, for example, by offering them protection, financial subsidies or a lower tax rate. Similar to our discussion in the previous paragraph, because of information asymmetry, the government cannot know whether an SOE's good financial performance is due to executive effort or preferential treatment. Therefore, we posit that accounting-based firm performance is less effective in evaluating the performance of executives in SOEs because of the presence of a largely redundant workforce. Our first hypothesis is thus as follows.

H1. Overemployment reduces executive pay-for-performance sensitivity, all else being equal.

We now turn to a consideration of how rational executives deal with the necessity of maintaining a large surplus workforce. Although implicit incentives exist in Chinese SOEs, such as on-the-job consumption and political promotion opportunities, there are also strong incentives to maximize the monetary compensation of top executives.[3] As market reforms proceed and private enterprises develop more rapidly, SOEs will face increased competition, meaning their political goals may by replaced by economic targets, and the government may place greater weight on these targets in assessing executive performance. In the process, the government may allow greater managerial discretion to boost enterprise efficiency (Xu et al., 2005).

Not all executive compensation in SOEs is insensitive to performance even when overemployment exists. If management believes compensation to bear no relationship to performance, then it has no incentive to improve performance. However, because executives' effort cannot be reflected in enterprise performance, the government cannot judge whether moral hazard exists. The greater the size of an enterprise's redundant workforce, the more difficult it is for the government to clearly distinguish executive effort and performance outputs and the more obvious the problems of moral hazard and opportunistic behavior become. Thus, to a large extent, overemployment becomes an umbrella to shelter management laziness. If executive compensation and firm performance are closely related, then executives' desire to maximize self-interest will motive them to work hard to improve performance. However, a high percentage of redundant positions in the workforce dilutes executives' input–output ratio. Hence, using their own discretionary power to control employment numbers is the only choice open to executives whose interests are closely aligned with performance. When large numbers of redundant staff become a drag on the maximization of executive self-interest, it is impossible to transform effort into good performance. We thus propose hypothesis H2(a).

H2 (*a*). If executive compensation is sensitive to performance, then the greater the size of the surplus workforce, the greater executives' motivation to control future employment growth.

The decision to lay off redundant employees is not management's alone, but also depends on government plans. China's economic reforms have led to different local governments playing different roles. Governments in regions with a high degree of marketization may create a high-quality environment for enterprises through institutional and technological innovation. In an attempt to reduce the burden on SOEs to absorb a large number of surplus employees, service-oriented local governments may attempt to alleviate unemployment in different ways, such as by creating more jobs to absorb former SOE employees. Moreover, these governments are likely to give executives greater discretionary power in personnel matters. In this way, service-oriented governments not only achieve the political goals of reducing unemployment and creating a stable social environment, but also improve the economic efficiency of SOEs. Governments in regions with a low degree of marketization, in contrast, are more likely to rely on SOEs to absorb the redundant workforce rather than create new jobs.[4] Government and management alike must adjust their behavior according to that of the other side. Management usually wishes to lay off redundant employees to maximize its interests, but such behavior is contrary to government objectives. This discussion leads to our final hypothesis, H2(b).

[3] Although it is essential to give executives monetary incentives, such implicit incentives as on-the-job consumption and political promotion opportunities influence the effects of monetary incentives. Although they cannot take the place of monetary incentives, they weaken their functions.

[4] In Guangdong Province, where the marketization degree is high, for example, to bring in more talent and accelerate the flow of talent, the government forbids enterprises to hire redundant employees, especially since the financial crisis (Chen, 2009). In Henan Province, in contrast, where the degree of marketization is lower, the government has taken measures to stabilize employment and avoid large-scale layoffs, such as reducing working hours and salaries and introducing job-sharing.

H2 (*b*). In the case of a large number of surplus employees in the current period, management in regions with a low degree of government intervention will tend to control the growth of employee numbers in the future.

4. Research design

4.1. Data sources

Our financial data and data on executive pay and employee numbers come primarily from the China Stock Market & Accounting Research (CSMAR) and China Center for Economic Research (CCER) databases. As the CSMAR database began publishing employee numbers for listed companies only in 1999, we selected all Shanghai and Shenzhen A-share companies for the 11-year period from 1999 to 2009 as our initial sample.

To ensure data quality, we gradually reduced the sample by (1) excluding financial companies; (2) removing companies that did not disclose information on their actual controller; (3) excluding companies whose transaction status was blank, ST or PT; (4) removing small and medium enterprises (SMEs) and Growth Enterprise Market (GEM) listed companies; (5) excluding companies whose ultimate controllers are privately held, foreign-owned or collectively held entities or unidentifiable; and (6) excluding observations with incomplete financial data or lacking data on executive pay or employee numbers. Following this process of deletions, the study's final sample includes 7594 firm-year observations. Its regional distribution is shown in Table 1, and industry and year distribution in Table 2.[5]

4.2. Model specification and variable definitions

Model (1) is employed to test our first hypothesis.

$$\begin{aligned}\text{Lncomp} = {} & \alpha_1 + \alpha_2\text{ROA} + \alpha_3\text{EL} + \alpha_4\text{EL} * \text{ROA} + \alpha_5\text{AssetsSize} + \alpha_6\text{Lev} + \alpha_7\text{Shr1} + \alpha_8\text{Dual} \\ & + \alpha_9\text{Mshare} + \alpha_{10}\text{Rinde} + \alpha_{11}\text{Pegdp} + \alpha_{12}\textstyle\sum \text{Ind} + \alpha_{13}\sum \text{Year} + \varepsilon \end{aligned} \quad (1)$$

To test Hypothesis 2, we use the following ordinary least squares (OLSs) multiple regression model.

$$\text{Pnum}_t = \alpha_1 + \beta_1\text{lagel} + \beta_2\text{senti} + \beta_3\text{senti} * \text{lagel} + \beta_4\text{lagnum} + \text{other control variables} \quad (2)$$

The model variables are defined in Table 3.

We follow Du and Zhai (2005) and Xin et al. (2007) and take the natural logarithm of the total amount of compensation paid to a company's top three highest-paid senior managers as a proxy[6] for executive pay. Corporate performance is measured by the return on total assets (ROAs).[7] In robustness tests, we also employ such profitability indicators as ROA (Net Profit/End Total Assets), OROA (Operating Profit/End Total Assets), EBIT/End Total Assets and Total Profit/End Total Assets because these indicators are the assessment indicators[8] adopted by the SASAC at all levels to evaluate the annual performance of SOE principals.

[5] Because the non-state enterprise sample for the extractive industry (B) and wood furniture industry (C2) is too small (<20), observations from these industries are omitted.

[6] Because equity incentive plans were implemented relatively late in China, it is not very common for the senior management of listed companies to hold stock or stock options (Li, 2000; Wei, 2000), and hence this study examines executive compensation only in respect of its cash component.

[7] We do not use market value or other market data as proxies for corporate performance, as China's capital market development is still in its initial stages and the price signal contains too much noise. It thus lacks reliability and comparability. In addition, Chinese enterprises, particularly SOEs, rarely consider a company's market value in compensation contracts, rendering such value less important in research on the issues surrounding compensation. Du and Wang (2007) find executive compensation in listed companies to be weakly related to a company's market value. Xin and Tan (2009) find a stronger relationship between managerial compensation and the stock market returns of state-owned listed companies in regions with a more advanced degree of marketization, but the relationship between the two is still relatively weak.

[8] For example, in 2005 Guangdong Province issued a "Notice of Interim Measures on Assessing the Performance of the Management of State-owned Enterprise by the Guangdong Provincial Government," in which it clearly stipulates that the basic indicators of annual performance evaluation include the firm's total net profit, rate of ROE, gross profit and net asset rate. In 2005, the SASAC of Jiangsu Province promulgated "Interim Measures on the Assessment of the Annual and Three-year Term Performance of the Principals of Provincial Enterprises in Jiangsu Province," which stipulates that the basic indicators include annual gross profit and net capital gains.

Table 1
Sample distribution by region.

Region	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Sum	%
Anhui	8	7	20	24	31	31	33	33	31	31	32	281	3.70
Beijing	9	13	48	57	62	70	70	65	68	70	73	605	7.97
Chongqing	7	8	16	16	14	12	16	16	19	16	16	156	2.05
Fujian	8	7	20	17	18	22	23	22	24	21	21	203	2.67
Gansu	6	4	12	15	12	13	15	13	9	7	8	114	1.50
Guangdong	31	24	75	84	80	87	83	75	76	77	70	762	10.03
Guangxi	5	3	15	17	15	16	15	12	15	13	14	140	1.84
Guizhou	3	4	7	9	9	10	12	12	13	10	10	99	1.30
Hainan	4	5	11	8	6	9	9	7	8	6	5	78	1.03
Hebei	6	6	16	18	22	21	23	23	23	20	17	195	2.57
Heilongjiang	11	10	17	18	19	20	18	18	14	15	13	173	2.28
Henan	2	3	13	16	17	21	23	24	18	17	17	171	2.25
Hubei	13	9	35	33	30	34	39	36	36	30	30	325	4.28
Hunan	9	10	22	23	24	24	33	29	32	27	28	261	3.44
Jiangsu	15	9	38	44	44	52	53	50	53	51	47	456	6.00
Jiangxi	4	3	14	15	22	22	22	24	21	19	17	183	2.41
Jilin	7	6	14	17	15	17	17	13	15	16	16	153	2.01
Liaoning	14	10	31	33	36	35	35	30	26	27	25	302	3.98
Neimenggu	6	4	11	12	10	11	11	12	8	9	10	104	1.37
Ningxia	3	3	8	8	8	10	9	7	5	7	7	75	0.99
Qinghai	3	4	4	4	6	5	5	4	3	4	5	47	0.62
Shandong	14	13	41	41	49	49	53	50	49	44	41	444	5.85
Shanghai	24	10	81	94	92	100	103	105	106	101	90	906	11.93
Shanxi	4	5	11	13	14	13	15	15	16	14	14	134	1.76
Shanxi1	5	6	15	16	18	14	16	16	14	12	12	144	1.90
Sichuan	24	20	35	33	27	34	33	35	33	30	28	332	4.37
Tianjin	5	5	13	19	19	16	19	16	17	19	18	166	2.19
Xinjiang	2	0	9	12	13	17	16	16	16	15	14	130	1.71
Xizang	0	0	1	2	2	2	2	1	1	1	1	13	0.17
Yunnan	8	8	15	13	14	17	17	13	13	12	13	143	1.88
Zhejiang	5	3	29	34	34	32	36	29	31	33	33	299	3.94
Total	265	222	697	765	782	836	874	821	813	774	745	7594	100.00

Overemployment is measured as the difference between the actual number of employees (AL: the number of employees per million yuan in assets, including serving and retired employees) and expectations of future employee numbers. The non-state sector, which is less affected by government policy burdens, is likely to calculate its personnel needs in accordance with the laws of the market economy and hence to use the factors of production (Chen and Lu, 2003). We take private enterprises as a reference for our estimate of the coefficient of superfluous employees to minimize estimation bias. When the amount of labor employed diverges from profit or value maximization goals, non-SOEs can independently adjust that amount. Therefore, in theory, non-SOEs should have no superfluous personnel.

We first regress the sample of non-SOEs by industry to obtain the parameters of our estimated industry expectation employee scale model and then use the difference between the actual SOE employment scale (AL) and the expectations-of-employee-numbers scale (Exp-L) as a proxy for the size of the redundant workforce. According to the research of Zeng and Chen (2006), company size (AssetsSize), capital intensity (FixedAssets), sales growth (SalesGrowth) and industry characteristics (Ind: China Securities Regulatory Commission [CSRC] industry code classifications) are the most important factors in determining the size of a company's workforce. Based on these authors' work, Xue (2008) employed these four factors combined with asset growth (AssetsGrowth) to measure expectations of employee numbers. In the current study, we employ Xue's approach and estimate these expectations by industry on the basis of model (3) (see Table 3 for variable definitions). Considering the difference between SOEs and private enterprises in the condition of fixed assets and personnel allocation, we add the variable of accumulated depreciation (Dep) to the four factors in the model:

Table 2
Sample distribution by industry.

Industry	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Sum	%
Agriculture	3	6	18	19	20	18	18	18	21	18	18	177	2.33
Food	20	16	33	34	36	37	35	35	33	31	31	341	4.49
Textile Industry	11	7	31	34	27	29	29	24	24	22	19	257	3.38
Papermaking and Paper Products	9	7	15	19	15	17	16	14	13	12	12	149	1.96
Petroleum	39	31	93	99	97	102	98	95	95	82	82	913	12.02
Electronic	7	8	23	24	24	27	29	27	25	26	25	245	3.23
Metal Products	32	26	76	75	87	89	97	96	80	79	73	810	10.67
Machinery Manufacturing	31	31	110	116	122	137	141	135	134	126	122	1205	15.87
Medical	10	7	34	45	42	44	48	47	44	44	42	407	5.36
Other Manufacturing	3	1	6	8	7	9	8	8	7	6	7	70	0.92
Electric Power, Water	21	14	30	40	45	49	60	56	61	57	55	488	6.43
Construction	2	4	11	12	14	19	22	19	19	22	19	163	2.15
Transportation	10	10	31	33	39	51	50	52	54	55	50	435	5.73
Information Technology	4	5	32	38	41	44	57	40	41	41	40	383	5.04
Wholesale and Retail	31	19	66	66	62	60	61	57	56	52	51	581	7.65
Real Estate	8	7	21	26	34	36	33	30	37	35	35	302	3.98
Social Services	7	9	24	29	30	29	28	28	29	29	28	270	3.56
Broadcasting and Media	0	0	6	9	8	7	7	6	6	7	7	63	0.83
Others	17	14	38	39	32	32	37	34	34	29	29	335	4.41
Total	265	222	698	765	782	836	874	821	813	773	745	7594	100.00

Table 3
Variable definitions.

Name	Definition
Lncomp	Logarithm of sum of compensation of top three managers
ROA	Net income deflated by total assets at the end of the year
EL	Overemployment, as estimated by model (3)
Lagel	Lag of EL
AL	Ratio of the number of employees (included retired employees) to total assets at the end of the year
Num	Logarithm of the number of employees
Lagnum	Lag of Num
Pnum	Growth in employment
Senti	Dummy variable equaling 1 if pay is sensitive to performance and 0 otherwise
AssetsSize	Logarithm of total assets at the end of the year
FixedAssets	Ratio of fixed assets to total assets at the end of the year
SalesGrowth	Growth in sales
AssetsGrowth	Growth in total assets
Dep	Ratio of depreciation to total assets at the end of the year
Market	Marketization index of regions per year according to Fan and Wang (2010)
Nature	Dummy variable equaling 1 if the company is controlled by the central government, and 0 otherwise
Layoff	Unemployment rate according to the NBSC
Lev	Ratio of total debt to total assets at the end of the year
LargeHold	Percentage of shares held by the largest shareholder
Dual	Dummy variable that equals 1 if the chairman and CEO are the same person, and 0 otherwise
Mshare	Percentage shareholding of management other than board directors
Rinde	Ratio of independent directors to total members on the board
Pegdp	Regional per capita GDP (in yuan 000)
Ind	Industry dummies based on CSRC classifications
Year	Year dummies

$$AL = \alpha_1 + \alpha_2\ AssetsSize + \alpha_3\ AssetsGrowth + \alpha_4\ SalesGrowth + \alpha_5\ FixedAssets + \alpha_6\ Dep + \varepsilon \quad (3)$$

As noted in Footnote 5, because the number of non-SOE observations in the extractive and wooden furniture industries is too small, we also remove observations in these industries from the SOE sample. After estimating the parameters of the expectations of employee numbers on the basis of model (3), we have the extent

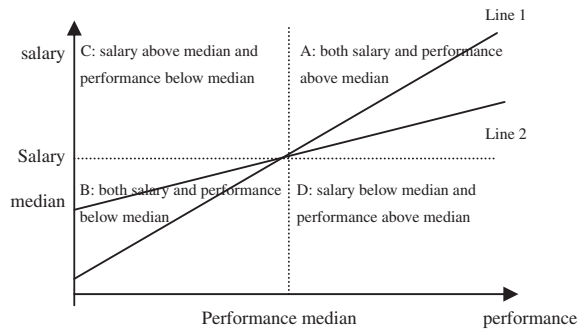

Fig. 1. Definition of PPS.

of overemployment in SOEs (EL), which equals the difference between the actual employee scale (AL) and expected employee numbers.

Our measure of the degree of marketization (Market) is based on Fan and Wang's (2010) annual regional market indices: the larger the value, the higher the degree of marketization. As the market indices compiled by Fan and Wang (2010) began only in 2007, we use the market indices for that year. The higher the level of regional unemployment (Layoff), the greater the pressure the government faces to solve local employment problems and hence the stronger the motivation of the government administration to interfere in SOEs (Chen et al., 2009). Accordingly, we expect the regional unemployment rate to be positively related to the size of the redundant workforce.

Chen (2002) shows that local governments have stronger incentives to intervene in business and thus we expect a negative relationship between the number of superfluous employees and the level of government controlling the company (Nature). We hand-collect actual controller information for the 1999–2009 period and then divide the data into central and local government control groups. In line with previous studies, we control for firm size (Du and Zhai, 2005; Du and Wang, 2007), debt ratio (Harris and Raviv, 1991; Du and Wang, 2007), ownership concentration (Petronic and Safieddine, 1999), aggregate number of those holding multiple positions (Du and Zhai, 2005), proportion of independent directors (Westphal, 1996), per capita GDP (Li, 2000) and several other variables.

In model (2), we use a dummy variable for PPS. Because the PPS of each company is difficult to quantify, we follow Abowd (1990) and Chen et al. (2010) in employing a dummy variable to differentiate between high and low sensitivity. The specific variables are defined in Fig. 1.

Although, in theory, the sensitivity represented by line 1 is stronger than that represented by line 2, the slope and intercept of the two straight lines cannot be measured accurately. Therefore, we can describe the sensitivity only qualitatively through the use of dummy variables. Based on whether PPS is greater or less than the median, we divide it into two groups and form four regions, namely, A, B, C and D. If executive (employee) pay and company performance in period T in zones A and B are higher (lower) than the median of such pay and performance, then we consider the salary to be sensitive (insensitive) to company performance.

The applicability and reliability of our main variable, PPS, are core issues in this paper. However, to render the main body of the text and overall structure of the paper more readable, we relegate our discussion of the related issues to Appendix A. In addition, another important variable is the surplus workforce, and the factors affecting the size of that workforce, such as the degree of marketization, may have some impact on this study. For similar reasons to those mentioned above, we also discuss the relationship between the degree of marketization and the number of superfluous employees and the reliability of our surplus employment estimation in Appendix B.

5. Descriptive statistics

5.1. Main variables

The descriptive statistics presented in Table 4 show an uneven distribution of overemployment. The mean of EL is higher than the median and the sample distribution is obviously skewed to the left. The distribution of

Table 4
Statistical summary of variables.

Variables	*N*	Min	P25	Median	P75	Max	Mean	Std
Lncomp	7594	9.16	12.39	13.13	13.73	16.53	13.03	1.00
ROA	7594	−2.75	0.01	0.03	0.05	0.34	0.03	0.08
EL	7594	−7.85	−0.19	0.33	1.11	59.09	0.62	1.66
Lev	7594	0.01	0.36	0.50	0.62	2.56	0.49	0.19
LargeHold	7594	0.00	0.11	0.20	0.32	0.78	0.23	0.14
Dual	7594	1.00	2.00	2.00	2.00	2.00	1.90	0.30
Mshare	7594	0.00	0.00	0.00	0.00	0.19	0.00	0.01
Rinde	7594	0.00	0.27	0.33	0.36	0.67	0.29	0.13
Pegdp	7594	2545	10,323	16,999	33,151	78,989	23,735	17,967
Market	7594	−1.14	7.18	8.47	9.46	10.65	8.24	1.62
Layoff	7594	0.60	3.24	3.70	4.20	6.50	3.61	0.89
AL	7594	−1.00	0.53	1.13	2.04	60.11	1.53	1.70
AssetsSize	7594	18.62	20.78	21.41	22.13	26.76	21.54	1.08
FixedAssets	7594	−0.21	0.17	0.29	0.45	0.96	0.32	0.19
SalesGrowth	7594	−1.00	−0.01	0.14	0.32	149.08	0.27	2.63
AssetsGrowth	7594	−0.04	0.02	0.04	0.09	0.75	0.06	0.06
Dep	7594	0.00	0.07	0.13	0.22	3.51	0.16	0.15

the other variables, in contrast, is relatively even, with no significant differences between means and medians. As the surplus employment scale differs by year and region, we analyze its size in different years and regions.

Table 5 provides a more detailed description of overemployment (EL) by year and industry.

If EL is greater than 0 then overemployment exists. In the time series in Table 5, the trend of such employment appears to be declining in both the mean and median. In terms of the median, the phenomenon of a redundant workforce in SOEs is on the decline, especially since 2004. The probable reasons for this decline are the progress of marketization, the deepening of state sector reforms and the weakening of multiple objectives among SOEs, thus strengthening the ability of these enterprises' managers to determine the size of the labor force they employ. However, the number of superfluous employees in state-owned companies has been on the rise since 2008, mostly likely because, following the financial crisis of 2008, the large amount of downsizing in private companies affected the parameters of the employee estimation function. Because of the policy burden placed upon it by the government, the state-owned sector was unable to engage in downsizing to any significant extent, but was rewarded with such measures as tax relief.

Table 6 presents the regional ranking results sorted by the median of overemployment (EL). Most of the observations with large numbers of surplus employees are distributed in the western regions, such as Guizhou, Hebei, Sichuan, Shanxi and Chongqing. These regions have a lower degree of marketization and thus are more likely to experience government intervention in state-owned companies.

Table 7 presents a time series of the degree of marketization, executive compensation and enterprise performance.

It can be seen from this table that executive compensation (*Lncomp*) has increased gradually in state-owned listed companies over the sample period in terms of mean and median, with the mean (median) increasing from approximately 122,000 yuan (88,000) in 1999 to 1.3 million yuan (990,000) in 2009. There is no obvious trend in the mean or median in the descriptive statistics for enterprise performance (ROA) in different years, although Table 7 shows a rise in the degree of marketization (Market), which indicates a steady decline in the degree of government intervention.

5.2. Univariate analysis

We compare executive compensation with the number of superfluous employees. In terms of executive compensation in the complete sample, the mean (median) for the low and high redundant employment groups is 13.102 (13.199) and 12.964 (13.037), respectively. The mean and median are significantly different, indicating that executive compensation is lower when the extent of overemployment is greater. In terms of enterprise

Table 5
Distribution of overemployment (1999–2009).

Year	*N*	Min	P25	Median	P75	Max	Mean	Std
1999	265	−2.86	0.14	1.03	2.43	17.11	1.67	2.58
2000	222	−2.27	0.06	0.76	1.98	19.96	1.32	2.28
2001	698	−7.85	−0.18	0.45	1.44	25.08	0.85	2.04
2002	765	−4.73	−0.19	0.44	1.32	20.83	0.78	1.86
2003	782	−3.56	−0.18	0.34	1.16	10.86	0.60	1.42
2004	836	−3.32	−0.18	0.28	1.02	6.98	0.51	1.23
2005	874	−2.97	−0.25	0.22	0.94	7.70	0.43	1.21
2006	821	−3.26	−0.21	0.26	0.97	10.22	0.48	1.26
2007	813	−2.98	−0.20	0.25	0.95	8.58	0.46	1.18
2008	773	−3.45	−0.20	0.29	0.93	8.23	0.45	1.15
2009	745	−2.94	−0.21	0.28	0.90	59.09	0.49	2.41

Table 6
Distribution of overemployment by region.

Region	*N*	Min	P25	Median	P75	Max	Mean	Std
Anhui	281	−2.27	−0.25	0.36	1.20	9.83	0.63	1.38
Beijing	605	−7.85	−0.51	0.09	0.98	8.40	0.30	1.39
Chongqing	156	−1.03	0.11	0.82	1.85	18.70	1.26	1.98
Fujian	203	−2.15	−0.15	0.26	0.74	3.80	0.38	0.95
Gansu	114	−1.45	−0.17	0.34	1.07	5.49	0.67	1.32
Guangdong	762	−3.27	−0.12	0.36	0.93	6.43	0.46	1.14
Guangxi	140	−3.56	−0.06	0.39	1.11	3.95	0.40	1.22
Guizhou	99	−2.31	0.00	1.16	2.11	4.65	1.14	1.34
Hainan	78	−1.24	−0.36	−0.11	0.32	5.54	0.25	1.19
Hebei	195	−1.07	0.06	0.88	2.06	13.70	1.54	2.47
Heilongjiang	173	−1.13	0.14	0.49	1.16	3.94	0.79	1.04
Henan	171	−2.64	−0.01	0.45	1.08	6.54	0.68	1.29
Hubei	325	−1.71	−0.13	0.37	1.68	10.86	0.89	1.61
Hunan	261	−3.16	−0.38	0.14	0.81	4.92	0.37	1.19
Jiangsu	456	−2.86	−0.32	0.12	0.66	6.38	0.30	0.89
Jiangxi	183	−1.33	−0.05	0.40	1.01	5.05	0.73	1.30
Jilin	153	−1.19	0.10	0.46	0.83	4.65	0.61	0.93
Liaoning	302	−2.27	0.01	0.50	1.45	13.11	0.85	1.45
Neimenggu	104	−1.02	−0.27	0.40	0.76	4.59	0.42	0.99
Ningxia	75	−1.41	−0.47	0.33	1.10	4.21	0.60	1.43
Qinghai	47	−2.48	−0.39	0.19	1.23	2.36	0.28	1.13
Shandong	444	−3.29	−0.08	0.54	1.25	8.76	0.72	1.30
Shanghai	906	−4.54	−0.29	0.15	0.89	59.09	0.55	2.38
Shanxi	134	−1.62	−0.03	0.69	1.26	3.87	0.65	1.04
Shanxi1	144	−4.73	−0.31	0.52	1.73	8.73	1.19	2.33
Sichuan	332	−2.32	0.10	0.88	1.97	25.08	1.60	3.10
Tianjin	166	−2.97	−0.69	−0.01	0.66	5.01	0.05	1.44
Xinjiang	130	−3.26	−0.67	0.02	0.57	5.67	0.14	1.42
Xizang	13	−0.55	−0.16	0.45	1.46	1.65	0.65	0.84
Yunnan	143	−2.43	−0.22	0.10	1.01	5.04	0.39	1.12
Zhejiang	299	−3.45	−0.30	0.05	0.55	4.99	0.24	1.02

performance (ROA), the low overemployment group is higher than the high overemployment group, and both the mean and median are significantly different. See Table 8 for univariate analysis of the overemployment rate.

5.3. Correlation analysis of the main variables

Table 9 shows the degree of marketization (Market) to be negatively correlated with overemployment (EL), which supports our hypothesis. In addition, executive compensation (Lncomp) is positively correlated with

Table 7
Statistical summary of key variables.

Year	N	Market Index		Management compensation (yuan 000)		ROA	
		Mean	Median	Mean	Median	Mean	Median
1999	265	6.33	6.9	12.23	8.78	0.047	0.052
2000	222	6.39	6.45	14.42	9.48	0.041	0.042
2001	698	6.54	6.55	29.16	21.16	0.022	0.032
2002	765	6.92	7.02	38.93	29.93	0.019	0.028
2003	782	7.50	7.52	51.21	39.06	0.021	0.027
2004	836	8.47	8.53	65.22	49.93	0.025	0.026
2005	874	8.96	9.13	67.05	52.13	0.014	0.023
2006	821	9.00	9.21	79.68	64.90	0.027	0.027
2007	813	9.20	9.32	105.63	81.40	0.040	0.036
2008	773	9.23	9.32	120.02	92.00	0.021	0.024
2009	745	9.18	9.32	127.75	99.00	0.023	0.028

Table 8
Univariate analysis of overemployment.

	EL	N	Mean	T	Median	Wilcoxon
Lncomp	0	3801	13.102	6.01^{***}	13.199	5.255^{***}
	1	3793	12.964		13.037	
ROA	0	3801	0.028	3.33^{***}	0.030	3.603^{***}
	1	3793	0.021		0.027	

$^{*}p < 0.10$.
$^{**}p < 0.05$.
$^{***}p < 0.01$.

Table 9
Correlations.

	Lncomp	EL	ROA	Market
Lncomp	1	-0.139^{***}	0.232^{***}	0.584^{***}
EL	-0.183^{***}	1	-0.041^{***}	-0.117^{***}
ROA	0.168^{***}	-0.065^{***}	1	0.026^{**}
Market	0.576^{***}	-0.111^{***}	0.029^{***}	1

Note: The top presents Spearman coefficients and the bottom Pearson coefficients.
$^{*}p < 0.10$.
$^{**}p < 0.05$.
$^{***}p < 0.01$.

enterprise performance (ROA), indicating that the pay contracts of SOE executives have a certain motivational function.

6. Results

6.1. Hypothesis 1

We employ the following OLS regression model to test H1, with the results shown in Table 10.
Model (1):

$$\mathrm{Ln\,comp} = \alpha_1 + \alpha_2\ \mathrm{ROA} + \alpha_3\ \mathrm{EL} + \alpha_4\ \mathrm{EL} * \mathrm{ROA} + \alpha_5\ \mathrm{AssetsSize} + \alpha_6\ \mathrm{Lev} + \alpha_7\ \mathrm{Shr1}\ \alpha_8\ \mathrm{Dual} + \alpha_9\ \mathrm{Mshare} + \alpha_{10}\ \mathrm{Rinde} + \alpha_{11}\ \mathrm{Pegdp} + \alpha_{12}\sum \mathrm{Ind} + \alpha_{13}\sum \mathrm{Year} + \varepsilon$$

Regression (1) in Table 10 shows that the regression coefficient of the interaction variable ELROA is −0.159 and significantly negative at the 1% level. After controlling for the other variables in regression (2), this coefficient becomes −0.112 and remains significantly negative at the 1% level, which indicates that the presence of a surplus workforce leads to a reduction in the sensitivity of executive compensation to enterprise

performance, a result consistent with H1. As both the policy burden placed on a company and a reduction in its number of surplus employees may bring benefits, it is difficult for corporate performance to reflect the degree of effort exerted by executives. The performance index thus contains government behavior that is difficult to separate out, increasing the amount of noise in evaluating managerial effort. These factors diminish the function of accounting-based performance in executive pay contracts. Hence, the existence of overemployment weakens the relationship between executive compensation and enterprise performance.

The coefficient on ROA is 1.890 and the coefficient on ELROA is −0.112. The economic significance of these results is as follows. If the difference in ROA between two companies is 10%, and EL equals 0, then the difference in pay is $e\ (0.10 * 1.890) - 1 = 20.80\%$. After adding the standard deviation ($\sigma = 1.66$) to EL, the difference in ROA leads to a difference in pay. This difference is $e\ [0.10 * (1.890–0.113 * 1.66)] - 1 = 18.53\%$. The 1.27% difference in pay suggests that the economic significance of the sensitivity of executive compensation to enterprise performance caused by overemployment is relatively weak.

Executive compensation increases with an increase in enterprise performance (ROA), the local economic development level (Pegdp) and asset size (AssetsSize), although ownership concentration (LargeHold) is negatively related to the executive compensation level. The implication of these findings is that a lower ownership concentration can increase control capability and supervision motivation while reducing the issue of moral hazard among executives.

6.2. Hypothesis 2

6.2.1. Hypothesis 2(a)

To test the effect of PPS on the number of employees to be hired in the future, we employ the following OLS regression model, with the results shown in Table 11.

Model (2):

$$\text{Pnum}_t = \alpha_1 + \beta_1\ \text{lagel} + \beta_2\ \text{senti} + \beta_3\ \text{senti} * \text{lagel} + \beta_4\ \text{lagnum} + \text{other control variables}$$

Table 11 shows that in the regression in which pay is sensitive to performance, the coefficient on Lagel is −0.338 and significantly negative at the 1% level, which indicates that the number of employees hired in the future will increase more slowly if a greater number of redundant employees were employed in the last term. Hence, executives whose pay is sensitive to performance will be motivated to control hiring in the future to improve firm performance. There are two possible explanations for the relationship between former overemployment and slower-paced employee growth in the future. First, management is likely to lay off currently redundant employees to improve production efficiency. The proportion of layoffs will be greater with a larger surplus workforce. Second, controlling employee numbers in the future can help to control increases in labor costs. The latter explanation may have negative implications for the future development of the company. In companies in which executive compensation is not sensitive to performance, the number of redundant employees maintained in the last term is significantly negatively related to the number of employees to be hired in the future. However, the coefficient on Lagel is −0.202, greater than that in the sample in which executive compensation is sensitive to performance. The implication is that companies in which executive compensation is sensitive to performance will reduce employee growth in the future. The regression intercept of the sensitive sample is −4.956 and significant at the 5% level, whereas that of the insensitive sample is 1.540. Hence, it is clear that after controlling for the other variables, future employee growth remains negative in the sensitive sample, and this sample has a smaller regression intercept than its insensitive counterpart. These results are largely consistent with our hypothesis.

In the complete sample regression, the interaction variable *Senti* * *Lag*EL is not significant, and the T value is only −1.242, although the direction is in line with our expectations. In a subsequent robustness test using the robustness inference of heteroskedasticity and the cluster regression method, we find the regression coefficient on *Senti* * *Lag*EL to be significant at the 1% level.

6.2.2. Hypothesis 2(b)

To test the degree of government intervention and the influence of prior-period overemployment on performance, we establish an interactive variable between the degree of marketization and the number of last-term

Table 10
Effect of overemployment on pay for performance.

Variable	(1)	(2)
EL	−0.106***	−0.039***
	(−15.70)	(−8.057)
ROA	2.159***	1.890***
	(14.88)	(17.14)
ELROA	−0.159***	−0.113***
	(−4.734)	(−4.959)
Layoff		−0.099***
		(−10.87)
Pegdp		0.082***
		(15.11)
Lev		0.051
		(1.019)
AssetsSize		0.262***
		(30.11)
LargeHold		−0.006***
		(−12.14)
Dual		0.025
		(0.988)
Mshare		4.177***
		(4.018)
Rinde		0.338***
		(2.652)
Constant	13.046***	6.649***
	(1045)	(37.07)
Year, Ind	Controlled	
Observations	7594	7594
R-squared	0.061	0.583

Notes: The dependent variable is executive compensation. The independent variables are firm performance (ROA), and Senti is a dummy variable for PPS, Senti_ROA is the interaction of Senti and ROA, Pedgp is the natural logarithm of per capita GDP, Lev is the firm leverage ratio, Assetsize is the natural logarithm of total assets, Largehold is the share proportion of the largest shareholder, Dual is a dummy variable that equals 1 if the CEO and chairman of the board are the same person, and 0 otherwise, Mshare is managerial ownership, and Rinde is the ratio of independent directors on the board. Regression (1) is the OLS regression without controlling for the other variables and regression (2) controls for the other variables.

* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

surplus employees. In addition, to test the effect of PPS on the future increase in employee numbers, we also carry out regression analysis on the sample, the results of which are shown in Table 12.

As regression (1) in Table 12 shows, in the regression that does not include the interaction variable M_Lagel, last-term overemployment is significantly negatively associated with future employee growth, that is, the greater the extent of overemployment in the prior period, the smaller the future increase in workforce size. When the interaction variable M_Lagel is included, the regression coefficient becomes −0.116, significant at the 0.01 level. Hence, the greater the extent of marketization and the greater the number of superfluous employees, the slower the growth in future employee numbers. Regions with a high degree of marketization experience less government intervention and SOE executives have greater power to lay off redundant employees. The coefficient of Lagel on last-term redundant employment is 0.615. As the model is a nonlinear equation, the influence (the mean of the marketization degree in 0.625–0.116* is 8.24) of Lagel on last-term redundant employment is −0.341, which is still negative and means that if there is a one-unit increase in the number of surplus employees in the previous period, there will be a 0.341-unit decrease in the number of employees hired in the future. Relatively speaking, the redundant workforce variable has a great effect on the size of the future workforce.

Table 11
OLS regressions of future employment growth on pay for performance.

Variable	Sensitive sample (1)	Non-sensitive sample (2)	Total sample (3)
Lagel	−0.338***	−0.202***	−0.225***
	(−3.947)	(−4.690)	(−3.207)
Senti			0.187
			(1.384)
Senti_Lagel			−0.102
			(−1.243)
Market	−0.004	−0.002	0.000
	(−0.045)	(−0.042)	(0.007)
Num	0.498***	0.452***	0.479***
	(4.074)	(6.501)	(6.008)
Layoff	−0.055	0.100*	0.005
	(−0.476)	(1.688)	(0.070)
Pegdp	0.057	0.131***	0.086*
	(0.803)	(3.556)	(1.912)
Lev	−0.297	−0.163	−0.299
	(−0.513)	(−0.535)	(−0.814)
AssetsSize	0.099	−0.229***	−0.028
	(0.723)	(−3.033)	(−0.316)
LargeHold	−0.009	−0.001	−0.006
	(−1.450)	(−0.228)	(−1.556)
Dual	0.099	−0.146	0.001
	(0.303)	(−0.847)	(0.005)
Mshare	38.661***	−1.424	17.614**
	(2.599)	(−0.237)	(2.096)
Rinde	0.413	−0.254	0.065
	(0.338)	(−0.481)	(0.0911)
Constant	−4.956**	1.540	−2.508
	(−1.983)	(1.191)	(−1.595)
Year, Ind	Controlled		
Observations	3871	2662	6533
R-squared	0.017	0.028	0.015

Notes: The dependent variable is the change in employment, Pnum. The independent variables are the lag of overemployment, Lagel. Senti is the sensitivity index for pay for performance, Senti_Lagel is the interaction of Senti and Lagel, Market is the marketization index according to Fan and Wang (2010), Layoff is the regional unemployment rate, Pegdp is per capita regional GDP, Lev is firm leverage, AssetsSize is the logarithm of total assets, LargeHold is the percentage of the largest shareholder's shareholding, Dual is a dummy that equals 1 if the chairman and CEO are the same person, and 0 otherwise, Mshare is the percentage of management's shareholding, and Rinde is the ratio of independent directors on the board. Regression (1) is an OLS regression using the sensitive sample, regression (2) uses the non-sensitive sample and regression (3) is the total sample.

* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

After dividing the sample in accordance with PPS, we find the coefficient on the interaction term M_Lagel in the PPS sample to be −0.159, which is significant at the 0.01 level. The influence of Lagel, last-term surplus employment, on future employee increases (the mean of the marketization degree in 0.898–0.159* is 8.24) to −0.412, which suggests that if pay is sensitive to performance, then the presence of a redundant workforce has an effect size of −0.412 on the size of the employment increase in the future. In the non-PPS sample, in contrast, the coefficient on the interaction term is −0.057, which is small and significant only at the 0.05 level. The impact of last-term overemployment on the size of the future increase in employee numbers (0.228–0.057 ∗ 8.24) is −0.242, which is significantly smaller than that in the PPS sample. Similar to the regression in Table 11, in the PPS sample, the intercept is −5.810, significant at the 0.01 level, clearly lower than the intercept of 1.235 in the non-PPS sample. These results are largely supportive of our hypothesis.

We also ran specifications with three-way interactions: marketization degree ∗ sensitivity ∗ last-term overemployment. Because of the existence of strong collinearity, however, we failed to find significant results. Combining the regression results in Tables 11 and 12 allows us to draw the following conclusions. If executive compensation is sensitive to performance, and we assume that managers are driven by the self-interest maximization motivation, then management is more likely to lay off redundant employees or control the growth in employee numbers to control labor costs and increase efficiency. The less government intervention there is, the larger the degree of power management enjoys to lay off redundant employees and determine future employee numbers.

6.3. Additional test: government-imposed policy burden and government gains

In this study, we assume that the existence of a government-imposed policy burden and government gains decrease the efficacy of using accounting performance to evaluate executives. However, the prerequisite for

Table 12
OLS regressions of future employment on government intervention.

Variable	Total sample (1)	Total sample (2)	Sensitive sample (3)	Non-sensitive sample (4)
Lagel	−0.282***	0.615***	0.898**	0.228
	(−5.294)	(2.640)	(2.351)	(1.247)
Market		0.070	0.076	0.038
		(1.210)	(0.824)	(0.815)
M_Lagel		−0.116***	−0.159***	−0.057**
		(−3.955)	(−3.320)	(−2.422)
Num	0.478***	0.535***	0.563***	0.487***
	(6.006)	(6.610)	(4.555)	(6.865)
Layoff		0.008	−0.047	0.099*
		(0.111)	(−0.406)	(1.664)
Pegdp	0.084**	0.080*	0.058	0.125***
	(2.213)	(1.784)	(0.819)	(3.381)
Lev	−0.311	−0.296	−0.299	−0.144
	(−0.846)	(−0.806)	(−0.517)	(−0.473)
AssetsSize	−0.024	−0.040	0.084	−0.242***
	(−0.269)	(−0.449)	(0.613)	(−3.196)
LargeHold	−0.006	−0.007*	−0.011*	−0.001
	(−1.538)	(−1.732)	(−1.704)	(−0.277)
Dual	0.012	−0.005	0.073	−0.157
	(0.0603)	(−0.0255)	(0.225)	(−0.909)
Mshare	17.600**	18.232**	39.153***	−1.050
	(2.097)	(2.171)	(2.635)	(−0.175)
Rinde	0.094	0.338	0.879	−0.176
	(0.143)	(0.473)	(0.716)	(−0.333)
Constant	−2.465	−3.135**	−5.810**	1.235
	(−1.620)	(−1.985)	(−2.315)	(0.952)
Year, Ind	Controlled			
Observations	6533	6533	3871	2662
R-squared	0.015	0.017	0.019	0.030

Notes: The dependent variable is the change in employment, Pnum. The independent variables are the lag of overemployment, Lagel. Market is the marketization index according to Fan and Wang (2010), Senti is the sensitivity index of pay for performance, M_Lagel is the interaction of Market and Lagel, Layoff is the regional unemployment rate, Pegdp is regional per capita GDP, Lev is firm leverage, AssetsSize is the logarithm of total assets, LargeHold is the percentage of the largest shareholder's shareholding, Dual is a dummy variable that equals 1 if the chairman and CEO are the same person, and 0 otherwise, Mshare is the percentage of management's shareholding, and Rinde is the ratio of independent directors on the board. Regression (1) does not include Market, regression (2) includes Market, regression (3) is the OLS regression using the sensitive sample and regression (4) uses the non-sensitive sample.

* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

this assumption is that the government imposes a policy burden and confers preferential treatment at the same time to obtain some government gain. Xue and Bai (2008) find that SOEs in regions with high unemployment retain more surplus employees. As compensation, the government awards them financial subsidies. Accordingly, we test for another possible preferential policy, the tax rate, which we define as follows.

The tax rate = initial taxes + taxes − closing taxes Definition (1)

The tax rate = current taxes Definition (2)

We employ these two definitions because taxes assessed on an accrual basis and realization basis result in different tax rates and actual taxes can differ greatly from accrued taxes. After standardizing the two tax rate calculations by revenue, we perform regression analysis on the size of an enterprise's redundant workforce. The results are presented in Table 13 and show that the tax rate levied on SOEs is significantly negatively related to the number of redundant employees it retains. These findings constitute evidence that although SOEs are forced to shoulder a government policy burden, they are rewarded for doing so with preferential policies, such as a lower tax rate.

Table 13
Regression of policy burden and its benefits.

	Definition (1)		Definition (2)	
Variable	(1)	(2)	(3)	(4)
EL	−0.010	−0.024***	−0.002**	−0.002***
	(−1.261)	(−2.709)	(−2.392)	(−2.653)
Layoff		0.012		−0.001
		(0.754)		(−0.322)
Nature		−0.021		−0.011***
		(−0.624)		(−3.068)
AssetsSize		0.020		0.000
		(1.281)		(0.137)
FixedAssets		−0.074		0.017*
		(−0.804)		(1.773)
ROA		−0.232		−0.017
		(−1.217)		(−0.857)
Lev		−0.145		−0.057***
		(−1.589)		(−5.896)
LargeHold		−0.054		0.010
		(−0.496)		(0.873)
Dual		0.029		0.004
		(0.622)		(0.776)
Mshare		−0.766		0.001
		(−0.402)		(0.00413)
Rinde		−0.393*		−0.046*
		(−1.679)		(−1.867)
Constant	0.068***	−0.311	0.082***	0.117***
	(4.600)	(−0.911)	(50.81)	(3.247)
	Controlled			
Observations	7594	7594	7594	7594
R-squared	0.000	0.010	0.001	0.079

Notes: The dependent variable is the effective tax rate. EL is overemployment, Layoff is the regional unemployment rate, Nature is the firm's position in the political hierarchy, AssetsSize is the logarithm of total assets, FixedAssets is the size of fixed assets, ROA is return on assets, Lev is leverage, LargeHold is the percentage of the largest shareholder's shareholding, Dual is a dummy that equals 1 if the chairman and CEO are the same person, and 0 otherwise, Mshare is the percentage of management's shareholding and Rinde is the ratio of independent directors on the board.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

6.4. Robustness tests

Hypothesis 1 posits that overemployment leads to a decrease in PPS. However, a surplus workforce and PPS are likely to display an endogenous relationship, that is, SOEs with certain company characteristics (such as greater government intervention in their affairs) take on more political responsibilities. Hence, these enterprises retain redundant staff and profitability is not a key performance indicator by which to measure executive effort, thereby leading to weak PPS. However, in the test of Hypothesis 1, the control variables are those that affect executive pay, not PPS, which may introduce the possibility of endogeneity. To investigate the impact of surplus employees on PPS and the possible endogeneity between them, we add a conservatism test, which adopts the dummy variable for PPS from Abowd (1990) as the dependent variable and overemployment as the main study variable. After consulting the studies carried out by Firth et al. (2006) and Kato and Chery (2004) on the pay of Chinese executives, we also control for the state-owned equity ratio, firm size, the proportion of independent directors and the debt ratio to determine how they affect the sensitivity of the executive compensation variable. After controlling for these variables, if overemployment still has a significant effect on the coefficient regression of the sensitivity variable, then we consider endogeneity not to be a concern and the overemployment variable to be one of the key factors affecting PPS. The regression results are presented in Table 14.

Regressions (2) and (3) in Table 14 show that after controlling for the aforementioned variables, overemployment is significantly negatively related to the dummy variable for PPS, which shows that the existence of redundant staff decreases PPS.

ROA is used as the performance index for the tests of Hypothesis 1 and profits in this index include unsustainable profits. To overcome the influence of unsustainable profits on our conclusions, we also use OROA and OROE as the performance index in this test, but the empirical results are largely the same. In addition to replacing the main index, we also carry out a conservatism test on our calculations using a heteroskedasticity-robust inference and year cluster analysis, and the empirical results remain robustness.

Table 14
Logistic regression according to Abowd (1990).

Variable	(1)	(2)	(3)
EL	−0.001	−0.003**	−0.006**
	(−1.125)	(−2.121)	(−2.181)
State		0.096	0.025
		(0.835)	(0.194)
Nature		−0.127**	−0.130**
		(−2.182)	(−2.117)
AssetsSize		0.063**	0.072***
		(2.522)	(2.607)
Lev		0.162	−0.022
		(1.119)	(−0.141)
Dual		−0.116	−0.105
		(−1.347)	(−1.196)
Rinde		0.861***	−0.815*
		(3.292)	(−1.755)
Constant	0.374***	−1.133**	−1.462**
	(13.98)	(−2.108)	(−2.421)
Year, Ind	Controlled		
Observations	6533	6533	6533
Pseudo R^2	0.01	0.01	0.02

Notes: The dependent variable, Senti, is a dummy variable for PPS. EL is overemployment, Nature is the firm's position in the political hierarchy, AssetsSize is the logarithm of total assets, Lev is the firm leverage ratio, Dual is a dummy that equals 1 if the chairman and CEO are the same person, and 0 otherwise, and Rinde is the ratio of independent directors on the board.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

Table 15
Robustness test of H2.

Variable	Robust	Cluster (year)
Lagel	−0.237***	−0.237***
	(−3.656)	(−5.331)
Senti	0.197	0.197
	(1.587)	(1.563)
Senti_Lagel	−0.099*	−0.099*
	(−1.795)	(−1.801)
Market	0.031	0.031
	(0.370)	(0.439)
Num	0.486***	0.486***
	(6.027)	(4.182)
Layoff	0.019	0.019
	(0.207)	(0.216)
Pegdp	0.104**	0.104
	(2.501)	(1.350)
Lev	−0.257	−0.257
	(−0.714)	(−0.653)
AssetsSize	−0.017	−0.017
	(−0.205)	(−0.140)
LargeHold	−0.009	−0.009
	(−1.121)	(−1.075)
Dual	−0.008	−0.008
	(−0.0535)	(−0.0558)
Mshare	17.270	17.270
	(0.815)	(0.785)
Rinde	1.591	1.591
	(1.373)	(1.269)
Constant	−2.818	−2.818
	(−1.791)	(−1.309)
Year, Ind	Controlled	
Observations	6533	6533
R-squared	0.016	0.016

Notes: The dependent variable is the change in employment, Pnum. The independent variables are the lag of overemployment, Lagel. Senti is the sensitivity index for pay for performance, Senti_Lagel is the interaction of Senti and Lagel, Market is the marketization index according to Fan and Wang (2010), Layoff is the regional unemployment rate, Pegdp is regional per capita GDP, Lev is firm leverage, AssetsSize is the logarithm of total assets, LargeHold is the percentage of the largest shareholder's shareholding, Dual is a dummy that equals 1 if the chairman and CEO are the same person, and 0 otherwise, Mshare is the percentage of management's shareholding and Rinde is the ratio of independent directors on the board.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

We also perform a number of robustness tests on Hypothesis 2. For H2(a), the use of a heteroskedasticity-robust inference and year cluster regression analysis show that the interaction term, *Senti_Lag*EL, which was not previously significant, becomes significant at the 0.1 level and remains significant in the sub-sample regression. Similar methods are employed to test H2(b) and the regression results remain largely unchanged. All of these results are presented in Table 15, from which it can be seen that these tests confirm the relative robustness of our empirical results.

7. Conclusion

Drawing on a sample of SOEs listed on the Shanghai and Shenzhen Stock Exchanges during the 1999–2009 period, this study is the first to research the influence of overemployment on PPS. Our findings show the exis-

tence of a surplus workforce significantly weakens PPS and the efficacy of accounting measures in assessing performance. A further finding is that the greater the PPS, the greater management's motivation to lay off redundant staff and reduce future growth in employee numbers to maximize its own interests. Further, the lower the degree of government intervention, the greater the control management has over future employee growth.

This paper makes several contributions to our understanding of executive incentives against the institutional background of SOEs in China. Although previous research has considered the influence of government intervention on the PPS of top managers, here government intervention is measured by SOE overemployment, which is shown to affect executive PPS. This study thus extends the literature by considering the economic consequences of PPS. We also identify a type of gambling between executives and the government. In pursuit of personal interest maximization, management gambles with the government according to its level of PPS, laying off a certain number of redundant employees, which reacts with the PPS factors. This finding constitutes one of the main differences between this research on the impact of PPS and similar research carried out abroad.

The study also has several limitations. First, the size of the redundant workforce in this paper is measured following Xue's (2008) method and thus does not take into account other indices for measuring overemployment. Our calculations may thus fail to reflect reality. We assume that private enterprises shoulder no policy burden and thus employ them to estimate employee numbers in similar enterprises in the state sector. It is possible that systematic differences between the two types of enterprises may have biased our estimation of overemployment.

Second, although monetary rewards are the primary means of motivating executives, our sole use of such rewards may have an impact on our research conclusions. In the special system that prevails in China, executive compensation is controlled to a certain extent and other motivation modes such as on-the-job consumption and opportunities for political promotion may take the place of monetary rewards in certain instances (Chen, 2005). The existence of such motivating factors may serve to weaken the effect of monetary incentives. Furthermore, the index of executive pay used in this paper is based on the top three disclosures by listed companies and the exclusion of non-listed personnel may affect our conclusions.

Finally, we employ the degree of marketization index in Fan and Wang (2010) as the measurement index for government intervention. Although the degree of regional marketization may reflect relations between the local government and the market to a certain extent, this index is based on provincial data. Applying this data to reflect government intervention at the firm level inevitably introduces noise that is likely to affect the conclusions of this study.

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Appendix A

Test of Abowd's (1990) PPS dummy variable.

PPS is an important variable in this study. Here, we explain our use of the variable in greater depth, taking Abowd's (1990) definition as our example.

1. Definition reliability. Abowd's variable is an important indicator of PPS. We test his method of arriving at it and the results are presented in Table A.1. It can be seen that the interaction variable is significant, which indicates that Abowd's definition largely reflects whether or not salary is sensitive to performance.
2. Endogeneity. If the empirical results support Hypothesis 1 in that currently employed redundant personnel influence current compensation-performance sensitivity, then we consider current PPS to be part of an enterprise's current policy burden. What we wish to analyze further is whether overemployment-influenced current PPS has any effect on the size of an enterprise's workforce in the future. The current endogenous variable possesses a certain degree of exogeneity relative to the future variable and its endogeneity contrasts with

the variables for the current or prior period. Similar to Abowd (1990), we employ the PPS variable to determine whether the current exogenous salary reacts sensitively to performance as a way of explaining future improvements in enterprise performance to which incentivizing executives in the current period is exogenous.

3. Dynamic characteristics of sensitivity. Determining whether enterprises exhibit stable PPS characteristics is an important issue in this study. The main evidence for PPS sensitivity is whether current salary changes with current performance. Searching for this evidence requires large-sample regression analysis. We can determine what kind of corporation exhibits greater sensitivity between salary and performance, or we can draw conclusions about which factors influence compensation-performance sensitivity. In other words, we take the law as a whole, and the law is whether salaries in the sample corporations are sensitive to performance changes. This concept is similar to accounting conservatism. We adopt Basu's (1997) model to analyze the overall conservatism of the sample enterprises in the earliest period. However, Khan and Watts (2009) design a firm-year accounting conservatism measure, which demonstrates how corporate conservatism has changed. All of these methods provide indirect support for our Hypothesis.

As we can see from Table A.1, from regression (1) to regression (4), the interaction variable of the dummy variable Senti and ROA is significant, which indicates that the dummy variable for PPS measured by Abowd's (1990) method is largely able to describe the sensitivity of payment to performance.

Table A.1
Results of tests on Abowd's (1990) method.

Variable name	Variable symbol	Regression (1)	Regression (2)	Regression (3)	Regression (4)
Firm performance	ROA	0.831***	0.448**	0.448**	0.448**
		(3.012)	(2.167)	(1.966)	(2.786)
Sensitivity	Senti	0.047*	−0.009	−0.009	−0.009
		(1.947)	(−0.516)	(−0.367)	(−0.285)
Cross item	Senti_ROA	2.613***	2.128***	2.128***	2.128**
		(8.049)	(9.148)	(3.011)	(2.837)
Per capita GDP	Pegdp		0.092***	0.092***	0.092***
			(17.00)	(19.15)	(9.859)
Leverage	Lev		−0.016	−0.016	−0.016
			(−0.306)	(−0.162)	(−0.140)
Firm size	AssetsSize		0.259***	0.259***	0.259***
			(27.91)	(18.90)	(21.05)
Proportion of largest shareholders	LargeHold		−0.006***	−0.006***	−0.006***
			(−11.06)	(−10.99)	(−15.06)
CEO and chairman	Dual		−0.013	−0.013	−0.013
			(−0.463)	(−0.425)	(−0.450)
Managerial ownership	Mshare		4.656***	4.656***	4.656***
			(4.192)	(6.557)	(5.784)
Ratio of independent directors	Rinde		0.287**	0.287*	0.287**
			(1.968)	(1.867)	(2.569)
Constant	Constant	13.073***	6.524***	6.524***	6.524***
		(694.2)	(34.13)	(25.51)	(27.71)
Year Industry	Year, Ind		Controlled		
	Observations	6533	6533	6533	6533
	R-squared	0.063	0.528	0.528	0.528

Notes: This table presents the regression results of the checks on Abowd's (1990) method. The dependent variable is executive compensation. The independent variables are (ROA) firm performance, Senti is a dummy variable for PPS, Senti_ROA is the cross-item of Senti and ROA, Pedgp is the natural logarithm of per capita GDP, Lev is the leverage ratio of a firm, Assetsize is the natural logarithm of total assets, Largehold is the proportion of shares held by the largest shareholder, Dual is a dummy variable that equals 1 if the CEO and chairman of the board are the same person, and 0 otherwise, Mshare is managerial ownership, and Rinde is the ratio of independent directors on the board. Regression (1) is the OLS regression without controlling for the other variables, regression (2) controls for the other variables, regression (3) includes a heteroskedasticity-robust inference and regression (4) is clustered by year.

* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

Appendix B. Relationship between the degree of marketization and overemployment

To test the reliability of our overemployment estimate and the theoretical influence of the degree of marketization on the size of the redundant workforce, we test the relationship between the two.

In regions with a high degree of marketization, governments afford enterprises a relatively high degree of control for several reasons. The local governments in these regions tend to be more open-minded, better able to use market tools skillfully and to have more market mechanisms at their disposal. In addition, there is generally greater market competition in these regions. These regional conditions compel local governments to exhibit behavior that is closer to market requirements if they are to survive and develop in the face of competition (Chen, 2009). In regions with a lower degree of marketization, in contrast, local protectionism and government intervention are stronger and these regions still carry elements of the planned economy (Fan and Wang, 2010). SOEs in these regions are thus more likely to experience government intervention and, accordingly, to take on more social responsibilities, such as supporting employment. It is for these reasons that we test the relationship between the degree of marketization and overemployment.

Table A.2
OLS regression of overemployment on market development.

Variable name	Variable symbol	Regression (1)	Regression (2)
Market development	Market	−0.114***	−0.037**
		(−9.793)	(−2.333)
Unemployment rate	Layoff		0.067***
			(3.101)
Political ranks of firms	Nature		−0.193***
			(−4.382)
Firm size	AssetsSize		0.038*
			(1.807)
Fixed assets	FixedAssets		0.722***
			(6.032)
Firm performance	ROA		−0.804***
			(−3.252)
Leverage	Lev		0.620***
			(5.243)
Ownership concentration	LargeHold		0.346**
			(2.434)
CEO and chairman	Dual		0.045
			(0.739)
Managerial ownership	Mshare		0.389
			(0.157)
Ratio of independent directors	Rinde		−0.169
			(−0.556)
Constant	Constant	1.559***	0.181
		(15.89)	(0.404)
Year-Industry	Year, Ind	Controlled	
	Observations	7594	7594
	R-squared	0.012	0.121

Notes: This table presents the results of the test of the association between government intervention and overemployment. The dependent variable is overemployment (EL). The independent variables are Market, which is the development of the local market as a proxy for government intervention; Layoff, which is the local unemployment rate; Nature, which is the political rank of a firm; AssetsSize, which is the natural logarithm of total assets; Fixedassets, which is the size of fixed assets; ROA, which stands for firm performance; Lev, which stands for the firm leverage ratio; LargeHold, which stands for ownership concentration measured by the proportion of shares held by the largest shareholder; Dual, which is a dummy variable that equals 1 if the CEO and chairman of the board are the same person, and 0 otherwise; Mshare, which is the degree of managerial ownership; and Rinde, which is the ratio of independent directors on the board. Regression (1) is an OLS regression without controls for the other variables and regression (2) includes such controls.

* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

As there is no related research on the determining factors of overemployment and our other control variables for testing the degree of marketization are based primarily on the domestic literature discussing policy objectives, excess employees and government intervention in SOEs, we adopt the following model for our test, with the results presented in Table A.2.

$$\mathrm{EL} = \alpha_1 + \alpha_2\ \mathrm{Market} + \alpha_3\ \mathrm{Layoff} + \alpha_4\ \mathrm{Nature} + \alpha_5\ \mathrm{Pegdp} + \alpha_6\ \mathrm{AssetsSize} + \alpha_7\ \mathrm{FixedAssets} + \alpha_8\ \mathrm{ROA} + \alpha_9\ \mathrm{Lev} + \alpha_{10}\ \mathrm{H5} + \alpha_{11}\ \mathrm{Dual} + \alpha_{12}\ \mathrm{Mshare} + \alpha_{10}\ \mathrm{Rinde} + \alpha_{11}\sum \mathrm{Year} + \alpha_{12}\sum \mathrm{Ind} + \varepsilon$$

It can be seen from this table that regardless of whether we perform single- or multiple-variable regression, the degree of marketization (Market) and the scale of overemployment (EL) are negatively related at the 1% level of significance, which indicates that the higher the degree of marketization, the smaller the size of the redundant workforce. The degree of marketization is a variable that embodies the degree of government intervention. Hence, less government intervention allows SOEs to reduce their multiple objectives and policy tasks such as employment promotion and unemployment reduction. Consequently, the extent of overemployment is reduced.

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Accounting standard changes and foreign analyst behavior: Evidence from China

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ABSTRACT

This study investigates changes in foreign analyst behavior before and after Chinese New Accounting Standards was implemented during 2007. The empirical results show that after the new accounting standards were implemented, forecast error among foreign analysts decreased in both absolute and relative terms in comparison with domestic analysts, and foreign analysts forecast earnings more frequently than they did before the new accounting standards. These results imply that the implementation of new accounting standards in the Chinese capital market helped mitigate both information asymmetry between listed firms in China and foreign investors, and the "home bias" of foreign analysts. It also increased the attractiveness of listed firms and facilitated international communication and cooperation. This study also has significant implications for how resource allocation efficiency in the Chinese capital market can be raised and how the "introducing in" policy should be assessed.

1. Introduction

This paper explores the effect of IFRS adoption in the Chinese stock market on foreign investors by examining its impact on foreign analyst behavior. The new accounting standards issued on January 1, 2007

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represent a significant systematic reform of accounting standards and were a major measure by which the "bringing in, going out" enterprise strategy[1] was put into practice. This reform was intended to enhance the comparability of accounting standards, to assist Chinese enterprises in going abroad, and to facilitate overseas financing and international exchange and cooperation. Most prior research on the effect of the new standards focuses on the local capital market from perspectives such as earnings management and value relevance. Given that the behavior and preferences of foreign investors are largely reflected in the behavior of foreign analysts, this paper uses foreign analysts as the treatment sample compared with the control sample of local analysts. We are interested in the impact of the information contained in financial reports issued under the old and new accounting standards on the earnings forecasts of foreign analysts,[2] and further examine the outcomes of adopting the "bringing in" strategy.

Foreign analysts are generally more familiar with IFRS than local analysts.[3] Following implementation of the new Chinese accounting standards, which converge local standards with IFRS, we expect that the costs foreign analysts face in collecting public information from financial reports prepared under the new accounting standards to have been significantly reduced. As a result, foreign analysts are likely to make more accurate earnings forecasts than they did before the new accounting standards took effect. In this paper, we test the predicted relationship between foreign analyst earnings forecasts and the new accounting standards. With a comprehensive set of controls for the individual characteristics of analysts, we find that after the new standards were implemented, the forecast errors of foreign analysts fell substantially in terms of both their raw and relative values (using local analysts as the control sample). Furthermore, the number of foreign analysts following Chinese listed companies has increased significantly since the new standards were introduced. If foreign analysts and foreign investors share the same information set, these results imply that IFRS convergence has lowered the information costs of foreign investors, which will ultimately help Chinese listed firms communicate and coordinate more effectively in the international arena. They also suggest that having more participants in the analyst sector also improves the efficiency with which resources are allocated in the capital market.

This study makes the following contributions to the literature. First, it provides results of practical significance to market participants and policymakers. The primary purpose of implementing the new accounting standards was to enhance the international comparability of financial reports, which would both attract more foreign investors to participate in the Chinese capital market and improve the allocation efficiency and competitiveness of the market. However, to the best of our knowledge, few studies have investigated whether the new standards have achieved this goal. Despite difficulties in directly observing the behavior and preferences of foreign investors, we argue that they are reflected to a great extent in the behavior of foreign analysts. We thus focus on the effects of the new Chinese accounting standards on the behavior of foreign analysts, enabling us to infer how the new standards have impacted foreign investors. Second, this study reports important empirical evidence on the effect of the changes made by the new accounting standards. Unlike other studies on the impact of IFRS adoption, this paper concentrates on the Chinese setting. Because it is compulsory to comply with IFRS in China, we can dismiss the self-selection issue, i.e., the bias caused by voluntary adoption in previous research (e.g., Leuz and Verrecchia, 2000) have to deal with this issue in their study of voluntary IFRS adopters in Germany). While some recent studies have also investigated the impact of

[1] The "bringing in, going out" strategy is mentioned in an important speech on accounting changes delivered by Jin Renqing, Minister of Finance, when the new accounting standard and new auditing standard were issued. He noted that the new accounting and auditing standards were significant measures to optimize the Chinese market economy and assist enterprises in implementing the "bringing in, going out" strategy (see also "Index for Accounting Standards for Business Enterprises," 2008). We believe that "bringing in" refers to assisting foreign investors (including foreign analysts) to understand Chinese financial reports, and that "going out" refers to assisting local enterprises to understand the financial reports of foreign companies.

[2] We do not emphasize the effect of the new standard on accounting information quality. The fall in forecast error among foreign analysts does not necessarily demonstrate improved accounting information quality alone, but could also be due to reduced information collecting and processing costs.

[3] Not all foreign analysts are located in countries that adopt IFRS, an example being US analysts. We cannot distinguish among these countries due to data limitations. However, even for analysts in countries that do not follow IFRS, we do not expect them to know less about IFRS than local analysts do. Therefore, the new standards are unlikely to have increased the information costs of these analysts, and including them in the tests would introduce a bias against our results.

mandatory IFRS adoption (e.g., Armstrong et al., 2010; Tan et al., 2009), our Chinese setting provides three advantages. First, it is not subject to the omitted variables issue introduced by institutional differences, an issue usually found in international studies. Second, the rapidly growing analyst industry in China can be employed as the control sample, which further helps rule out the impact of other potential confounding effects. Third, in comparison with other Chinese studies on the effect of changes in accounting standards, this paper reveals evidence from a new perspective: that of foreign analysts (foreign investors). Most previous studies on new accounting standards – such as analysis of market reactions (Wang et al., 2009a) and management behavior (Wang et al., 2009b; Ye et al., 2009) –examine the local investor context. Although these studies provide some evidence on the impact of the new standards, they suffer from a number of limitations: in terms of information costs, although local investors (or analysts) are already fairly familiar with the old standards, they must learn and digest the new standards when they are released. Therefore, due to the time and effort local investors (or analysts) need to expend in learning the new standards, their information costs are likely to go up rather than down. Consequently, it is unclear what impact the new standards are likely to have on local investors (or analysts), and the increase in their information costs may result in earnings management and changes in local analyst behavior, which would confound the analysis of this issue. In contrast, foreign analysts provide us with a cleaner research environment to examine the issues at hand, because a reduction in information costs is more likely to be reflected in their behavior due to their limited understanding of the previous accounting standards. Hence, analyzing the cohort of foreign analysts is likely to reveal a clearer picture of the significant role the new accounting standards have played in reducing information costs.

2. Research hypotheses and empirical models

2.1. Background of Chinese accounting standard changes

The changes (including those made most recently) made to the Chinese accounting standards system, since the Basic Standard was enacted in 1992 and the first specific accounting standard (Disclosure of Related Party Relationships and Transactions) was introduced in 1997, can generally be divided into three stages. In the first stage (1992–2000), 10 specific accounting standards and the general principle of freedom were brought into effect. Provided the enterprise gave full disclosure, any accounting treatment leading to an increase or decrease in profit was acceptable (Liu et al., 2004). Substantial changes were made in the second stage (2001–2006), the key ones being an increase in the number of specific accounting standards to 15 and the elimination of fair value; additional limitations on items that could be taken into account in calculating profit, as reflected by many items such as gains on debt restructuring no longer being included in profit calculations and being moved to capital reserves instead; requiring listed companies to set aside provisions for diminution in asset values and write-offs of organization costs as a lump sum rather than by installments; and a cap on profits from related party transactions. The third stage starting from 2007 includes the recent accounting standard changes. The new accounting standards issued in 2007 introduced substantial changes, and together constitute an integrated system of Chinese accounting standards. In particular, these changes include revision of the Basic Standard and the enactment of 38 specific accounting standards aimed at converging Chinese accounting practices with International Financial Reporting Standards (IFRS); more freedom in choosing the guiding philosophy in comparison with that available in the second stage, with some items which used to be disregarded in calculating profit (e.g., gains on debt restructuring) again being allowed to appear in the income statement; widespread introduction of the fair value model and giving more accounting treatment choices to enterprises. The two key reforms made during these three stages were the changes made to accounting standards in 2001 and 2007. This paper focuses on the latter set of changes implemented via the new accounting standards issued in 2007.

In the second stage starting from 2001, the overall guiding philosophy of Chinese accounting standards was still generally affected by the old Basic Standard, and a large emphasis was placed on the fiduciary function of accounting. Subsequently, specific accounting standards were introduced to do everything possible to impose restrictions on earnings manipulating activities among listed companies and required them to include proceeds from unavoidable economic items such as gains on debt restructuring into shareholders' equity to limit the opportunity for management to window-dress profits. It was during this stage that efforts were made to

establish accounting standards systems with Chinese characteristics. Moreover, to help enterprises adopt the "bringing in, going out" strategy, the changes made to accounting standards in 2007 resulted in a substantial degree of convergence with IFRS, with an emphasis on the accounting functions of facilitating useful decisions and providing information, the active introduction of fair value models and giving enterprises more choices in accounting treatments. Therefore, while there were substantial differences between Chinese accounting standards and IFRS before 2007 in terms of both the guiding philosophy and the number of accounting standards in place, these differences have been reduced since 2007 due to the ongoing pattern of IFRS convergence in China, a trend certain to have far-reaching implications for China's economy, society and capital market.[4] Hence, this paper investigates the effect on foreign analysts of the new accounting standards implemented at the turning point of 2007, and examines the outcomes of implementing the "bringing in" strategy.

2.2. Research hypotheses

The convergence of Chinese accounting standards with IFRS is part of the international trend of accounting harmonization. Despite the widespread implementation of IFRS in many countries, there are still disputes in academia about whether international accounting harmonization can improve the quality of financial reporting and the information environment. Supporters of accounting harmonization believe that IFRS can enhance the comparability of financial reports in different countries and thereby restrict earnings management. Moreover, introduction of the fair value model enhances the connection between financial figures and intrinsic value. Barth et al. (2008) document improved accounting quality following the implementation of IFRS, including less earnings management, more timely recognition of losses and a closer connection between financial figures and intrinsic value. In terms of overall accounting quality, Beuselinck et al. (2009) find that the implementation of IFRS improves the information environment and increases the transparency of accounting information. These empirical results show that the international convergence of accounting standards does indeed improve the accounting information environment and reduce the information asymmetry faced by investors, both of which help enhance the efficiency of capital markets and resource allocation.

However, opponents of accounting harmonization believe that because institutional backgrounds, cultures, history and other characteristics determine a country's accounting standards system, a harmonized set of accounting standards is unlikely to facilitate improvements in the quality of financial reporting and the local information environment. Consequently, a unified system of accounting standards does not always benefit every country and the compulsory implementation of IFRS could lead to huge transition costs. Daske (2006) examines the economic effect of IFRS implementation through the lens of the expected cost of equity capital, finding the cost of equity capital rises rather than falls during the transition period, thus revealing that the compulsory implementation of IFRS could bring substantial transition costs. In terms of earnings management, Van Tendeloo and Vanstraelen (2005) provide empirical evidence supporting the view that the introduction of IFRS seems to increase the likelihood of earnings management. These empirical studies show that the international convergence of accounting standards neither limits opportunistic activities among managers nor improves the information environment or reduces the information asymmetry faced by investors.

Chinese empirical research concerning accounting harmonization does not reveal a consensus either. Some researchers find that the change to IFRS helps raise the quality of accounting information and boosts the connection between financial figures and intrinsic value (Jin, 2010; Luo et al., 2008; Wang et al., 2009a), whereas others conclude that the change weakens the connection between financial figures and intrinsic value (Zhu et al., 2009) and increases the likelihood of earnings management (Ye et al., 2009).

The preceding review of the literature illustrates two points. First, academics hold diverging opinions on the effect of IFRS implementation, leading to a limited comprehension of the current effect of implementing new accounting standards. Second, researchers in China generally investigate the effect of accounting harmonization from the perspective of local financial report users. Research examining the effect of accounting standard changes through the eyes of foreign investors is scarce. This study is aimed at filling this gap by providing new

[4] Although the new accounting standards have resulted in convergence with IFRS, they still have Chinese characteristics, such as in statements forbidding the reversal of impairment losses on assets and the recognition of related parties, both of which are different from IFRS.

empirical evidence of the effect of implementing accounting standard changes through investigating the behavior of a special group of capital market participants-foreign analysts. The relationship between the behavior of foreign analysts and accounting standards can be attributed to many factors. First, many studies find that accounting standards exert substantial effects on foreign analyst behavior. Ashbaugh and Pincus (2001) find that the larger the difference between local accounting standards and IFRS, the lower the accuracy of analyst forecasts, and that their accuracy improves after IFRS reforms. Hope (2003a) finds a positive correlation between the level of disclosure of accounting policy and the accuracy of earnings forecasts. Furthermore, Hope (2003b) also finds a positive correlation between the effectiveness with which accounting standards are implemented and the accuracy of analyst forecasts. Basu et al. (1998) show that forecast accuracy is lower in countries with less accrual-based accounting, more market-based accounting and fewer accounting treatment choices. Guan et al. (2006) discuss the effect of the extent of similarity between local accounting standards and US GAAP on analyst forecasts, and find the smaller the difference, the higher the accuracy of forecasts. Second, the convergence of IFRS and local GAAP reduces the information asymmetry faced by foreign analysts. Because such analysts are more familiar with IFRS, and accounting harmonization in China reduces differences between standards in China and those in their own country, it is more convenient for them to gather and process public information and thus alleviate information asymmetry, which in turn enables them to make more effective forecasts through private information gathering. Bae et al. (2008) find in an international study that the smaller the differences among accounting standards in various countries, the more foreign analysts will follow companies in such countries and the higher the accuracy of their forecasts. These studies show that the international convergence of accounting standards reduces the difference between Chinese accounting standards and the standards of countries where analysts are domiciled, lowers the cost of gathering and processing information, and ultimately leads to changes in both the number of followers and forecast accuracy.

This study focuses on the effect of accounting harmonization on changes in the behavior of foreign analysts. In doing so, we may uncover more precise empirical evidence for the debate on accounting harmonization. IFRS implementation is aimed at enhancing the comparability of accounting standards, improving the accounting information environment and reducing information asymmetry between firms and investors. Given that foreign investors face higher costs in gathering and processing information, we are likely to observe whether the goal of accounting harmonization has been achieved from changes in the behavior of foreign investors. Bae et al. (2008) examine the effect of various accounting standards on foreign analysts, finding the larger the differences between accounting standards in the countries where analysts are domiciled and those in the home country of the company being followed, the smaller the number of foreign analysts following the company and the lower the accuracy of their forecasts. Their study thus shows that prior to accounting harmonization, foreign analysts face higher information asymmetry and information processing costs. Tan et al. (2009) further examine whether accounting harmonization has raised the level of accuracy of foreign analyst forecasts, finding less forecast error after the adoption of IFRS. This study also examines the effect of IFRS convergence in China on foreign analysts, but differs from that of Tan et al. (2009) in the following respects: (1) this paper focuses on the Chinese market, which is not subject to omitted variable issues that often emerge in international studies; and (2) the rapidly growing local analyst market in China provides a natural control sample and helps in carefully examining the effect of IFRS on foreign analysts. Foreign analysts have their strengths and weaknesses in comparison with local analysts. On the one hand, they have the advantage of greater familiarity with IFRS.[5] On the other hand, they lack knowledge of the Chinese capital market and incur higher information costs. These characteristics explain why foreign analysts rely heavily on financial reports to make earnings forecasts. The new accounting standards issued in 2007 put IFRS convergence into practice, thus enabling foreign analysts to take full advantage of one of their strengths by reducing information costs through their familiarity with IFRS. This induces them to invest more resources or to profit more from the same resources, a benefit bound to attract more foreign analysts to follow Chinese listed companies and enhance the efficiency of their forecasts. Based on the above discussion, we now put forward our two hypotheses:

[5] There were substantial differences between Chinese accounting standards and IFRS before 2007. Therefore, in comparison with local analysts, foreign analysts are relatively familiar with IFRS.

H1. Forecast error among foreign analysts of Chinese listed companies decreases after the implementation of IFRS in China.

H2. The number of foreign analysts following Chinese listed companies increases after the implementation of IFRS in China.

2.3. Empirical model

The focus of this study is on whether changes made to Chinese accounting standards have affected the behavior of foreign analysts. However, other factors might also have affected their forecast accuracy. For example, forecast error is likely to have fallen to an extent corresponding to the level of improvement in information disclosure (Lang and Lundholm, 1996). It would be quite difficult to continue our examination if these factors have had effects flowing in the same direction as those of the accounting standard changes. We therefore employ local analysts as our control sample to eliminate factors with similar effects on Chinese and foreign analysts and thus derive more persuasive results. We use the following two models to test our hypotheses:

$$\begin{aligned} AFEP_{ijt} = {} & \alpha_0 + \alpha_1 Post + \alpha_2 Gexp_{it} + \alpha_3 Fexp_{ijt} + \alpha_4 Ncom_{it} + \alpha_5 Nind_{it} + \alpha_6 Brktop10_{it} + \alpha_7 Ananum_{jt} \\ & + \alpha_8 Size_{jt} + \alpha_9 Oprofvar_{jt} + \alpha_{10} ROE_{jt} + \alpha_{11} Ret\_EPS_{jt} + \alpha_{12} LogQFII_t \\ & + \alpha_{13} LogFH_{ijt} + \alpha_i \sum_{\kappa=14}^{24} ind_{\kappa t} + \varepsilon_{ijt} \end{aligned} \tag{1}$$

$$\begin{aligned} AFEP_{ijt} = {} & \beta_0 + \beta_1 Post + \beta_2 Forana_t + \beta_3 Forana_t\_Post + \beta_4 Gexp_{it} + \beta_5 Fexp_{ijt} + \beta_6 Ncom_{it} + \beta_7 Nind_{it} \\ & + \beta_8 Brktop10_{it} + \beta_9 Ananum_{jt} + \beta_{10} Size_{jt} + \beta_{11} Oprofvar_{jt} + \beta_{12} ROE_{jt} + \beta_{13} Ret\_EPS_{jt} \\ & + \beta_{14} LogQFII_t + \beta_{15} LogFH_{ijt} + \beta_i \sum_{\kappa=16}^{26} ind_{\kappa t} + \varepsilon_{ijt} \end{aligned} \tag{2}$$

Based on Model (1), Model (2) includes the additional dummy variables *Forana* (1 for foreign analysts and 0 otherwise) and *Forana_Post* to enable local analysts to be used as a control sample.

The following model is used to measure fluctuations in the number of analysts following local listed companies before and after the implementation of new accounting standards:

$$\begin{aligned} Ananum_{jt} = {} & \gamma_0 + \gamma_1 Post + \gamma_2 Forana_t + \gamma_3 Forana_t\_Post + \gamma_4 Size_{jt} + \gamma_5 Oprofvar_{jt} + \gamma_6 ROE_{jt} \\ & + \gamma_7 Ret\_EPS_{jt} + \gamma_8 LogQFII_t + \gamma_i \sum_{\kappa=9}^{19} ind_{\kappa t} + \varepsilon_{jt} \end{aligned} \tag{3}$$

In the models above, the variable subscripts *i*/*j*/*t* refer to analyst *i*, company *j* and time *t*, respectively. We expect that $\alpha_1 < 0$ (for foreign analysts), $\beta_3 < 0$ and $\gamma_1 > 0$. In calculating the forecast error variable *AFEP*, analysts' earnings forecasts are measured from the 2nd quarter earnings announcement date to the annual earnings announcement date, while actual earnings are drawn from the relevant database (described in more detail below).[6] We control for three sets of factors affecting forecast error in Model (1) and Model (2). The first set of factors are individual analyst characteristics, including the work experience of the analyst ($Gexp_{it}$), their experience following a specific company ($Fexp_{ijt}$), the number of companies the analyst has followed ($Ncom_{it}$), the number of industries the analyst has followed ($Nind_{it}$), the size of the brokerage where the analyst works ($Brktop10_{it}$) and the actual number of days from the date the analyst forecast is issued to the date the annual earnings is announced, which is calculated by adding 1 and taking the natural logarithm ($LogFH_{ijt}$). The second set of factors are company characteristics based on measures such as $Ananum_{jt}$, $Size_{jt}$, $Oprofvar_{jt}$, ROE_{jt} and Ret_EPS_{jt}. The third set of factors are macro variables based on factors such as the level of *QFII* investment, which is calculated as its natural logarithm ($LogQFII_t$), and industry dummy variables. Table 1 defines the variables employed in the models in detail.

[6] This approach is adopted in this study to avoid the complication of having the two different definitions of profits used by the two databases from which our data is drawn. We thank the referee for this suggestion.

Table 1
Variable definitions.

Symbol	Definition
Panel A: Dependent variables	
$AFEP_{ijt}$	Absolute value of the difference between the individual analyst's predicted value[a] and the actual value, divided by the closing price at the end of the year
$Ananum_{jt}$	Number of analysts following a specific company
Panel B: Explanatory variables	
Post	A dummy variable assigned the value of 1 for analyst forecasts after 2007 and 0 otherwise
$Forana_t$	A dummy variable assigned the value of 1 for foreign analysts and 0 otherwise
$Forana_t\_Post$	Interaction term for *Forana* and *Post*
Panel C: Control variables (individual characteristics, company characteristics)	
$Gexp_{it}$	General experience of an individual analyst, defined by his/her number of years of employment in the database
$Fexp_{ijt}$	Experience of an individual analyst in following a specific company, defined by the number of years he/she has made forecasts for the company in the database
$Ncom_{it}$	Number of listed companies the individual analyst has followed based on all data in the database
$Nind_{it}$	Number of industries the individual analyst has followed based on all data in the database, categorized according to CSRC
$Brktop10_{it}$	A dummy variable for the size of the brokerage where the analyst works, assigned the value of 1 for brokerages ranking in the top 10 in terms of the number of analysts and 0 otherwise
$Size_{jt}$	Size of the listed company, defined by the natural logarithm of its total assets
$Oprofvar_{jt}$	Longitudinal dispersion of the company's operating profits in the last 3 years, calculated by: $Oprofvar_i = \frac{Std(NI_i)}{Abs[Mean(NI_i)]} \quad i = -3, -2, -1$
ROE_{jt}	Return on stockholders' equity
Ret_EPS_{jt}	Correlation coefficient of buy and hold return and EPS in the past 5 years
$LogQFII_t$	Natural logarithm of annual QFII, in millions
$LogFH_{ijt}$	Actual number of days from the date the analyst forecast is issued to the date the annual earnings is announced (*Forecast Horizon*), with the natural logarithm being used in the regression

[a] Data on profit forecasts made by analysts from home and abroad are based on the company's normal operating activities. Because non-recurring profits and losses cannot be forecast, profits are calculated using data from the CSMAR database; I/B/E/S figures are similar.

3. Empirical analysis

3.1. Sample collection and descriptive statistics

This study draws on an initial sample comprising 134,062 observations (company-year-estimated observations by analysts) of all listed companies[7] followed by both Chinese and foreign analysts prior to the 2008 financial year (inclusive). On this basis, we delete 8859 observations for finance and insurance companies, leaving 125,203 in the sample. Furthermore, due to missing data on domestic analysts before 2002, we also delete pre-2002 company data[8] to enable better comparisons between Chinese and foreign analysts' performance, leaving 121,795 observations. Third, we omit sample observations for which the period is confined to between the 2nd quarter earnings announcement date and the annual earnings announcement date, leaving 44,811 observations. We then delete observations that have no analyst code or lack correlated variables, yielding a final sample of 38,140 observations. The data on Chinese analysts and financial data employed in this study come from the CSMAR database maintained by GTA Information Technology Co., Ltd. The data on foreign analysts come from I/B/E/S. Values for the QFII control variable are sourced from the CEIC database. Details of the sample screening process are provided in Panel A of Table 2. The table reports the following: company-year-analyst sample observations, company-year, company and the number of analysts following

[7] All A-share and B-share companies are included. Because no local analysts follow B-share companies, we examine only A-share companies in tests involving local analysts. However, we adopt B-share companies as our control sample in robustness tests.

[8] Another reason for deleting pre-2002 observations from the sample is because 2001 is the year in which key changes were made to Chinese accounting standards. There was no change in the philosophy underlying Chinese accounting standards from 2002 to 2006 (Liu et al., 2004).

Table 2
Sample screening process and yearly distribution.

Screening process		Company-year-analysts forecast	Company-year-analysts	Company-year	Company	Number of analysts following	
						Local	Foreign
Panel A: Sample screening process							
Initial sample: all observations of forecasts made by local and foreign analysts		134062	51624	6009	1472	2155	1355
Sample after deleting observations for listed finance and insurance companies		125203	48939	5891	1443	2032	1275
Sample after deleting pre-2002 observations		121795	47684	5555	1429	2032	1203
Observations for which the period is confined to between the 2nd quarter earnings announcement date and the annual earnings announcement date		44811	23923	4080	1303	1761	1110
Sample after deleting observations with no analyst code		42723	22834	4016	1286	1760	1109
Final sample after deleting observations missing data on variables such as analyst forecast error		38140	19621	3553	1160	1663	1058
Sample observations for companies followed by foreign analysts		19371	6329	2078	789		
Sample observations for companies followed by local analysts		18769	13292	3129	1086		
Explanation			2002 2003	2004	2005 2006	2007 2008	Total
Panel B: Yearly distribution[a]							
Sample[b]	Number of companies		87 258	389	524 611	782 902	3553
	Average number of analysts following each company		1.17 1.98	3.13	3.62 4.13	6.46 9.23	
	Average number of forecasts for each company		1.59 3.08	6.59	6.55 7.42	12.1 19.08	
Foreign analysts	Number of companies		12 78	234	232 398	482 642	2078
	Average number of analysts following each company		1.25 1.62	2.58	2.34 2.61	2.9 4.05	
	Average number of forecasts for each company		3.83 4.95	7.92	7.35 6.67	7.99 13.83	
Local analysts	Number of companies		76 223	292	468 521	725 824	3129
	Average number of analysts following each company		1.14 1.73	2.1	2.89 2.85	5.04 6.94	
	Average number of forecasts for each company		1.21 1.83	2.43	3.69 3.61	7.74 10.12	

[a] Statistics based on the financial year.
[b] Among all company-year sample observations, 1654 are for companies followed by the two types of analysts simultaneously, representing 47% of the total sample (3553). They involve 677 companies, representing 58% of the total number of companies (1160).

the company. Differences between company-year-analyst sample observations and company-year analyst forecasts are due to multiple forecasts being made by some analysts during the sample period. Panel B of Table 2 reports the number of companies followed by analysts and the distribution of forecasts from year to year, showing a significant increase in the number of companies followed by foreign analysts since 2007 (from 398 in 2006 to 482 in 2007 and 642 in 2008), as well as an increase in the average number of analysts following each company, from 2.61 in 2006 to 4.05 in 2008, jumping by more than 50%. To some extent, these figures demonstrate that the new accounting standards have attracted more foreign analysts to follow Chinese listed companies, while the growth in the average number of analysts following these companies is even more substantial, rising from 2.85 in 2006 to 5.04 in 2007 and 6.94 in 2008. Furthermore, in terms of the number of years each company is followed by an individual analyst, fluctuations among foreign analysts are less marked than those among Chinese analysts, possibly owing to new local analysts entering the market after 2006.

3.2. Effect of accounting standard changes on the accuracy of foreign analyst forecasts

This study starts with univariate analysis designed to test Hypothesis 1. The results shown in Table 3 illustrate the variation in forecast error among local and foreign analysts prior to and after the new accounting

Table 3
Forecast error differences between local and foreign analysts prior to and after the enactment of new accounting standards.

Type	Explanation	Obs.	Mean	Median	*t*-Test	Wilcoxon
Foreign analysts	Prior to the new standards	5625	0.054	0.0298	8.12***	10.79***
	After the new standards	13746	0.043	0.0223		
Local analysts	Prior to the new standards	4678	0.011	0.0048	−12.24***	−0.11
	After the new standards	14091	0.017	0.0043		

Table 4
Descriptive statistics.

Variable	Obs.	Mean	Median	STD	Min.	Max.
Panel A: Full sample						
AFEP	38140	0.031	0.011	0.058	0.000	0.680
Ananum	3553	5.522	3.000	6.511	1.000	45.000
Size	38140	22.630	22.464	1.345	19.650	27.301
Oprofvar	38140	0.581	0.326	1.118	0.012	13.819
ROE	38140	0.130	0.126	0.116	−0.605	0.624
Ret_EPS	38140	2.506	1.007	8.310	−35.200	67.080
LogQFII	38140	9.068	9.235	0.740	0.000	9.563
FH	38140	139.345	147.000	68.985	0.000	293.000
Panel B: Individual characteristics of foreign analysts						
Gexp	1058	3.367	2.000	3.332	1.000	16.000
Fexp	1058	1.073	1.000	0.391	1.000	6.000
Ncom	1058	10.124	9.000	7.912	1.000	64.000
Nind	1058	1.852	1.000	1.421	1.000	14.000
Brktop10	1058	0.751	1.000	0.432	0.000	1.000
Panel C: Individual characteristics of local analysts						
Gexp	1663	1.784	1.000	1.179	1.000	8.000
Fexp	1663	1.061	1.000	0.330	1.000	7.000
Ncom	1663	6.210	5.000	5.792	1.000	134.000
Nind	1663	2.017	2.000	1.222	1.000	14.000
Brktop10	1663	0.348	0.000	0.476	0.000	1.000

standards were enacted. The number of forecasts made by both of these groups increased significantly from 5625 to 13,746 among foreign analysts and from 4678 to 14,091 among local analysts. Moreover, forecast error among foreign analysts after the new accounting standards were implemented fell dramatically: the mean dropped from 0.054 to 0.043 and the median from 0.0298 to 0.0223, both of which are statistically significant results. In contrast, mean forecast error among local analysts rose from 0.011 to 0.017. These findings are consistent with H1, implying that the new accounting standards have made foreign analysts more familiar with Chinese accounting standards and reduced the uncertainty of future profit forecasts based on information in financial reports, which is helpful in improving the accuracy of forecasting (Zhang, 2006).

Table 4 reports descriptive statistics for the full sample examined in this paper and for the individual characteristics of the two types of analysts. Panel A shows statistics for all variables other than analysts' individual characteristics. With the exception of the *Ananum* variable, for which data is gathered on the basis of a company-year sample, the other variables are all based on a company-year-analyst forecast sample (comprising 38,140 observations in total). Panel B and Panel C show statistics for analysts' individual characteristics and a sample based on individual analysts (1058 foreign analyst observations and 1663 local analyst observations, respectively). Panel A demonstrates that the average forecast error among analysts represents 3.1% of the stock price, the average number of analysts following the company is about six, and the average actual number of days between the analyst forecast issuance date and the earnings announcement date is about 140 (*FH*). A comparison between Panel B and Panel C shows that the average work experience of foreign analysts following Chinese listed companies is 3.367 years (*Gexp*), higher than that of local analysts (1.784); the

Table 5
Correlation coefficient matrix.

Variable	*AFEP*	*Gexp*	*Fexp*	*Ncom*	*Nind*	*Brktop10*	*Anamum*	*Size*	*LogQFII*	*Oprofvar*	*ROE*	*Ret_EPS*	*FH*
AFEP		0.021***	0.009*	0.115***	0.081***	0.026***	−0.054***	0.164***	−0.016***	0.075***	−0.233***	0.05***	0.086***
Gexp	−0.024***		0.358***	0.128***	0.027***	−0.024***	0.137***	0.117***	0.11***	0.017***	0.011**	0.026***	−0.057***
Fexp	0.035***	0.454***		0.033***	−0.021***	−0.024***	0.15***	0.108***	0.132***	−0.014***	0.004	0.015***	−0.075***
Ncom	0.162***	0.232***	0.142***		0.768***	−0.167***	−0.025***	0.005	0.083***	0.013**	−0.031***	0.02***	−0.019***
Nind	0.064***	0.028***	0.025***	0.631***		−0.221***	−0.092***	−0.069***	0.057***	−0.003	−0.024***	0.008	−0.016***
Brktop10	0.074***	−0.046***	−0.021***	−0.114***	−0.174***		−0.163***	0.003	−0.064***	0.013**	−0.037***	−0.005	−0.036***
Ananum	−0.099***	0.224***	0.144***	−0.003	−0.092***	−0.151***		0.401***	0.258***	−0.029***	0.14***	0.098***	0.103***
Size	0.193***	0.104***	0.12***	0.02***	−0.092***	0.002	0.397***		0.065***	0.013***	−0.06***	0.043***	0.017***
LogQFII	0.108***	0.264***	0.184***	0.193***	0.106***	−0.033***	0.379***	0.098***		0.013**	−0.003	0.106***	−0.021***
Oprofvar	0.103***	0.021***	0.001	0.019***	0.029***	0.006	−0.019***	0.003	0.068***		−0.173***	−0.019***	−0.003
ROE	−0.118***	0.036***	0.013***	−0.039***	−0.062***	−0.032***	0.205***	0.008	−0.074***	0.064***		−0.098***	−0.034***
Ret_EPS	0.011**	0.058***	0.028***	0.046***	0.039***	−0.024***	0.13***	−0.017***	0.224***	0.095***	0.024***		0.013**
FH	0.135***	−0.06***	−0.081***	−0.036***	−0.011**	−0.036***	0.099***	0.019***	−0.164***	0.013***	−0.032***	0.018***	

Note. The upper right corner shows Pearson correlation coefficients and the bottom left corner displays Spearman correlation coefficients. The sample comprises 38140 observations.
* 10% Significance level.
** 5% Significance level.
*** 1% Significance level.

average number of years foreign analysts have followed this specific company is 1.073 (*Fexp*), close to that of local analysts; the average number of companies followed by each foreign analyst is 10 (*Ncom*), higher than that of local analysts (6.21); the average number of industries followed by each foreign analyst is 1.852 (*Nind*), close to that of local analysts; and 75% of foreign analysts work for big brokerages, higher than the proportion of local analysts (35%). These results indicate that foreign analysts are more sophisticated than their local peers, i.e., foreign analysts follow more Chinese listed companies and work for bigger brokerages than local analysts.

The correlation matrix is displayed in Table 5. It shows a significant negative correlation between *AFEP* and *Gexp* and significant positive correlations between *AFEP* and both *Ncom* and *Nind*, implying the less experienced the analyst, the more companies and industries they follow and the higher the level of forecast

Table 6
Regression analysis of forecast error among foreign and local analysts before and after implementation of new standards.

Variable	Foreign analysts	Local analysts	Total sample
Constant	−0.0932*	−0.0860***	−0.117***
	(−1.807)	(−4.677)	(−3.810)
Post	−0.0124**	0.00231*	0.00279*
	(−2.146)	−1.95	−1.917
Forana			0.0409***
			−6.873
Forana_Post			−0.0160***
			(−2.762)
Gexp	−0.000176	−5.86E−05	−7.03E−05
	(−0.408)	(−0.311)	(−0.244)
Fexp	0.000655	0.000506	0.000639
	−0.643	−1.511	−1.341
Ncom	0.000382**	0.000228***	0.000234***
	−2.191	−6.071	−3.294
Nind	0.000327	−0.00125***	5.07E−05
	−0.469	(−4.694)	−0.119
Brktop10	−0.000144	−0.00205***	−0.00231***
	(−0.101)	(−4.359)	(−2.855)
Ananum	0.000232	0.000204	9.73E−05
	−0.415	−1.258	−0.49
Size	0.00699***	0.00355***	0.00542***
	−2.692	−4.541	−3.737
Oprofvar	0.0017	0.00196***	0.00180**
	−1.484	−3.013	−2.352
ROE	−0.113***	−0.128***	−0.117***
	(−4.944)	(−8.873)	(−6.799)
Ret_EPS	0.000287*	0.000214**	0.000242**
	−1.92	−2.089	−2.029
LogQFII	−0.00366**	0.000274	−0.00117*
	(−2.300)	−0.873	(−1.661)
LogFH	0.00410***	0.00568***	0.00495***
	−4.331	−14.55	−8.765
Ind Control	Yes	Yes	Yes
Observations	19371	18769	38140
Adjusted R^2	0.099	0.239	0.18

Note. The explanatory variable is profit forecast error among analysts *AFEP*. *LogFH* is calculated by taking the logarithm of 1 plus FH. *t*-values are reported in brackets and are adjusted for clustering at the company level.

* Significance level of 10%.

** Significance level of 5%.

*** Significance level of 1%.

error. In addition, the significant positive correlations between *AFEP* and both *Fexp* and *Brktop10* indicate that contrary to our expectations, the longer the analyst has followed the company, the bigger the brokerage they work for and the higher the level of forecast error.

The results of regressions based on Model (1) and Model (2) are displayed in Table 6. The first two columns report the results of separate regressions for foreign analysts and local analysts, respectively. The last column shows the results of a regression for the two groups of analysts combined. In unreported analysis, we examine the VIFs of various variables, all of which are below 5 and thus indicate the absence of significant multicollinearity. In Table 6, following the implementation of accounting standard changes, *Post* is significantly negative for foreign analysts and significantly positive for local analysts, thus demonstrating an improvement in forecast error among foreign analysts and a deterioration in forecast error among local analysts. We integrate the two types of analysts into the regression model in the last column to explore the relative reduction in forecast error among foreign analysts. The interaction term *Forana_Post* is significantly negative, revealing a reduction in forecast error among foreign analysts relative to local analysts following the implementation of the new standards. In summary, these results point to a significant reduction in the forecast error of foreign analysts after the accounting standard changes, a result not affected by fluctuations in the analyst industry as a whole. This evidence is consistent with H1.

Turning to the control variables, the insignificance of the results for the individual analyst characteristics variables *Gexp, Fexp* and *Nind* and the significant positive coefficient on *Ncom* demonstrate that the more companies an analyst follows, the higher the level of forecast error, a finding consistent with that of Clement (1999). However, the significant negative result for *Brktop10* is inconsistent with our expectations, and is more prominent in the local analysts group than in the foreign analysts group. Furthermore, we find the larger the company (*Size*), the larger the variation in profits (*Oprofvar*), the longer the horizon between the forecast issuance date and the annual earnings announcement date (*LogFH*) and the worse the company's performance, the larger the forecast error among analysts, all of which are consistent with our predictions. Moreover, the higher the annual *QFII*, the lower the level of forecast error among foreign analysts, a result not repeated for the local analysts group (for which we find an insignificant coefficient on *LogQFII*). Together with the results shown in Table 8, we find that QFII investment in the Chinese capital market is an important factor contributing to improved forecast quality and a higher number of foreign analysts following Chinese companies. Above all, the results for the control variables are consistent with those reported in prior research.

3.3. Effect of accounting standard changes on the number of foreign analysts following Chinese companies

After the new standards were implemented, the information costs of foreign analysts declined owing to their familiarity with IFRS, leading to a rational expectation they would increase the number of forecasts they made on Chinese listed companies. We restrict our sample on a company-year basis to examine the effect of the new standards on the number of foreign analysts following Chinese companies. If in 1 year there are two types of analysts following one company, then two observations exist; otherwise, only one observation exists. This gives us a total of 5207 observations, including 2078 observations of companies followed by foreign analysts each year and 3129 observations of companies followed by local analysts each year (the details are given in Panel A of Table 2). We first look into differences in the number of analysts following each company and whether such differences are significant before and after the accounting standard changes. The results shown in Table 7 indicate that following the accounting standard changes, the average number of foreign analysts following Chinese listed companies increased substantially (fifth column) from 2.565 prior to their implementation to 3.358 post-implementation, with a 1% level of significance. Moreover, the number of local analysts following these companies also rose substantially from 2.490 pre-implementation to 5.954 post-implementation, an increase larger than that among foreign analysts.

Table 7 shows statistics on changes in the number of listed companies followed by Chinese and foreign analysts. The third column (Obs.) shows the annual number of listed companies followed by foreign analysts, with the total of 2078 including 818 observations before the standards were changed and 1260 after the new standards were implemented. It also reports the annual number of listed companies followed by local analysts, the total of 3129 including 1541 observations before the new standards were implemented and 1588 afterwards. The fourth column lists the number of companies followed by local and foreign analysts prior to and after

Table 7
Comparison of number of companies followed by foreign and local analysts.

	Explanation	Obs.	Fm obs.	Mean	Median	*t*-Test	Wilcoxon
Foreign analysts	Before the changes	818	397	2.565	2	−7.14*	−5.86*
	After the changes	1260	740	3.358	2		
Local analysts	Before the changes	1541	723	2.49	2	−22.44*	−19.81*
	After the changes	1588	946	5.954	4		

***Significance at the 1% level.
**Significance at the 5% level.
* Significance at the 10% level.

the accounting standard changes,[9] showing 397 companies were followed by foreign analysts before the changes and 740 after the changes, an increase of nearly 100%, while the corresponding number of companies followed by local analysts increased less markedly from 723 to 946.

Table 8 provides regression results based on Model (3), among which the result for *Post* is positive for both the local analysts group and the foreign analysts group, the latter indicating a significant rise in the number of foreign analysts following Chinese listed companies after the changes and supporting Hypothesis 2. However, we also find that the corresponding number of local analysts rose proportionally more than that of foreign analysts (derived from the interaction variable for the full sample result for *Forana_Post*). The increase in the number of local analysts is substantially larger than that of foreign analysts, probably due to the ongoing prosperity of the Chinese capital market and more analysts joining the industry.

Turning again to the control variables, *Size, ROE* and *LogQFII* are all significantly positive in the three groups, and *Oprofvar* is significantly negative, indicating that the larger the company, the better its performance and the higher the level of QFII investment, the more analysts following the company. However, larger fluctuations in performance (*Oprofvar*) reduce the number of analysts following the company. These results are also consistent with those of previous research.

3.4. Robustness tests

We conduct a series of four robustness tests to confirm the validity of our results. First, the main test includes all companies followed by local and foreign analysts to mitigate sample selection bias. If foreign analysts followed a company only before the accounting standard changes were implemented or entered the industry only after the changes were made, then the reduction in forecast error might not have been caused by the accounting standard changes, but may instead be attributable to other changes in macro factors. Therefore, to enhance the reliability of our results, we restrict the sample further by requiring each type of analyst to have followed the company both before and after the accounting standard changes, thus omitting observations with only one type of follower before or after the accounting standard changes. This criterion results in a sample comprising 31,542 observations. On a similar basis, limitations are also placed on the individual characteristics of analysts and companies and on the effect of the macro environment. The results based on Model (2) are displayed in the first column (Eq. (1)) of Table 9. They are consistent with those presented in Table 6 and provide additional support for our hypotheses.

Second, while the robustness test above (Table 9, Eq. (1)) requires each type of analyst to have followed the company both before and after the accounting changes were made, our next test imposes a more restrictive requirement that an individual analyst (local or foreign) has to have followed Chinese listed companies both before and after the accounting standard changes, which reduces the number of observations sharply to 6827. Based on this and the previous limitations on individual factors, company characteristics and macro factors, the second column (Eq. (2) of Table 9 lists the results obtained using Model (2), which conform to those reported in Table 6.

[9] We ignore the effect of various years before and after the accounting standard changes. For example, if company A was followed by any foreign analyst in 2003 and 2004, i.e. prior to the accounting standard changes, we treat it as a single company. The approach taken in other circumstances is similar.

Table 8
Analysis of number of analysts following companies.

Variable	Foreign analysts	Local analysts	Total sample
Constant	−7.403***	−6.307***	−6.627***
	(−16.14)	(−16.69)	(−18.83)
Post	0.106***	0.538***	0.524***
	(3.283)	(20.16)	(19.93)
Forana			−0.160***
			(−5.441)
Forana_Post			−0.375***
			(−11.23)
Size	0.321***	0.286***	0.302***
	(16.55)	(17.34)	(19.90)
Oprofvar	−0.0369***	−0.0432***	−0.0401***
	(−2.708)	(−3.886)	(−3.909)
ROE	1.316***	2.177***	1.803***
	(7.502)	(12.42)	(11.75)
Ret_EPS	0.00469**	0.00208	0.00308*
	(2.153)	(1.083)	(1.762)
LogQFII	0.132***	0.0840***	0.0911***
	(6.978)	(12.38)	(14.25)
Ind Control	Yes	Yes	Yes
Observations	2078	3129	5207
Adjusted R^2	0.306	0.356	0.343

Note. The explanatory variable is $Ananum_{jt}$ and is calculated by taking the natural logarithm. *t*-values are reported in brackets and are adjusted for clustering at the company level.
* Significance at the 10% level.
** Significance at the 5% level.
*** Significance at the 1% level.

Third, the main test differentiates between foreign analysts and local analysts according to the database employed, with information on the former group being drawn from the I/B/E/S database and information on the latter from the CSMAR database. An important problem, however, is whether the I/B/E/S data include predictions made by local analysts. To enhance the robustness of our main results, we limit the data on foreign analysts to data on those following both foreign and Chinese listed firms. This approach adds to the robustness of our results, but leaves us with fewer observations for foreign analysts. After applying this restriction, we obtain a total of 12,236 observations representing 63.17% of the full sample. The results based on Model (2) are shown in the third column (Eq. (3)) of Table 9 and are similar to the findings reported in Table 6.

Finally, in the main regression analysis, we use local analysts as our control sample to examine the effect of accounting standard changes on foreign analysts. Yet B-share companies could also be used as a control sample, as they have been required to conform to IFRS throughout the sample period. Therefore, if our expectations still hold using B-share companies as our control sample, we should observe a change in the level of forecast error among foreign analysts of A-share companies and no change in the level of forecast error among foreign analysts of B-share companies. The results of this robustness test are shown in Table 10, where foreign analysts are our treatment sample and are required to have followed the company both before and after the accounting standard changes. The results show a significant drop in foreign analyst forecast error for A-share companies (at the 1% level of significance) and an insignificant change in foreign analyst forecast error for B-share companies. It should be noted, however, that the coefficient on *Post* in the B-share companies group is close to being significant ($t = 1.667$) and is larger than that on *Post* in the A-share companies group.[10] Considering the smaller sample of B-share companies[11] and the smaller *t*-value obtained, the result is unstable and should be interpreted with caution.

[10] We thank the anonymous referee for this suggestion.
[11] Statistically, there are only 32 B-share companies followed by foreign analysts. This small control sample implies a possibility of one-sided evidence.

Table 9
Results of robustness tests.

Variable	Eq. (1) Sample firms followed by one type of analyst before and after 2007	Eq. (2) Sample of a specific company followed by a specific analyst before and after 2007	Eq. (3) Sample after deleting data of analysts that do not follow foreign companies in I/B/E/S
Constant	−0.130***	−0.0644***	−0.110***
	(−3.591)	(−3.731)	(−3.570)
Post	0.00292*	0.00109	0.00343**
	−1.908	−0.503	−2.378
Forana	0.0403***	0.0320***	0.0446***
	−6.7	−18.08	−6.031
Forana_Post	−0.0161***	−0.00933***	−0.0175**
	(−2.725)	(−3.883)	(−2.438)
Gexp	−0.000157	0.000637**	−0.000467
	(−0.458)	−2.223	(−1.407)
Fexp	0.000951*	0.00166***	0.000732
	−1.702	−2.855	−1.54
Ncom	0.000245***	−0.000364***	0.000149***
	−2.856	(−3.295)	−2.701
Nind	0.00021	0.00103**	0.000581
	−0.422	−2.171	−1.333
Brktop10	−0.00226**	−0.00253**	−0.00148*
	(−2.546)	(−2.143)	(−1.712)
Ananum	0.000186	0.000353**	6.44E−05
	−0.839	−2.515	−0.333
Size	0.00609***	0.00398***	0.00482***
	−3.527	−7.532	−3.426
Oprofvar	0.00159	0.00165**	0.00183**
	−1.424	−2.476	−2.322
ROE	−0.114***	−0.0846***	−0.116***
	(−5.433)	(−14.99)	(−6.655)
Ret_EPS	−8.23E−05	−0.000174	0.000244*
	(−0.711)	(−1.550)	−1.954
LogQFII	−0.00148*	−0.00282**	−0.000514
	(−1.935)	(−2.339)	(−0.748)
LogFH	0.00444***	0.00282***	0.00505***
	−7.021	−4.329	−8.42
Ind Control	Yes	Yes	Yes
Observations	31542	6827	31005
Adjusted R^2	0.18	0.132	0.192

Note. The explanatory variable is profit forecast error among analyst *AFEP*. *LogFH* is calculated by taking the logarithm of 1 plus FH. *t*-values are reported in brackets and are adjusted for clustering at the company level.
* Significance at the 10% level.
** Significance at the 5% level.
*** Significance at the 1% level.

4. Conclusion

This study examines the effect of Chinese accounting standard changes on foreign analysts' behavior and shows the influences international convergence toward IFRS might have had on the behavior of foreign investors. We believe that the accounting standard changes made in 2007, which were aimed at IFRS convergence, affected the behavior of foreign analysts in two ways. First, they reduced forecast error by improving the quality of information in financial reports and lowering information uncertainty. Second, due to the familiarity of foreign analysts with IFRS, the accounting standard changes attracted more analysts to follow Chinese listed companies and enhanced the accuracy of their forecasts. Our empirical evidence confirms the expectations reflected in our two hypotheses. In designing this study, we decided to adopt local analysts as our control

Table 10
Results based on sample of foreign analysts only.

Variable	A-share companies sample	B-share companies sample
Constant	−0.0911**	−0.569
	(−2.082)	(−0.554)
Post	−0.00740***	−0.0674
	(−3.796)	(−1.667)
Gexp	−6.80E−05	0.00275
	(−0.128)	−0.347
Fexp	0.000589	0.00682
	−0.748	−0.554
Ncom	0.000125	−0.000278
	−1.046	(−0.144)
Nind	0.000421	0.0043
	−0.809	−0.419
Brktop10	0.00296**	−0.00575
	−2.01	(−0.290)
Ananum	0.00146**	−0.00332
	−2.592	(−0.477)
Size	0.00401**	0.0344
	−2.422	−0.734
Oprofvar	0.000972	−0.00759
	−0.836	(−0.474)
ROE	−0.0849***	−0.514
	(−4.722)	(−1.307)
Ret_EPS	−0.000161	0.00632*
	(−1.212)	−1.759
LogQFII	0.00111	0.00687
	−0.712	−1.259
LogFH	0.00192***	0.00316
	−3.316	−0.301
Ind Control	Yes	Yes
Observations	10113	1321
Adjusted R^2	0.114	0.23

Note. The explanatory variable is profit forecast error among analysts *AFEP*. *LogFH* is calculated by taking the logarithm of 1 plus FH. *t*-values are reported in brackets and are adjusted for clustering at the company level.

* Significance at the 10% level.
** Significance at the 5% level.
*** Significance at the 1% level.

sample to highlight the incremental effect of the accounting standard changes on foreign analyst forecasts. We find the changes attracted more foreign analysts to follow Chinese listed companies and that forecast error among foreign analysts fell after the new standards were implemented, with the extent of the fall being significantly larger than that seen among local analysts. These results indicate that IFRS convergence has enhanced the familiarity of foreign analysts with Chinese accounting standards, has boosted their enthusiasm to follow Chinese listed companies, has improved the accuracy of their forecasts, has contributed to reducing the information costs of foreign investors and has improved the efficiency of resource allocation. Our results give us a clearer understanding of the effect of Chinese accounting standard changes on foreign investors (or foreign analysts) and are of value to both policymakers and practitioners in facilitating sound economic decisions.

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Controller changes and auditor changes

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ABSTRACT

Using listed companies in China's A-share market from 1997 to 2009, this paper investigates the relationship between controller changes (including changes in controlling shareholders, directors and CEOs) and auditor changes. The empirical evidence indicates that controller changes are positively related to auditor changes and that auditor changes are more likely if there are extensive controller changes. For companies in which both the controlling shareholder and the auditor change, if the successor controlling shareholder is controlled by an other-province government, the auditor is more likely to be replaced and the successor auditor is more likely to be a smaller auditor from the same province as the new controlling shareholder.

1. Introduction

Auditor changes (or auditor switches)[1] and opinion shopping have been the subject of considerable concern from investors, regulators and researchers. The extant research has identified several reasons for companies to change auditors, including the desire to decrease audit fees, improve the credibility of annual reports, improve audit quality, lower agency costs, obtain a more favorable audit opinion, etc. (Firth, 1999). Of these, opinion shopping, whereby management replaces the incumbent auditor with one who will accept more aggressive

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[1] Generally, auditor changes involve the replacement, through dismissal or resignation, of the accounting firm (not the CPA) that audits the financial statements of a company. We are not concerned with involuntary auditor changes, such as changes caused by accounting firm dissolution.

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Table 1
The probability of controlling shareholder change, chairman change and CEO change.

	Controlling shareholder change (%)	Chairman change (%)	CEO change (%)	Any change (%)
Sample with auditor changes ($n = 1169$)	20.7	32.5	36.5	52.3
Sample without auditor changes ($n = 13{,}238$)	5.9	18.6	23.4	34.6
Difference	14.8***	13.9***	13.1***	17.7***

*** Indicates significance at the 1% level.

Table 2
Average ROA and the probabilities of receiving a qualified opinion, controller change and auditor change.

Average ROA	⩽−0.15	(−0.15, −0.05]	(−0.05, 0.05]	>0.05	All
The probability of receiving a qualified opinion in the previous year (%)	60.5	30.1	16.5	5.5	11.3
The probability of controlling shareholder change in this year (%)	17.4	14.2	8.9	5.5	7.1
The probability of main business change in this year (%)	3.9	3.1	1.8	1.1	1.5
The probability of chairman change in this year (%)	40.7	32.5	25.1	16.3	19.7
The probability of CEO change in this year (%)	44.3	36.6	28.8	21.5	24.6
The probability of auditor change in this year (%)	20.1	11.9	9.7	6.7	8.1
Sample size	772	741	2069	10,703	14,285

accounting numbers, has received the most attention. However, most of the relevant research has found that management attempts to engage in opinion shopping are unsuccessful. In this study's sample, companies that change (do not change) their auditors after receiving a qualified opinion have a 64.1% (64.0%) probability of receiving a qualified opinion.

If a company cannot obtain a more favorable opinion, why does it change its auditor after receiving a qualified opinion? Table 2 shows that companies receiving qualified opinions usually have poor performance and are more likely to experience a controlling shareholder change, chairman of the board change and CEO change. It is possible that the companies change their auditor either because the controller changes or because the firm is performing poorly. In Beattie and Fearnley's (1995) survey, 14% of the respondents cite "merger/takeover with/by another company" as the reason for a change in auditor and they also find that a change (or consideration of a change) of auditor is associated with changes in top management. Anderson et al. (1993) identify corporate takeovers as events that generate auditor choice decisions, the acquiring company (the acquirer) has to choose whether to retain the new subsidiary's (the acquiree's) incumbent auditor or switch to its own auditor. Firth (1999) finds that of the 175 takeovers which took place in the UK from 1976 to 1992 (in which all of the acquirers and acquirees were publicly listed companies), 141 switched the auditor of the subsidiary to that of the acquirer and 34 retained the incumbent auditor of the subsidiary for at least 2 years following the takeover. These auditor changes were based on the perceived cost savings and efficiency benefits derived from the use of one auditing firm rather than two.

The transfer of controlling rights in China's capital market offers a unique opportunity to investigate the relationship between controller changes and auditor changes. First, most of the acquirers are non-listed companies. Second, most of the acquirers and acquirees are not in the same or a similar industry. Third, most of the sellers of controlling shares are state controlled, whereas the acquirers are mixed – some are controlled by individuals, some by the central government, some by local governments and some by other province governments (provinces other than that of the companies themselves). It is the identity (individual, central government, local government, other-province government) of the acquirer, not the similarity of activities (main business) of the acquirer and the acquiree (as investigated by Firth, 1999), that determines whether or not the acquiree's auditor is changed.

Using 14,407 observations of listed companies on China's capital market from 1997 to 2009, this paper finds that auditor changes are positively related to controller changes (including controlling shareholder changes, chairman of the board changes and CEO changes). This positive relationship is more pronounced

when there are more extensive controller changes, such as when both the controlling shareholder and the chairman (or CEO) change or if the predecessor and the successor controlling shareholders are not controlled by the same government or if the successor chairman or CEO is from outside the company. I also find that for companies in which the controlling shareholder and auditor change, if the successor controlling shareholder is controlled by an other-province government, the auditor is more likely to be replaced and the successor auditor is more likely to be a smaller auditor from the same province as the new controlling shareholder.

This paper makes the following contributions: (1) the findings suggest that auditor changes are influenced more by controller changes (especially controlling shareholder change) than by qualified opinions; (2) it subdivides the types of controlling shareholder changes, the identities of the successor controlling shareholders and the origins of the successor chairman and CEO; and (3) it investigates how the successor controlling shareholder chooses an auditor for the acquiree.

Zhang et al. (2010) investigate the effects of controlling shareholder changes and management changes on auditor changes and find that management changes, rather than controlling shareholder changes, result in auditor changes. Their findings differ from those reported here, which show that controlling shareholder changes result in auditor changes. However, I question the data used by Zhang et al. (2010). In their 7997 sample observations in the 2001–2007 period, the percentage of auditor change is 25.45%, which seems beyond belief. For example, Wen and Ding (2007) report 8.2% auditor change in their 4444 sample observations in the 2001–2004 period and Wu and Zhu (2010) report 12% auditor change in their 10,510 sample observations in the 2000–2008 period and this 12% already includes mandatory auditor changes. In the sample used in this paper, 8.1% of companies changed their auditor, and the figure is 8.7% for the 2001–2007 period. This is close to that of Wen and Ding (2007) and Wu and Zhu (2010). I conjecture that Zhang et al.'s (2010) auditor change sample firms include mandatory auditor changes, auditor mergers and auditor name changes.

2. Literature review and theoretical analysis

2.1. Auditor changes and opinion shopping

A large volume of literature has reported evidence indicating that companies are more likely to change their auditors after receiving qualified opinions (Chow and Rice, 1982; Krishnan and Stephen, 1995; Li et al., 2001; Geng and Yang, 2001; Li and Wu, 2002a). Krishnan (1994) finds that auditor changes are triggered by auditors' use of conservative judgments for some clients. However, most of the related literature finds that companies that change auditors do not seem to receive "improved" opinions in the year following the change (Chow and Rice, 1982; Krishnan, 1994), suggesting that opinion shopping is generally futile. Chen and Zhang (2004), Wu and Tan (2005) and Wang (2006) find similar evidence in China. Krishnan et al. (1996) even find that auditors are more likely to issue qualified opinions to switchers. One exception is Lennox (2000), who finds that companies successfully engaged in opinion shopping in the UK.

China's reinforced regulations may prevent companies from successfully engaging in opinion shopping. Since 2002, the Chinese Institute of Certified Public Accountants (CICPAs) has introduced several measures relating to auditor changes, aimed at ensuring the independence of the successor auditor and preventing auditors from issuing improper opinions.[2] The CICPA issued an "Urgent notice on further carrying out the auditing of listed companies' annual reports of 2001," requiring auditors who were dismissed in the process of auditing listed companies' 2001 annual reports to report the events to the CICPA in writing by the end of April. This notice illustrates the CICPA's concern over auditor changes, which may be triggered by the intention to opinion shop (Li and Wu, 2002b). On June 25th, 2002, the CICPA issued "The guiding opinions of CPA professional ethics," which clearly states that before accepting auditing work, the successor auditor should inquire with the predecessor auditor the reason for the auditor change and pay attention to the probable divergence between the auditor and management. One may conjecture that a rational and smart management would not change auditor merely for receiving a qualified opinion (Li and Wu, 2004).

[2] One example is "ZonHeng International (600862)." See Li and Wu (2002b).

2.2. Controller changes and auditor changes

In China, few qualified opinions are actually triggered by disagreements between the auditor and the firm's management, as most qualified opinions are either going-concern opinions or merely emphasize some important or abnormal events. Most of the companies that receive qualified opinions are falling into financial distress, have made losses in the past few years and have extremely high leverage. Some of them have had considerable sums of money misappropriated by their controlling shareholders. These companies have a high probability of bankruptcy and the probability of auditor resignation is relatively high. Schwartz and Menon (1985), Geng and Yang (2001) and Li and Wu (2002a) find that auditors are more likely to resign if clients are in financial distress. However, companies that are in financial distress are also more likely to go through controlling shareholder changes and management changes. Table 2 shows that poor performing companies are more likely to receive qualified opinions and also experience controller changes (including controlling shareholder changes, chairman changes and CEO changes) and auditor changes. Thus, the reason for auditor changes may not be qualified opinions, but poor performance or controller changes.

In China, the majority of listed companies have controlling shareholders who hold large proportions of outstanding shares and enjoy substantial control rights, including the right to choose the auditor. Liu et al. (2010) points out that since the establishment of the stock markets in the early 1990s, the right to choose the auditor has been controlled by controlling shareholders and management. Zhang and Zhang (2007) note that in the currently implemented auditor–client relationship, it is the agent of the company who chooses the auditor. Therefore, a change in the controller (the controlling shareholder, the chairman of the board or the CEO) may result in a change of auditor.

Beattie and Fearnley (1995), Anderson et al. (1993) and Firth (1999) note that acquiring companies change the acquiree's incumbent auditor. Anderson et al. (1993) and Firth (1999) focus on the similarity of the acquirer's and the acquiree's main business activities. The replacement of the acquiree's auditor by the acquirer's auditor is based on the perceived cost savings and efficiency benefits of using one auditing firm rather than two. These cost savings and efficiency benefits are more significant if the acquirer and the acquiree are in the same or a similar industry.

Transferring controlling rights in China's capital market is a quite different process from that in developed capital markets. First, most acquirers are non-listed companies. Second, most acquirers and acquirees are not in the same or a similar industry. Third, most sellers of controlling shares are stated-controlled and the acquirers are mixed – some are controlled by individuals, some by the central government, some by local governments and some by other-province governments (provinces other than that of the companies themselves). It is the identity (individual, central government, local government, other-province government) of the acquirer, not the similarity of activities (main business) of the acquirer and the acquiree (as investigated by Firth, 1999), that determines whether or not the acquiree's auditor is changed.

2.3. Choice of auditors

In markets in which companies require high quality audit services, companies select appropriate auditors to mitigate specific conditions, such as information asymmetry and agency problems. Pittman and Fortin (2004) find that retaining a Big Six auditor, which can reduce debt-monitoring costs by enhancing the credibility of financial statements, enables young firms to lower their borrowing costs. Choosing a Big Six auditor also affects firms' interest rates less over time and particularly benefits firms with short private histories that initially experience worse information problems. Using a broad sample from eight East Asian economies, Fan and Wong (2005) document that firms with agency problems embedded in their ownership structures are more likely to employ Big Five auditors. Lennox (2005) finds that the association between management ownership and audit firm size is significantly negative within low and high regions of management ownership. Using a unique dataset of 176 privatizations from 32 countries, Guedhami et al. (2009) find that privatized firms worldwide are less (more) likely to appoint a Big Four auditor with the extent of state (foreign) ownership. The basis of these studies is that it is the company (not the controller) that chooses the auditor that fits the company best.

In China's capital market, there is no evidence that companies need high quality audit services. Liu et al. (2002) points out that in the process of meeting the requirements of the regulatory authority in China, auditing is a by-product of imitating international routines and is not necessarily needed by the capital markets. Audit quality is not a variable in the cost-benefit functions of listed companies. Companies just need a clean opinion and it does not matter which auditor conducts the audit. In this case, the controller may choose the auditor from his own perspective.

Wang et al. (2008) find that compared with non-state-owned firms, Chinese state-owned enterprises controlled by province, city and county governments (local SOEs) are more likely to hire small auditors from the same region (small local auditors).

3. Empirical analysis

3.1. Sample

The sample includes listed companies in China's A-share market in the 1997–2009 period. This long period provides a large sample size to subdivide the sample by controlling shareholder change, the identities of successor controlling shareholders and the origins of the successor chairman and CEO. The sample starts from 1997 because controlling shareholder changes were rare before then. Every company in every year is a sample company, but I exclude the year when the company was first listed on the stock market because it was not listed in the previous year. I exclude companies whose predecessor auditors were disbanded or were banned by the regulatory authority from auditing listed companies. If two accounting firms merged, and these two accounting firms' clients employed the newly established accounting firm, I treat it as no auditor change. There are 14,407 sample observations with an auditor change rate of 8.1%.

Of these 14,407 sample observations, 1022 (7.1%) changed their controlling shareholder, 2839 (19.7%) changed their chairman of the board and 3526 (24.5%) changed their CEO. Controlling shareholder change refers to a change in the biggest shareholder[3] or the ultimate controller of the company. All related parties are regarded as one shareholder. If shares are transferred from a father (mother) to a son (daughter) or between shareholders controlled by the same individual, it is regarded as no transfer. Instances where the shareholder becomes the biggest shareholder by buying shares in the secondary market, there are generally several big shareholders or the biggest shareholder changes frequently and does not completely control the company are also regarded as no transfer. Management buy-outs (MBOs) are regarded as no transfer because the company was controlled by the management both before and after the MBO. There are eight methods for changing the controlling shareholder: (1) the predecessor and the successor biggest shareholders agree on the sale of the shares. If the government controls the shares, the change date is the day on which the agreed sale is eventually authorized by the government. If the government does not control the shares, the change date is the day on which the agreement is signed. (2) The biggest shareholder itself is sold out. The change date is the same as for method (1). (3) The listed company offers shares to the buyer, who then becomes the biggest shareholder. The change date is the day on which the China Securities Regulatory Commission (CSRC) approves the share offer plan. (4) Joint venture – the predecessor biggest shareholder contributes the shares to a corporation, which is then not controlled by the biggest shareholder itself, or the acquirer invests in the predecessor biggest shareholder and then controls it. The change date is the day on which the investment agreement is signed. (5) The change date is the jurisdiction day if the shares are transferred by jurisdiction. (6) Shares are not sold between the predecessor and successor biggest shareholders. The change date is the same as for method (1). (7) Shares are transferred within the same state-controlled group. The change date is the day on which the agreement is signed. (8) Free transfer between two state-controlled entities. The change date is the day on which the free transfer is eventually authorized by the government. In Table 8, I exclude the last two methods of controlling shareholder change as they are not commonly used and I obtain similar results (see Table 8).

[3] If the annual reports state that the biggest shareholder does not control the company, I do not treat it as the controlling shareholder. For example, The South Securities Co. was once the biggest shareholder of Harbin Pharmaceutical Group (600644), but the company's annual report identifies the controlling shareholder as Harbin Pharmaceutical Co., not South Securities Co.

3.2. Descriptive statistics

Table 1 shows that for the sample with auditor changes, the probabilities of a controlling shareholder change, chairman change and CEO change are 20.7%, 32.5% and 36.5% respectively, which are significantly higher than for the sample without auditor changes. For the sample with auditor changes, the probability of one of the three types of controller change (controlling shareholder change, chairman change and CEO change) is 52.3%, which is higher than the sample without auditor changes. The difference of 17.7% indicates that controller changes account for 17.7% of auditor changes.

In Table 2, the sample observations are divided into four sub-samples according to average ROA (average return on assets in the sample year and 1 year before) while excluding 122 sample companies in the finance industry. Table 2 shows that lower ROA is associated with higher probabilities of receiving a qualified opinion, controlling shareholder change, main business change, chairman change, CEO change and auditor change. Poor performing companies are more likely to manipulate earnings and have higher audit risk, thus the auditors are more likely to resign. Shu (2000) finds that auditors are more likely to resign from high-risk clients. Companies that receive a qualified opinion in the previous year are more likely to disagree with auditors, thus the auditors are more likely to resign. A change in the main business means that the new controlling shareholder injects business into the company that results in the company's main business changing. In the case of a main business change, the cost of an auditor change is not high because the predecessor auditor is not familiar with the new business.

3.3. Controller changes and auditor changes

Table 3 shows the probability of auditor change for the sample with (without) a controlling shareholder change, chairman change and CEO change in each year. It shows that the probability of auditor change is 16.8% higher for the sample with a controlling shareholder change than for the sample without. The difference between the samples with and without a chairman change (or CEO change) is also significant. The difference between the samples with and without a controlling shareholder change is much larger than that between the samples with and without a chairman change (or CEO change), which indicates that compared to a chairman change and CEO change, a controlling shareholder change has a stronger effect on auditor change.

In Table 4, the sample is divided into eight sub-samples according to whether or not the controlling shareholder, chairman and CEO change. It shows that the probability of auditor change increases with more controller changes (controlling shareholder, chairman and CEO). The difference between the two sub-samples in

Table 3
The probability of auditor change (%): subsample by year.

Year	97	98	99	00	01	02	03	04	05	06	07	08	09	All	Difference
Sample with controlling shareholder change	11.4	16.2	17.8	22.0	18.3	24.8	25.3	25.0	20.0	27.7	26.8	30.0	29.6	23.7	16.8***
Sample without controlling shareholder change	2.9	5.4	5.5	7.0	6.8	6.5	5.5	7.0	9.0	8.6	8.2	7.2	6.3	6.9	
Sample with chairman change	4.8	13.2	10.9	11.4	10.6	14.4	11.3	13.2	14.8	15.9	15.3	14.6	16.5	13.4	6.6***
Sample without chairman change	3.3	4.5	5.1	7.5	6.9	6.3	5.7	6.7	8.2	9.0	8.3	7.2	5.8	6.8	
Sample with CEO change	4.7	9.1	9.5	12.6	9.4	13.5	11.0	12.3	15.7	11.2	15.1	9.6	15.8	12.1	5.3***
Sample without CEO change	3.2	5.5	5.3	6.4	7.2	6.2	5.5	6.5	7.6	10.0	7.8	8.1	5.3	6.8	
All	3.6	6.4	6.6	8.4	7.8	8.3	6.9	7.9	9.5	10.3	9.5	8.4	7.5	8.1	
Sample size	478	683	804	891	875	1090	1186	1256	1337	1316	1372	1525	1594	14,407	

*** Indicates significance at the 1% level.

Table 4
The probability of auditor change (%): subsample by controller change.

Controlling shareholder	No change	Change	No change	Change	No change	Change	No change	Change
Chairman	No change	No change	No change	No change	Change	Change	Change	Change
CEO	No change	No change	Change	Change	No change	No change	Change	Change
Sample size	9220	371	1860	117	1124	166	1181	368
The probability of auditor change (%)	6.1	16.2	7.8	21.4	8.0	20.5	11.3	33.4
Difference	10.1***		13.6***		12.5***		22.1***	

*** Indicates significance at the 1% level.

each of the four groups is whether or not the controlling shareholder changes. It shows that in each of these four groups, the probability of auditor change for companies with a controlling shareholder change is much higher than that for companies without a controlling shareholder change. If we compare the probabilities of auditor change between sub-samples with and without a chairman change (or CEO change), we also find a difference, but the difference is not as large as that between sub-samples with and without a controlling shareholder change. This means that compared to a chairman change and a CEO change, a controlling shareholder change has a greater effect on auditor change.

3.4. The method of controlling shareholder change and the probability of auditor change

In Table 5, the sample is divided into eight sub-samples according to the method of controlling shareholder change. I define the first five methods as TYPE I and the last three methods as TYPE II. The controlling shareholder change is more extensive in TYPE I than in TYPE II. The probabilities of auditor change are different between TYPE I and TYPE II, indicating that the auditor is more likely to be replaced if there are more extensive controlling shareholder changes.

Table 5
The method of controlling shareholder change and the probability of auditor change.

The method of controlling shareholder change	*N*	Probability of auditor change (%)
Agreed sale of shares between the predecessor and successor biggest shareholders	476	26.5
The biggest shareholder is sold out	74	23.0
The listed company offers shares to the buyer	26	57.7
Joint venture	26	30.8
Shares are transferred by jurisdiction	99	28.3
Shares are sold not between the predecessor and successor biggest shareholders	40	15.0
Shares are transferred within the same state-controlled group	76	18.4
Free transfer between two state-controlled entities	205	13.7
TYPE I	701	27.7
TYPE II	321	15.0
Difference		12.7***
No controlling shareholder change	13,385	6.9

*** Indicates significance at 1%.

I also find that for companies with a main business change following controlling shareholder change, the probability of auditor change is 41.7%. For companies with a controlling shareholder change but no main business change, the probability of auditor change is 20.5%. The difference is highly significant (the *p*-value is 0.000).

3.5. The origins of the successor chairman and CEO and the probability of auditor change

The origin of the successor chairman and CEO implies the extent of controller change. For example, if the successor chairman is promoted from inside (usually from the position of vice-chairman or CEO), the controller change is not as severe as when the chairman is from outside.

Panel A of Table 6 shows that the probabilities of the successor chairman and CEO coming from outside are highest for a TYPE I controlling shareholder change and lowest for companies without a controlling shareholder change. Panel B of Table 6 shows that the auditor is more likely to be replaced if the successor chairman (or CEO) comes from outside.

3.6. Auditor change regressions

A logistic regression model is used to test the effects of a controlling shareholder change, main business change, chairman change and CEO change on auditor change. The dependent variable *AuditorChange* = 1 if the auditor changes, and 0 otherwise. The explanatory variables are defined as follows:

- *Holderchange* = 1 if the controlling shareholder changes, otherwise 0.
- *Businesschange* = 1 if the main business changes, otherwise 0.
- *Chairmanchange* = 1 if the chairman changes, otherwise 0.
- *CEOchange* = 1 if the CEO changes, otherwise 0.
- *Nonclean* = 1 if the company received a qualified opinion, otherwise 0.
- *ROA* = average return on assets in the sample year and 1 year before; *ROA* is winsorized at 1% to mitigate the influence of outliers.

Table 6
The origins of the successor chairman and CEO and the probability of auditor change.

	TYPE I controlling shareholder change	TYPE II controlling shareholder change	No change in controlling shareholder
Panel A: The probability of the successor chairman and CEO coming from outside			
The probability of the successor chairman coming from outside (%)	83.8	64.2	45.5
The probability of the successor CEO coming from outside (%)	71.1	58.2	39.5

	All	TYPE I controlling shareholder change	TYPE II controlling shareholder change	No change in controlling shareholder
Panel B: The probability of auditor change (%)				
The successor chairman comes from outside	17.0	34.0	22.8	10.9
The successor chairman comes from inside	9.4	21.7	12.8	8.7
Difference	7.6***	12.3**	10.0	2.2*
The successor CEO comes from outside	15.1	34.9	24.6	10.1
The successor CEO comes from inside	9.8	29.5	12.2	8.6
Difference	5.3***	5.4	12.4	1.5

*** Indicate significance at 1% levels.
** Indicate significance at 5% levels.
* Indicate significance at the 10% levels.

- *Merged* = 1 if the predecessor auditor is an acquired audit firm whose audit revenue is less than one-third of the acquirer audit firm; otherwise 0.

Merged equals 1 in 209 of the sample companies. A small audit firm being acquired by a big audit firm may result in auditor changes. For example, in the year following Ernst & Young's acquisition of the audit firm DaHua, 30 of DaHua's 46 client companies went through auditor change and 11 companies changed auditors in the year of the merger (Chen et al., 2010; Wang and Chen, 2004).

Table 7 presents the regression results. The coefficients for *Holderchange*, *Businesschange*, *Chairmanchange*, *CEOchange, Nonclean* and *Merged* are all significantly positive, indicating that a controlling shareholder change, main business change, chairman change, CEO change, qualified opinion and auditor firm being acquired all contribute to auditor change. The coefficient for *Holderchange* is much larger than that for *Chairmanchange* and *CEOchange*, indicating that controlling shareholder change has a stronger effect on auditor change. The Pseudo R^2 in regressions (1)–(3) show that controller changes have strong explanatory power for auditor change. I exclude one explanatory variable in each of the regressions from (4) to (10) and the Pseudo R^2 in regression (4) is the smallest, indicating that controlling shareholder change is the most powerful explanation for auditor change.

Table 8 presents robustness tests for the auditor change regressions. The first column, "Exclude sample," means that observations in which the controlling shareholder changes and shares are transferred within the same state-controlled group or there is a free transfer between two state-controlled entities are excluded. These two types of controlling shareholder change are not commonly referred to as controlling rights transfers. The regression results are similar to those in Table 7. I also divide the sample into three periods: 1997–2000, 2001–2006 and 2007–2009, because the institutional environment changed over these sample periods. In 2001, there was the YinGuangXia affair. In 2007, the new accounting standards and auditing standards began to be implemented. The regression results are similar to those in Table 7.

I do not control for auditor resignations, as companies usually do not report the reason for auditor changes. However, I can say that the probability of auditor resignation is slim for companies with positive ROA and companies that receive clean opinions, because these companies have relatively low audit risk. Therefore, I divide the sample into four sub-samples according to the variables *Nonclean* and *ROA*. For the sub-sample with *Nonclean* = 0 and $ROA \geqslant 0$, the regression results are similar to those in Table 7, indicating that the main findings in Table 7 are robust. For the sub-sample with *Nonclean* = 0 and $ROA < 0$, the

Table 7
Auditor change regressions.

AuditorChange	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Holderchange		1.13***	0.99***		1.07***	1.06***	1.01***	1.04***	1.01***	1.01***
		(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Businesschange		0.61***	0.51***	1.09***		0.53***	0.54***	0.64***	0.50***	0.47***
		(0.000)	(0.004)	(0.000)		(0.003)	(0.002)	(0.000)	(0.004)	(0.004)
Chairmanchange		0.38***	0.29***	0.42***	0.30***		0.38***	0.32***	0.28***	0.31***
		(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
CEOchange		0.34***	0.27***	0.31***	0.28***	0.36***		0.28***	0.27***	0.30***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
Nonclean	0.97***		0.77***	0.83***	0.80***	0.79***	0.78***		0.76***	0.96***
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Merged	1.57***		1.55***	1.58***	1.55***	1.55***	1.55***	1.52***		1.57***
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
ROA	−1.15***		−0.90***	−0.97***	−0.87***	−0.95***	−0.94***	−1.60***	−0.90***	
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Cons.	−3.21***	−3.64***	−3.51***	−3.41***	−3.54***	−3.47***	−3.45***	−3.35***	−3.51***	−3.69***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Year dummies	Control	Control	Control	Control	Control	Control	Control	Control	Control	Control
Pseudo R^2	0.0473	0.0474	0.0750	0.0628	0.0740	0.0733	0.0734	0.0659	0.0668	0.0733
N	14,285	14,285	14,285	14,285	14,285	14,285	14,285	14,285	14,285	14,285

*** Indicates significance at 1%. 122 companies in the finance industry are excluded.

Table 8
Robustness tests for auditor change regressions.

AuditorChange	Exclude sample	1997–2000	2001–2006	2007–2009	Nonclean = 0		Nonclean = 1	
					ROA ⩾ 0	ROA < 0	ROA ⩾ 0	ROA < 0
Holderchange	1.08*** (0.000)	0.92*** (0.000)	0.97*** (0.000)	1.11*** (0.000)	1.02*** (0.000)	0.98*** (0.000)	0.95*** (0.001)	1.01*** (0.000)
Businesschange	0.43** (0.018)	0.49 (0.267)	0.49* (0.063)	0.56** (0.050)	0.99*** (0.000)	0.83* (0.095)	0.14 (0.743)	−0.03 (0.939)
Chairmanchange	0.27*** (0.001)	0.24 (0.196)	0.26** (0.017)	0.38*** (0.007)	0.35*** (0.000)	0.38* (0.083)	0.09 (0.712)	0.02 (0.919)
CEOchange	0.27*** (0.000)	0.31* (0.075)	0.24** (0.020)	0.29** (0.034)	0.28*** (0.003)	0.53** (0.013)	0.17 (0.477)	0.12 (0.535)
Nonclean	0.79*** (0.000)	0.63*** (0.002)	0.88*** (0.000)	0.68*** (0.000)				
Merged	1.65*** (0.000)	1.73*** (0.000)	1.84*** (0.000)	1.21*** (0.000)	1.47*** (0.000)	1.89*** (0.000)	2.60** (0.023)	1.74*** (0.004)
ROA	−0.87*** (0.000)	−0.78 (0.154)	−0.84*** (0.001)	−1.02*** (0.001)	−0.75* (0.089)	−1.80** (0.011)	−1.01 (0.279)	−0.76** (0.049)
Cons.	−3.43*** (0.000)	−3.49*** (0.000)	−2.92*** (0.000)	−2.60*** (0.000)	−3.56*** (0.000)	−3.29*** (0.000)	−2.50*** (0.001)	−19.3*** (0.000)
Year dummy	Control	Control	Control	Control	Control	Control	Control	Control
Pseudo R^2	0.0755	0.0721	0.0777	0.0706	0.0431	0.0933	0.0690	0.0591
N	14,006	2850	7009	4426	11,348	1320	778	839

*** Indicate significance at 1% levels.
** Indicate significance at 5% levels.
* Indicate significance at 10% levels.

Table 9
Auditor change regressions according to the method of controller change.

AuditorChange	
Holderchange1	1.03*** (0.000)
Holderchange2	0.69*** (0.000)
Businesschange	0.41** (0.021)
Chairmanchange1	0.43*** (0.000)
Chairmanchange2	0.09 (0.426)
CEOchange1	0.31*** (0.001)
CEOchange2	0.23** (0.012)
Nonclean	0.76*** (0.000)
Merged	1.57*** (0.000)
ROA	−0.88*** (0.000)
Cons.	−3.50*** (0.000)
Year dummy	control
Pseudo R^2	0.0766
N	14,285

* Indicate significance at 10% levels.
*** Indicate significance at 1% levels.
** Indicate significance at 5% levels.

Table 10
The effects of the identity of the successor controlling shareholder on auditor change.

Identity of the successor controlling shareholder	*N*	The probability of auditor change (%)	*Scalechange*			
			N	1/4	Median	3/4
Local government	328	14.6	28	0.71	1.44	2.47
Other-province government	70	41.4	21	0.30	0.67	1.02
Local private	148	23.0	23	0.73	1.19	1.74
Other-province private	278	26.6	48	0.64	0.97	1.89
Central government and university	198	28.8	43	1.00	2.75	4.13

coefficients for *Businesschange* and *Chairmanchange* are positive, though only marginally significant. This may be due to the small sample size. For the sub-sample with *Nonclean* = 1, the coefficients for *Businesschange*, *Chairmanchange* and *CEOchange* are insignificant. Maybe there are more complicated reasons for these companies changing auditors. For all sub-samples, the coefficient for *Holderchange* is large and significantly positive and, once again, this means that compared to chairman and CEO changes, controlling shareholder changes have a stronger effect on auditor changes.

In Table 9, *Holderchange1* = 1 for companies with a TYPE I controlling shareholder change. *Holderchange2* = 1 for companies with a TYPE II controlling shareholder change. *Chairmanchange1* = 1 for companies with chairman change and the successor chairman comes from outside. *Chairmanchange2* = 1 for companies with chairman change and the successor chairman comes from inside. *CEOchange1* = 1 for companies with CEO change and the successor CEO comes from outside. *CEOchange2* = 1 for companies with *CEO* change and the successor *CEO* comes from inside.

The coefficients for *Holderchange1* and *Holderchange2* are significantly positive, and the coefficient for *Holderchange1* is larger than that for *Holderchange2*, indicating that compared to a TYPE II controlling shareholder change, a TYPE I controlling shareholder change has a stronger effect on auditor change. The coefficient for *Chairmanchange1* is significantly positive and the coefficient for *Chairmanchange2* is insignificant, indicating that a successor from outside affects auditor change, whereas a successor from inside does not. This may be because an inside successor would have held a previous top management position (usually vice-chairman or CEO) and thus would already have been acquainted with the incumbent auditor. The coefficients for *CEOchange1* and *CEOchange2* are significantly positive, indicating that CEO change affects auditor change, no matter where the successor comes from.

Table 11
Regression on the effects of the identity of the successor controlling shareholder on auditor change.

Scalechange	(1)	(2)
Other-province-state	−0.963* (0.073)	−1.058* (0.054)
Central	0.972** (0.018)	0.966** (0.024)
Buyper		−3.862 (0.475)
Buyper^2		7.087 (0.264)
Sellerper		1.756 (0.384)
Leverchange		−0.087 (0.615)
Cons.		2.048* (0.086)
Year dummy		Control
Adj. R^2	0.056	0.115
N	163	163

*** Indicate significance at 1% levels.
** Indicate significance at 5% levels.
* Indicate significance at 10% levels.

3.7. How does the successor controlling shareholder choose an auditor?

In Table 10, I divide the sample companies with controlling shareholder changes into five sub-samples according to the identities of the successor controlling shareholders. "Local" ("Other-province") means that the ultimate controller is located in (out of) the province of the sample company, but isn't the central government. Table 10 shows that other-province (local) governments are more (less) likely to change auditors. Of those companies with local governments as the successor controlling shareholder, 88% were already controlled by local governments before the controlling shareholder change. There are 39 companies with local governments as the successor controlling shareholder that were not previously controlled by local governments. The probability of auditor change of these 39 companies is 20.5%. If both the controlling shareholder and the auditor change, how does the successor controlling shareholder choose a new auditor? The variable *Scalechange* is the revenue of the successor auditor/revenue of the predecessor auditor. The sample period for "*Scalechange*" is 2002–2009 because revenue data is unavailable before 2002. Table 10 shows that controlling shareholders controlled by central governments and universities are more likely to choose larger auditors and controlling shareholders controlled by other-province governments are more likely to choose smaller auditors.

Table 11 is the regression of the effects of the identity of the successor controlling shareholder on auditor change. The dependent variable *Scalechange* is the revenue of the successor auditor/revenue of the predecessor auditor. The explanatory variables are as follows.

Other-province-state = 1 if the successor controlling shareholder is controlled by an other-province government, and 0 otherwise. *Central* = 1 if the successor controlling shareholder is controlled by the central government or a university, and 0 otherwise. *Buyper* is the percentage of the outstanding shares controlled by the controlling shareholder. *Sellerper* is the percentage of shares retained by the predecessor controlling shareholder. *Leverchange* is the ratio of the year-end leverage to the leverage of the previous year. *Scalechange* and *Leverchange* are winsorized at 2% to mitigate the influence of outliers. Table 11 shows that the coefficient for *Other-province-state* is significantly negative and the coefficient for *Central* is significantly positive, indicating that controlling shareholders controlled by central governments and universities are more likely to choose larger auditors, whereas those controlled by other-province governments are more likely to choose smaller auditors.

In Table 12, the sample includes those companies with auditor changes and controlling shareholder changes in which the predecessor and successor controlling shareholders are not from the same province, but excludes companies in which the predecessor auditor and the successor controlling shareholder are from the same province. It also excludes companies in which the successor controlling shareholder is an individual or not from mainland China. Table 12 shows that compared to companies acquired by other-province private acquirers, companies acquired by other-province government controlled acquirers are more likely to choose auditors located in the province of the acquirers. Taken together, Tables 10–12 show that if the successor controlling

Table 12
The probability of the successor auditor being from the same province as the successor controlling shareholder.

Identity of the successor controlling shareholder	*N*	The probability of the successor auditor being from the same province as the successor controlling shareholder (%)
Other-province government	31	45.2
Other-province private	64	25.0
Difference		20.2**

shareholder is controlled by an other-province government, the auditor is more likely to be replaced and the successor auditor is more likely to be a smaller auditor from the same province as the new controlling shareholder.

4. Conclusion

Auditor change and auditor choice have received considerable attention because they may affect auditor quality. The literature on auditor change has mainly focused on qualified opinions and the literature on auditor choice has generally examined the influence of company factors, such as information asymmetry and agency costs, on auditor choice. This study hypothesizes that the controller, including the controlling shareholder, chairman and the CEO, affects the choice of auditor. The results show that auditor changes are influenced by changes in the controlling shareholder, the main business, the chairman and the CEO, and the auditor is more likely to change with more extensive changes in the controller. If the successor controlling shareholder is controlled by an other-province government, the auditor is more likely to be replaced and the successor auditor is more likely to be a smaller auditor from the same province as the new controlling shareholder.

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Enforcement actions and their effectiveness in securities regulation: Empirical evidence from management earnings forecasts

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ABSTRACT

Due to resource constraints, securities regulators cannot find or punish all firms that have conducted irregular or even illegal activities (hereafter referred to as fraud). Those who study securities regulations can only find the instances of fraud that have been punished, not those that have not been punished, and it is these unknown cases that would make the best control sample for studies of enforcement action criteria. China's mandatory management earnings forecasts solve this sampling problem. In the A-share market, firms that have not forecasted as mandated are likely in a position to be punished by securities regulators or are attempting to escape punishment, and their identification allows researchers to build suitable study and control samples when examining securities regulations. Our results indicate that enforcement actions taken by securities regulators are selective. The probability that a firm will be punished for irregular management forecasting is significantly related to proxies for survival rates. Specifically, fraudulent firms with lower return on assets (ROAs) or higher cash flow risk are more likely to be punished. Further analysis shows that selective enforcement of regulations has had little positive effect on the quality of listed firms' management forecasts.

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1. Introduction

Due to resource constraints, securities regulators cannot discover and punish all instances of fraud. Therefore, many firms escape exposure and/or punishment. This leads to an important line of questioning, namely how do securities regulators identify questionable firms to examine? Is their targeting random or selective? Unfortunately, due to the absence of suitable control samples,[1] explorations of securities regulation preferences are rare. Management earnings forecasts (hereafter referred to as MFs) provide us with the opportunity to solve this issue. In the A-share market, MFs are mandatory. Firms with performance that meets specific criteria must forecast within specified time periods. Since 2000, some of the firms that have not forecasted as mandated have been punished by securities regulators, but most escaped punishment. Under these conditions, samples of firms that have been fined and firms that have escaped punishment can be built simultaneously (and used as a control sample) with homogeneous instances of fraud, which solves the sampling problems confronted by researchers.

Our results indicate that the enforcement actions of securities regulators are selective. The probability that a firm will be punished for irregular forecasting is significantly correlated with proxies for survival rates. Specifically, fraudulent firms with lower return on assets (ROAs) or higher cash flow risk are more likely to be punished.

From a conservatism perspective, selective enforcement is unquestionable. In China's one-way trading system, investors can only profit from increases in stock prices, and the principle of value investment states that a price increase is the result of good news, while a lower survival rate is the result of bad news. Therefore, the punishment of firms using bad news becomes a breaking point. In a market with perfect delisting regulations, most punished firms disappear from the capital markets (Beasley et al., 1999), making the study of their post-punishment disclosure behavior impossible. In the A-share market, however, the delisting mechanism plays almost no role and most punished firms survive year after year without any instances of delisting. This provides us with a good opportunity to examine the effects of enforcement actions.

The majority of the enforcement actions against MF irregularities occurred from 2000 to 2002. We examine the effects of the enforcement actions on the quality of MFs disclosed during the period from 2002 to 2009. Our results indicate that the effects of enforcement actions were different to expectations. First, the preference for selective enforcement has not proven a significant threat. The forecasting precision and accuracy of firms with a lower survival probability are still significantly lower than those with a higher survival probability. Second, the enforcement actions did not significantly improve the precision and accuracy of the subsequent forecasts issued by the punished firms.

This study makes two main contributions. First, we resolve the sampling problem that has previously limited the research on securities regulations. Specifically, we simultaneously create punished and unpunished samples with the same irregularity, complementary to the literature represented by Chen et al. (2011). Second, we examine the effects of enforcement actions on MF quality as one of the important aspects of listing firms' information disclosure (Bai, 2009).

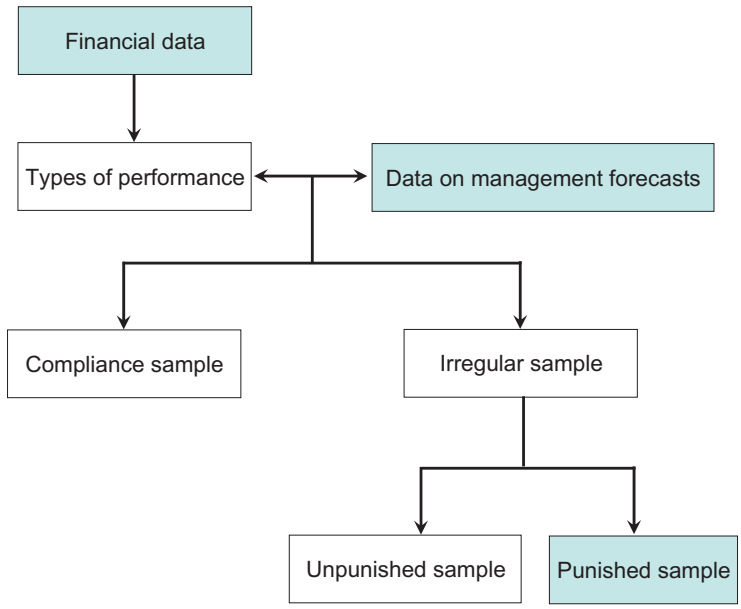
The remainder of this paper is organized as follows. Section 2 reviews the related literature and discusses our research logic. Section 3 discusses the institutional background of management forecasting in China. Section 4 analyzes the enforcement actions applied to MF irregularities. Section 5 discusses the effects of these enforcement actions. Conclusions are presented in Section 6.

2. Literature and research logic

2.1. Preferences in securities regulation

Beneish (1999) and Dechow et al. (1996) note that due to resource constraints securities regulators cannot detect and punish all instances of fraud. This reality presents the question: what types of fraud do securities

[1] Previous studies have only used sample firms with punished irregularities. They have not used firms that have not been punished but have actually had irregularities.



Note: The colored cells represent external data with some hand collection when necessary.

Fig. 1. Sampling map. *Note*: The colored cells represent external data with some hand collection when necessary.

regulators prefer to investigate? Unfortunately, there are few studies that address this question. Pincus et al. (1988) points out that the SEC pays more attention to newly listed firms because they are more likely to commit fraud. According to an analysis of select regulators, Kedia and Rajgopal (2011) suggest that securities regulators in the US prefer to target listed firms within 100 miles of their offices, but that this focus does not necessarily lead to an increase in the probability of being punished. Therefore, their research cannot be classified as a strict study of enforcement preference. Chen et al. (2011) make a breakthrough by studying firms under the special institutional environment in China. They provide evidence that fraudulent firms owned by the state received a less serious punishment than those that are not state-owned. These results only cover fraudulent firms that have been punished, however, and do not apply to those that have not. Therefore, although they can examine the degree of punishment, it is impossible for them to study the probability of being punished. It is this probability that this study aims to explore.

Fig. 1 presents the sampling map. We use the financial data of listed firms to determine performance and infer the observations obliged by regulation to issue MFs. Comparing the MF records then allows us to find observations that are consistent with MF irregularities, called fraud firms. Based on enforcement action records, these fraud firms can be further classified into two subgroups: punished and unpunished. Then we can study the factors influencing the probability of being punished.

2.2. Effects of enforcement actions

From the perspective of securities regulators, punishment is an instrument, not the aim – the fraud occurred and while punishment cannot change history it can deter future instances of fraud. Therefore, an effective punishment warns all firms, including punished firms. Luo et al. (2005) examine the effect of enforcement actions by studying whether punished firms were punished again after the first punishment. They find that many firms have been punished again, many times in some cases, after the first punishment. This suggests that the effects of enforcement actions are not as expected, and although their results are interesting, their sample design has the same drawback as that of Chen et al. (2011). That is, they only cover the fraudulent firms that have been punished without considering their unpunished counterparts – a group that may even represent a majority.

Chen et al. (2005) analyze the market reaction to the disclosure of enforcement actions. They argue that the CSRC is far from a "toothless tiger" because the market reacts negatively to the disclosure of enforcement

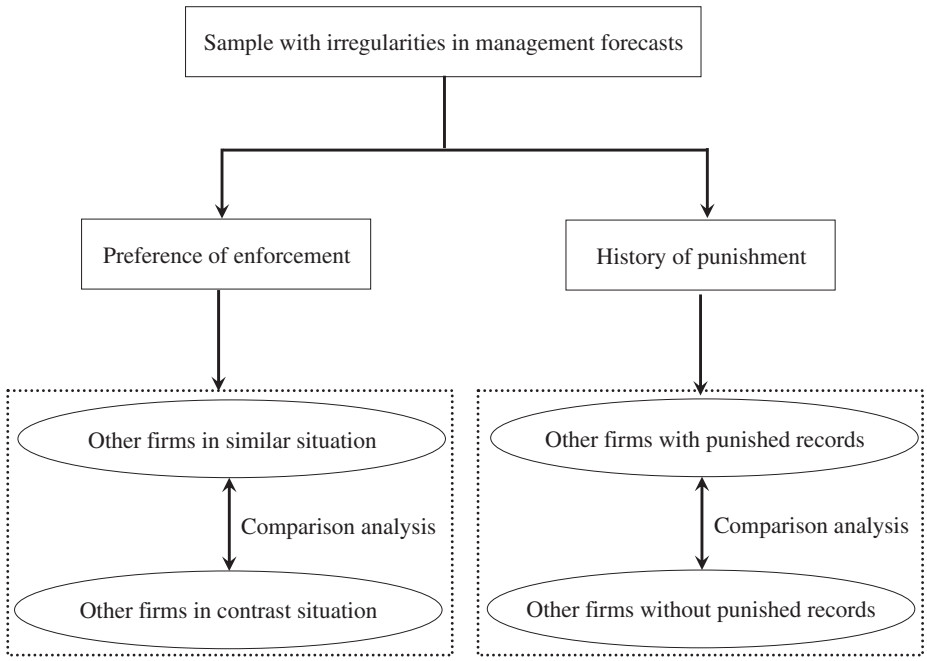


Fig. 2. Research logic for studying the effects of enforcement actions.

actions. This line of reasoning is questionable, because the market reaction reflects the informational content of fraud disclosure rather than the CSRC's effectiveness.[2]

We argue that research on the effects of enforcement actions should focus on a longer window. For example, Farber (2005) finds that punished firms take actions to improve their governance, because investors appear to value governance improvements.[3] In line with that theory, Li (2007) examines how the credit-file system established in the Shanghai Securities Exchange and the Shenzhen Securities Exchange impacts the improvement of the quality of listed firms' accounting information. Li uses accounting conservatism as an indicator of accounting information quality to find that the credit-file system enhances the quality of accounting information to a certain extent, but that the result is not as significant as expected.

Another method of measuring the effect of fraud punishments is to examine whether regulatory preferences influence the behavior of listed firms. If regulators prefer to target certain fraudulent firms, the expectation would be that other firms in that category would work harder to avoid detection and punishment. In other words, regulatory preferences should push such firms to improve the quality of their information disclosure. Kedia and Rajgopal (2011) provide evidence of this, specifically that listed firms within 100 miles of the offices of securities regulators display a significantly lower probability of restatements than their counterparts that are located further away, because securities regulators in the US are inclined to pay more attention to listed firms within 100 miles of their offices.

We use MF quality as an indicator of listed firms' information disclosure quality and examine the effects of enforcement actions in two ways: regulatory preferences and punishment history. Fig. 2 shows our research logic. If regulatory preferences can change the information disclosure behavior of listed firms, then other firms in similar situations should make MFs of a higher quality. In contrast, if other firms in similar situations have not provided MFs of a higher quality, or even of lower quality, then we argue that regulatory preferences do not provide a sufficiently strong deterrence.

[2] Event studies usually examine information content. In the announcement of enforcement actions, the most informative is not the punishment, but the fraud. In fact, most event studies of enforcement actions (such as Feroz et al., 1991; Wu and Gao, 2002) examine the information content of fraud disclosures rather than the effectiveness of securities regulators.

[3] Firms that take action to improve governance have superior stock price performance, even after controlling for earnings performance.

Similarly, if regulators' punishments warn previously punished fraudulent firms, they should provide a higher quality of information when forecasting in subsequent periods. If they have not provided a higher quality of MFs in subsequent periods, we argue that the punishment did not provide a sufficiently strong deterrence.

3. Institutional background

3.1. MF regulations

A-share firms began to issue MFs in the 1998 fiscal year. Before that, listed firms only provided MFs for approximately three subsequent years when they were targeting an IPO. Following the success of an IPO, few firms provided additional information about future earnings. Due to this lack of information, stock prices had a tendency to fluctuate substantially on future earnings, particularly when loss firms released their annual reports. In 1998, securities regulators in China required firms with a three-year continuous loss or a one-year material loss to make their MFs on time,[4] aiming to alleviate the information asymmetry between listed firms and their investors and reduce price fluctuations around the announcements of annual reports (Xue, 2001). This regulation did not change[5] in 1999 and at the close of 2000, MF regulations began to evolve. Panel A of Table 1 summarizes the key changes to MF regulations.

In the first phase, the firms expected to make MFs were expanded from "a three-year continuous loss or a one-year material loss" to "a one-year loss". Meanwhile, the deadline for forecasting was specified. According to the *Notice* with regards to 2000 annual reports,[6] "Firms that forecast a loss in 2000 should make MFs within two months after December 31, 2000. Firms that forecast a three-year continuous loss should make at least three forecasts within 2 months after December 31, 2000".

In the second phase, firms expected to make MFs also included from "loss" to "profit" firms. According to the *Notice* with regards to the interim reports of 2001, firms that forecast a loss or a big decline in earnings should make MFs in a timely manner before July 31, 2001 and suspended firms should make their loss forecasts within 15 working days after June 30, 2001. At that time, there were no clear definitions regarding what qualified as a "big" decline in earnings. On September 4, 2001 the Shanghai Securities Exchange and the Shenzhen Securities Exchange simultaneously criticized firms that had experienced a big decline in earnings, but had not forecast them.[7] The number of firms criticized quickly rose to 24, making that day one of the most notable in the history of securities punishments.

In the third phase, firms expected to make MFs extended from "bad news" to "good news", meeting investors' fundamental information needs. According to the *Notice* with regards to the annual reports of 2001, after the end of the 2001 fiscal year firms that forecasted a big loss or change (an increase or decrease of 50% or more) in total income compared to the previous year should make MFs within 30 working days after December 31, 2001, while firms with relatively small comparison bases were exempt from forecasting.[8] That *Notice* also implemented two changes. First, good news was included for the firms expected to make MFs, in contrast

[4] Specified in the second item of "Notice on the Work of 1998 Annual Reporting".

[5] Specified in the seventh item of "Notice on the Work of 1999 Annual Reporting".

[6] Specified in the 10th and 8th items of "Notice on the Work of 2000 Annual Reporting" issued by the Shanghai Securities Exchange and the Shenzhen Securities Exchange, respectively. Subsequently, the contents of "Notice on the Work of ×× Periodic Reporting" issued by the Shanghai Securities Exchange and the Shenzhen Securities Exchange are fundamentally indeterminate. Therefore, we refer to them hereafter as *Notice* without pointing out the particular items.

[7] According to the *Basic Maxim on the Investigation and Settlement of Securities Frauds by Chinese Securities Regulation Commission* and the *Maxim on the Evidence of the Investigation and Settlement of Securities Frauds by the Chinese Securities Regulation Commission*, the CSRC can settle a case in one of the following ways: withdraw, circulate a notice of criticism, pay an administrative penalty or transfer to another institution. Public criticism voiced by the securities exchange is included in the administrative penalty. From August, 1997 the Shanghai Securities Exchange and the Shenzhen Securities Exchange became subordinate units of the CSRC, making "the behavior preference of securities exchanges fundamentally similar to that of the CSRC" (Liu, 2006, p. 28). Based on the reality of the authority system, "securities exchanges really have no authority to settle instances of fraud without the permission of the CSRC" (Liu, 2006, p. 28). Therefore, we view the "public criticism" voiced by securities exchanges as the intention of the CSRC.

[8] The comparison basis is the absolute value of total earnings per share. For annual forecasting, the exempt criterion is 0.05 or less.

Table 1
Changes and details of MF regulations in China.

	Criteria of forecasting	Forecasting period	Definition of performance	Timing of forecasting
Panel A: key changes to MF regulations				
December, 1998	Successive losses or material loss	Annual	Not defined	Before disclosure of annual report
December, 2000	Loss			After the end of fiscal periods
July, 2001	+ Big decrease	+ Interim		
December, 2001	+ Big increase [a]		Total income	
March, 2002	[b]		Net income	In the last periodic report
June, 2002		+ Quarterly		
May, 2006	+ Loss to Profit [c]			

	Interim forecasts		Annual forecasts	
Year	Deadline	Reference	Deadline	Reference
Panel B: specified forecasting deadlines[d]				
2000	NA	NA	2001.2.28	*Notes*
2001	2001.7.31	*Notes*	2002.2.28	*Notes*
2002	*Not mentioned*	*Notes*	2003.2.21	*Listing Rules*
2003	*Not mentioned*	*Notes*	2004.2.24	*Listing Rules*
2004	2004.7.15	*Notes*	2005.2.1	*Notes*
2005	2005.7.15	*Notes*	2006.1.25	*Notes*
2006	2006.7.31	*Listing Rules*	2007.1.31	*Notes*

	Net earnings or total earnings				
Types	*Forecasting period*	*Prior period*	*Direction of change*	*Percent of change*	*Exemption*
Panel C: definitions of MF types					
Loss	Negative	Negative or Positive			
Loss to profit	Positive	Negative			
Big decrease	Positive	Positive	Negative	[50%, 100%)	Yes
Big increase	Positive	Positive	Positive	$\geqslant$50%	Yes

In Panel A, + represents when a new regulation was added. The blank cell represents no change compared to the upper line.

[a] Exemption is applied. In the forecasting of 2001 annual performance, the exemption basis (comparison basis) was that the absolute value of total earnings per share was no more than 0.05.

[b] From 2002, the exemption basis is defined according to the absolute value of net earnings per share. The specified numbers are 0.05, 0.03 and 0.04 for annual, interim and third-quarter forecasting, respectively.

[c] Firms with loss to profit are definitely expected to increase by more than 100%. Before 2006, they were regulated as firms with big increases and, therefore, were probably exempt from forecasting. From 2006, they are regulated as an independent class with no exemption.

[d] *Notes* are the "Notes on the work of $\times\times$ Reports" issued by the Shanghai (or Shenzhen) Securities Exchanges, which are fundamentally identical. *Listing Rules* are the Listing Rules of the Shanghai (or Shenzhen) Securities Exchanges. Forecasting deadlines not specified in the *Notes* are defined according to whatever Listing Rules were effective in the corresponding periods. Regulations on management forecasts as specified in the Listing Rules are reported in Table 2.

to the previous focus on bad news. Second, the definitions of performance, percent of change and comparison basis were clearly specified to improve the feasibility of MFs.

In the fourth phase, the timing of forecasts was shifted from "after the end of fiscal periods" to "before the end of fiscal periods", making the "forecasting" more literal.[9] According to the *Notice* with regards to the first quarter reports of 2001, firms forecasting a big loss or change (an increase or decrease of 50% or more) in interim *net* income should make MFs in their first quarter reports. Thus, investors could obtain information about listed firms' future earnings at least two months earlier.

In the fifth phase, beginning from the third quarter reports of 2002, the forecasting of quarterly earnings was included. Finally, "loss-to-profit" was separated from "big increase", which makes little difference. Before

[9] According to the definition established by King et al. (1990), MFs are the voluntary disclosure of future earnings before announcements of actual earnings are made, including forecasts disclosed after the end of fiscal periods, but before the announcements of actual earnings. Research on voluntary disclosure, however, usually focuses on forecasts that have been disclosed before the end of fiscal periods (e.g., Baginski et al., 2008).

Table 2
Regulations for MFs specified in Listing Rules.

Time	Sections	Forecasting criteria	Forecasting period	Timing of forecasting	Forecast in advance	Definition of performance	Exemption
May, 2000	7.4.1	Loss	Annual	Before disclosure of annual report	No	No	No
June, 2001	7.4.1	Loss	Annual	Within 30 working days after the end of the fiscal year	No	No	No
Amendment in the year 2002 did not change regulations for MFs							
November, 2004	6.4 11.3	Loss, changes in performance $\geqslant 50\%$	All	No	Yes	Net income	Yes
May, 2006	11.3	Loss, loss to profit, changes in performance $\geqslant 50\%$	All	Within one month after the end of a fiscal period[a]	Not mentioned	Net income	Yes
October, 2008	11.3	Loss, loss to profit, changes in performance $\geqslant 50\%$	All	Annual forecast must be disclosed within one month after the end of the fiscal year, other forecasts are not specified	Not mentioned	Net income	Yes [b]

[a] The Listing Rules of the Shenzhen securities exchange do not specify forecasting deadlines, except for the annual forecast.
[b] Exemption criteria are clearly defined for every period, namely the absolute value of net income per share. The specified numbers are 0.05, 0.03 and 0.04 for annual, interim and third-quarter forecasting, respectively.

this separation, some "loss-to-profit" firms were exempt from forecasting. After separation, there was no exemption for "loss-to-profit" firms.

The securities exchange also magnified their consideration of MFs when amending their Listing Rules. Table 2 summarizes the specifications for management forecasts in the current and historic revisions of the Listing Rules. It is clear that there is always a time lag between the amending of Listing Rules and their practice. For example, in practice, firms that experienced big changes were required to forecast from 2001, but the 2002 amendments to the Listing Rules did not reflect corresponding changes. In fact, the aforementioned changes were not made until December 2004.

3.2. Punishments for irregular management forecasts

The punishment of irregular management forecasts began with the annual forecasting of 2000 and peaked during the interim forecasting of 2001. There were sporadic instances after that period, but those punishments were usually enforced on firms that had experienced an annual loss. Table 3 summarizes the details of punishments for irregular management forecasts in the period from 2000 to 2006.[10]

The efficiency of securities regulations, with respect to the period that firms escaped punishment, is relatively high. Most irregularities are punished within three months. Unreported results indicate that the longest escape was 239 days and the shortest was a single day.

There are four types of irregular MFs: face-change forecasts, wrong forecasts, no forecasts and delayed forecasts. "No forecasts" and "delayed forecasts" are easily defined as firms that are expected to make an MF (i.e., they fall into one of the four situations listed in Panel C of Table 1) but do not actually make a forecast or forecast after the deadline, respectively (see Table 1 for details). Because the punishment of delayed forecasts tends to associated with annual reports, delayed forecasts are usually issued in March or April, with more concentrated in April.

The term "face-change" is from a unique technique of Chuan opera in which characters appear to magically shift from one painted face to another. When related to capital markets, it is used to portray a dramatic change in the performance of listed firms. When talking about MFs specifically, a face-change forecast is when

[10] There are a total of 72 observations. We deleted one observation from the financial industry, one observation after delisting and one observation with regards to third-quarter earnings, so 69 observations remain.

Table 3
Details of MF irregularities from releases of enforcement actions.

Escape days [a]	All [b]	Single	Irregularity types	All	Single	Actual performance	All	Single	Period	All	Single
⩽10	7	5	Face-change	21	17	Big decrease	28	26	Interim	25	24
10–20	9	8	Wrong MF	2	1	Loss	40	25	Annual	44	28
20–30	14	13	No MF	29	26	Small increase	1	1		69	52
30–60	25	20	Delayed MF	16	8		69	52			
60–90	9	3	Others	1							
>90	5	3		69	52						
	69	52									

Face-change map	All	Single	Disclosure time of face-change MF[c]	All	Single	Disclosure time of delayed MF[c]	All	Single
Big decrease → Loss	6	5	January	1	1	March	2	2
Loss to profit → Continuous loss	14	11	February	1	1	April	13	6
Big increase → Loss	1	1	March	5	4	June	1	0
	21	17	April	14	11		16	8
				21	17			

[a] Escape days = gaps between the announcement day for enforcement actions and the discovery day for irregularities, the latter of which included face-change day for firms with face-change MFs, forecasting day for firms with delayed MFs and the announcement day of periodic reports for firms with no forecast or wrong forecasts.
[b] All represents the sample of firms that engaged in other kinds of fraud besides irregularities in MF; Single represents the sample of firms with irregularities in MF only.
[c] All refers to the month after the end of the forecasting fiscal year.

a firm issues an MF that is significantly different from an earlier one with regards to the same period. Luo and Song (2011) provide a detailed summary of this concept. Although a face-change forecast is covered by the changes between "continuous loss" and "loss-to-profit", only firms that shift from "good news" to "bad news" or from "bad news" to "worse news" are punished (Table 3). Due to the uncertainty inherent in forecasting, regulators usually permit listed firms to revise their disclosed forecasts when necessary, but always before the deadlines listed in Panel A of Table 1. That is, firms that change their forecasts before the deadline will not be classified as irregularities by regulators. Therefore, face-change forecasts that are punished are usually disclosed in March or April of the following year, with the majority concentrated in April.

Theoretically, a wrong forecast means that the forecast performance is significantly different from actual performance. It is almost impossible to make a 100% correct forecast, however, and it is considered reasonable to allow for some error. As Table 3 shows, wrong forecasts are defined as firms that forecast profits when they actually experience losses. That is, there are qualitative errors.

As for actual performance, most of the punished observations are losses in the forecasting periods, while the others have a decline that is significant enough that only one firm is punished for overestimating a "small increase" as a "big increase". In other words, the probability of being punished is low for firms with "good news", even if they make irregular MFs.

3.3. Reasons for the existence of selective enforcement

Chen et al. (2011) provide detailed discussion of the reasons for the existence of selective enforcement in Chinese securities markets and pay particular attention to the ultimate nature of firms (i.e., whether they are state-owned) than to the quality of listed firms, which is our focus. We argue that in a multiple-player game, the dominant strategy is to punish fraud firms whose survival rates are lower in order to maximize the utility of regulators for the following two reasons.

First, it is a self-protective incentive under the extant regulatory system. Liu (2006) portrays CSRC regulations as "all-around", noting that, under an all-around regulatory system, the CSRC does not have the incentive to actively disclose listed firms' fraud. The CSRC has an incentive to supervise and publicly disclose

that information when, and only when, the fraudulent information is detected before a firm's IPO, such as in the Kaili case mentioned by Chen et al. (2011). The CSRC is reluctant to publicly disclose fraudulent information detected after a firm's IPO. For example, the suspicion that surrounded Lantian's financial data prompted the CSRC to continuously decline Lantian's refinancing proposals, despite the fact that the survey that generated the data did not take place until the break-down of Lantian's cash chain (Liu, 2006).

Second, it meets the political demands under government control. Luo et al. (2005) pointed out that, "under the dual pressure to develop and regulate the market, the value orientation of the CSRC is partly dissimilated as maintaining the stability of stock prices and the securities market, which acquiesces the existence of fraud. There are different penalty criteria in different times due to different regulatory demands and policies. Sometimes more firms are punished and the degree of punishment is heavier. In other times, fewer firms are punished and the degree of punishment is lighter. That is, the policy-orientation is significantly evident". The one-way trading system enforces that effect. When investors can only profit from an increase in stock prices, firms with "good news" are inevitably protected and favored by stakeholders while firms with "bad news" may be neglected. When firms with "good news" commit fraud, stakeholders are more likely to actively lobby that those firms not be punished. When firms with "bad news" commit fraud, the resulting absence of lobby pressure allows securities regulators to exercise their authority by punishing them. At that time, stakeholders tend to stop resisting in the hope that they might receive some compensation in the future.[11]

4. Selective enforcement actions for MF irregularities

4.1. Sample and descriptive statistics

According to the penalty records, we can classify the following observations as firms with irregular MFs: (1) firms expected to make a "loss" or "big decline" forecast that fail to make any forecast; (2) firms expected to make a "loss" or "big decline" forecast that fail to make any forecast before a stated deadline[12]; (3) firms expected to make a "loss" or "big decline" forecast that fail to forecast correctly before a stated deadline[13] and (4) firms not included in the previous three classes that overestimate their earnings through forecasts that are inconsistent with actual earnings.[14] The details of these observations are reported in Table 4.

Overall, the probability of being punished for MF irregularities is relatively low.[15] After 2002, the attention that regulators paid to irregular annual forecasts and the probability of being punished was significantly lower than it was in 2001. Another interesting point is that about 10% of firms with MF irregularities were punished in the following year without any reference to MF irregularities in the announcements of the enforcement actions.

The financial data and market reactions of fraud observations are reported in Table 5. Because our observations include both annual and interim examples, we use the deciles of financial data to avoid potential confusion induced by the different lengths of fiscal periods.[16] We examine the difference between the punished sample and the control sample from the perspective of survival rates. The financial variables with regards to survival rates include ROA, CFO, Growth and LEV. ROA measures accounting profitability, CFO measures liquidity, Growth measures growth ability and LEV measures solvency. The ROA of the punished observations is concentrated in the lowest quintile, while the observations with ROA in the highest quintile are

[11] Chen et al. (2011) find that punished firms were given priority in their subsequent refinancing.

[12] The deadline for annual forecasting is March 1 of the subsequent year and the deadline for interim forecasting is August 1 of the current year.

[13] The deadline for annual forecasting is March 1 of the subsequent year and the deadline for interim forecasting is August 1 of the current year.

[14] Observations with a "small decrease" or "small increase" in performance (Table 3) fall into this class. Firms with a "small decrease" in performance might forecast a "small increase" or "big increase". Firms with a "small increase" in performance might forecast a "big increase". Observations with wrong forecasts also include some firms expected to forecast "big decrease" or "loss" that actually forecasted higher performance.

[15] Among the 697 observations with MF irregularities, firms punished for irregular MFs represent less than 10%.

[16] The corresponding financial data of all A-share firms available in the database are ranked by fiscal periods and classified into ten groups (deciles).

Table 4
Summary of firms with MF irregularities.

Form of irregularities	Total	Those without any punishment next year	Those that are punished the next year		
			MF not involved	MF involved	Only MF
Panel A: according to the form of irregularities					
Face-change	92	63	9	20	16
Delayed MF	164	121	27	16	8
No MF	274	225	21	28	25
Wrong MF	167	152	13	2	1
	697	561	70	66	50
Period					
Panel B: according to the forecasting period					
2000-12-31	16	7	5	4	1
2001-6-30	92	65	4	23	23
2001-12-31	80	63	3	14	13
2002-6-30	76	70	6		
2002-12-31	88	76	6	6	4
2003-6-30	24	21	3		
2003-12-31	77	59	15	3	3
2004-6-30	26	20	6		
2004-12-31	76	60	10	6	4
2005-6-30	19	17	2		
2005-12-31	46	36	4	6	1
2006-6-30	43	39	4		
2006-12-31	34	28	2	4	1
	697	561	70	66	50
Annual	417	329	45	43	27
Interim	280	232	25	23	23
Actual performance [a]					
Panel C: according to actual performance					
Small decrease	12	12			
Small increase	51	50		1	1
Big decrease	296	253	16	27	25
Loss	338	246	54	38	24
	697	561	70	66	50

As indicated, there are a total of 697 observations with MF irregularities, among which 561 observations were free of any punishment in the following year and will be used as a control sample. The others were punished in the following year for numerous reasons. Among the 136 observations with punishment, 70 observations were punished for irregularities that were not related to MF; the others were punished for irregularities including irregular MF, and will be used as study sample 1, among which the 50 observations that are punished for irregular MF only will be used as study sample 2.

[a] For firms with small decreases or increases, and those with big decreases or big increases the actual performance of the forecasting period and that of the compared prior period are both positive. The difference lies in the direction and magnitude of changes in performance. Small decrease (increase) refers to a negative (positive) change in performance of less than 50%. Big decrease (increase) refers to a negative (positive) change in performance of no less than 50%.

rarely punished. Fraudulent firms with CFO in the lowest quintile are more likely to be punished than other firms, and those with CFO in the highest quintile are also rarely punished. Fraudulent firms with Growth in the highest quintile are significantly less likely to be punished than those with Growth in the lowest quintile.

Moreover, we analyze whether investor losses and the nature of the ultimate controller influence the probability of being punished, as per Chen et al. (2011). As for the nature of the ultimate controller, most of the punished firms are owned by the state, which is in contrast to the results of Chen et al. (2011). We argue that the difference is due to different sample periods. As Table 4 shows, the punishment of irregular management forecasts was concentrated in 2001, when almost all firms were owned by the state. Chen et al. (2011) use a sample period that ended in 2008. From 2002 to 2008 many private firms went public through IPOs or the acquisition of listed firms, significantly lowering the percentage of SOEs among listed firms. The following

Table 5
Description of independent variables.

	Total	Those without any punishment next year	Those that are punished the next year		
			MF not involved	MF involved	Only MF
Net income deflated by total assets (ROA)					
Lowest 20%[a]	413	305	57	51	38
Median	263	236	12	15	12
Highest 20%	21	20	1	0	0
CFO deflated by total assets (CFO)					
Lowest 20%	218	160	27	31	22
Median	414	341	38	35	28
Highest 20%	65	60	5	0	0
Growth of sales (Growth)					
Lowest 20%	251	179	36	36	24
Median	352	300	26	26	22
Highest 20%	94	82	8	4	4
Leverage ratio (LEV)					
Lowest 20%	105	92	6	7	4
Median	394	327	34	33	28
Highest 20%	198	142	30	26	18
Nature of ultimate control (State)					
0	227	179	32	16	8
1	470	382	38	50	42
CAR(−1, +1)					
Positive	202	170	22	10	8
Negative	495	391	48	56	42

As indicated, there are a total of 697 observations with MF irregularities, among which 561 observations are free of any punishment in the following year and will be used as a control sample. The others are punished in the following year for numerous reasons. Among the 136 observations with punishment, 70 observations are punished for irregularities that do not relate to MF; the others are punished for irregularities including irregular MF and will be used as study sample 1, among which the 50 observations that are punished for irregular MF only will be used as study sample 2.

ROA = Net income deflated by total assets; CFO = Cash flow from operating activities deflated by total assets; Growth = Change in sales deflated by lagged sales; LEV = Total debt deflated by total assets; State = 1 if the ultimate controller is state and zero otherwise; CAR = Cumulative abnormal returns around [−1, +1], and the event day is the discovered day of irregular MF.

[a] The data of all A-share firms in the corresponding periods are ranked into five groups and the quintile distribution of observations used as our sample is reported.

regression results also show that after controlling for timing differences, the influence of SOEs almost disappears.

Chen et al. (2011) also find that the degree of punishment is significantly positively related to investor losses. This study also examines the influence of investor losses, but through an event window around the detection day[17] of the fraud to measure investor losses – a much shorter period than that used by Chen et al. (2011).[18] As Table 5 shows, most of the punished frauds have negative CARs (losses to investors).

[17] For observations with "wrong forecasts" or "no forecasts", the detection day is the announcement day of the corresponding periodic reports. For observations with "delayed forecasts", the detection day is the forecasting day. For observations with "face-change forecasts", the detection day is the day on which the face-change forecasts are released.

[18] In the Chen et al. (2011) sample, there is usually a two year or longer "escape period" before the fraudulent firms are punished by regulators. Before the announcements of enforcement actions, it is difficult for investors to get information on the existence of fraud by other measures. Our sample is different from theirs in three ways. First, the detection of MF irregularities is relatively simple, with no need to wait for punishment. Second, we do not find when the fraudulent activity begins for "delayed" and "no" forecasts. Finally, there might be an overlap between the announcements of MFs and actual earnings if we choose a longer event window, which would also introduce more confounding factors.

4.2. Regression results

Because the punished observations make up a relatively small percentage of all observations and different sample sizes might influence the robustness of our results, we use both all sample observations and a matched sample in our regressions. The regression model is shown as follows:

$$\begin{aligned} Probability\ (Fined = 1) &= \alpha_0 + \alpha_1\ Investors'\ loss + \alpha_2\ Deciles\ of\ ROA \\ &\quad + \alpha_3\ Deciles\ of\ CFO + \alpha_4\ Deciles\ of\ Growth \\ &\quad + \alpha_5\ Deciles\ of\ LEV + \alpha_6\ State + \alpha_7\ Size \\ &\quad + Control\ Variables + \varepsilon \\ Where,\ Investors'\ loss &= the\ negative\ of\ CARs\ [-1, +1]; \\ Deciles\ of\ var\_m &= the\ deciles\ ranked\ according\ to\ var\_m\ of\ all\ A-share\ firms\ for\ the\ same \\ &\quad fiscal\ period,\ where\ var\_m\ represents\ ROA,\ CFO,\ Growth\ and\ LEV,\ respectively; \\ State &= 1\ for\ SOEs\ and\ 0\ otherwise; \\ Size &= Natural\ log\ of\ total\ assets. \end{aligned} \tag{1}$$

In the regressions with the full sample, control variables include industry and year dummies. In the regressions with the matched sample, these control variables are not included because we select matched firms based on the same industry, the same forecasting period and the nearest total assets.

Because some observations are punished for reasons besides irregular management forecasts, we exclude them in the regressions reported in Table 6. That is, in the regressions reported in Table 6, we only use observations that are punished for irregular management forecasts as our study sample and those without any punishment in the following year as our control sample. The results indicate that investors' loss is the most important factor influencing the probability of being punished, which is consistent with Chen et al. (2011). After controlling for investors' loss, liquidity and growth potential also have significant influences on the probability of being punished. For example, in regression 3 of panel B, the estimated coefficient on Deciles of CFO is −0.292, significant at the 1% level. In regression 4, the estimated coefficient on Deciles of Growth is −0.156, significant at the 10% level.

4.3. Other potential factors

In the regressions reported in Table 6, observations punished for multiple reasons, including irregular management forecasts, are excluded. Does that exclusion influence the robustness of our results? We re-ran the regressions reported in Table 6 with those observations included and the results (Table 7) are fundamentally consistent with those in Table 6.

In summary, investor losses resulting from fraud is the primary factor influencing the probability of being punished. After controlling for investor losses, enforcement actions still exhibit some "selection bias". The probability of being punished is negatively related to the fraudulent firms' accounting profitability, liquidity and growth potential. In other words, firms with lower survival rates are more likely to be punished.

5. Effects of enforcement actions on quality

In a market with perfect delisting regulations, fraudulent firms with lower survival rates delist from capital markets (Beasley et al., 1999), making the study of their post-punishment disclosure behavior impossible. In the A-share market, however, due to the scarcity of "shell resources",[19] most fraudulent firms survive year after year without any instances of delisting, even if their survival rates are lower or they are technically bankrupt. This may impair the efficient allocation of resources, but it also provides us with an opportunity to examine the subsequent effects of punishments.

[19] "Shell resources" means the qualification of listing.

Table 6
Results for sample with irregular MF only.

	Model 1	Model 2	Model 3	Model 4	Model 5
Panel A: results for all sample (N = 548)					
Intercept	−2.654	−2.328	−2.837*	−2.723	−2.489
	(1.662)	(1.668)	(1.694)	(1.663)	(1.702)
CAR	25.683***	24.059***	24.459***	25.302***	22.590***
	(4.531)	(4.589)	(4.567)	(4.544)	(4.656)
Deciles of ROA		−0.305*			−0.286*
		(0.170)			(0.171)
Deciles of CFO			−0.152*		−0.142
			(0.085)		(0.087)
Deciles of growth				−0.127*	−0.107
				(0.075)	(0.076)
Deciles of LEV	0.062	0.016	0.072	0.078	0.041
	(0.074)	(0.077)	(0.075)	(0.075)	(0.080)
State	0.775	0.660	0.823	0.895	0.791
	(0.551)	(0.545)	(0.556)	(0.555)	(0.554)
Size	−0.119	−0.037	−0.049	−0.080	0.048
	(0.230)	(0.234)	(0.238)	(0.229)	(0.241)
Industry & year	Controlled	Controlled	Controlled	Controlled	Controlled
Rescaled R^2 (%)	43.20	44.38	44.30	44.18	46.11
Panel B: results for matched sample (N = 96)					
Intercept	−1.061	−1.020	−1.285	−0.923	−1.052
	(2.027)	(2.023)	(2.059)	(2.025)	(2.070)
CAR	14.384***	14.057***	12.185**	14.989***	12.522**
	(4.810)	(4.848)	(4.799)	(4.885)	(4.913)
Deciles of ROA		−0.087			−0.072
		(0.169)			(0.188)
Deciles of CFO			−0.292***		−0.293***
			(0.104)		(0.105)
Deciles of growth				−0.156*	−0.173*
				(0.091)	(0.099)
Deciles of LEV	0.023	0.007	0.023	0.007	−0.010
	(0.081)	(0.087)	(0.085)	(0.083)	(0.093)
State	0.610	0.594	0.746	0.806	0.922
	(0.660)	(0.660)	(0.687)	(0.664)	(0.695)
Size	−0.030	−0.003	0.123	−0.005	0.172
	(0.284)	(0.288)	(0.299)	(0.284)	(0.303)
Rescaled R^2 (%)	17.06	17.38	27.47	20.69	31.02

The study sample is only firms punished for MF irregularities. In panel A, the control sample did not receive any punishment in the following year despite having MF irregularities. In panel B, the control sample is matched with the same forecasting period, industry, form of MF irregularities and the nearest size of total assets based on the control sample in panel A.
Standard error in parentheses.
* Significance at the 10% level.
** Significance at the 5% level.
*** Significance at the 1% level.

We examine the effects of enforcement actions through the quality of management forecasts for three reasons. First, management forecasts are an important part of listed firms' information disclosure and the quality of management forecasts can represent the quality of information disclosure (Bai, 2009).[20] Second, it is easier to measure the quality of management forecasts without any sophisticated statistical models or subjective

[20] Bai (2009) finds that there is a significant positive relation between the information disclosure rating issued by the Shenzhen Securities Stock Exchange and the quality of management forecasts. Research on developed markets reveals that the quality of management forecasts is often used as a proxy for the quality of listed firms' information disclosure: see, for example, Graham et al. (2005) and Wang (2007).

Table 7
Results for sample with irregularities including irregular MF.

	Model 1	Model 2	Model 3	Model 4	Model 5
Panel A: results for all sample (N = 564)					
Intercept	−1.799	−1.477	−1.932	−1.877	−1.605
	(1.357)	(1.358)	(1.385)	(1.372)	(1.407)
CAR	20.024***	18.775***	18.781***	19.720***	17.328***
	(3.397)	(3.459)	(3.436)	(3.441)	(3.532)
Deciles of ROA		−0.303**			−0.279*
		(0.143)			(0.143)
Deciles of CFO			−0.187***		−0.186**
			(0.072)		(0.075)
Deciles of growth				−0.167**	−0.158**
				(0.066)	(0.066)
Deciles of LEV	0.081	0.040	0.096	0.098	0.072
	(0.060)	(0.062)	(0.062)	(0.061)	(0.065)
State	0.393	0.304	0.408	0.511	0.405
	(0.397)	(0.396)	(0.403)	(0.399)	(0.405)
Size	−0.146	−0.075	−0.069	−0.093	0.036
	(0.188)	(0.190)	(0.196)	(0.190)	(0.199)
Industry & year	Controlled	Controlled	Controlled	Controlled	Controlled
Rescaled R^2 (%)	33.84	35.32	35.95	35.89	39.08
Panel B: results for matched sample (N = 124)					
Intercept	−0.353	−0.359	−0.640	−0.210	−0.503
	(1.767)	(1.764)	(1.819)	(1.776)	(1.832)
CAR	9.368***	9.161**	7.636**	9.907***	8.213**
	(3.564)	(3.571)	(3.579)	(3.668)	(3.682)
Deciles of ROA		−0.075			−0.052
		(0.156)			(0.174)
Deciles of CFO			−0.318***		−0.318***
			(0.094)		(0.095)
Deciles of growth				−0.183**	−0.195**
				(0.079)	(0.086)
Deciles of LEV	0.049	0.037	0.048	0.035	0.024
	(0.069)	(0.073)	(0.072)	(0.070)	(0.078)
State	0.670	0.665	0.801	0.879*	1.004*
	(0.480)	(0.481)	(0.506)	(0.493)	(0.519)
Size	−0.124	−0.100	0.043	−0.093	0.097
	(0.251)	(0.255)	(0.264)	(0.251)	(0.270)
Rescaled R^2 (%)	11.00	11.23	23.44	16.46	28.21

The study sample is firms punished for items including MF irregularities. In panel A, the control sample did not receive any punishment in the following year despite having MF irregularities. In panel B, the control sample is matched with the same forecasting period, industry, form of MF irregularities and the nearest size of total assets based on the control sample in panel A.
Standard error in parentheses.
* Significance at the 10% level.
** Significance at the 5% level.
*** Significance at the 1% level.

judgments. Third, there is consistency in the nature of the information disclosed. We examine the punishments for irregular management forecasts, but the best way to examine the effects of these punishments is to measure their effects on subsequent management forecasts.

We examine the precision and accuracy of annual MFs issued by A-share firms from 2002 to 2009.[21] Extant research argues that MF quality is positively related to their precision and accuracy.

We examine the effects of punishments in two ways. First, we ask whether the preference of enforcement actions influences the disclosure behavior of other firms. Kedia and Rajgopal (2011) find that listed firms

[21] We use the latest forecasts for firms that issue more than one forecast with regards to the same forecasting year.

Table 8
MF precision for observations with extreme values from 2002 to 2009.

Precision	Highest deciles		Lowest deciles		Totals	
	Obs.	Percent (%)	Obs.	Percent (%)	Obs.	Percent (%)
CFO deflated by total assets (CFO)						
Qualitative estimate	106	19.70	253	38.70	359	30.10
Open-end estimate	190	35.40	133	20.30	323	27.10
Interval estimate	142	26.40	144	22.00	286	24.00
Point estimate	99	18.40	124	19.00	223	18.70
	537		654		1191	
Ratio test[a]	$\chi^2 = 49.37^{***}$					
Net income deflated by total assets (ROA)						
Qualitative estimate	54	9.90	622	60.70	676	43.00
Open-end estimate	193	35.30	28	2.70	221	14.10
Interval estimate	196	35.90	103	10.00	299	19.00
Point estimate	103	18.90	272	26.50	375	23.90
	546		1025		1571	
Ratio test[a]	$\chi^2 = 372.84^{***}$					
Growth of sales (Growth)						
Qualitative estimate	187	26.50	421	52.80	608	40.40
Open-end estimate	210	29.70	104	13.00	314	20.90
Interval estimate	180	25.50	103	12.90	283	18.80
Point estimate	129	18.30	170	21.30	299	19.90
	706		798		1504	
Ratio test[a]	$\chi^2 = 106.25^{***}$					
Leverage ratio (LEV)						
Qualitative estimate	475	57.10	90	19.20	565	43.50
Open-end estimate	79	9.50	115	24.60	194	14.90
Interval estimate	93	11.20	176	37.60	269	20.70
Point estimate	185	22.20	87	18.60	272	20.90
	832		468		1300	
Ratio test[a]	$\chi^2 = 173.19^{***}$					

[*] Significance at the 10% level.
[**] Significance at the 5% level.
[***] Significance at the 1% level.
[a] The ratio test examines whether the distribution of qualitative and quantitative forecasts in the highest and lowest deciles of the corresponding financial data is significantly different.

within 100 miles of the offices of securities regulators are significantly less likely to have restatements than their counterparts located further away because securities regulators in the US are inclined to pay more attention to listed firms within 100 miles of their offices. This means that the preferences of regulators can change the expectation of listed firms and has a significant influence on the disclosure behavior of other firms. We find that regulators are inclined to punish fraudulent firms with lower profitability, lower liquidity and lower growth potential. Does this regulatory preference improve the quality of MFs issued by firms in similar situations? We rank the corresponding financial data of all of the A-share firms available to get deciles by fiscal year. Then we choose MFs issued by firms that fall in the highest deciles or lowest deciles with the aim of examining whether there is a significant difference in the MF quality among firms in different deciles.

Second, we examine whether firms that have been punished for MF irregularities improve the quality of their subsequent forecasts to improve their image. Farber (2005) finds that punished firms take actions to improve their governance and improve the quality of their information disclosure. Because there is still controversy over whether corporate governance plays a role in A-share markets,[22] we use the quality of information disclosure to directly measure the effects of punishment. The dependent variables are the precision and

[22] Another consideration is that most governance mechanisms for A-share firms are mandatorily planted, rather than voluntarily developed.

Table 9
Distribution of MF precision from 2002 to 2009.

Precision	All observations	Not fined	Fined_MF	Fined_ALL
Qualitative estimate	1613	1274	75	339
Open-end estimate	1320	1244	13	76
Range estimate	1361	1244	12	117
Point estimate	1068	887	26	181
	5362	4649	126	713

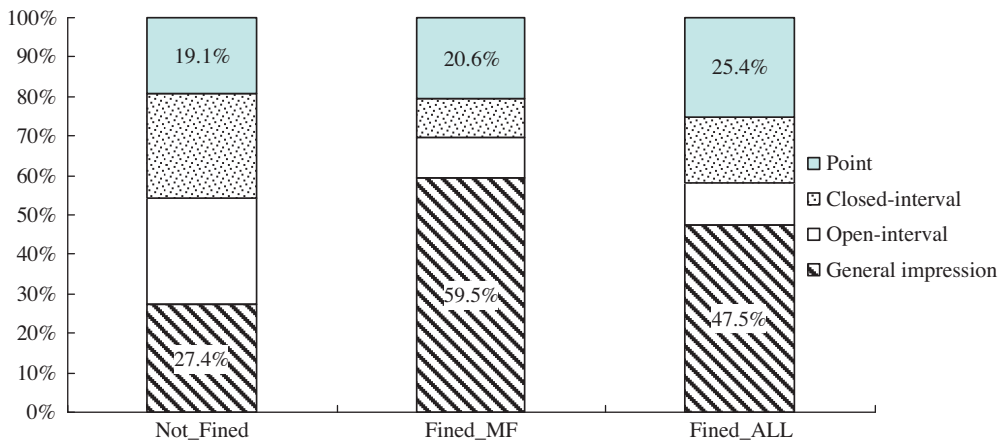


Fig. 3. Distribution of forecast precision. *Note*: "Not-Fined" indicates firms that did not receive any punishment during the previous three years. "Fined_MF" indicates firms that were punished for MF irregularities, while "Fined_All" indicates firms that were punished for irregularities that did not necessarily include MF irregularities during the previous three years.

accuracy of MFs, which are our proxies for MF quality. We use the models shown in Eqs. (2) and (3) to examine the effect of punishment after controlling for other factors that influence MF quality.

$$Precision = f(Fined\_MF,\ Control\ Variables) \tag{2}$$

$$Accuracy = f(Fined\_MF,\ Control\ Variables) \tag{3}$$

where Fined_MF equals 1 if the firm has been punished for an irregular MF in the past three years, and 0 otherwise.

The control variables are chosen according to the extant literature, including earnings volatility (Rank of EV, measuring forecasting difficulty), the level of earnings (ROA), the timing of forecasts (Month), an index of financial distress (ST) and indices of corporate governance (State and Herf5), firm size, industry and year dummies.[23]

We also examine whether the punishments induced by other irregularities influence MF quality. The regression models are shown as follows:

$$Precision = f(Fined\_ALL,\ Control\ Variables) \tag{4}$$

$$Accuracy = f(Fined\_ALL,\ Control\ Variables) \tag{5}$$

[23] Baginski and Hassell (1997) find that firms of small size with less earnings volatility are more likely to issue management forecasts with higher precision. Ajinkya et al. (2005) find that firms with higher earnings volatility provide less accurate management forecasts. Johnson et al. (2001), Ajinkya et al. (2005) and Karamanou and Vafeas (2005) all find that the accuracy of management forecasts that are disclosed earlier is lower than that of those that are disclosed later. Eames and Glover (2003) argue that the level of earnings must be controlled for when examining forecasting errors. Koch (2002) finds that firms in financial distress are more likely to issue misleading management forecasts. Johnson et al. (2001) find that the accuracy of management forecasts has a significantly negative relation to firm size.

where Fined_ALL equals 1 if the firm has been punished (not necessary for MF irregularities) in the past three years, and 0 otherwise. The control variables are the same as those in Eqs. (2) and (3).

5.1. Effects of punishment on MF precision

Table 8 analyzes whether regulatory punishment preferences influence MF precision. It is evident that punishment preferences do not efficiently deter other firms. For example, observations with CFO in the highest

Table 10
Effects of enforcement on MF precision from 2002 to 2009.

	All samples	Matched samples	All samples	Matched samples
Panel A: MF precision is grouped into two levels				
Intercept	1.622***	2.886**	1.603***	2.308***
	(0.347)	(1.381)	(0.347)	(0.505)
Fined_MF	0.176	0.027		
	(0.242)	(0.320)		
Fined_ALL			0.234**	0.119
			(0.115)	(0.134)
Rank of EV	−0.457***	−0.375***	−0.459***	−0.292***
	(0.018)	(0.067)	(0.018)	(0.027)
ROA	2.663***	1.851**	2.721***	2.367***
	(0.274)	(0.724)	(0.278)	(0.324)
Month	0.621***	0.518***	0.618***	0.547***
	(0.041)	(0.117)	(0.041)	(0.059)
ST	−1.320***	−0.242	−1.369***	−0.667***
	(0.107)	(0.354)	(0.110)	(0.147)
State	−0.145	−0.075	−0.132	−0.297**
	(0.091)	(0.339)	(0.091)	(0.133)
Herf5	0.952***	−1.328	0.986***	−0.546
	(0.339)	(1.249)	(0.340)	(0.581)
Size	−0.105***	−0.151	−0.105***	−0.045
	(0.041)	(0.182)	(0.041)	(0.067)
Industry &year	Controlled		Controlled	
Rescaled R^2 (%)	53.21	32.78	53.27	30.19
Obs.	5362	252	5362	1414
Panel B: MF Precision is Grouped into Four Levels				
Intercept 3	−2.516***	0.486	−2.552***	−0.530
	(0.232)	(1.165)	(0.232)	(0.396)
Intercept 2	−1.058***	1.238	−1.091***	0.466
	(0.231)	(1.166)	(0.231)	(0.396)
Intercept 1	0.394*	2.091*	0.363	1.237***
	(0.230)	(1.171)	(0.230)	(0.397)
Fined_MF	0.233	0.139		
	(0.188)	(0.282)		
Fined_ALL			0.315***	0.185*
			(0.085)	(0.111)
Rank_EV	−0.154***	−0.256***	−0.157***	−0.142***
	(0.010)	(0.053)	(0.010)	(0.020)
ROA	1.427***	1.311**	1.472***	1.597***
	(0.163)	(0.519)	(0.165)	(0.222)
Month	0.624***	0.491***	0.621***	0.537***
	(0.026)	(0.096)	(0.026)	(0.044)
ST	−0.594***	−0.064	−0.668***	−0.255**
	(0.080)	(0.316)	(0.082)	(0.126)
State	−0.016	−0.053	−0.004	−0.196*
	(0.058)	(0.290)	(0.058)	(0.108)

(*continued on next page*)

Table 10 (*continued*)

	All samples	Matched samples	All samples	Matched samples
Herf5	0.308	−1.372	0.330	−0.785*
	(0.221)	(1.093)	(0.221)	(0.475)
Size	−0.150***	−0.155	−0.148***	−0.052
	(0.025)	(0.157)	(0.025)	(0.053)
Industry & year	Controlled		Controlled	
Rescaled R^2 (%)	33.89	22.52	34.03	17.99
Obs.	5362	252	5362	1414

In panel A, MF precision is grouped into two levels: for quantitative forecasts, precision equals 1 and for qualitative forecasts, precision equals 0.
In panel B, MF precision is grouped into four levels: for general impression forecasts, precision equals 0 while for open-interval, closed-interval and point estimates, precision equals 1, 2 and 3, respectively.
Fined_MF equals 1 if the observation was punished for MF irregularities in the past three years, and 0 otherwise.
Fined_ALL equals 1 if the observation was punished (not necessarily for MF irregularities) in the past three years, and 0 otherwise.
The RANK of EV is calculated as follows. We first calculated EV as the standard deviation of net incomes in the past three years, deflated by the absolute value of their mean. Then we ranked the EV of all the observations (5362) by year into ten groups.
ROA = net income/total assets, winsorized at 1% and 99% of all samples by fiscal year.
ST is equals 1 if the firm was in ST, or *ST when the MF was disclosed, and 0 otherwise.
Month is equals 1 if the MF was disclosed before the end of the fiscal year and the month of disclosure otherwise.
State is equals 1 if the ultimate controller or local government were central, and 0 otherwise.
Herf5 is the sum of the square of the percentage holdings for the five largest shareholders.
Size equals the log of the total assets.
The study sample was chosen from firms with Fined_MF (or Fined_ALL) values equaling 1, and the control sample was chosen from firms with Fined_ALL values equaling 0, matched with the same forecasting period, industry and nearest total assets.
Standard error in parentheses.
* significance at the 10% level.
** significance at the 5% level.
*** significance at the 1% level.

Table 11
Errors of MFs for Observations with Extreme Values from 2002 to 2009.

MFE	Highest deciles		Lowest deciles		Totals	
	Obs.	Percent (%)	Obs.	Percent (%)	Obs.	Percent (%)
CFO deflated by total assets (CFO)						
⩽−10%	42	9.80	139	34.70	181	21.80
(−10%, 10%]	207	48.30	165	41.10	372	44.80
>10%	180	42.00	97	24.20	277	33.40
	429		401		830	
Net income deflated by total assets (ROA)						
⩽−10%	26	5.30	173	42.90	199	22.30
(−10%, 10%]	294	59.90	201	49.90	495	55.40
>10%	171	34.80	29	7.20	200	22.40
	491		403		894	
Growth of sales (Growth)						
⩽−10%	61	11.80	162	43.00	223	24.90
(−10%, 10%]	240	46.20	139	36.90	379	42.30
>10%	218	42.00	76	20.20	294	32.80
	519		377		896	
Leverage ratio (LEV)						
⩽−10%	118	33.10	91	24.10	209	28.40
(−10%, 10%]	127	35.60	199	52.60	326	44.40
>10%	112	31.40	88	23.30	200	27.20
	357		378		735	

$MFE = (NET_{actual} - NET_{forecasted})/|NET_{forecasted}|$, where NET_{actual} is actual net income and $NET_{forecasted}$ is the forecasted net income in the MF.

Table 12
MF accuracy for observations with extreme values from 2002 to 2009.

Quartile of accuracy	Highest deciles		Lowest deciles		Totals	
	Obs.	Percent (%)	Obs.	Percent (%)	Obs.	Percent (%)
CFO deflated by total assets (CFO)						
1	91	21.2	124	30.9	215	25.9
2	93	21.7	88	21.9	181	21.8
3	128	29.8	94	23.4	222	26.7
4	117	27.3	95	23.7	212	25.5
	429		401		830	
Ratio test[a]	$\chi^2 = 6.56^{**}$					
Net income deflated by total assets (ROA)						
1	64	13.0	89	22.1	153	17.1
2	94	19.1	95	23.6	189	21.1
3	149	30.3	101	25.1	250	28.0
4	184	37.5	118	29.3	302	33.8
	491		403		894	
Ratio test[a]	$\chi^2 = 14.18^{***}$					
Growth of sales (Growth)						
1	118	22.7	137	36.3	255	28.5
2	122	23.5	80	21.2	202	22.5
3	141	27.2	82	21.8	223	24.9
4	138	26.6	78	20.7	216	24.1
	519		377		896	
Ratio test[a]	$\chi^2 = 13.92^{***}$					
Leverage ratio (LEV)						
1	125	35.0	68	18.0	193	26.3
2	84	23.5	86	22.8	170	23.1
3	87	24.4	96	25.4	183	24.9
4	61	17.1	128	33.9	189	25.7
	357		378		735	
Ratio test[a]	$\chi^2 = 39.06^{***}$					

[a] The ratio test examines whether the distribution of highest deciles and lowest deciles in the lowest and highest quartile of accuracy is significantly different, where Accuracy = 1/|MFE|.
* Significance at the 10% level.
** Significance at the 5% level.
*** Significance at the 1% level.

deciles issued more quantitative forecasts than those with CFO in the lowest deciles. That is, the quality of the former's MFs are higher than those of the latter's.

Table 9 reports the precision of annual MFs issued by A-share firms from 2002 to 2009, and Fig. 3 portrays the distribution of forecast precision. We can see that the precision of subsequent MFs issued by firms punished for irregular MFs are significantly lower than that of unpunished firms. The precision of subsequent MFs issued by firms punished for all irregularities is higher than that of unpunished firms. This difference might be the result of timing, with punishments for MF irregularities concentrated in 2001 and with subsequent MFs issued from 2002 to 2004, when the quality of all listed firms' MFs was improving. Therefore, it is necessary to control for other factors that influence MF quality.

Because the precision of MFs is an ordinal variable, we run the regressions with logit or ordered-logit. As the percentage of punished observations is relatively low, we also use a matched sample to avoid potential confusion introduced by different sample sizes. The regression results are reported in Table 10.

It is clear that after controlling for factors influencing MF precision, the estimated coefficient of Fined_MF is not significantly different from zero – indicating that the effects of such punishments are not as expected. The estimated coefficient of Fined_ALL is significantly positive, indicating that the effects of such punishments are somewhat significant. Comparing the results of Fined_MF and Fined_ALL, we argue that one explanation for

Table 13
Distribution of annual MF accuracy from 2002 to 2009.

MFE	All observations	Not_Fined	Fined_MF	Fined_ALL
⩽−80%	170	150	3	20
(−80%, −50%]	192	171	5	21
(−50%, −20%]	327	292	5	35
(−20%, −10%]	293	262	5	31
(−10%, 10%]	1629	1465	21	164
(10%, 20%]	394	361	6	33
(20%, 50%]	400	369	2	31
(50%, 80%]	121	110	1	11
>80%	218	191	3	27
	3744	3371	51	373

$MFE = (NET_{actual} - NET_{forecasted})/|NET_{forecasted}|$, where NET_{actual} is the actual net income while $NET_{forecasted}$ is the MF's forecasted net income.
Not_Fined represents observations that did not receive any punishment in the past three years.
Fined_MF represents observations that were punished for MF irregularities in the past three years.
Fined_ALL represents observations that were punished (not necessarily for MF irregularities) in the past three years.

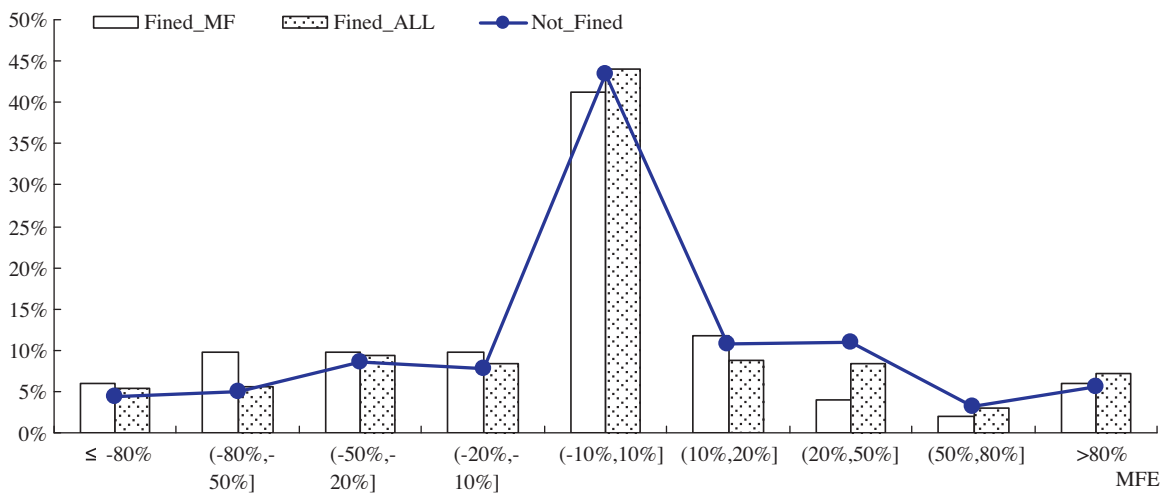


Fig. 4. Distribution of forecast errors. *Note*: $MFE = (NET_{actual} - NET_{forecasted})/|NET_{forecasted}|$, where NET_{actual} is actual net income and $NET_{forecasted}$ is the forecasted net income in the MF. "Not-Fined" are firms that were not punished during the previous three years. "Fined_MF" are firms that were punished for MF irregularities and "Fined_All" are firms that were punished for irregularities that did not necessarily include MF irregularities during the previous three years.

the difference might be that the degree of punishment for MF irregularities is relatively lighter, indicating an insufficiently strong deterrence effect.[24]

5.2. Effects of punishment on MF accuracy

We classify MFs into three groups: overestimated, accurate and underestimated. MFs predict activities and it is almost impossible to be 100% accurate. An accurate forecast is one for which forecasted earnings are

[24] Punishment for irregular management forecasts usually takes the form of public criticism, which is lighter than a public fine. For example, the influence of public criticism on the qualification of refinancing is only one year, while that of a public fine is three years. Moreover, Luo et al. (2005) find that the probability of being punished again is lower for firms that have received a public fine, suggesting that public fines offer the strongest deterrence.

Table 14
Effects of enforcement on the accuracy of annual MFs from 2002 to 2009.

	All samples	Matched samples	All samples	Matched samples
Intercept	6.477***	9.925***	6.434***	5.716***
	(0.400)	(2.018)	(0.401)	(0.676)
Fined_MF	0.110	0.432		
	(0.383)	(0.605)		
Fined_ALL			0.197	0.215
			(0.154)	(0.220)
Rank of EV	−0.331***	−0.522***	−0.334***	−0.267***
	(0.017)	(0.103)	(0.018)	(0.040)
ROA	3.873***	6.126***	3.903***	3.034***
	(0.463)	(2.042)	(0.463)	(0.678)
Loss	1.515***	1.686**	1.514***	1.202***
	(0.172)	(0.802)	(0.171)	(0.330)
Month	0.541***	0.759***	0.538***	0.544***
	(0.045)	(0.193)	(0.045)	(0.089)
State	0.037	0.757	0.043	0.492**
	(0.097)	(0.588)	(0.097)	(0.211)
Size	−0.199***	−0.697**	−0.193***	−0.159*
	(0.039)	(0.287)	(0.039)	(0.089)
Industry and year	Controlled		Controlled	
Adjusted R^2	12.91%	31.51%	12.95%	10.96%
Obs.	3744	100	3744	740

Notes: The dependent variable RANK of ACCURACY was calculated as follows. First, we first calculated FE as the absolute value of the difference between actual net income and the net income forecasted by management, deflated by the absolute value of the net income forecasted by management with ACCURACY as the inverse of FE. Then we ranked the ACCURACY of all observations (3744) by year into 10 groups.
Fined_MF equals 1 if the observation was punished for MF irregularities in the past three years, and 0 otherwise.
Fined_ALL equals 1 if the observation was punished (not necessarily for MF irregularities) in the past three years, and 0 otherwise.
The RANK of EV was calculated as follows. First, we calculated EV as the standard deviation of net incomes in the past three years, deflated by the absolute value of their mean. Then we ranked the EV of all observations (3744) by year into 10 groups.
ROA = net income/total assets, winsorized at 1% and 99% of all samples by fiscal year.
Loss is equals 1 if the actual net income for the forecasting year is negative, and 0 otherwise.
Month is equals 1 if the MF is disclosed before the end of the fiscal year, and the month of disclosure otherwise.
State equals 1 if the ultimate controller or local government is central, and 0 otherwise.
Size is equal to the log of total assets.
The study sample is those firms with Fined_MF (or Fined_ALL) values equaling 1, and the control sample is chosen from those firms with Fined_ALL values equaling 0, matched with the same forecasting period, industry and the nearest total assets.
Standard error in parentheses.
* Significance at the 10% level.
** Significance at the 5% level.
*** Significance at the 1% level.

within a 10% deviation from actual earnings. If the forecasted earnings deviate from the actual earnings by more than 10%, we classify the forecast as "overestimated" or "underestimated", according to the sign of the difference between the forecast earnings and the actual earnings. Our previous results indicate that punishment for MF irregularities is rarely enforced on "good news". The only times "good news" is punished is when the forecast is "overestimated". In other words, overestimation is not welcomed by regulators, but does this preference impact the tendency of target firms to overestimate? The results in Table 11 indicate that it does not.

For example, the percentage of overestimation is 9.8% and 34.7% for observations in the highest deciles of CFO and those in the lowest deciles, respectively, with the latter three times higher than the former. In contrast, their corresponding percentage of underestimation is 42.0% and 24.2%, respectively, with the latter much lower than the former.

Accuracy is measured by the inverse of absolute MFE (MF error, see Table 12 for its definition). To avoid the influence of extreme values, we use the rank of Accuracy (from 9 for the highest deciles to 0 for the lowest deciles) in our regressions. To save space, the results reported in Table 12 are based on quintiles.

We still find that punishment preferences do not provide a sufficiently strong deterrence. For example, the percentage of lowest accuracy is 30.9% for observations with CFO falling in the lowest deciles, which is higher than that of observations with CFO falling in the highest deciles (21.2%). In contrast, the percentage of highest accuracy is 23.7% and 27.3% for observations with CFO falling in the lowest and highest deciles, respectively. The χ^2 of the ratio test is 6.56, which is significant at the 5% level.

The accuracy of all MFs issued by A-share firms from 2002 to 2009 is reported in Table 13. Fig. 4 portrays the distribution of forecast accuracy. The accuracy results are similar to those for forecast precision. That is, firms punished for MF irregularities still have lower accuracy in their subsequent forecasts than other firms, indicating no significant improvements. Meanwhile, the accuracy of subsequent MFs issued by firms punished for all irregularities is not significantly different from that of unpunished firms.

The regression results are reported in Table 14. After controlling for factors that influence MF accuracy, the estimated coefficients for Fined_MF and Fined_ALL are all insignificantly different from zero, indicating that the punished firms did not improve their subsequent forecast accuracy to please regulators.

6. Conclusions

We use irregular MFs from 2000 to 2006 to examine whether the resulting enforcement actions are selective. Our results indicate that enforcement actions by securities regulators are selective. All things being equal, the probability of being punished for irregular MF is significantly related to proxies for survival rates. Specifically, fraud firms with a lower ROA or a higher risk of cash flows are more likely to be punished.

Most enforcement actions for MF irregularities occurred from 2000 to 2002. Therefore, we examine the effects of enforcement actions based on MF quality, in disclosures from 2002 to 2009. Our results indicate that the effects of enforcement actions fall far from expectations. First, the preference for selective enforcement has not proven a significant threat. The forecasting precision and accuracy of firms with a lower survival probability were still significantly lower than those with a higher survival probability. Second, enforcement actions did not significantly improve the precision and accuracy of subsequent forecasts issued by punished firms.

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Women on boards of directors and corporate philanthropic disaster response

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ABSTRACT

In this study we conduct firm-level analysis of the impact of women in the boardroom on corporate philanthropic disaster response (CPDR). We propose that CPDR contains agency costs and that female directors are more likely to restrain the associated agency costs of CPDR. We predict a negative relationship between the ratio of women on boards of directors (WoBs) and philanthropic contribution, which is weaker in firms with political connections and stronger in firms with better-developed institutional environments. Data was collected from the philanthropic responses to the Wenchuan earthquake on May 12, 2008 of privately-owned listed Chinese firms. The results support the hypothesized negative relationship, which is found to be weaker in firms with political connections. However, marketization-related factors do not significantly moderate this relationship. These results indicate that CPDR contains agency costs and that female directors do not facilitate the corporate donation process, but rather evaluate the benefits and restrain the associated agency costs.

1. Introduction

In recent years, considerable attention has been paid to the ability of firms to devote their resources to addressing natural disasters, with arguments made based on the scale of the resources that firms possess,

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the competencies they may have, or the specific goods or services they can deliver (Hess et al., 2002; Margolis and Walsh, 2003; Muller and Kräussl, 2011). The impact of natural disasters on corporate business has dramatically strengthened in recent years due to a number of high-profile events, such as the South Asian tsunami in 2004, Hurricane Katrina and the Kashmiri earthquake in 2005, the Californian wildfires of 2007 (Muller and Kräussl, 2011) and China's Wenchuan earthquake in 2008. Thus far, however, organizational research has not explored why and when a firm might execute a corporate philanthropic disaster response (CPDR), which has attracted a great deal of attention given its great importance to society.

Previous research has shown that women are generally more responsive to crisis situations and more likely to engage in giving than men (Williams, 2003). There is some anecdotal evidence that the number of women serving on a corporate board exerts an influence on the level of activities related to corporate social responsibility (CSR) (Wang and Coffey, 1992; Stanwick and Stanwick, 1998). It has also been observed that women are more likely than men to desire updates on how their charitable donations are being used because they view charity as a means of securing additional relationships and a greater involvement in the community (Marx, 2000).

Does the presence of women on boards of directors (WoBs) facilitate corporate philanthropic disaster response, generally referred to as corporate social responsibility (CSR)? Understanding the effects of increasing the voice of women is even more important given the recent and upcoming changes in workforce demographics (Richard et al., 2006). In fact, Ely and Padavic (2007) note that the issue of how WoB operate in most organizations is still a "black box".

While Hillman and Cannella (2007) propose that increasing the number of WoB would alter inter-group relations among directors and affect organizational strategy, the empirical literature on the relationship between WoB and CSR has produced few studies that systematically theorize and test women's influence at the corporate level (Terjesen et al., 2009). Williams (2003) studies this relationship based on the corporate charitable giving stated in annual reports and confirms that the underlying motives for why women are more charitable than men remain unclear. Furthermore, no previous studies have employed constructs and variables that are specifically germane to a CPDR evaluation perspective (Muller and Kräussl, 2011), especially in a transitional economy such as China where corporate social practices are too underdeveloped to establish a well-formed CSR culture.

Our empirical test offers a thorough examination of the firm-level effects of WoB, beginning with the general question that opened this article and moving to address whether and how WoB influence corporate philanthropic strategy and the disbursal of corporate resources through participation in and contribution to corporate disaster response. In particular, we investigate how female directors evaluate CPDR and highlight a different aspect of the relationship between WoB and CSR. Specifically, we emphasize that the role of female directors is to evaluate rather than facilitate CPDR.

Our first goal is to explore the effect of WoB on CPDR by integrating agency costs theory and a knowledge-based view to suggest a negative relationship between WoB and CPDR. Theoretically, the most relevant theories for explaining women's effects on corporate issues in China are agency costs and knowledge-based theory. Agency costs theory captures the essence of CPDR in China and asks for regulatory methods to increase governance efficiency and restrain agency costs. The knowledge-based view of firms suggests that increased communication, coordination and collaboration among organizational members are the keys to efficient organizational decisions because they allow for knowledge integration through the pooling of group resources (Bantel and Jackson, 1989; Pelled et al., 1999). These theories complement our investigation of the relationship between WoB and CPDR in China.

Our second goal is to explore the managerial motivation for CPDR. Previous studies have not considered what motivates female directors in CPDR situations, i.e. whether they restrain agency costs for the benefit of investors or whether they serve their own self interest by targeting private managerial benefits. Godfrey et al. (2008) find that the insurance effect of CSR that protects investors' wealth holds for the CSR targeting of a firm's secondary stakeholders, but does not hold for the social initiatives targeting of a firm's primary stakeholders. We still do not know the CPDR target that motivates directors and whether it has potential benefits for investors.

Furthermore, it is important to understand the conditions under which female directors exert the ability to evaluate the benefits and restrain the agency costs of CPDR. Although strategic scholars have identified the external environment as the key contingency factor in the relationship between organizational processes and

corporate strategy (Richard et al., 2006), no systematic study has examined the roles that contingent factors play in the relationship between WoB and CPDR. We call for an integration of the organizational behavior and strategy literature and posit that women's behavior and group processes in specific environmental contexts must be considered, along with the association between these processes and the context in which they occur. Therefore, it is important to consider the varying impact that WoB have on CPDR under different types of conditions. Thus, our third goal is to examine contingent effects on the relationship between WoB and CPDRs.

This study makes the following contributions. First, we extend the literature by integrating agency costs and knowledge-based theories and propose an evaluation function for female directors to emphasize the negative impact that WoB have on CPDR. Second, we examine the moderating effects of marketization and political connections – typical characteristics of transitional economies, especially China – on the relationship between WoB and CPDR. Third, we use a unique database gathered from Chinese privately-owned listed firms' donation announcements after the Wenchuan earthquake of 2008, and the empirical results support our hypotheses.

The remainder of this article proceeds as follows. The next section describes the theoretical model and presents hypotheses for empirical testing. The third section outlines the empirical method used to investigate the hypotheses. The fourth section presents the results. The fifth and concluding section discusses the implications of the findings and the limitations of the study.

2. Theory and hypothesis development

In this section we discuss why CPDR contains considerable agency costs, especially in China. We then consider how WoB affect the organizational evaluation of CPDR before philanthropic contribution decisions are made. In addition, we outline two contingency factors that might mitigate female directors' ability to properly evaluate CPDR: the *marketization factor*, which influences whether female directors are empowered with the rights to evaluate CPDR and the *political connection factor*, which determines the extent to which female directors hold the rights to alter CPDR.

2.1. Corporate philanthropic disaster response and agency costs

Margolis and Walsh (2001) review almost 100 studies attempting to quantify a relationship between CSR and corporate financial performance, but they fail to produce a conclusive result. The motivation behind CSR is quite complex and changes within different contexts, making it difficult to rely on a single theory to explain all of the resulting relationships. We propose that CPDR can be classified as a kind of agency cost in China that is based on exchanges between firms and the government.

2.1.1. Exchanges between firms and government in China

"CSR activities targeting primary stakeholders should produce exchange capital among groups – the potential to create more advantageous exchanges between the firm and its primary stakeholders. Such CSR activities, however, are less likely to produce moral capital; indeed, precisely because these actions can be viewed through a power-exchange lens they may be viewed as merely self-serving, rather than other-regarding, behaviors" (Godfrey et al., 2008, p. 5).

As one of the largest transitional economies in the world, China has undergone dramatic changes since 1978. The government has played a very important role in economic development and continues to exert great influence on corporate operations (Nee et al., 2007; He and Tian, 2008). Government bureaus at all levels are powerful groups in that they are the most important stakeholders of business firms (He and Tian, 2008).

Even with China's current economic transition, a large number of firms still depend on the government for resources such as capital, land, favorable policies and other assistance. A Chinese firm must use some government-oriented strategies to cultivate its relationship with the government. Chinese political institutions do not legitimize corporate political rent-seeking such as campaign contributions or corporate lobbying, so it becomes necessary to find other ways to obtain rents. In China, firms use philanthropic contributions for rent-seeking more frequently than firms in other countries. Corporate involvement in government-proposed social and charitable activities is a very helpful conduit because firms achieve moral legitimacy when the

government judges their activities to be acceptable and proper. For example, after the Wenchuan earthquake in 2008, the government encouraged firms to engage in disaster relief. Because corporate donations were motivated in this way, CPDR helped firms to cultivate a beneficial relationship with the government, which in turn created favorable policies. This kind of donation is similar to the political lobbying that prompts cash-preferential policy exchanges between firms and the government.

2.1.2. Agency cost perspective

It remains a concern that corporate responses to disaster in the form of cash donations to the government are not altruistic. In such cases state-owned listed firms should donate more generously than privately-owned listed firms because the former represent the government's efforts to assume social responsibility and deliver disaster relief. However, Zhang et al. (2009) find that state-owned listed firms donated less than privately-owned listed firms in response to the Wenchuan earthquake. Furthermore, disaster victims typically need vital emergency materials such as food, water and medicine, and it can be difficult to apply cash in solving such resource limitation problems in a timely manner. A firm's choice to donate cash is mainly driven by the knowledge that doing so might grab stakeholders' attention without the responsibilities of providing the necessities of disaster relief.

Consistent with a political contribution perspective on CPDR, managerial opportunism is an additional motive behind corporate disaster donations. A manager may contribute corporate resources to achieve a higher social status, gain favor with board members by contributing to their favorite causes or further their own ideological preferences (Barnard, 1997). Boatsman and Gupta (1996) and Helland and Smith (2003) provide evidence that managers and board members exert significant influence over corporate giving. Previous studies on the antecedents of CSR show that agency cost-related variables such as managerial shareholdings, board composition and the number of board members significantly influence corporate donations (e.g., Brown et al., 2006; Helland and Smith, 2003). Giving programs may enable managers and directors to support favorite charities at shareholders' expense.

Although managers may use CPDR to build up a relationship (*guanxi*) with the government and simultaneously purchase personal benefits, many empirical studies show that the practice is not necessarily beneficial for investors.

2.1.3. Empirical studies on CPDR

Several empirical studies support our conclusion that CPDR is not related to altruism. Muller and Whiteman (2008) collect data on donations related to the South Asian tsunami, Hurricane Katrina and the Kashmiri earthquake from Fortune Global 500 firms located in North America, Europe and Asia. Their results reveal inter-regional differences in the overall likelihood of donations and their cash value, providing evidence of a home-region effect on CPDR, whereby firms pay more attention to disasters that are close to home or in locations where they have a local presence. Shan et al. (2008) study the economic motivation for corporate donations based on Chinese firms' responses to the Wenchuan earthquake and find that firms with products directly related to consumers' daily lives generally donated 50% more than other firms.

It could be argued that if CPDR is certain to be beneficial to a firm, its investors would respond positively to corporate donation announcements. However, empirical results from previous studies do not support this conclusion. Muller and Kräussl (2011) investigate stock market reactions to corporate donation announcements based on the corporate response to Hurricane Katrina. Their results show that CPDR is not linked to specifically positive or negative abnormal returns overall. They further argue that in such cases the donating firm gains no "moral capital" because although the cause (the CPDR) is considered positive, the firm's intentions are not perceived as genuine.

Taken together, both the exchanges between firms and government and the agency cost perspective suggest that CPDR which targets the Chinese government generates private benefits for managers, and that this kind of corporate donation is similar to an agency cost that does not definitively provide benefits for investors.

2.2. Women on boards of directors and corporate philanthropic disaster response

CPDR contains agency costs and is not necessarily consistent with investors' values. Although directors can expropriate private benefits from CPDR, female directors have significantly different motivations from their

male counterparts when it comes to such benefits. Female directors mainly evaluate the benefits of CPDR for corporate efficiency and the consideration of investors. International comparisons show that countries with more women in their governments also have a lower level of corruption (Swamy et al., 2001; Dollar et al., 2001; Cheung and Hernández-Julián, 2007). Eckel and Grossman (2001) find women to be less selfish in dictator game experiments and Schubert et al. (1999) find them to be more risk-averse in their financial decision-making. Levi et al. (2008) show that the bid premium over pre-announcement target share prices is statistically and economically smaller if the CEO of the bidding firm is a woman. These studies suggest that women would be less likely to participate in the selfish, risky activities of corruption and more likely to use creative measures to discover value and correct the tendency to overpay, if it exists.

The effect of female directors in boardrooms on buffering the conflicts of interest that arise between male directors and investors during CPDR, from an agency costs and knowledge-based perspective, suggests a negative relationship between WoB and CPDR. The *knowledge-based view of the firm* suggests that although knowledge is developed by individuals, the organization plays a critical role in articulating and applying it through integration and coordination efforts (Grant, 1996). WoB have a positive effect on corporate governance efficiency (Francoeur et al., 2007; Adams and Ferreira, 2009). On male-dominated corporate boards, female directors promote a better understanding of the marketplace, increase organizational creativity and innovation, exercise effective problem solving, promote corporate monitoring, decrease the private benefits of managerial control, enhance the effectiveness of corporate leadership, display a better understanding of the complexities of the environment, promote more effective global relationships and encourage cultural sensitivity among corporate leaders (Robinson and Dechant, 1997; Carter et al., 2003; Richard et al., 2007). The potential agency costs of CPDR stimulate female directors to make decisions in opposition to those of their male counterparts, preventing the chance that CPDR will be initiated by selfish behavior.

Based on the preceding logic, because CPDR contains considerable agency costs it is reasonable to propose that WoB increase corporate governance efficiency and female directors evaluate the benefits of CPDR for shareholders, restrain the agency costs of CPDR and, consequently, respond negatively to CPDR. Hence, we assert:

Hypothesis 1. Women on boards of directors have a negative association with corporate philanthropic contributions to disaster relief.

2.3. Moderating roles of political connections and marketization

Contingency theory states that an organizational process must fit its context (Drazin and Van de Ven, 1985). It hypothesizes that no one method of management can be optimally effective in all situations, and research should explore the context in which various resources will have the best influence (Miller and Shamsie, 1996; Richard et al., 2007).

Given that it is the largest transitional economy in the world, China has only recently built up an efficient institutional separation between business and government. Firms, governments and wide societal elements collectively shape market regulations conducted through consultation and accommodation, resulting in incremental and ongoing rather than episodic and radical policy change (Detomasi, 2008). Therefore, relationships with the government help firms to obtain rent-seeking benefits. Detomasi (2008) argues that the institutional characteristics of a political environment have the potential to determine whether and how firms might pursue CSR. We propose that political connections with the government and marketization levels have a significant influence on the relationship between WoB and CPDR in China.

2.3.1. The moderating role of political connections

Political connections are a kind of relational wealth whereby managers' personal connections with the government (or government officials) affect not only corporate performance but also decisions regarding issues such as philanthropic contributions. A number of studies examine corporate political connections within different countries (see, e.g., Fisman (2001) for Indonesia, Johnson and Mitton (2003) for Malaysia, Ferguson and Voth (2008) for Germany and Agrawal and Knoeber (2001) for a sample of outside directors in the

US). Several recent studies also provide cross-country evidence of the impact of political connections on firm value (Faccio, 2007). Taken together, these findings suggest that politically connected firms should benefit from their connections, particularly in countries with higher levels of corruption. If CPDR facilitates the development and maintenance of relationships with the government, then political connections should promote the effects of corporate philanthropic decisions beyond any constraints, such as female directors' negative impact on CPDR – ultimately facilitating firm-government exchanges.

In politically connected firms, female directors encounter strong pressure exerted by politically connected managers and a firm-connected government, which might make them less likely to vote against CPDR. This creates an environment in which female directors are less likely to challenge a political intervention initiated by the government that interrupts the regular organizational decision-making process. Based on this logic, we hypothesize:

Hypothesis 2. Political connections weaken the effect of female directors in such a way that the negative relationship between women on boards of directors and corporate philanthropic contributions to disasters will be less salient for listed firms with political connections.

2.3.2. The moderating role of marketization

Market development means market-based transactions and a free economy. In an environment with a high level of marketization, capital markets tend to be broad, deep and active, providing venture capital for start-ups and disciplining poor performing firms to produce returns and increase their value for shareholders (Murtha and Lenway, 1994). The process of organizational decision making in this type of environment is normative and follows market principles. Professional women are selected and promoted to various boards based on merit. Female directors are less likely to encounter a glass ceiling when they seek promotion and are empowered based on their board seats. This empowerment strengthens their ability to oppose their male counterparts regarding CPDR, which contains considerable agency costs. In addition, an efficient market that yields insignificant positive returns after CPDR (Muller and Kräussl, 2011) validates the rejection of CPDR by female directors.

However, if firms are operating under an environment with a low level of marketization that does not allow for promoting women onto boards of directors, they will not have the motivation to invite professional women capable of hampering the male-dominant board culture to serve on their boards. Furthermore, female directors will be more likely to be punished for their contrary suggestions/decisions than their male counterparts. Westphal and Stern (2007) use survey data from 760 outside directors at large and medium-sized US firms and find that women are rewarded less than their male counterparts in the director labor market for engaging in a given level of advice-giving or ingratiatory behavior. In other words, women are less likely to improve their chances of receiving a board appointment by engaging in this behavior. They are also punished more frequently for engaging in monitoring and controlling behavior. In these situations, female directors are compelled to agree with their male counterparts rather than vote against them. Following this logic, we posit:

Hypothesis 3. The negative relationship between women on boards of directors and corporate philanthropic contributions to disasters will be more salient for listed firms operating in an environment with a higher level of marketization than those operating in an environment with a lower level of marketization.

3. Methodology

3.1. Sample

The May 12, 2008 Wenchuan earthquake resulted in more than 68,858 deaths and losses in the hundreds of billions of Yuan as of May 30, 2008. These numbers will undoubtedly continue to increase as more information becomes available about the extent of the event (Wang, 2008). After the earthquake, many publicly traded firms listed on the Shanghai and Shenzhen stock exchanges disclosed philanthropic contribution plans. Our sample consists of all privately-owned firms listed before 2006, a total of 519 firms.

We do not include state-owned listed firms in our study for the following reasons. First, the legitimacy of state-owned listed firms' donations of corporate resources to the government is still debatable. The regulatory agencies with jurisdiction over SOEs have raised concerns that such donations could undermine the value of

state-owned assets and seriously control corporate donations.[1] Second, the motivation behind the donations of SOEs is complex. Wang and Qian (2010) study the relationship between corporate donation and performance in China and find that state-owned firms do not receive benefits from corporate donations. An SOE's donation of corporate resources is more likely to be motivated by other political factors, regardless of the economic returns. Third, there are generally fewer women serving on the corporate boards of state-owned listed firms than on the boards of privately-owned listed firms. Based on our collected data, the ratio of WoB is only 9% in SOEs, comparatively less than the ratio of WoB in privately-owned firms. However, studies on women's ability to alter corporate decision making emphasizes that only one or two women usually serve in the boardroom, and they are treated as tokens whose contributions are dismissed or devalued by their male counterparts (e.g., Konrad et al., 2008; Torchia et al., 2011). Consequently, the effect of women on corporate governance is quite limited in SOEs. Furthermore, in a robustness test, we analyze a sample of SOEs and find the relationship between the ratio of WoB and corporate donations is not significant.

Consistent with previous research (e.g., Muller and Whiteman, 2008) our investigation is based on firm self-reporting and draws from information disseminated through the official information disclosure website appointed by the China Securities Regulatory Commission (CSRC),[2] corporate websites and press releases.[3] To obtain charitable donation data, we match these firms with data provided in corporate disclosures after the earthquake. The disclosures include information on cash contributions by firms. A total of 121 listed firms made charitable donations. We also use financial data from these firms' annual reports for 2006. As a result of missing data, the sample varies between 468 and 476 listed firms.

3.2. Measures and analytical approach

3.2.1. Dependent measures

In line with Brown et al. (2006), we introduce three dependent variables: *donation*, *the ratio of giving to assets* and *the ratio of giving to profits*. We use the dummy variable *donation* to measure whether a firm demonstrated a philanthropic disaster response. If the firm responded to the disaster, donation is coded 1, otherwise 0. The ratio of giving is defined as the amount the firm identified as its cash contribution to disaster relief. We use two ratios of giving measures proposed by Brown et al. (2006), where the *ratio of giving to assets* equals the log-transformed (ratio of RMB value of company donations to total assets $* 100 + 1$) and *ratio of giving to profit* equals the log-transformed (ratio of RMB value of company donations to net profits $+ 1$).

3.2.2. Independent variable

We use the ratio of women on boards of directors as the measure of WoB. This treatment is consistent with previous studies (Adams and Ferreira, 2009; Harrison and Klein, 2007; Campell and Mínguez-Vera, 2007).

3.2.3. Moderating variables

Next, we include three moderating variables. Following Faccio (2007) and Fan and Wong (2007) we define *political connection* as the CEO being connected to current or former government bureaucrats or a member of the Peoples' Congress. We measure the *marketization* of different regions that listed firms are registered in China based on Fan and Wang (2010). We decompose the index of marketization into marketization level and law enforcement level as proposed by Fan and Wang (2010). Based on whether the marketization and law enforcement level values are larger than the mean, we construct two dummy variables and code marketization and law enforcement levels as 1 and 0, respectively.

3.2.4. Control

A number of controls are included in the analysis. The *ratio of debt to assets* is measured to control for capital structure. *Net profit* is specified in the model as a control variable because it has been found to have

[1] In November 2009, the Chinese State-owned Assets Supervision Admission Committee established a regulation on charitable giving by SOEs that are under central government control. Please refer to the website: http://www.gov.cn/gzdt/2009-12/16/content_1488862.htm.

[2] The website is http://www.cninfo.com.cn/default.htm.

[3] The information published on http://www.finance.sina.com.cn/blank/zzqyxd.shtml also provides corporate giving data.

a direct effect on corporate philanthropic contributions due to the influence of economic scale and market power (Brown et al., 2006). In addition, we introduce *listed years*, the number of years between the year in which the firm was listed in 2008, to control for the effect of corporate familiarity because firms that have been listed for a long time tend to make large philanthropic contributions (Godfrey, 2005). We also control for the geographic location effect with *geographic distance*, which is calculated based on the geographic distance between the registered region of the listed firm and the earthquake center as drawn from Google Maps data. Finally, we introduce *market type* to control for industry effects. If a firm's industry is classified as not being related to the basic necessities of life such as clothing, food, shelter and transportation, the market type is coded 1, otherwise 0.

3.3. Correction for endogeneity

Although we anticipate that WoB influence corporate donations to disasters, it is possible that corporate characteristics influence the presence of women on corporate boards. Brown et al. (2006) propose that firms introduce women onto their boards symbolically. If sufficient women serve on the board of supervisors, which is coordinated with the board of directors, the firm will also provide more seats on the board for women, to disperse any concerns about discrimination. Furthermore, if the chairman, CEO or board secretary is a woman, then the firm will have more women on the board of directors in accordance with a preference for gender similarity (Adams and Ferreira, 2009). Adams and Ferreira (2009) show that the ratio of WoB is smaller in large firms. Keeping the requirement of efficient instrumental variables in mind, to control for potential endogeneity we introduce *number of female directors on monitoring board*, *chairman or CEO is a woman*, *board secretary is a woman* and *corporate asset scale* as instrumental variables.

Table 1
Variable definitions. This table reports and describes the variables used in our regression analysis. Data sources: A = annual reports; B = listed firms temporary disclosure; C = data stream (http://www.gtarsc.com/) and D = news reports on the Internet or in books.

Variables	Description	Source
Donation	If the listed firm donates, this variable is coded 1, otherwise 0	B, D
Cash giving (RMB)	The amount of cash given by listed firms	B, D
Ratio of giving to assets	Logarithm of (ratio of cash giving to total assets $*$ 100 + 1)	C
Ratio of giving to profits	Logarithm of (ratio of cash giving to net profit + 1)	C
Ratio of WoB	The proportion of women on boards of directors	A
Number of female directors on the board of supervisors	Equals the number of female directors on corporate supervisory boards	A, C
Chairman or CEO is a woman	If the gender of the Chairman or CEO is female, this variable is coded 1, otherwise 0	A, C
Board secretary is a woman	If the gender of the board secretary is female, this variable is coded 1, otherwise 0	A, C
Total assets	Corporate assets including all debt and equity	A, C
Marketization level	Based on the data provided by Fan and Wang (2010), which is supported by the National Economic Research Institute (NERI). When the value of marketization is larger than the mean, this variable is coded 1, otherwise 0	D
Law enforcement level	Based on the data provided by Fan and Wang (2010), according to whether the value of law enforcement is larger or smaller than the mean, it is coded 1 or 0, respectively	D
Political connection	Political affiliation is defined as the CEO being a current or former government bureaucrat or a member of the Peoples' Congress	A
Ratio debt to assets	Ratio of total debt to total assets	A
Net profit	Profits excluding costs	A
Cash holding	Calculated based on the formula: (cash and cash equivalents + temporary investments)/(total Assets − cash and cash equivalents − temporary investments)	A
Earn per share	The ratio of net profit to total shares	C
Listed years	Number of years between the listing year and 2008	A
Geographic distance	Geographic distance is calculated based on the geographic distance between the registered region of listed firms and the earthquake center	D
Market type	According to the industry categories of listed firms, if the industry is not related to basic necessities of life such as clothing, food, shelter and transportation, the market type is coded 1, otherwise zero	A

Table 2
Means, standard deviations and correlations.[a]

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Donation	0.27	0.44																	
2. Ratio of giving to assets[b,c]	3.00	5.11	0.99																
3. Ratio of giving to profits[b,d]	2.92	5.02	0.99	0.99															
4. Ratio of WoB	0.12	0.11	−0.09	−0.09	−0.08														
5. Number of female directors on the board of supervisors	0.94	0.92	−0.03	−0.02	−0.02	0.15													
6. Chairman or CEO is a woman	0.12	0.32	−0.05	−0.04	−0.04	0.29	0.06												
7. Board secretary is a woman	0.21	0.4	−0.07	−0.06	−0.06	0.15	0.08	0.02											
8. Total assets[b]	20.98	1.13	0.29	0.25	0.26	−0.12	−0.04	−0.02	−0.05										
9. Marketization level	0.59	0.49	0.14	0.13	0.11	−0.03	0.01	−0.02	0	0.13									
10. Law enforcement level	0.53	0.5	0.11	0.1	0.09	−0.05	0.03	−0.02	0.01	0.09	0.88								
11. Political connection	0.3	0.46	0.27	0.29	0.29	−0.02	−0.04	0.02	−0.05	0.15	−0.03	−0.02							
12. Ratio of debt to assets[b]	3.94	0.65	−0.11	−0.11	−0.11	0.06	0.05	0.04	0	−0.11	−0.04	−0.04	−0.08						
13. Net profit[b]	19.6	0.21	0.28	0.26	0.25	−0.07	0.03	−0.02	0	0.47	0.07	0.05	0.12	−0.01					
14. Cash holding	0.21	0.22	0.14	0.14	0.13	−0.05	−0.01	−0.02	−0.01	−0.04	0.22	0.21	0.08	−0.33	0.06				
15. Earn per share[b]	1.44	0.14	0.17	0.17	0.16	−0.01	0.04	−0.04	−0.04	0.18	0.16	0.14	0.03	−0.16	0.32	0.19			
16. Listed years	8.77	4.31	−0.23	−0.23	−0.23	0.05	0.1	0.07	0.08	0.01	−0.2	−0.11	−0.04	0.23	−0.02	−0.31	−0.19		
17. Geographic distance[b]	7.46	0.6	−0.07	−0.09	−0.11	−0.02	0.03	0.04	−0.05	0.1	0.41	0.38	−0.01	−0.03	0.04	0.07	0.09	−0.1	
18. Market type	0.66	0.47	−0.07	−0.07	−0.08	−0.11	−0.02	−0.17	−0.01	0.02	0.1	0.14	−0.04	0.01	−0.07	−0.01	0.04	−0.05	0.06

[a] $N = 476$; correlations $\geqslant |0.09|$ are significant at the $p < 0.05$ level.
[b] Logarithm.
[c] $N = 470$ due to missing data.
[d] $N = 468$ due to missing data.

Table 3
First-stage regression analysis for the ratio of women on boards of directors.[a]

Variables	Coefficients
Number of female directors on the board of supervisors	0.015***
	(0.01)
Chairman or CEO is a woman	0.093***
	(0.02)
Board secretary is a woman	0.038***
	(0.01)
Total assets[b]	−0.010*
	(0.01)
Ratio of debt to assets[b]	0.005
	(0.01)
Net profit[b]	−0.020
	(0.02)
Cash holding	−0.020
	(0.02)
Earn per share[b]	0.037
	(0.05)
Listed years	0.000
	(0.00)
Geographic distance[b]	−0.002
	(0.01)
Market type	−0.013
	(0.01)
Political connection	0.002
	(0.01)
Marketization level	0.019
	(0.03)
Law enforcement level	−0.021
	(0.03)
Constant	0.643
	(0.42)
Adjusted R^2	0.14
N	476

[a] Standard errors are listed in parentheses.
[b] Logarithm.
* $p < 0.1$ for two-tailed tests.
*** $p < 0.01$ for two-tailed tests.

The analysis is conducted in two stages. In the first stage we use ordinary regressions to model the influence of instrumental variables on the ratio of WoB. In the second stage we include the endogeneity correction variable and use a binomial logistic regression to model the likelihood that a given firm is expected to donate. We analyze the ratios of giving amounts using Tobit regression models. Because a large number of values for the dependent variable 'Giving' are 0, the censorship regression model is appropriate. Table 1 presents the definitions and sources of the data.

4. Results

The results are reported in Tables 2, 3 and 4a–4c. Table 2 reports the descriptive statistics of our variables. The correlations between the variables do not suggest any potential for serious multicollinearity in the regression analysis.

Table 3 reports the regression results and effectiveness of the instrumental variables. As predicted, all of the instrumental variables are significantly related to the ratio of WoB. Following the methods described in our

Table 4a
Second-stage regression results predicting the relationship between corporate donations and women on boards of directors.[a]

Independent variables	Dependent variables		
	Donation Model 1	Ratio of giving to assets Model 2	Ratio of giving to profits Model 3
Ratio of debt to assets[b]	−0.087	−0.997	−0.949
	(0.17)	(1.50)	(1.51)
Net profit[b]	3.534***	14.349***	14.264***
	(0.93)	(3.83)	(3.82)
Cash holding	0.109	0.764	−0.006
	(0.53)	(3.81)	(3.83)
Earn per share[b]	0.745	6.186	7.292
	(1.53)	(5.77)	(5.79)
Listed years	−0.126***	−0.820***	−0.827***
	(0.03)	(0.20)	(0.20)
Geographic distance[b]	−0.805***	−5.360***	−5.469***
	(0.20)	(1.36)	(1.36)
Market type	−0.636**	−3.972**	−4.173**
	(0.27)	(1.77)	(1.77)
Residual of ratio of WoB	7.976**	43.045*	43.434*
	(3.48)	(23.75)	(23.70)
Political connection	1.216***	8.777***	8.905***
	(0.25)	(1.66)	(1.66)
Marketization level	0.827	4.800	4.476
	(0.54)	(3.43)	(3.41)
Law enforcement level	0.070	0.866	0.804
	(0.50)	(3.19)	(3.18)
Ratio of WoB	−7.653**	−41.502*	−40.537*
	(3.42)	(22.35)	(22.32)
Constant	−63.754***	−246.176***	−245.239***
	(17.24)	(73.43)	(73.33)
Log likelihood	−217.450	−611.692	−600.434
Chi2	103.258	114.177	115.022
N	476	470	468

[a] Standard errors are listed in parentheses.
[b] Logarithm.
* $p < 0.1$ for two-tailed tests.
** $p < 0.05$ for two-tailed tests.
*** $p < 0.01$ for two-tailed tests.

two-stage regression to control for endogeneity, we create a variable to measure the *residual of the ratio of female directors on the board* and include it in the following regression models.

Tables 4a–4c report the regression model for CPDR. The significant coefficients on the residual of the ratio of WoB confirm the endogeneity problem for WoB and the effectiveness of introducing the two-stage regression method to correct for it. To test whether political connections, marketization level and law enforcement level are significant moderators of the relationship between WoB and CPDR, we introduce a hierarchical regression analysis. Step 1 includes models 1, 2 and 3. The control and main effect variables are included with the dependent variables *donation*, *ratio of giving to assets* and *ratio of giving to profits*, respectively. When model 1 predicts CPDR probability, the coefficient for the ratio of WoB ($\beta = -7.653$, $p < 0.05$) is significant. Similarly, when models 2 and 3 predict the giving ratio, the coefficients for the ratio of WoB in model 2 ($\beta = -41.502$, $p < 0.10$) and model 3 ($\beta = -40.537$, $p < 0.10$) are also significant. These results support Hypothesis 1.

Step 2 includes models 4, 5 and 6. We include the product term of political connection × ratio of WoB to signify the interaction between political connections and WoB. When model 4 predicts CPDR probability, the interaction effect between political connections and the ratio of WoB is significant ($\beta = 4.337$, $p < 0.05$). When models 5 and 6 are used to predict the ratio of giving to assets and the ratio of giving to profits, the interaction effects are also significant in model 5 ($\beta = 26.059$, $p < 0.10$) and model 6 ($\beta = 24.452$, $p < 0.10$), which support Hypothesis 2.

Table 4b
Second-stage regression results predicting the relationship between corporate donations and women on boards of directors, including the moderator of political connections.[a]

Independent variables	Dependent variables		
	Donation Model 4	Ratio of giving to assets Model 5	Ratio of giving to profits Model 6
Ratio of debt to assets[b]	−0.081	−0.858	−0.806
	(0.17)	(1.49)	(1.49)
Net profit[b]	3.709***	14.838***	14.688***
	(0.96)	(3.83)	(3.82)
Cash holding	0.119	0.841	0.091
	(0.54)	(3.79)	(3.80)
Earnings per share[b]	0.647	5.753	6.816
	(1.52)	(5.74)	(5.75)
Listed years	−0.122***	−0.793***	−0.800***
	(0.04)	(0.20)	(0.20)
Geographic distance[b]	−0.865***	−5.684***	−5.770***
	(0.19)	(1.38)	(1.37)
Market type	−0.601**	−3.809**	−4.015**
	(0.27)	(1.77)	(1.76)
Residual of ratio of WoB	7.842**	40.019*	40.759*
	(3.55)	(23.77)	(23.71)
Political connection	0.727**	5.802**	6.092***
	(0.34)	(2.27)	(2.27)
Marketization level	0.870	5.146	4.804
	(0.55)	(3.44)	(3.42)
Law enforcement level	0.095	1.027	0.962
	(0.51)	(3.19)	(3.17)
Ratio of WoB	−9.234**	−49.815**	−48.539**
	(3.59)	(22.88)	(22.85)
Political connection × ratio of WoB	4.337**	26.059*	24.452*
	(2.21)	(14.27)	(14.19)
Constant	−66.549***	−252.944***	−250.866***
	(17.77)	(73.32)	(73.18)
Log likelihood	−215.610	−609.999	−598.930
Chi2	105.241	117.564	118.031
N	476	470	468

[a] Standard errors are listed in parentheses.
[b] Logarithm.
* $p < 0.1$ for two-tailed tests.
** $p < 0.05$ for two-tailed tests.
*** $p < 0.01$ for two-tailed tests.

Step 3 includes models 7, 8 and 9. We include interaction terms between political connections, marketization and political intervention with the ratio of WoB. The interaction terms between political connection and the ratio of WoB are positive and significant in models 7 and 8. However, the interaction terms between the marketization-related variables and the ratio of WoB are not significant in all three models. These results confirm Hypothesis 2, but not Hypothesis 3.

To visualize the relationship outlined in Hypothesis 2, Figs. 1a and 1b show the plot of the significant interaction (Aiken and West, 1991) between political connections and the ratio of WoB. The CPDR probability and giving ratio are negatively related to WoB, and the relationship is more salient within firms without political connections than with political connections.

5. Discussion

Previous CSR research has not studied the relationship between WoB and CPDR or considered the ways in which institutional environments moderate it. Using unique data collected from privately-owned listed firms'

Table 4c
Second-stage regression results predicting the relationship between corporate donations and women on boards of directors, including the three moderators.[a]

Independent variables	Dependent variables		
	Donation Model 7	Ratio of giving to assets Model 8	Ratio of giving to profits Model 9
Ratio of debt to assets[b]	−0.080	−0.866	−0.816
	(0.17)	(1.48)	(1.49)
Net profit[b]	3.662***	14.429***	14.434***
	(0.96)	(3.85)	(3.85)
Cash holding	0.124	0.803	0.053
	(0.54)	(3.78)	(3.80)
Earnings per share[b]	0.647	5.350	6.508
	(1.55)	(5.75)	(5.77)
Listed years	−0.121***	−0.786***	−0.794***
	(0.04)	(0.20)	(0.20)
Geographic distance[b]	−0.865***	−5.703***	−5.780***
	(0.19)	(1.38)	(1.37)
Market type	−0.598**	−3.766**	−3.985**
	(0.27)	(1.76)	(1.76)
Residual of ratio of WoB	7.888**	41.092*	41.620*
	(3.53)	(23.78)	(23.75)
Political connection	0.740**	5.905***	6.166***
	(0.35)	(2.27)	(2.27)
Marketization level	0.972	7.429	6.512
	(0.69)	(4.76)	(4.74)
Law enforcement level	0.096	−0.000	0.009
	(0.64)	(4.43)	(4.41)
Ratio of WoB	−8.665**	−43.463*	−44.756*
	(3.88)	(24.18)	(24.13)
Political connection × ratio of WoB	4.200*	24.535*	23.461
	(2.26)	(14.31)	(14.25)
Marketization level × ratio of WoB	−0.873	−19.648	−14.793
	(5.00)	(29.94)	(29.59)
Law enforcement level × ratio of WoB	−0.065	9.209	8.644
	(4.88)	(29.45)	(29.10)
Constant	−65.703***	−245.007***	−245.854***
	(17.84)	(73.65)	(73.71)
Log likelihood	−215.526	−609.627	−598.760
Chi2	107.602	118.308	118.370
N	476	470	468

[a] Standard errors are listed in parentheses.
[b] Logarithm.
* $p < 0.1$ for two-tailed tests.
** $p < 0.05$ for two-tailed tests.
*** $p < 0.01$ for two-tailed tests.

philanthropic disaster responses after China's Wenchuan earthquake in 2008, this study provides convincing evidence that CPDR is negatively related to the ratio of WoB, and that political connections positively moderate the relationship between WoB and CPDR. However, our results do not support the theory that marketization-related factors, such as marketization level and law enforcement level, also moderate this relationship.

5.1. Theoretical implications

This study makes the following theoretical contributions. First, it extends the CSR literature to show that women in boardrooms influence corporate social practice. Our comprehensive model also explores a distinctive type of CSR, namely corporate philanthropic disaster response (CPDR). In addition, we use a previously

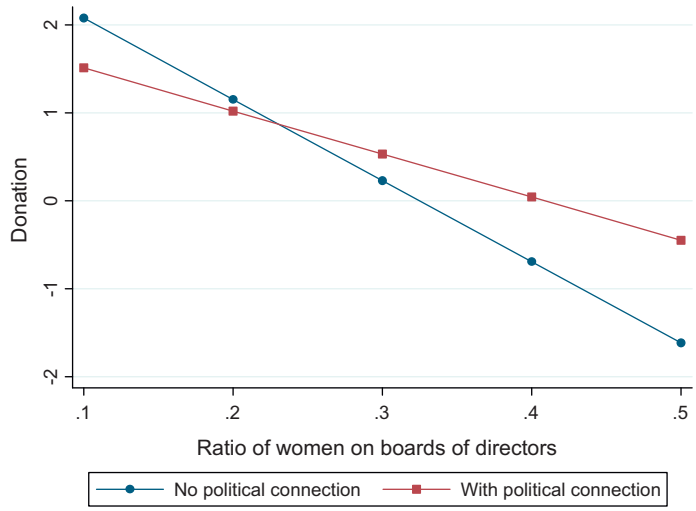

Fig. 1a. The moderating effect of political connections on the relationship between women on boards of directors and corporate donation probability.

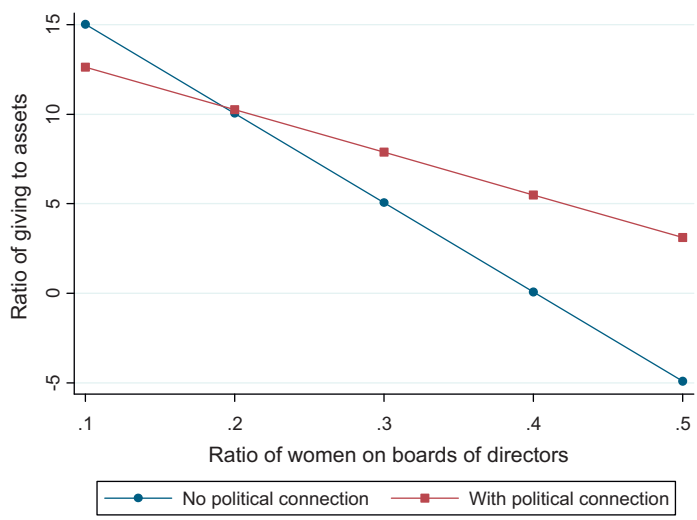

Fig. 1b. The moderating effect of political connections on the relationship between women on boards of directors and corporate giving ratio.

unstudied context, CPDR, and incorporate political connections along with marketization and law enforcement levels as moderators. Thus, this study not only contributes to the ongoing exploration of the relationship between WoB and CPDR, but also promotes an increased understanding of the impact that corporate ties with government and institutional environments have on this relationship.

Second, the study advances our understanding of female directors' function as evaluators of the agency costs of CPDR, which challenges the notion that women are more "giving" than men in times of crisis. Previous studies on the relationship between WoB and CSR emphasize the emotional perspective that female directors are generally more responsive to acts of giving than their male counterparts in crisis situations (e.g., Williams, 2003). This study overturns previous views of female directors, presenting instead a professional and rational perspective that emphasizes the effects of their evaluations when making corporate contribution decisions after natural disasters.

We find that in a transitional economy where corporate social activities act as a kind of exchange between firms and the government they include significant agency costs and female directors play a very important evaluation role that constrains the irrational waste of corporate resources and protects investor value.

Third, our results provide insights into the moderating role of firm relationships with government and the institutional environment in the relationship between WoB and CPDR. In particular, this study illustrates how the negative effect that female directors have on CPDR might be undermined in different conditions, especially in a transitional economy like that of China. This analysis helps to paint a more complete picture of the relationship between WoB and CPDR.

5.2. Managerial implications

Our results also have practical implications for listed firms. CSR is thought to be essential to corporate survival and growth, yet very little research has clarified how a firm should initiate and utilize CSR, particularly regarding how firms should respond to natural disasters. Based on our results, we advise that WoB help listed firms to evaluate the benefits of CPDR and restrain the wasteful donation of corporate resources. Furthermore, we also suggest that political connections influence the impact that female directors have on CPDR. In a transitional economy like China, the chairman or CEO's political status determines the empowerment of female directors, and they are well empowered to vote against CPDR in firms that are not politically connected.

5.3. Limitations and future research

This study has the strength of employing both the knowledge-based view of the firm and agency costs theory to study the relationship between WoB and CPDR. However, it also has limitations. First, our findings are contrary to the conventional wisdom that WoB tend to vote for CPDR, and we do not study the conditions under which women prefer CSR. Second, we define CPDR as a kind of agency cost that does not benefit investors, but we do not examine the relationship between CPDR and corporate performance or investor reaction to directly test this proposition. Third, the moderating factors of the relationship between WoB and CPDR have some limitations. Specifically, female directors' backgrounds, such as their beliefs and personal relationships with disaster areas, also influence their decisions, but we do not control for such factors. Fourth, our data is from a single source, which might generate omitted variable bias given that an endogenous event would influence both dependent and independent variables that we do consider. In addition, the sample selection method may be biased because we only include listed firms, but many other types of firms, such as non-listed and multinational firms, also contribute to disaster relief.

Future research should be pursued in three directions. First, it should explore the relationship between WoB and CPDR in different contexts. Comparative studies of firms responding to disasters that have happened in different countries would be very informative. Second, women are becoming increasingly important in corporate governance and it is essential to determine how best to empower them to maximize the benefits generated from their service on corporate boards. Third, further studies that examine other moderators of the relationship between WoB and CPDR would be very useful.

5.4. Conclusion

Our results reveal that female directors do not always respond positively to CSR initiatives. They do increase a firm's rationality with regard to joining disaster relief efforts and respond negatively to CPDR. However, political connections positively moderate the relationship between WoB and CPDR.

Our primary goal in this study is to inspire further research that expands our understanding of this special phenomenon of CPDR and to provide a more intense study of the effects of gender on corporate governance and management. Our findings strongly support the importance of the link between WoB and CPDR. We demonstrate that there is considerable value in drawing on CSR, especially CPDR, to understand whether and how to initiate a CPDR to increase an organization's success.

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