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## Executive compensation, board characteristics and firm performance in China: the impact of compensation committee

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### Abstract

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### Keywords

Executive, compensation, board, characteristics, firm, performance, China, impact, compensation, committee

### Disciplines

Business | Social and Behavioral Sciences

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# Executive compensation, board characteristics and firm performance in China: the impact of compensation committee

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## Abstract

The independent directors of a board can impact CEO pay-performance more effectively if a compensation committee provides information and assist them in designing relevant executive pay schemes. On the basis of this idea, we developed and tested the hypotheses that Chinese firms with a compensation committee have a closer CEO pay link with performance when a larger proportion of independent directors serves on the board. We focused primarily on the effect of a compensation committee on CEO pay-performance relation as a consequence of its help for the board and found that board independence produces a stronger relationship between executive compensation and firm performance in Chinese listed firms. This association is more evident in those firms which have a compensation committee. Our findings suggest that the interaction between independent directors on the board and a compensation committee has important consequences for CEO incentive systems as well as corporate governance structures in China.

Key words: Compensation committee; Executive compensation; Board characteristics

JEL Classification: G30; G34; O15

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## **1. Introduction**

Recent scandals related with executive compensation have attracted public attendance on the debate about restricting executive compensation and reforming the associated governance structure. Executive compensation plays a key role in corporate governance structure by providing motivations for executives to perform their duties to the maximization of shareholders' wealth (Andersen and Bizjak, 2003). For most firms, the specific design of executive compensation is delegated to a sub-committee of the board of directors: the compensation committee (CC). The board of directors get to approve the final executive pay schemes and thus the boards and their compensation committee both play an important role in linking executive pay to firm performance, and as well aligning the interests of managers with shareholders (Sun and Cahan, 2009).

Similar to its Western counterparts, the board of directors in Chinese listed firms delegates the rights regarding executive compensation to its compensation committee. Therefore, the board characteristics and compensation committee qualities play an important role in determining executive compensation. Recently the code of corporate governance implemented in 2003 for listed firms in China stipulates that executive compensation should reflect firm performance, accordingly enhancing pay-for-performance relation and emphasizing the role of executive compensation governance mechanisms in Chinese listed firms from the standard setters' viewpoint. Though corporate governance in Chinese listed firms have been improved since then, there are still three fundamental issues regarding corporate governance in China: the expropriation of large shareholders, the neglect of duties by directors, and insider control. Thus, the monitoring role of the board and the executive compensation, whether or not it is set by the compensation committee, to a large extent will affect corporate governance in Chinese firms and hence mitigate relative agency issues. Not like their existing Western counterparts with long history, the compensation committee was only recommended by the Corporate Code 2001 by CSRC in China. Until now, the formation of compensation committee is still not a requirement for publically listed firms, making China a good example to investigate the voluntary formation of compensation committee in recent years as well as its effect on CEO pay-performance relation.

Our study contributes to the literature in the following ways. First, the empirical evidence to date on certain governance structures to motivate managers to increase firm performance is mixed and gives little coherent support for the shape of an optimal governance structure. For example, the results of board independence on setting optimal executive compensation are inconclusive by using either Western data or Chinese data. Even there are considerable studies on executive compensation in US firms<sup>2</sup>, systematic research is only a few outside of the US as a result of limited data availability. Therefore, our study fills the void by providing evidence on board of directors, compensation committee, and executive pay-performance relation in Chinese listed firms. Secondly, the compensation committee composition data, for example, the proportion of independent directors on the committee, is not provided by any database in China when there is no any mandatory requirements for listed firms to disclose these information. We hand-collected the data on compensation committee composition from voluntary disclose in the annual report and for the first time investigated the relation of compensation committee independence and executive pay-performance. Thirdly, prior evidence on board independence and executive pay-performance is mixed (e.g., Conyon and Peck, 1998; Dahya and McConnell, 2005). Our study focuses on the role of compensation committee and suggests a stronger relation between board independence and executive pay-performance when the compensation committee presents, partially contributing to an alternative explanation for the mixed results.

Our results indicate that board independence produces a stronger relation between executive compensation and firm performance in Chinese listed firms. This association is driven by those firms which have a compensation committee ( $\beta = 13.39$  and  $\beta = 1.58$  for firms with a compensation committee and firms without a compensation committee, respectively). Moreover, the positive relation between board independence and executive pay-performance link is more evident in well performing firms and in firms with very large or very small board. For example, the estimates on coefficients of the interaction term (performance\*board independence) are significantly positive for both sub-samples ( $p=0.03$  for small boards and  $p=0.01$  for large boards). Further tests show that

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<sup>2</sup> See, for example, Murphy (1999) reviews empirical studies on executive compensation when Gibbons (1997) reviews the pertinent theoretical literature.

independent directors on board work more effectively in setting right executive pay in the time periods after ( $\beta = 5.33$ ,  $p=0.01$ ) than before the formation of a compensation committee ( $\beta = 1.52$ ,  $p=0.3$ ). On the other hand, no significant relation was found between the proportion of independent directors on a compensation committee and executive pay-performance link.

Our paper focuses on the governance environment, specifically the board structure and compensation committee composition. We examine the relation between CEO compensation and corporate performance and investigate the role played by the board of directors and a compensation committee on executive pay-performance link by using a sample of 362 listed firms from 2001 to 2004 and 492 listed firms from 2005 to 2007.

In the next section, we begin with literature review and hypotheses development on Chinese executive pay-performance and corporate governance with particular emphasis on compensation committee, and then introduce the data and describe our empirical strategy in Section 3. The results are presented in Section 4, followed by a concluding section.

## **2. CEO compensation, firm performance, and board characteristics**

Interest in the specific governance structures of Chinese publicly listed firms has been growing in response to the increasing stock market in China (see, for example, Schipani and Liu, 2002) and hence the need for better governance structures of Chinese listed firms. The board, as well as its sub-committees, plays a key role in enhancing corporate governance in light of the specific ownership issues and insider control in China. Therefore, research on the association between executive compensation, corporate performance, board composition and compensation committee has been increased recently, which will be the focus of our empirical analysis.

### **2.1 CEO compensation and firm performance**

Aiming at aligning CEO's interests with shareholder and maximizing shareholder wealth, the CEO compensation should be tied to firm performance (Fung et al., 2001), or

in other words, the pay-performance sensitivity should be high. Baker (1992), Dechow and Sloan (1991) and Kaplan (1994) all suggest that the CEO pay-performance relation is the essence of principal-agent theory. The determinants of executive compensation shed light on how effectively a firm address the divergent interests between management and shareholders. Thus, by tying executive compensation to firm performance, firms can align the interests of managers with owners (shareholders) (Murphy, 1999). Agency theory suggests a positive relationship between CEO pay and firm performance and in order to confirm the relation, empirical studies have been done in different contexts but only found weak or even no relation between CEO pay and firm performance. Thus the focus has been turned to examine the impact of corporate governance in the setting of CEO pay. Compensation decisions are generally made by the board of directors in publically listed firms and hence prior literature has emphasized the key role played by the board in arranging executive compensation. For example, Bebchuk and Fried (2003, 2004) suggest that lack of board oversight can contribute to CEO overcompensation.

By using data from the US., UK., and elsewhere, numerous studies on the CEO pay-performance relation have provided inconclusive results. For example, Gregg et al. (2005) examine the executive pay-performance relation for a sample of large UK firms over 1994-2002 and find that over time there is little relationship between executive pay and performance. On the other hand, through their studies on listed firms in Korea, Kato et al. (2007) document a significant positive relation between executive cash compensation and stock market performance, however, the overall significant CEO pay-performance relation is driven by non-business group affiliations not business group affiliation firms.

Kato and Long (2006b) affirm two types of acute principal-agent issues in China: the diverging interests between managers and shareholders and the diverging interests between controlling shareholders and minority shareholders. They support that tying the wealth of managers to firm performance can align the interests of shareholders and those of managers. Hence, linking managers' personal fortune to firm's breaks up the "ligament" between the controlling shareholders and managers and thus helps in protecting the interests of minority shareholders.

There is only a few research on the link of CEO compensation and firm performance in China and also provides mixed results. Kato and Long (2006a) find a positive

executive pay-performance relation by examining 937 listed firms from 1998 to 2002. Rui et al (2002) also support the study of Kato and Long (2006a) by providing evidence on a significant association between the return on assets and CEO compensation in Chinese listed firms while no such relation is found between stock returns and CEO compensation. However, the findings of Mengistae and Xu (2004) show that the CEO pay-performance sensitivity decreases with the variance of performance by using a sample of 400 Chinese state-owned enterprises in the 1980s. They also find executive pay-performance sensitivity increases with managerial control and market competition faced by the firm. Moreover, Firth et al (2006) point out that the sensitivity of CEO pay and performance is low on average compared to Western counterparts while they document a relation between CEO cash compensation and firm performance in another study a year later (Firth et al., 2007). They provide evidence that ownership and governance factors are determinants of CEO cash compensation.

In summary, although some extant research find no or little evidence on executive pay-performance relation, many prior theoretical and empirical studies document a positive relation between executive compensation and firm performance, suggesting that firm performance plays an important role in setting executive compensation contracts. Therefore, CEO pay-performance relation can be deemed as one indicator of corporate governance structures (Conyon and He, 2008) and hence other governance mechanisms can be investigated in light of CEO pay-performance relation.

## **2.2 Board composition**

The amount of executive compensation and the extent of pay-for-performance for managers have been a considerable controversy topic in the academic and business communities. Critics of executive compensation practices argue that the board does not design the executive compensation schemes to maximize value of shareholders because of the CEO power on board (Core et al., 1999). Outside directors inclined to effectively monitor the management because they are less affected by CEO power and aim at protecting their reputations in the labour market (Fama and Jensen, 1983). However,

when outside directors are too busy, have insufficient information pertaining to the firm or get appointed by the CEO, they may perform less effectively (Jensen, 1993).

There is a growing literature suggesting that the boards or the independent directors are ineffective. Employing data from the U.K., Conyon and Peck (1998) find that the outside directors on the board only have limited effects on executive compensation. Crystal (1991) points out that because the independent directors appointment decisions sometimes are made by the CEO, independent directors are unwilling to confront the CEO, especially concerning the executive compensation. That is, the boards may be ineffective in setting appropriate executive compensation to the maximization of shareholder value. On the other hand, Dahya and McConnell (2005) argue that the boards with a larger proportion of outside directors can make better decisions, specifically on the appointment of CEOs.

In spite of the important and pivotal role play by the boards in setting executive compensation, there has been comparatively little China research with respect to this issue. This contrasts with the situation in the US, where there are studies on various dimensions of board and the relation between board and CEO compensation; examples of such research include the studies of Lambert et al. (1993) and Boyd (1994) suggesting that executive compensation is more linked with firm performance in firms with a larger proportion of outside directors on board. However, the exclusive focus on economies like the US makes it far from apparent that how would board independence affects executive compensation and pay-performance relation in transitional economies such as China. This leads to our investigation of the relation between board independence and executive pay-performance in China, an economy which, despite its increasing importance in global economy, is lack of empirical research on the effectiveness of its corporate governance structures.

In Chinese listed firms, many directors found it difficult to exert any significant influence, other than figure influence, on the firm they serve. A survey in 1999 by Tenev and Zhang (2002) shows that only 3.1 percent of directors had independence to some extent. Consequently, the role of board and independent directors has attracted more concerns in China recently. For example, in August 2001, the China Securities Regulatory Commission (CSRC) released statement 102 “Guidelines for establishing an

independent directors system for listed companies” in which one third independent directors are required for listed firms by June, 2003. CSRC’s 2002 corporate governance code also requires that independent directors must spend enough time on the firms they serve and one director cannot hold more than five directorship positions at the same time. However, there is difference between Chinese boards and the US boards due to different legal and institutional contexts, even the boardroom in China is getting much closer to its US counterparts. The independent directors in US focus more on solving agency cost problem while the independent directors in China aim at protecting shareholders, specifically minority shareholders (Kato and Long, 2006a), due to different ownership structures in China. Furthermore, compared to China, the US has stronger securities regulation and more severe punishment for wrong-doing, resulting in higher costs for violations of securities law and regulations. Additionally, China has highly concentrated ownership when state dominates a large proportion of total shares. Combed together, the specific independent board structure and ownership structure make China an interesting example to examine the association between board structure and executive pay-performance relation.

As Finkelstein and Hambrick remarked, “Boards have long been considered to play an important role in the establishment of executive pay” (1996). However, as noted earlier, those studies on board structure and pay-performance relation provide mixed evidence, suggesting that further investigation is warranted. This idea gives rise to our first hypotheses:

**Hypothesis 1a.** Top managers’ compensation is expected to be negatively associated with the proportion of independent directors on the board.

**Hypothesis 1b.** Companies with larger proportion of independent directors on the board will have a stronger link between their top managers’ pay and corporate performance than other companies.

### 2.3 Compensation committee

Today compensation committees are getting more engaged in corporate decisions. In terms of the effectiveness of boards, it is of importance to understand the fact that most

board functions are performed by sub-committees. As noted by Lorsch and MacIver (1989), “the work of the board is done in committees”. With respect to the design of executive pay scheme, compensation committee is the most important sub-committee under the board of directors.

The characteristics of compensation committee have considerable impact on the effectiveness of compensation committee. Since early 1990s, compensation committee attracts more and more concerns from shareholders. From 1991 to 1995 there were 161 shareholder proposals related to CEO compensation (Johnson and Shackell, 1997). Among them twenty proposals concern the issues of compensation committee independence. In the absence of compensation committee, there exists an opportunity for top management to award themselves compensation that are not to the maximization of shareholder value. Williamson (1985) comments that managers are likely to write their own pay contracts with one hand and sign them with the other in firms without compensation committees. Main and Johnston (1993) point out that a compensation committee is expected to exert an influence on top executive pay, which should be set in the interests of shareholders. However, simply reduce the pay of self-serving managers is not the only purpose of compensation committee, more importantly, economic and agency theories would suggest that directors on the compensation committee determine the appropriate design of executive pay and align the interests of management and shareholders (Canyon et al., 1995; Main and Johnston, 1993).

Long used in the U.S., this compensation committee governance mechanism is comparatively new in China. Critics argue that most boards and committees in Chinese firms are lack of independence because politicians and owners controlled by the State sit on most boards and committees in response to the highly concentrated ownership. Therefore the corporate governance code of 2002 for Chinese listed firms states this: “Boards of listed firms are recommended to appoint compensation committees, consisting wholly or mainly of independent directors and chaired by an independent director and suggesting the board the compensation of the executive managers”.

For most large companies in the U.S. and U.K., the decision of executive pay is delegated to a subcommittee, the compensation committee, of the board of directors. Consequently, the compensation committees play an important role in determining CEO

pay schemes in the firm's best interests. However, limited extant evidence is provided on the characteristics and effectiveness of compensation committees. For example, Newman and Mozes (1999) focus on the relation between compensation committee and executive compensation by using a sample of 161 U.S. firms. They find that the sensitivity of executive pay to performance is lower when at least one member on the compensation committee is an insider. That is, the relation between CEO compensation and firm performance is more favourable to managers (at shareholders' expense) in firms with insiders on the compensation committee. Moreover, Vafeas (2003) and Perry and Zenner (2001) find that the pay-for-performance relation is weaker and the level of executive compensation is higher in firms with insider-dominated compensation committee. However, by using a sample of 200 firms from Fortune 500 in 1992, Daily et al. (1998) did not find any evidence that the proportion of insider directors lead to greater level of executive compensation. In addition, the findings of Anderson and Bizjak (2003) show some evidence that the more outside directors on the compensation committee the higher levels of CEO compensation and the higher pay-performance sensitivity. Interestingly, after ownership is controlled, they find no relation between compensation committee independence and total compensation. In UK., Conyon and Peck (1998) did not find any relation between the presence of compensation committee and CEO compensation level while they provides evidence that firms with outsider-dominated compensation committee have their CEO compensation more aligned with firm performance.

Evidence is provided from countries other than the US and UK too. Sapp (2007) examines 400 large Canadian listed firms and finds an increase in the proportion of independent directors on the compensation committee increases the CEO compensation level. On the other hand, Conyon and He (2004) find no evidence that insiders on the compensation committee increase CEO pay. More recently, through their study on large Canadian corporations, Chowdhury and Wang (2009) document a significant effect of compensation committee independence on CEO contingent compensation.

If inside directors intend to act in the interests of managers instead of the interests of shareholders, we expect that compensation committees with less proportion of independence directors are likely to pay CEO higher compensation and thus associated with less sensitive pay-performance relation. According to the Listed Company Rules and

Corporate Governance Code in 2002, the boards in Chinese listed firms may, with a general shareholders' meeting resolution, set up sub-committees such as compensation committee and delegate the responsibility of setting executive compensation to their compensation committee. All members on the compensation committee are recommended to be directors. In addition, the compensation committee is suggested to be composed of a majority of independent directors and have independent director as the chair of committee. Other than the agency reasons noted earlier, the recent corporate governance reform and code in 2002 in China following the publication of the Cadbury (1992), Greenbury (1995) reports, and the policy changes occurred in the US after Enron, lead us to expect compensation committees to play an important role in linking executive compensation to firm performance. This contributes to the following hypotheses:

**Hypothesis 2a.** Top managers' compensation is expected to be lower in companies that adopt compensation committees or have a larger proportion of independent directors on their compensation committees.

**Hypothesis 2b.** The link between executive pay and firm performance is expected to be stronger in companies that adopt compensation committees or have a larger proportions of independent directors on their compensation committees.

The role of compensation committee is to determine executive pay schemes or to make recommendations to the board of directors. Hence, the board inclined to adopt the recommendations from the compensation committee with possible modest modifications. If the compensation committee does not exist, the board of directors assumes the role of determining executive compensation. Additionally, it is believed that the presence of committees such as compensation committee may enhance the board's power, especially when the CEO is not a member of the committees (see, for example, Andjelkovic et al., 2002). The important role played by the compensation committee in CEO compensation decisions is also supported empirically (e.g., Belliveau et al., 1996).

Meanwhile, the board of directors intends to represent shareholders' interests and alleviate the interest conflicts between managers and shareholders. The compensation committee, a sub-committee under the board of directors, assesses executives' performance, determines appropriate compensation packages and reports to the board. Therefore, the establishment of compensation committees, more specifically independent

compensation committees, has the potential to play an important role in designing executive compensation to align the interests of shareholders and managers by providing appropriate information to the board. Combined together, an alternative explanation for weak impact of board independence on executive pay-performance relation from prior research is the inexistence of compensation committee. This leads to our last hypothesis.

**Hypothesis 2c.** When compensation committee presents, executive compensation exhibits a stronger sensitivity to firm performance in firms with a larger portion of independent directors on board.

### **3. Method**

#### **3.1 Data and sample**

The sample consists of 1448 observations over a four-year period (from 2001 to 2004) for 362 publicly traded Chinese firms in Shanghai security exchange (SHSE) and Shenzhen security exchange (SZSE), and another sample consists of 1476 observations over 2005-2007 for 492 publicly listed firms. Most prior CEO pay research in China employs sample window when the disclosure of executive compensation was voluntary and thus gives rise to selection effects and biases. Therefore, following Conyon and He (2008), we use data after 2001 with respect to the fact that executive compensation was required to be disclosed in annual reports since 1998, therefore mitigating such sample selection effects. On the other hand, started from 2005, non-tradable shares reform aims at changing the status of non-tradable shares to tradable shares. These changes may alter the governance structure of most Chinese listed firms which characterized with highly concentrated ownership of State. Therefore, it is reasonable to expect different pay-for-performance after the commencement of non-tradable shares reform. To exclude the disturbing effects of that reform, we focus our research on data between 2001 and 2004. In later section, the sample between 2005 and 2007 is used to examine the possible changes in corporate governance when the non-tradable shares reform is considered.

Specifically, we constructed the dataset by merging the following three separate databases. First, we used accounting, CEO compensation and other corporate governance

data from the database developed by SinoFin Information Services<sup>3</sup>. Second, we assembled basic data on compensation committees from China Stock Market and Accounting Research Database (CSMAR) developed by Shenzhen GTA Information Technology Company<sup>4</sup>. Finally, from CCFR database developed by Tsinghua University, we collected data on stock returns. In response to the fact that the information of the independent directors on compensation committee is not provided by any database, we identify independent compensation committees by the information of committee memberships provided by CSMAR as well as annual report of listed firms.

The final sample consists of data on 20 non-financial industries in terms of standard industrial classification codes of CSRC during the time periods from 2001 to 2004. Among them, we only select manufacturing firms as our sample firms for three reasons. First, in response to the fact that manufacturing industry accounts for about 60% listed firms (711 listed manufacturing firms in the whole 1243 listed Chinese firms in 2004; sales and the book value of assets of manufacturing firms take up almost 50% of total listed firms) in China and it uses pretty similar executive pay schemes. Therefore, the executive pay-performance of manufacturing firms is expected to represent the whole picture of Chinese listed firms. Second, government focuses more on manufacturing and thus the relation between executive compensation and performance should be most evident in manufacturing industry. Furthermore, using manufacturing firms reduces our industry classifications from 20 to 9 (Standard Industrial Sub-classification codes in Manufacturing Industry of CSRC), resulting in less excessive dummy variable issues. We only include observations for the nine industries that have at least ten observations with complete data so that we can generate reasonable estimates for the sub-industry indicator variables in our study. Finally, we delete observations without the availability of executive compensation, accounting and financial data, and corporate governance data that this study needs, leaving a final sample of 362 firms and 1448 firm-year observations.

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<sup>3</sup> Prior research has used SinoFin data set in their studies on Chinese corporate governance, for example, see, Kato and Long, 2006a.

<sup>4</sup> Prior research has used CSMAR data set in their studies on Chinese corporate governance, for example, see, Bai et al., 2003; Sun and Tong, 2003; and Bai et al., 2004.

Like the study of Core et al. (1999), the variables proxying for the economic determinants of executive compensation were lagged one year to reduce potential endogeneity.

### **3.2 CEO compensation and firm performance**

We focus on cash compensation because we are interested in the reward portion of total compensation. Hence, the cash compensation can be viewed as ex-post compensation depending on past and current performance (see, for example, Gaver and Gaver, 1998; Comprix and Mueller, 2006). Following Leone et al. (2006), we use the sum of bonus and salary, which is the total cash compensation, as the measurement of executive compensation. Moreover, we employ the nature log of cash compensation like most prior studies (see, e.g., Lambert and Larcker, 1987). The nature log can mitigate the difference in executive compensation across firms and hence reduce heteroskedasticity. Among the alternative measures of executive compensation provided in the SinoFin database, average pay of top three highest-paid executives, which composes of the salary and bonus, resembles most prior studies on executive compensation and thus will be the focus of our study. In Table 2, we present summary statistics concerning financial variables, CEO characteristics, board and firm-specific measures. Descriptive statistics for CEO compensation are summarized in panel A where all compensations are in 2000-constant Yuan<sup>5</sup>. Over the sample period of 2001-2007 average cash compensation of executive managers was on average about 182,309.3 Yuan (or approximately USD 22,789) of 2000-constant Yuan, which is much lower than that of their counterparts in the U.S. and Japan<sup>6</sup>. The mean CEO compensations are 81,750 Yuan, 111,322 Yuan, 141,984 Yuan, 178,158 Yuan, 207,196 Yuan, 242,590 Yuan, and 313,164 Yuan in 2001, 2002, 2003, 2004, 2005, 2006, and 2007 respectively. That is, the average CEO compensation almost increased by 400% in 7 years. The pay ranges from 10,804 to 423,700 Yuan, 6,607 to 741,684 Yuan, 21,782 to 675,677 Yuan,

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<sup>5</sup> In response to lagged sales, we consistently express both CEO compensation amount and sales in 2000-constant Yuan. All price changes are made according to CPI (Consumer Price Index) in China between 2000 to 2007.

<sup>6</sup> For example, Core et al. (1999) report an average of cash compensation of USD 614,000 for a sample of 205 firms between 1982 and 1984.

13,333 to 1,336,464 Yuan, 18,333 to 1,681,333 Yuan, 6000 to 3,016,200 Yuan, and 21,318 to 3,500,000 Yuan in 2001, 2002, 2003, 2004, 2005, 2006, and 2007 respectively.

In panel B the firms with compensation committee tend to pay their executives more than firms without compensation committee (151,871 of 2000-constant Yuan vs. 115,722 of 2000-constant Yuan for CEOCOM and 11.64 vs. 11.30 for  $\ln(\text{CEOCOM})$ ).

Lambert and Larcker (1987) employed return on assets as accounting measurement and stock returns as financial measurement. As they noted, return on assets, as one of the accounting numbers, are subject to the earnings management of management while stock returns are harder to manipulate. However, stock returns involve the effects of variability of stock market and macro-economics which are outside the control of management. More recently, it has become more popular to use the market or industry adjusted market performance as the benchmark for firm-specific performance measurements. We use return on assets (ROA) as our accounting performance measure, while we also use industry-adjusted stock returns as our financial performance measure to verify the robustness of our results. We define ROA as the ratio of net income to the book value of assets<sup>7</sup>. Our measure of industry-adjusted stock return is measured as annual stock returns minus industry mean stock returns. In our regressions, total cash compensation of CEO is used, contemporaneous and lagged performance measures can both impact the executive cash compensation and hence we use lagged performance in our study. As a sensitivity test, we rerun our analyses with contemporaneous performance measurements and receive similar results. Panel B of Table 2 shows that the average rate of return on assets (ROA) was 4% over the sample period and it was the same for firms with CC and for firms without CC (4% vs. 4%). Whilst firms without CC experienced a lower industry-adjusted stock returns compared to firms with CC (1% vs. 2%) and the average stock return over the sample period was 1%, that is, firms with CC grew faster than firms without CC on stock performance. To further examine if compensation committee affect CEO compensation, board characteristics and firm performance differently, we also present CEO compensation, firm performance and other firm characteristics separately for firms with CC and without CC. In terms of the Wilcoxon test, CEO compensation, firm performance and board characteristics in firms without CC are all significantly

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<sup>7</sup> Using operating earnings for our tests gives similar results.

smaller than firms with CC while sales figure, state, lagnegprofit and stdret are similar between firms with CC and firms without CC.

Most empirical studies on CEO compensation use data for individual executives from U.S. firms while the closest studies to ours are Kaplan (1994) and Kato et al. (2007) that used similar executive compensation data for Japanese and Korean firms. We begin with estimating the pay-performance semi-elasticity equations, like Kaplan (1994). That is,

$$\ln(\text{ceocom}) = \alpha + \beta \text{ Performance} + u \quad (1)$$

ROA and stock returns provide different indicators of a firm's performance and thus they are associated with different pay-performance sensitivities for executive pay. We use  $\ln(\text{CEOCOM})$  because  $\ln(\text{CEOCOM})$  is more likely than  $\text{CEOCOM}$  to be normally distributed.

### **3.3 Board characteristics**

There are numerous studies on the impact of board independence on the association between executive compensation and firm performance. However, those studies provide mixed evidence, suggesting that further investigation is warranted. To examine our first hypotheses we collect data on the board characteristics. In particular, we determine the proportion of independent directors, board size and the number of board meetings. Large boards are likely to be less effective than small boards because large boards may have free-riding problems in decision making (Jensen, 1993) and hence tend to compromise and make decisions in favour of managers' rather than shareholders' interests (Yermack, 1996). As shown in Panel B Table 2, the proportion of independent directors on board is about 24% in full sample when the firms with CC have a much higher percentage of independent directors on board than firms without CC (31% vs. 20%). The mean board size is 9.75, comparable to the average board size 13 for U.S. firms (Core et al., 1999). In terms of board diligence, the average annual board meetings were 7.14 over the sample period and the frequency is higher for firms with CC than for firms without CC (7.6 vs. 7).

Following our baseline model, we investigate the impact of board independence on the pay-performance semi-elasticity equations, an adaption of the model in Kaplan (1994). That is,

$$\ln(\text{ceocom}) = \alpha + \beta_1 \text{Performance} + \beta_2 \text{Boardind} + \beta_3 \text{Boardind} * \text{Performance} + u \quad (2)$$

Where  $\ln(\text{CEOCOM})$  is CEO compensation, calculated as the sum of top three highest executive compensation divided by three; Performance is return on assets (ROA); Boardind is the proportion of independent directors on board. The value of  $\beta_3$  indicates the impact of board independence on CEO pay-performance relation and is our interest of variable.

### 3.4 Compensation committee

Following our baseline model again, this time we test the impact of compensation committee independence on the pay-performance semi-elasticity equations, an adaption of the model in Kaplan (1994). That is,

$$\begin{aligned} \ln(\text{ceocom}) = \alpha + \beta_1 \text{Performance} + \beta_2 \text{CCind} + \beta_3 \text{CCind} * \text{Performance} \\ + \beta_4 \text{Other variables} + u \end{aligned} \quad (3)$$

In other variables, we define an indicator variable “paiddirector” to be equal to one if at least one member on the compensation committee gets paid from the firm they serve and zero otherwise. In addition, smaller compensation committees may have a shortage of monitor on management (Bushman et al., 2004) while larger compensation committees may be less easily influenced by CEOs. On the other hand, Jensen (1993) argues that lower cooperation costs and less free-riding may make small boards more effective. Thus, it is possible that small compensation committees can be more effective. We use the nature log of the number of directors on the compensation committees as one characteristic of compensation committee.

As indicated in Panel B Table 2, on average 35% firms formed their compensation committees over the sample period. Moreover, we can see from Panel C and Panel D of Table 2 that over the sample period 21, 112, 172 and 199 firms set up their compensation committees in 2001, 2002, 2003 and 2004, respectively. Then 309, 335, and 355 firms set up their compensation committees in 2005, 2006 and 2007, respectively. The mean

proportion of independent directors increased a little in 2002 and then remained constant as well as committee size (56%, 60%, 61% and 61% in 2001, 2002, 2003 and 2004 for CCIND and 1.26, 1.25, 1.27, 1.25 from 2001 to 2004 for  $\ln(\text{comsize})$ , respectively) when the mean proportion of independent directors kept constant over 2005-2007 (62%, 61% and 61% in 2005, 2006 and 2007 for CCIND). Finally, the percentage of firms that have at least one director on compensation committee getting paid by the firm is 71%, 59%, 61% and 58% in 2001, 2002, 2003 and 2004, respectively.

### **3.5 Other variables**

We include several control variables in the regression analysis to account for firm-specific characteristics that influence executive compensation. First, firm size is measured by  $\ln(\text{sales})$ . Prior literature has shown that firm size is positively associated with executive compensation significantly (for example, Firth et al., 2007). Thus, we use lagged  $\ln(\text{sales})$  as our proxy for firm size.

We also collect data on ownership structure, including the concentration of ownership of the second to fifth largest stockholders. If the State is the major shareholder in a firm then the variable *state* is coded one and zero otherwise. The state is the largest shareholder in about 78% of the observations.

Listed firms in China have two common features, the highly concentrated ownership and predominance of state ownership (Kato and Long, 2006b). Kato and Long (2004) suggest that state ownership in Chinese listed firms weakens CEO pay-performance link and hence makes firms less effective.

Firm risk is a measure of the firm's information environment and the risk of its operating environment (Core et al., 1999) and thus is a potential determinant of the level of executive compensation. Aggarwal and Samwick (1999) document a significant decrease in pay-performance sensitivity with a decrease in the variance of firm performance, owing to the trade-off of executive incentives against the allocation of performance risk. High firm risk is passed to managers and thus higher executive compensation is demanded. In our study, firm risk is defined as the standard deviation of the monthly stock returns over the previous 12 months.

Iyengar et al. (2005) find a significant positive relation between firm performance and executive compensation for all-equity firms while no such relation discerned for high-levered firms. Therefore, leverage is expected to play an important role in executive pay-performance relation in terms of the potential agency costs of debt. We therefore include leverage rate as control variable, which is measured as the book value of debt to the book value of shareholders' equity.

Sun and Cahan (2009) find that the positive effect of compensation committee quality on the executive pay-performance relation is less for high growth firms or loss-making firms. In order to include the impact of growth opportunity in executive compensation research, we also use lagged market value to book value of assets as a proxy for growth opportunities, like prior studies (e.g. Firth et al., 2007). Moreover, a dummy variable is defined to indicate if the firm made a loss in the previous year.

The mean leverage rate was 1.17 over the sample period and it was higher for firms with CC than for firms without CC (1.33 vs. 1.08). The data in Panel B of Table 2 also shows a higher sales in 2000-constant Yuan for firms with CC than for firms without CC (1,580 Yuan vs. 1,560 Yuan). Firms without CC have a higher ownership concentration than firms with CC (0.27 vs. 0.23 for H5). Moreover, State-owned firms are more likely to form a compensation committee (82% State-owned firms in firms with CC and 79% State-owned firms in firms without CC). With regard to stock return variance, firms with CC experienced the same firm risk as firms without CC while they experienced a lower growth opportunity than their counterparts (3.76 vs. 4.44). Finally, the average likelihood of making a negative pre-tax profit was about 7% for all firms. firms with CC are much more likely to make a negative pre-tax profit than firms without CC (8% vs. 6%).

Other factors are included in our study to account for industry and year effects (see Table 1 for the definitions). Industry is defined in terms of the securities exchange classifications and year is measured by three indicator variables.

## **4. Results**

### **4.1 The pay-performance relation**

In this section, we use multivariate analysis to test our five hypotheses. We examine how board structure and CC structure affect levels of executive compensation and

executive pay-performance relation and whether the presence of CC is associated with more effective board as well as more sensitive executive pay-performance relation.

#### **4.1.1 Board results**

The cross-sectional multiple regression results are shown in Table 3. Parameter estimates are given along with the corresponding heteroskedasticity-robust standard errors and p-values<sup>8</sup>. In panel A, we use lagged return on assets (ROA) and then test the robustness of the model estimates of the impact of board independence on executive pay-performance link by considering alternative performance measures (Panel B). Model 1 shows the results for firm performance (ROA, RET) in terms of board characteristics when other firm-specific characteristics are not included. Following Fan et al. (2007), model 2 tests for a possible curvilinear relation between firm performance and executive compensation when model 3 further adds industry and year control variables. The coefficients for the year and industry indicator variables are not reported in the tables because they are not of direct interest for this study.

We then compute variance inflation factors (VIF) for main variables and they are all below 8.2. These diagnostic statistics suggest that multicollinearity is not a major problem in our models.

The regression model 3 also contains three indicator variables that control for the year in which executive compensation was paid and eight indicator variables that control for sub-industry membership<sup>9</sup>.

The signs of the estimated coefficients on the accounting performance measure (ROA) and on the financial performance measure (RET) are expected to be positive; that is, the

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<sup>8</sup> We report heteroskedasticity-robust standard errors because the Breusch Pagan (1979) test is significant (p-values<0.05) for the test models of hypotheses 1. To test for autocorrelation at the panel level, the approach outlined in Wooldridge (2002) as implemented by Drukker (2003) is used. For all the regression analyses this test shows that autocorrelation is not evident.

<sup>9</sup> The regression analysis makes several important assumptions. First of all, we include only manufacturing firms in our sample and thus the regression coefficients are reasonably assumed to be identical across firms. However, we partially control for potential sub-industry and year differences by incorporating indicator variables to capture mean shifts for the dependent variable. Second, the error terms are assumed to be independent.

better the firm performance, the higher the executive compensation. Additionally, the sign of the estimated coefficient on the proportion of directors on board is expected to be negative, which is our first hypothesis. According to our hypothesis, the expected sign on the coefficient of the interaction term  $ROA*boardind$  (or  $RET*boardind$ ) is positive; that is, the executive pay-performance relation is stronger in firms with more independent directors on board than in firms with less independent directors on board. In accordance with most of the published literature, the signs on  $\ln(boardsize)$ , sales,  $stdret$  and  $opportunityg$  are expected to be positive while the signs on  $state$  and  $lagnegprofit$  are expected to be negative. We do not make priori predictions regarding the signs of the estimated coefficients on  $boardmeeting$ ,  $h5$  and  $LEV$  because prior evidence is either not compelling or is mixed.

Table 3 summarizes the regression estimates of Eq.(2) for our sample. Model 1 focused on what board characteristics could impact the level of executive compensation and pay-performance relation. The proportion of directors on board has significant effects on executive pay-performance relation statistically and economically as we expected. However, the sign on coefficient of board independence is opposite to our expectation and significant when the estimates on other coefficients are not significant.

Model 2 is used to test for a possible curvilinear relationship between firm performance and executive compensation; the squared term of firm performance was included in the equation. The squared term was not significant for both accounting and finance measurements, resulting in no curvilinear relation between performance and CEO pay. Model 3 examines the main effects of board independence on executive compensation and pay-performance relation controlling all other main possible determinants of executive pay. The effect of board independence on executive pay-performance relation remains significant statistically and economically after controlling main factors. Interestingly, the coefficient on board independence changed from positively significant to insignificant when the sign also changed. Thus, board independence is shown to have no significant effects on executive compensation while it is shown to have significant effects on executive pay-performance relation. That is, firms with larger proportion of independent directors on board will not change the level of executive compensation but will strengthen the relation between executive pay and firm

performance and thus enhance internal corporate governance. Therefore, Hypothesis 1a is not supported whilst Hypothesis 1b is strongly supported.

To examine the effect of board independence further, we divide the sample according to whether the board is bigger, whether the accounting performance is higher, and whether the proportion of independent directors on board is greater than one-third. The results are presented in Table 4. All regression analyses focus on our main firm performance ROA. First, independent directors are likely to exert different influence on corporate governance structure when the level of accounting performance is different. Therefore, we use one indicator variable to indicate whether the ROA is the highest (in the highest quartile of ROA) or lowest (in the lowest quartile of ROA), resulting in two sub-samples. The results in Table 4 show a significantly positive relation between board independence and executive pay-performance relation in well performing firms while their counterparts do not. Moreover, it suggests that the impact of board independence on executive pay-performance relation in full sample is basically driven by those well performing firms.

Secondly, we create an indicator variable to indicate whether the firms have very large boards (in the top quartile of board size) or very small boards (in the bottom quartile of board size). The results show that the estimates on coefficients of board independence are not significant for both sub-samples. Interestingly, the estimates on coefficients of the interaction term (ROA\*boardind) are significantly positive for both sub-samples ( $p=0.03$  for small boards and  $p=0.01$  for large boards). That is, the board independence is positively associated with executive pay-performance relation only when the firm has a very large board or a very small board. A possible explanation for the results is that when the board is very small, directors, specifically independent directors can avoid free-riding issues and are less influenced by CEO and thus do their job more effectively as suggested by most prior literature. On the other hand, concerning the corporate governance context in China, most board is believed to be a figure board and independent directors cannot exert much influence on CEO compensation. But when the board is very large, the influence of board becomes larger and thus the influence of independent directors on the firm becomes larger. Additionally, larger boards have a potential advantage in their advising role and are more capable of accomplishing the resource provision role of the

board (Coles et al., 2008). Consequently, Chinese independent directors work effectively in setting executive compensation when they serve on a very large or small board.

Finally, we use another indicator variable to indicate whether the proportion of independent directors is greater than 30%<sup>10</sup>. Two sub-samples are tested to see if the proportion of independent directors more than required percentage makes any difference in their effectiveness. The results are also presented in Table 4. They show a significant positive effect of board independence on executive pay-performance and a marginal significant negative effect of board independence on executive compensation ( $p=0.09$ ) in firms with less than 30% independent directors as our Hypotheses 1a and 1b expected. However, no such significant effects are found in firms with more than 30% independent directors on board, suggesting a more cosmetic board in Chinese listed firms as long as they already have required percentage of independent directors on board.

#### **4.1.2 Compensation committee results**

The questions, to which we now turn, are whether the relationship between executive compensation and firm performance is stronger for those firms with more independent directors on the compensation committee than the firms with less independent directors on the compensation committee.

We investigate the regressions by creating sub-sample. To be included in the sub-sample, these firms are required to (1) have a CC; (2) have at least three years of contiguous data between 2001 and 2004. We collect a 4-year panel of executive compensation data from 2001 to 2004 yielding a total 392 firm-years.

Table 5 summarizes the regression estimates of Eq. (3) to test Hypotheses 2a and 2b for our panel. We estimate separate regressions using ROA and RET as our performance measures in Panel A and Panel B when heteroskedasticity-consistent standard errors are reported in parentheses. The dependent variable is the nature log of executive cash compensation and the effect of the presence of CC and CC independence are tested on

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<sup>10</sup> In August 2001, the China Securities Regulatory Commission (CSRC) released statement 102 “Guidelines for establishing an independent directors system for listed companies” in which one third independent directors are required for listed firms by June, 2003.

executive pay-performance relation. The estimates on coefficients of control variables are not reported here because they are not of direct interests for our study. In the second column of Table 5, we investigate the impact of the presence of CC on the level of executive compensation as well as on executive pay-performance relation. The coefficient of the interaction term of CC presence and firm performance is not significant for both performance measurements. Moreover, the estimates of coefficient on CC are both significantly positive, which is to the contrast of our Hypothesis 2a and 2b, suggesting an unimportant role played by CC in Chinese listed firms. In the second column, we investigate the impact of CC independence on executive compensation as well as pay-performance relation and find no significant estimates for our interests of variables. That is, neither the presence of CC nor the independence of CC is shown as having any effect on executive compensation. On the other hand, as we expected, as long as at least one member on CC gets paid by the firm the level of executive compensation is higher.

To further examine the effect of CC, we divide the CC firm sub-sample again according to whether the proportion of independent directors on CC is greater than 60%<sup>11</sup>. That is, the CC firm sub-sample was further divided to two sub-samples with regard to different CC independence. The ROA in firms with more than 60% independent directors on CC positively associates with executive compensation. Moreover, the coefficient of ROA is statistically and economically significant. Therefore, even the estimate on the coefficient of the interaction of CC independence and ROA is significantly (but is not significant economically) negative, the partial effect of ROA on executive pay is still positive. On the other hand, those firms with less than 60% independent directors on CC show a positively significant effect of CC independence on executive pay-performance relation although the beta is not large ( $\beta=0.08$ ). Thus, not like their counterparts, firms with less than 60% CC independence partially strengthen their executive pay-performance link when they increase their CC independence. In addition, the presence of paid director on CC shows significantly positive effect on executive pay for both sub-samples. We also get similar results when we change the performance measurement to

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<sup>11</sup> The proportion of independent directors on CC mostly concentrates on the range of 40%-70% in Chinese listed firms; therefore we select the cut-off point as 60% to keep sufficient variability in our sample.

stock returns (RET) which presented in Panel B. Consequently, neither the presence of CC nor the CC independence show any important effect on the level of executive pay or pay-performance relation, but firms with high CC independence do present some positive impact of CC independence to enhance the relation of executive pay and firm performance, providing no support for Hypothesis 2a while providing partial support for Hypothesis 2b.

#### **4.1.3 Board independence and the presence of compensation committee**

Next, to test our hypothesis developed in previous section that the pay-performance relations are stronger for firms with larger proportion of independent directors on board when the compensation committee presents, we classify all firms into firms with CC and firms without CC and estimate the impact of board independence on executive pay-performance separately.

The results of our regressions using Eq. (2) are presented in Tables 6. The results for control variables are not reported because they are not of direct interests to our analysis. In Panel A of Table 6, the beta of ROA\*boardind is 13.39, indicating a strong significant effect of board independence on executive pay-performance relation statistically and economically for firms with CC. Although the coefficient of ROA is negatively significant in firms with CC, the beta is much smaller compared to the beta of ROA\*boardind, resulting in a positive partial effect of ROA on executive compensation. On the other hand, board independence does not show any significant impact on either executive compensation or pay-performance relation in firms without CC while board independence in full sample is positively significantly associated with stronger executive pay-performance relation. That is, the effect of board independence on executive pay-performance in full sample is mostly driven by firms with CC, offering strong support for our Hypothesis 2c. Then we use the alternative performance measurement RET to test the robustness of our results in Panel B and receive similar results. Consequently, the results strongly support Hypothesis 2c, suggesting that independent directors are likely to work more effectively on executive compensation setting if they formed compensation committee.

## 4.2 Further tests on the effect of compensation committee and board characteristics

In terms of the results from prior section, the hypothesis was supported that when compensation committee presents a larger portion of independent directors on board enhances the link between executive compensation and performance. To further test the effects of compensation committee, following Wild (1994), we examine the effect of board independence on executive pay-performance relation before and after the formation of compensation committee.

The primary tests of the hypotheses of our study focus on the magnitude of the slope parameter from the regression of executive compensation on firm performance and board independence. Specifically, the following regression is executed:

$$\ln(\text{ceocom}) = \alpha + \beta_1 \text{ROA}_{-1} + \beta_2 \text{Boardind} + \beta_3 \text{Boardind} * \text{ROA}_{-1} + u \quad (4a)$$

Where  $\ln(\text{CEOCOM})$  and  $\text{Boardind}$  are as defined in Table 1,  $\beta_1$  is the pay-performance relation and  $\beta_3$  is the variable of interest in our study, indicating the impact of board independence on executive pay-performance relation. In order to eliminate the tax impact, we use pre-tax profit to calculate  $\text{ROA}_{-1}$  (return on assets, lagged one year) instead of net income in the regressions.

The regression results for Eq. (4a) are reported in Panel A of Table 7. As expected, the parameter  $\beta_3$  on  $\text{ROA}_{-1} * \text{Boardind}$ , when using all periods' data, is positive (5.16) and significantly greater than zero at the 0.001 level. The central hypothesis to be examined is whether or not the effect of board independence on executive pay-performance is greater after committee formation than before. The second and third rows in Panel A of Table 7 present regression results for the periods before and the periods after formation. Consistent with increased board effectiveness, a larger proportion of independent directors on board is positively associated with stronger executive pay-performance relation ( $p=0.002$ ) for the periods after committee formation while no significant relation between board independence and executive pay-performance is found for the periods before committee formation.

As another test of the hypothesis, a second regression equation is formulated as follows:

$$\ln(\text{ceocom}) = \alpha + \beta_1 \text{ROA}_{-1} + \beta_2 \text{Boardind} + \beta_3 \text{Boardind} * \text{ROA}_{-1} + \beta_4 \text{ROA}_{-1} * \text{Post} + \beta_5 \text{Boardind} * \text{ROA}_{-1} * \text{Post} + u \quad (4b)$$

In this case, Post equals one if it is in the time periods after the committee formation, and equals zero otherwise. A test of the primary hypothesis is equivalent to a test of the alternative hypothesis that the coefficient  $\beta_5$  is significantly greater than zero.

The estimation results for the regression in Eq. (4b) are reported in Panel B of Table 7. The estimated coefficient  $\beta_5$ , in a test for a change in the effect of board independence on executive pay-performance relation from the periods before to the periods after formation, is positive (6.49) and is marginal significant (p=0.065). The evidence indicates that the effect of board independence on executive pay-performance is significantly greater after formation than before. That is, the hypothesis that greater board independence can strengthen the relation between executive compensation and firm performance when the compensation committee presents is supported again by testing time periods before and after the committee formation.

In order to investigate the effect of board and compensation committees in more details, we also run regressions for firms with CC and without CC over 2005-2007, during which the non-tradable shares reform was introduced and progressed in China. It can be seen from Table 8 that board independence shows a significant negative effect on CEO pay-performance relation for those firms without CC ( $\beta = -6.35$ ) while board independence affects firms with CC in an insignificant way, supporting our previous evidence that independent directors work more effectively in firms with CC than in firms without CC. Moreover, in Table 9, we use one indicator variable to indicate whether the ROA is the highest (in the top quartile of ROA) or lowest (in the bottom quartile of ROA), resulting in two sub-samples. Interestingly, even though the interaction term ROA\*COMCIND in best-performing firms shows a marginal significant negative association, it is not economically significant, and if combined with the effect of ROA ( $\beta = 8.86$ , p=0.03), CEO pay-performance relation would be significantly positive, compared with poorly-performing firms. Consequently, best-performing firms link their CEO compensation with firm performance much closer than those poorly-performing firms after the non-tradable shares reform started, suggesting better corporate governance in best-performing firms.

## 5. Summary and conclusions

As Finkelstein and Hambrick remarked, “Boards have long been considered to play an important role in the establishment of executive pay” (1996). However, as noted earlier, those studies on board structure and pay-performance relation provide mixed evidence in both Western countries and transitional economies such as China. This paper has provided the first rigorous estimates on the effect of board independence on executive pay-performance for Chinese listed firms with and without a compensation committee. To do so, we have assembled the panel data (that provide information not only on executive compensation and firm performance but also on compensation committee composition) for 362 manufacturing listed firms on Shanghai and Shenzhen stock markets from 2001 to 2004 as well as 492 manufacturing listed firms from 2005-2007.

Contrary to a popular belief that Chinese corporate governance, specifically the executive compensation scheme, does not work effectively, we provide new empirical evidence. Moreover, the function of Chinese boards and their sub-committees is believed to be more cosmetic than effective. However, we have found that executive cash compensation is more related to accounting and stock market performance when the proportion of independent directors on board is larger. And our results show that the independent directors on board work more effectively on setting executive compensation to the maximum of shareholder wealth if they have a compensation committee to offer them help and provide information. Perhaps even more importantly, our analysis has further revealed for the first time that such overall significant effect of board independence on executive pay-performance link is driven by firms with a compensation committee and that no such relation exists for firms without a compensation committee. As such, our study complements earlier works which tend to point to significant impact of board independence on executive pay-performance relation in general.

Our results also suggest that independent directors on board are more likely to be a good governance mechanism in setting optimal executive compensation when they formed their compensation committee. As such, our findings may partially explain the

reason why prior literature provides mixed evidence on board effectiveness in terms of setting appropriate executive pay.

Further investigation also shows that the positive effect of board independence on executive pay-performance link is more evident in well performing firms and in firms with very large or very small board. That is, firm performance and the size of board may affect the effectiveness of independent directors on setting optimal executive compensation. Finally, extended findings clarify that board independent is positively significantly associated with stronger executive pay-performance relation in time periods after than before the formation of compensation committee, supporting the important role played by a compensation committee.

However, no significant relation was found in our study about the impact of compensation committee independence on executive pay-performance relation. Consequently, the independent directors on compensation committee alone are not found to have significant effect on setting optimal executive compensation, while our results suggest that the existence of compensation committee can assist independent directors on board to design appropriate executive compensation.

Our results from the regressions for firms with a CC and without a CC over 2005-2007 indicate that during the non-tradable shares reform, board independence shows a significant negative effect on CEO pay-performance relation for those firms without a CC ( $\beta = -6.35$ ) while board independence affects firms with a CC in an insignificant way, supporting our previous evidence that independent directors work more effectively in firms with a CC than in firms without a CC. In addition, best-performing firms are more likely to link their CEO compensation with firm performance than those poorly-performing firms since the non-tradable shares reform, suggesting better corporate governance in best-performing firms.

Based on our knowledge, there is no prior research on the link of executive pay-performance relation and the change of ownership structure focusing on the time periods after the non-tradable shares reform. In our future work, we will investigate the impact of the change of ownership structure on executive pay-performance link since the start of the reform. To do so, we will need to continue to collect the board, ownership movement and executive compensation data in the coming years as non-tradable shares reform

progresses, in particular the adoption of a compensation committee and its composition are implemented.

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Table 1. Definitions of variables

Variable	Definition
<b><i>CEO compensation</i></b>	
Ln(ceocom) (nature logarithm)	the nature logarithm of average annual cash compensation of CEOs, calculated by dividing the sum of annual cash compensations of three highest-paid executives by three
<b><i>Firm performance</i></b>	
ROA	The lagged ROA, which is calculated as net income divided by the book value of assets of the previous year
RET	The lagged industry-adjusted annual stock returns, which is calculated as stock returns minus sub-industry (of manufacturing industry) mean stock returns for the previous year
<b><i>Compensation committee</i></b>	
CC	Equal to 1 if compensation committee exists, 0 otherwise
Ln(comsize) (nature logarithm)	Natural log of the total number of directors serving on the compensation committee
Ccind(%)	The proportion of independent directors on the compensation committee
paiddirector	Equal to one if at least one member on the compensation committee gets paid from the firm they serve and zero otherwise
<b><i>Board characteristics</i></b>	
boardind	The proportion of independent directors on board
Ln(boardsize)	The natural logarithm of the number of directors serving on board
boardmeeting	The number of board meetings for the current year
<b><i>Firm-level control variables</i></b>	
Lev	leverage rate (total debt/total assets)
Ln(sales)	Natural log of sales for the year prior (i.e., 2000) to the year in which executive compensation is awarded (i.e., 2001)
H5	Herfindahl_5 index, the sum of squared percent of the shareholdings of the top five largest shareholders
state	Dummy variables, equal to 1 if the largest shareholder is the State
lagnegprofit	Dummy variable, equal to 1 for loss-making firms in previous year and 0 otherwise
stdret	Standard deviation of monthly stock returns over the year
Growth-opportunity	Year-end market to book ratio of assets in the previous year
industry	Dummy variables, 9 sub-industries in manufacturing industry according to Standard Industrial Classification of CSRC (China Securities Regulatory Commission)
Year	Dummy variables, 4 years in the sample

Table 2. Descriptive statistics for CEO compensation and its hypothesized determinants

The sample consists of 1448 annual observations of 362 firms between 2001 and 2004, and 1476 annual observations of 492 firms between 2005 and 2007, which is during the non-tradable shares reform. Compensation amounts and sales are expressed in 2000 Yuan.

Panel A: CEO compensation

	Year	No.	Mean	S.D.	Minimum	Maximum
Ceocom	2001	362	81,750.6	68,101.2	10,804.4	423,700.8
	2002	362	111,322.9	97,630.6	6,607.0	741,684.3
	2003	362	141,983.7	112,219.0	21,782.2	675,676.6
	2004	362	178,158.3	165,354.3	13,333.3	1,336,464
	2005	492	207,195.5	184,487.2	18,333.3	1,681,333
	2006	492	242,590.2	232,526.6	6,000	3,016,200
	2007	492	313,163.7	304,078.7	21,318	3,500,000

Panel B: Summary of CEO compensation, firm performance, board characteristics and firm-specific characteristics

	All firms			Non-CC firms			CC firms			Test: difference in means
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	
<b>CEO compensation</b>										
ceocom	1448	128,303	121,577	944	115,721	112,020	504	151,870	134,693	***
Ln(ceocom)	1448	11.42	.84	944	11.30	.85	504	11.64	.77	***
<b>Firm performance</b>										
roa	1398	.04	.05	895	.04	.05	503	.04	.05	*
ret	1448	.01	.31	944	.01	.34	504	.02	.24	***
<b>Board characteristic</b>										
boardsize	1448	9.70	2.28	944	9.56	2.35	504	9.96	2.13	***
Ln(boardsize)	1448	2.24	.23	944	2.23	.24	504	2.28	.22	***
boardmeeting	1448	7.14	2.73	944	6.93	2.68	504	7.55	2.79	***
boardind	1448	.24	.14	944	.20	.14	504	.31	.09	***
CC	1448	.35	.48	944	0	0	504	1	0	***
<b>Firm-level control</b>										
lev	1448	1.17	1.44	944	1.08	1.20	504	1.33	1.79	***
Sales (millions of yuans)	1448	1,560	2,480	944	1,560	2,480	504	1,580	2,470	0
Ln(sales)	1448	20.45	1.16	944	20.44	1.16	504	20.46	1.15	0
H5	1448	.26	.15	944	.27	.16	504	.23	.14	***
state	1448	.80	.40	944	.79	.41	504	.82	.39	0
lagnegprofit	1448	.07	.25	944	.06	.25	504	.08	.26	0
stdret	1448	.09	.03	944	.09	.02	504	.09	.03	0
Growth-opportunity (opportunityg)	1448	4.21	2.72	944	4.44	2.78	504	3.76	2.54	***

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Panel C: Summary of compensation committee characteristics, 2001-2004

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		2001	2002	2003	2004
CC	Yes (numbers)	21	112	172	199
	No (numbers)	341	250	190	163
Ccind(%)	Mean	56.31	60.62	61.24	60.97
	S.D.	23.13	13.89	12.80	14.06
	Minimum	0	0	0	0
	Maximum	100	100	100	100
Ln(comsize)	Mean	1.26	1.25	1.27	1.25
	S.D.	.33	.26	.29	.30
	Minimum	.69	.69	0	0
	Maximum	1.61	1.95	1.95	1.95
Paiddirector	Mean	.71	.59	.61	.58
	S.D.	.47	.49	.49	.50
	Minimum	0	0	0	0
	Maximum	1	1	1	1

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Panel D: Summary of compensation committee characteristics, 2005-2007

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		2005	2006	2007
CC	Yes (numbers)	309	335	355
	No (numbers)	183	157	137
Ccind(%)	Mean	61.60	61.48	61.18
	S.D.	12.2	12.83	13.65
	Minimum	0	0	0
	Maximum	100	100	100

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Sample consists of 1448 firm-years of data for 362 publically traded manufacturing firms during the years 2001-2004, and 1476 firm-years of data for 492 publically listed manufacturing firms during the years 2005-2007.

The average CEO compensation, firm-specific characteristics and firm performance are compared between CC firms and non-CC firms using Wilcoxon test. Zero denotes no significant difference.

Variables are as defined in table 1.

Table 3. Regression of CEO compensation on its economic determinants, industry and year controls, and board and ownership structure variables

		Dependent variable: ln(total cash compensation)		
Variable	Predicted sign	Model 1	Model 2	Model 3
Panel A: firm performance is measured by lagged ROA				
ROA <sub>-1</sub>	+	.31(0.73)	.49(0.69)	.49(0.79)
ROA <sub>-1</sub> square			-.76(1.98)	
boardind	-	1.81***(0.17)	1.83***(0.16)	-.12(0.20)
Ln(boardsize)	+	.14(0.09)	.14(0.09)	.01(0.18)
Boardmeeting	?	-.00(0.01)	-0.00(0.01)	.01(0.01)
Ln(sales)	+			.24***(0.03)
stdret	+			1.55**(0.54)
state	-			-.10(0.06)
H5	?			-.75***(0.20)
LEV	?			-.01(0.01)
lagnegp	-			.13 <sup>+</sup> (0.07)
opportunityg	+			.03***(0.01)
ROA <sub>-1</sub> *boardind	+	4.43 <sup>+</sup> (2.43)	3.91(2.43)	5.50*(2.48)
Industry fixed effects		No	No	Yes
Year fixed effects		No	No	Yes
N		1398	1398	1398
R <sup>2</sup> (%)		27	35	42
Chi squares		357.45	524.86	831.58

Panel B: firm performance is measured by lagged RET

RET <sub>-1</sub>	+	-.02(0.08)	.04(0.08)	-.05(0.07)
RET <sub>-1</sub> square			-.08(0.06)	
boardind	-	1.85***(.10)	1.82***(.10)	.16(0.15)
Ln(boardsize)	+	.13(0.08)	.13(0.08)	.02(0.08)
boardmeeting	?	-.00(0.01)	-.00(0.01)	.01(0.01)
Ln(sales)	+			.25***(.03)
stdret	+			1.11*(.54)
state	-			-.09(0.06)
H5	?			-.76***(.20)
LEV	?			-.01(0.01)
lagnegprofit	-			-.06(0.05)
opportunityg	+			.04***(.01)
RET <sub>-1</sub> *boardind	+	.87**(.34)	.86*(.34)	.19(0.31)
Industry fixed effects		No	No	Yes
Year fixed effects		No	No	Yes
N		1448	1448	1448
R <sup>2</sup> (%)		28	28	41
Chi squares		107386.57	107099.16	145515.05

\* The Heteroskedasticity-robust standard errors are presented in parentheses

Variables are as defined in table 1.

The coefficients for the year and industry indicator variables are not reported in the tables because they are not of direct interest for this study.

\*\*\*:P<0.001, \*\*:P<0.01, \*: P<0.05, +: P<0.1

Table 4 Results of CEO pay-performance regressions for subsamples

Dependent variable: ln(total cash compensation)						
Variable	Top quartile of roa	Bottom quartile of roa	Large board	Small board	Board independence >30%	Board independence ≤ 30%
ROA <sub>1</sub>	-2.43**(0.95)	4.87**(1.87)	-1.70 <sup>+</sup> (0.97)	.58(1.18)	4.85 <sup>+</sup> (2.62)	-1.22(0.70)
boardind	-.79(0.57)	.27(0.30)	-.30(0.58)	-.37(0.27)	.08(0.68)	-.50 <sup>+</sup> (0.30)
Ln(boardsize)	-.28(0.18)	-.12(0.14)	-.16(0.32)	-.02(0.14)	.17(0.15)	-.11(0.12)
Boardmeeting	-.01(0.01)	.00(0.01)	.01(0.02)	.01(0.01)	.01(0.01)	-.00(0.01)
Ln(sales)	.25***(0.05)	.21***(0.04)	.27***(0.06)	.22***(0.03)	.21***(0.03)	.30***(0.03)
stdret	1.92 <sup>+</sup> (1.12)	-.22(0.95)	-.18(1.34)	1.61*(0.69)	.98(0.69)	1.13(0.79)
state	-.02(0.10)	-.21 <sup>+</sup> (0.12)	.01(0.12)	-.02(0.07)	.04(0.07)	-.14 <sup>+</sup> (0.08)
H5	-.85**(0.29)	-.37(0.30)	-1.00*(0.42)	-.87***(0.24)	-.52*(0.24)	-.90***(0.23)
LEV	.07(0.05)	.01(0.02)	-.01(0.09)	.00(0.01)	.00(0.01)	-.04(0.03)
opportunity	.06***(0.01)	.05*(0.02)	.02(0.02)	.04***(0.01)	.02(0.01)	.05***(0.01)
ROA <sub>1</sub> *boardind	13.39**(4.72)	-12.35*(6.12)	16.77*(6.72)	7.30*(3.30)	-6.23(6.54)	13.50***(3.40)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	350	349	238	847	695	703
R <sup>2</sup> (%)	57	42	50	42	32	35
Chi squares	349.00	200.29	458.93	539.74	304.93	346.05

Heteroskedasticity-consistent standard errors are presented in parentheses.

Variables are as defined in table 1. \*\*\*:P<0.001, \*\*:P<0.01, \*: P<0.05, <sup>+</sup>: P<0.1

Table 5 Results of compensation committees and CEO pay-performance regressions

Panel A: firm performance is measured by lagged ROA

Dependent variable: ln(total cash compensation)				
Variable	Full sample	CC firms	CC independence>60%	CC independence<=60%
ROA <sub>-1</sub>	1.85***(0.47)	1.29(1.43)	20.52**(7.54)	-1.19(1.68)
CC	.21***(0.05)			
Ccind(%)		.00(0.00)	.03 <sup>+</sup> (0.02)	-.01(0.01)
ROA <sub>-1</sub> *CC	-.91(0.77)			
ROA <sub>-1</sub> *Ccind		.03(0.03)	-.26*(0.10)	.08*(0.04)
Ln(comsize)		-.24 <sup>+</sup> (0.03)	-.13(0.38)	-.10(0.29)
Paiddirector		.23**(0.09)	.21 <sup>+</sup> (0.11)	.38*(0.18)
Time effects	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes
Observations	1398	391	239	152
R <sup>2</sup> (%)	43	38	32	50
Chi squares	842.73	196.14	165.74	239.99

Panel B: firm performance is measured by lagged RET

Dependent variable: ln(total cash compensation)				
Variable	Full sample	CC firms	CC independence>60%	CC independence<=60%
RET <sub>-1</sub>	.00(0.05)	.02(0.29)	1.18*(0.52)	-.49(0.41)
CC	.18***(0.04)			
Ccind(%)		.00(0.00)	.02 <sup>+</sup> (0.00)	-.00(0.01)
RET <sub>-1</sub> *CC	-.15(0.12)			
RET <sub>-1</sub> *Ccind		-.00(0.00)	-.02**(0.01)	.00(0.01)
Ln(comsize)		-.23(0.14)	-.06(0.37)	-.11(0.29)
Paiddirector		.22*(0.09)	.18(0.52)	.42*(0.19)
Time effects	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes
Observations	1448	392	240	152
R <sup>2</sup> (%)	42	36	32	48
Chi squares	143932.13	203.18	197.63	179.31

Heteroskedasticity-consistent standard errors are presented in parentheses.

Variables are as defined in table 1.

\*\*\*:P<0.001, \*\*:P<0.01, \*: P<0.05, <sup>+</sup>: P<0.1

Table 6 Regression results of CEO pay-performance for firms with or without CC

Panel A: firm performance is measured by lagged ROA

Dependent variable: ln(total cash compensation)			
Independent variables	All firms N=1398	CC firms N= 503	Non-CC firms N= 895
ROA <sub>-1</sub>	.40(0.80)	-2.24*** (0.70)	1.31 <sup>+</sup> (0.71)
boardind	-.14(0.20)	-.47(0.33)	.06(0.23)
ROA <sub>-1</sub> *boardind	5.56*(2.50)	13.39*** (2.72)	1.58(2.37)
Time effects	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes
Observations	1398	503	895
R <sup>2</sup> (%)	42	39	36
Chi squares	856.97	283.07	455.15

Panel B: firm performance is measured by lagged RET

Dependent variable: ln(total cash compensation)			
Independent variables	All firms N=1448	CC firms N=504	Non-CC firms N=944
RET <sub>-1</sub>	-.08(0.07)	-.58** (0.19)	.00(0.08)
boardind	.15(0.15)	.06(0.30)	.17(0.19)
RET <sub>-1</sub> *boardind	.33(0.30)	1.26 <sup>+</sup> (0.67)	.20(0.34)
Time effects	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes
Observations	1448	504	944
R <sup>2</sup> (%)	41	37	35
Chi squares	147055.45	253.05	461.29

The coefficients for the control variables are not reported in the tables because they are not of direct interest for this study. Variables are as defined in table 1.

\*\*\*:P<0.001, \*\*:P<0.01, \*: P<0.05, <sup>+</sup>: P<0.1

Table 7 Relationship between board independence and executive pay-performance before and after compensation committee formation

Test period	Model: $\ln(\text{ceocom}) = \alpha + \beta_1 \text{ROA}_{-1} + \beta_2 \text{Boardind} + \beta_3 \text{Boardind} * \text{ROA}_{-1} + u$						
	Number of observations	$\beta_1$	$\beta_3$	Adjusted R square	F-test		
Panel A: Regression of the nature log of executive compensation on $\text{ROA}_{-1}$ and boardind							
All periods	1398	.95*(0.44)	5.16***(1.20)	0.31	32.83		
Period before	266	-.38(0.89)	1.52(1.49)	0.30	6.77		
Periods after	503	.40(0.71)	5.33**(1.74)	0.23	8.45		
	Model: $\ln(\text{ceocom}) = \alpha + \beta_1 \text{ROA}_{-1} + \beta_2 \text{Boardind} + \beta_3 \text{Boardind} * \text{ROA}_{-1} + \beta_4 \text{ROA}_{-1} * \text{Post} + \beta_5 \text{Boardind} * \text{ROA}_{-1} * \text{Post} + u$						
	Number of observations	$\beta_1$	$\beta_3$	$\beta_4$	$\beta_5$	Adjusted R square	F-test
Before versus after	769	.99(0.72)	3.95*(1.58)	-2.34 <sup>+</sup> (1.20)	6.49 <sup>+</sup> (3.51)	0.31	16.10

Standard errors are in parentheses because the  $\rho$  value of White (1980) test is greater than 0.05, suggesting the models we used have little Heteroskedasticity issues.

The coefficients for the control variables are not reported in the tables because they are not of direct interest for this study.

Variables are as defined in table 1.

\*\*\*:  $P < 0.001$ , \*\*:  $P < 0.01$ , \*:  $P < 0.05$ , <sup>+</sup>:  $P < 0.1$

Table 8 Regression results of CEO pay-performance for firms with or without CC over 2005-2007

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Firm performance is measured by lagged ROA

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Dependent variable: ln(total cash compensation)

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Independent variables	All firms	CC firm	Non-CC firms
ROA <sub>-1</sub>	.91(0.86)	0.28(0.85)	2.91 <sup>+</sup> (1.04)
boardind	0.09(0.24)	0.03(0.27)	.29(0.50)
ROA <sub>-1</sub> *boardind	-2.09(2.52)	-1.00(2.58)	-6.35*(3.05)
Time effects	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes
Observations	1467	990	477
R <sup>2</sup> (%)	34	36	34
Chi squares	666.39	504.14	232.02

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Heteroskedasticity-consistent standard errors are presented in parentheses.

Variables are as defined in table 1.

\*\*\*:P<0.001, \*\*:P<0.01, \*: P<0.05, <sup>+</sup>: P<0.1

Table 9 Results of CEO pay-performance regressions for CC subsamples during 2005-2007

Dependent variable: ln(total cash compensation)		
Variable	Top quartile of roa	Bottom quartile of roa
ROA <sub>1</sub>	8.86 *(3.34)	-3.93(2.84)
CCIND	.01 *(0.01)	.01 <sup>+</sup> (0.00)
Ln(boardsize)	.09(0.18)	.27(0.20)
Boardmeeting	.01(0.01)	.01 <sup>+</sup> (0.01)
Ln(sales)	.21*** (0.06)	.23*** (0.05)
stdret	-.16(0.41)	.83 (0.55)
state	.04 (0.11)	.04 (0.11)
H5	-.49 (0.38)	-.43(0.44)
LEV	.05(0.03)	-.01 (0.02)
opportunityg	.04 <sup>+</sup> (0.02)	.00 (0.02)
ROA <sub>1</sub> *CCIND	-.13*(0.05)	.03 (.04)
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
N	221	202
R <sup>2</sup> (%)	58	32
Chi squares	192.35	94.24

Heteroskedasticity-consistent standard errors are presented in parentheses.

Variables are as defined in table 1.

\*\*\*:P<0.001, \*\*:P<0.01, \*: P<0.05, <sup>+</sup>: P<0.1