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**Article**

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# Executive compensation in business groups: Evidence from China<sup>☆</sup>



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## ABSTRACT

This paper examines executive compensation in the subsidiaries of business groups in China. Analyzing a sample of China business groups (the so-called “*XiZu JiTuan*” in Chinese) from 2003 to 2012, we find convincing evidence of the use of Relative Performance Evaluation (RPE) in the executive compensation of the subsidiaries of business groups. Specifically, when the change in performance of one subsidiary is lower than that of the other subsidiaries, the change in its executive compensation is significantly lower. Further, when the business group is private and the level of marketization is high, the subsidiary’s executive compensation is more likely to be influenced by the performance of the other subsidiaries. This research improves our understanding of the decision mechanisms of executive compensation in business groups and enriches the literature on executive compensation and business groups.

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## 1. Introduction

The use of executive compensation as an incentive mechanism to reduce agency problems (Jensen and Meckling, 1976) is a core research area in corporate governance. There is much research about executive compensation in China’s listed companies. The literature focuses mostly on pay–performance sensitivity (Fang,

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2009, 2011; Xin and Tan, 2009; Li et al., 2013) and the economic consequences of pay dispersion (Lin et al., 2003; Chen and Zhang, 2006; Li and Hu, 2012). However, this empirical literature is generally based on the implicit assumption that the listed companies are all independent, and that executive compensation is determined only by the characteristics of the company itself and the industry. Yet not all listed companies are independent. In Asian countries, independent companies are not even the main form of company. For example, Claessens et al. (2002) find that, in nine Asian countries, about 70% of the listed companies are controlled by business groups. In China, as of 2011 almost 76% of listed companies belonged to different groups (Zheng et al., 2014).

Therefore, it is important to examine executive compensation under the circumstances of business groups. From the perspective of business groups, the relationship between the ultimate controlling shareholder and the executives of the different subsidiaries is just like the situation of one principle and many agents. According to Relative Performance Evaluation (RPE) theory (Holmstrom, 1979, 1982; Murphy, 1999), in a multi-agent setting, although agents are confronted with common risks, valuable information about an agent's action can be conveyed by the outputs of the other agents. Therefore, if we ignore the fact that most listed companies are controlled by business groups, and if we fail to consider the influence of the other subsidiaries in the same group, the results of studies on executive compensation may not be true or reliable and may even mislead policymakers, which in the end will lead to the inefficient allocation of resources.

Exploring executive compensation in business groups is also an important task that can contribute to the literature of business groups. To date, studies about business groups mainly focus on the tunneling behavior of the ultimate shareholder (Bae et al., 2002; Bertrand et al., 2002; Baek et al., 2006; Jiang et al., 2010) and internal capital markets (Shin and Park, 1999; Hoshi et al., 1991; Gopalan et al., 2007; Shao and Liu, 2007, 2009; Yang, 2007; Ma and Chen, 2013; Almeida et al., 2014). These studies generally analyze the economic consequences of the sophisticated ownership structure of business groups, but rarely study the incentive and decision mechanisms in business groups, which can affect the governance of business groups directly. To the best of our knowledge, this paper is the first to empirically examine the incentive mechanism in business groups. Because business groups are prevalent around the world (Almeida et al., 2011; Masulis et al., 2013) and play an important role in some countries, especially in China, learning how to maximize the value of business groups requires us to open the black box of the incentive mechanism. Therefore, our research can shed light on how to improve the governance of business groups and to some degree fill the gap in the literature.

However, to examine subsidiaries' executive compensation decision mechanism, we need to collect data on the corporate governance of subsidiaries in business groups. Because non-public companies are not required to disclose their data, traditional research on business groups generally assumes that one business group has only one listed subsidiary company, and examines the operation or economic consequences based on this assumption,<sup>1</sup> which may not describe the business group comprehensively and objectively. In this study, we use a unique dataset of China business groups to examine executive compensation in business groups. In China, one special kind of business group, the so-called *XiZu JiTuan* in Chinese, has sprung up like bamboo in the past 20 years. *XiZu JiTuan* is defined as more than one listed company under the control of the same ultimate shareholder, which is the output of the development of business groups in the capital markets (Ma and Chen, 2013; Shao and Liu, 2007). These unique data allow us to explore the executive compensation decision mechanisms in the available business groups. The reasons are as follows. First, listed subsidiaries, as the main members of *XiZu JiTuan*, are required to disclose detailed information about their executive compensation and corporate governance, thus solving the problems of data sources and data reliability. Second, the previous literature on corporate governance rarely controls for the influence of the characteristics of the ultimate shareholder (e.g., their preferences) on corporate governance. In *XiZu JiTuan*, we can reduce this problem, because differently listed subsidiaries are ultimately controlled by the same shareholder. Third, by analyzing the ultimate shareholder's treatment of the different listed subsidiaries and the relationship between the ultimate shareholder and listed subsidiaries, such as their position and the ownership structure, we can systematically investigate the motives for and economic consequences of resource allocation inside business groups.

<sup>1</sup> For example, Gopalan et al. (2007) and Shin and Park (1999) investigate the motive and efficiency of the internal capital market of business groups indirectly, solely based on the study of listed companies.

Therefore, we use the sample of *XiZu JiTuan* during 2003–2011 in China, including 271 *XiZu JiTuan* and 4124 firm-year observations, to examine subsidiaries' executive compensation in business groups. Specifically, if there are two listed subsidiaries in the same business group, named firm *A* and firm *B*, then we examine whether the executive compensation of firm *A* is influenced by the performance of firm *B*, in addition to firm *A*'s performance and other characteristics. Our empirical research provides a positive answer. We find that, in the same business group, the executive compensation of one listed subsidiary is not only decided by its own performance but is also based on the performance of other listed subsidiaries or their relative performance ranking. When the change in performance of one listed subsidiary is relatively lower than that of other subsidiaries in the same business group, the change in executive compensation is significantly lower, which means that the relative performance evaluation (RPE) mechanism exists in decisions about executive compensation in business groups. However, our further research shows that the RPE mechanism in business groups exists more obviously only when business groups are private or the level of marketization is high.

This study contributes to the literature in three ways. First, unlike the previous literature on executive compensation that focuses on independent companies, we study executive compensation under the circumstances of business groups, which conforms more with the current situation of the capital markets in Asian countries, especially in China, and avoids the bias in the existing literature while providing a new angle to study executive compensation. Second, the current literature of business groups provides limited insights on the governance inside business groups. To our best knowledge, our paper is the first to study the incentive mechanism in business groups empirically, which also contributes to the literature on business groups. Third, the paucity of RPE in the components of executive compensation remains a puzzle (Murphy, 1999) and is not well understood in the literature. We provide a better research design to test RPE in executive compensation. By examining the RPE mechanism in business groups, we can control for the influence of the characteristics of the ultimate shareholder and obtain more conservative and reliable results, which sheds more light on the puzzle of RPE.

The remainder of this paper is organized as follows. Section 2 provides the theoretical analysis and the corresponding hypotheses. Section 3 describes our sample and research design. Section 4 presents our empirical analysis, and Section 5 concludes.

## 2. Theoretical analysis and hypothesis development

Executive compensation is a core issue in corporate governance. In a company, top managers are responsible for regular operations and thus have a decisive influence on the company's performance. However, according to agency theory, as a rational agent the top manager has the motivation to maximize his own private interest, which may be detrimental to the benefits of shareholders (Jensen and Meckling, 1976). Therefore, designing an effective incentive mechanism to encourage executives to work hard and maximize the value of shareholders (Jensen & Murphy, 1990) becomes the most important issue in corporate governance.

Since Holmstrom (1979, 1982) came up with RPE theory, many studies have examined the use of RPE in incentive contracts, but they have obtained inconsistent results (Albuquerque, 2009).<sup>2</sup> Murphy (1999) proposes that the paucity of RPE in options and other components of executive compensation remains a puzzle worth understanding. There are several potential explanations. First, the previous literature on executive compensation is based on independent companies and ignores the fact that different companies may belong to different groups. In business groups, the performance of one listed subsidiary and its executive compensation may be influenced by other subsidiaries. If we ignore these factors, our results may be unreliable. Second, the characteristics of the ultimate shareholder can vary greatly, which may also affect the results if we do not control for this factor. Therefore, it is very important to examine executive compensation from the perspective of business groups.

<sup>2</sup> The empirical studies of RPE proposed by Holmstrom (1979) obtain inconsistent results. For example, the results found by Gibbons and Murphy (1990) support the existence of RPE, but many papers could not find any evidence of the use of RPE (Barro and Barro, 1990; Garvey and Milbourn, 2003). Janakiraman et al. (1992) find that RPE exists only when performance is measured by stock returns.

### 2.1. Decision mechanism of executive compensation in business groups

Theoretically, from the view of business groups, the use of RPE can be an effective way to achieve the goal of maximizing the value of the group. There are two main reasons for this.

First, the use of RPE in business groups provides incremental information for assessing the actions taken by top managers. In business groups, the relationship between the ultimate shareholder and the executives of different subsidiaries is the situation of one principle and many agents. In this multi-agent setting, subsidiaries in the same group may face a common risk, and the output of other agents contains some valuable information about the agents' actions (Holmstrom, 1979, 1982). Therefore, the payment of one agent should not only be based on his own absolute performance, but also on his relative performance among the other agents, while eliminating the effects of common shocks. The tournament theory proposed by Lazear and Rosen (1981) states that because the cost of supervising management is quite high, the agent's compensation should be based on his ranking of the marginal output, rather than his absolute marginal output. Under the circumstances of business groups, the performance of one subsidiary is often affected by other subsidiaries. By building an internal capital market in a business group, internal resources can flow between different subsidiaries, which may reduce transaction costs but result in a high correlation between the subsidiaries' performance. Therefore, to effectively encourage executives, the decisions about subsidiaries' compensation should consider the performance of other subsidiaries. That is, when the performance of firm *A* is better than that of firm *B*, the executives of firm *A* should gain higher compensation.

Second, the use of RPE in business groups can ensure the executives' feeling that pay is equal. How to make executives feel that pay is fair is an important question. Both equity theory (Adams, 1965) and social comparison theory (Festinger, 1954) state that workers will compare their input level and outcome with those of their peers, and feel fairness only when the input level and the outcome match. When determining compensation, it is very important to make employees feel that the results are fair (Greenberg, 1987), otherwise, the perceived unfairness will lead to feelings of disenchantment, the temptation of negative sabotage and a loss of talent (Adams, 1965). Therefore, the procedural justice of the distribution of rewards<sup>3</sup> and perceptions of fairness among executives are crucial to the healthy operation of business groups. When firm *A* performs better than firm *B*, to meet the criteria of procedural justice, the executives of firm *A* should be rewarded with higher compensation.

Hence, we propose our first hypothesis.

**H1.** In the same business group, if firm *A* performs worse than firm *B*, the executive compensation of firm *A* should be lower. That is, the RPE mechanism exists in business groups.

### 2.2. Level of marketization

In China, there are various differences in the way executive compensation is designed and evaluated for SOEs and non-SOEs (Chen et al., 2012). However, China's diverse markets and geographic regions provide sufficient variation in the level of marketization to study the effects of the institutional environment on the incentive mechanism in business groups.

#### 2.2.1. Ownership type and executive compensation in business groups

In China, the compensation contracts of state-owned business groups (SOBG) are different from the contracts of non-state-owned business groups (non-SOBG).

First, SOEs are often controlled by the government. The government in China has the power to appoint and dismiss the executives to strengthen their influence in the operation of SOEs and achieve their political objectives. On the one hand, the executive compensation of SOEs is regulated by the government (Chen et al., 2005), and emphasizes egalitarianism. On the other hand, SOEs are required to undertake many policy

<sup>3</sup> The organizational procedures are more frequently cited than outcomes as causes of unfairness in organizations (Greenberg, 1986; Sheppard and Lewicki, 1987), and such procedures contribute more to job satisfaction than do outcomes (Alexander and Ruderman, 1987).

burdens, such as the improving the employment rate and tax income (Lin Justin et al., 1998; Lin Justin and Tan, 1999), so accounting-based performance plays a limited role in evaluating the performance of executives in SOEs. Besides, executives, especially the CEO and the chairman of the board, are often also government officials. The incentive of executives in SOEs may mostly come from the promotion of their administrative position or managerial perks (Chen et al., 2005). The socialist government always has a tendency toward egalitarianism. The government prefers to pay executives average pay rather than performance-based compensation or pay based on tournament ranking (Lin et al., 2003). Therefore, executive compensation in SOBGs depends less on the performance of other subsidiaries.

Second, the executive compensation in non-SOBGs is far more market oriented. Executives in non-SOBGs mainly come from the market of professional managers, and firms must design more effective contracts to attract and retain talent. Moreover, the goal of non-SOBGs is to maximize the value of the company, so it is rational to incentivize executives through performance-based compensation. In non-SOBGs, in evaluating the performance of executives, the relative performance among different subsidiaries contains more information about the efforts of executives.

Therefore, we propose our second hypothesis.

**H2.** Compared with SOBGs, the executive compensation in non-SOBGs depends more on the performance of other subsidiaries in the same business group.

### 2.2.2. Marketization and executive compensation in business groups

The last 30 years have seen a great development in the market economy of China (Fan and Wang, 2011). As an important external governance mechanism, China's marketization has improved the efficiency of capital allocation (Fang, 2006), corporate governance (Jiang et al., 2010) and the value of companies (Xia and Fang, 2005).

Theoretically, the development of marketization can impel business groups to design more effective compensation contracts. First, the higher the level of marketization, the stronger the legal protection of property rights, and the tunneling and self-interested behavior of management is then constrained. Second, the degree of regional marketization reflects the quality of the government administration. External corporate governance mechanisms include property rights, the government administration, legal protection, market competition, the credit system and the culture of contracts (Xia and Fang, 2005). In addition to legal protection, government administration is another important characteristic that Chinese companies face that is quite different from that in other countries. When the level of marketization is high, there will be less unreasonable government intervention, and executive compensation will also face less regulation, which can be helpful for business groups in designing effective compensation contracts. Third, the higher the degree of marketization, the more intense the competition in the product market, and the greater the transparency and comparability of a company's performance. A company will be more likely to release information about the efforts and ability of its executives in the form of their accounting performance, because the information will be helpful in creating a more effective compensation policy. We thus propose our third hypothesis.

**H3.** The higher the degree of marketization under which the group company operates, the more the executive compensation of the subsidiary depends on the performance of other subsidiaries in the business group.

## 3. Research design

### 3.1. Data sources

We hand collect the *XiZu JiTuan* data in the following steps. In the first step, we define the criteria for a listed firm belonging to a business group, that is, the ultimate controlling shareholder can exercise "controlling influence" over it (Almeida et al., 2011). In the second step, we analyze the detailed ownership structure data that the Chinese government has required public companies to disclose in their annual financial reports since 2003. Combining these ownership data with the list of Chinese large business groups in the "Annual Report on the Development of China's Large Enterprise Groups" (2004–2008) published by the National Bureau of

Statistics of PRC, we can group the listed companies that are controlled by one ultimate controlling shareholder. Finally, we obtain 271 *XiZu JiTuan* and 4124 firm-year observations from 2004 to 2012, after excluding financial companies and observations lacking complete financial data or data on the main variables. Our financial data are primarily from the China Stock Market and Accounting Research (CSMAR) database.

### 3.2. Research design

According to previous studies, executive compensation in business groups can have both the RPE mechanism (Aggarwal and Samwick, 1999; Albuquerque, 2009) and compensation peer group effects (Bizjak et al., 2008, 2011). To test the basic hypothesis H1, we use the following change model.

$$\Delta Compensation_{A,t} = \alpha_1 \Delta Performance_{B,t} + \alpha_2 \Delta Performance_{Ind,t} + \alpha_3 \Delta Performance_{A,t} + \alpha_4 \Delta Compensation_{B,t} + \alpha_5 \Delta Compensation_{Ind,t} + \alpha_i Controls_{i,t} + \varepsilon$$

$\Delta Compensation$  is the change in executive compensation, defined as executive compensation in of the current year minus executive compensation in the previous year. In Chinese listed companies, the structure of executive compensation consists of basic salary and performance compensation but relatively little stock-based compensation (Fang, 2009; Li et al., 2013). Therefore, we use the logarithm of the sum of the compensation of the top three managers to measure executive compensation, and we do not include stock-based compensation.  $\Delta Performance$  is the change in current performance, which is current return on assets (ROA) minus the ROA of the last year. The subscripts *A* and *B* refer to the different subsidiaries in the same business group. If we let firm *A* be the benchmark subsidiary, then the subscript *B* denotes another subsidiary, and if there are more than two listed subsidiaries in the same business group, all subsidiaries except for firm *A* will be set as firm *B*.  $\Delta Performance_{Ind,t}$  and  $\Delta Compensation_{Ind,t}$  are the change in the industry's performance and the change in the industry's executive compensation, respectively, to control for industry effects (Albuquerque, 2009; Bizjak et al., 2008, 2011).

We also control for other variables. Following Bizjak et al. (2011), we include *Lagged Compensation<sub>A</sub>* and *Lagged Performance<sub>A</sub>* to account for any mean reversion in pay and the autocorrelation of performance, respectively. In general, previous research finds a positive correlation between the size of a company and its executive compensation (Core et al., 1999; Firth et al., 2006). When the leverage of a company is high, its executive compensation is constrained by its creditors. So we also include the size of the company (*Size*) and its leverage (*Lev*). Because executives have the motive and the ability to increase their own compensation due to their managerial power (Bebchuk et al., 2002), we also control for variables such as the corporation's block holdings (*Top 1*), independence of the board (*Independence*), dual role of the CEO and chairman of the board (*Dual*) and executives' shareholdings (*MShare*). We also control for fixed year, industry and location effects. All of the continuous variables are winsorized at 1% and 99%.

The definitions for the variables are summarized in Table 1.

## 4. Empirical results

### 4.1. Descriptive statistics

Table 2 presents the descriptive statistics of the main variables. As shown in the table, executives hold a very small proportion of the stock (0.2%) in Chinese group companies, so it is reasonable to use only cash-based compensation when measuring Chinese executive compensation. There is little difference in the executive compensation and performance between subsidiaries *A* and *B* in the same group, which shows the homogeneity of subsidiaries in the same business group. In addition, the average value of executive compensation is about RMB1.25 million, and the difference between the highest and lowest pay is quite large, at about 100 times.

Table 3 shows the sample distribution by year after dividing the whole sample into state-owned business groups (SOBG) and non-state-owned business groups (NSOBG). We see that the proportion of SOBGs is

Table 1  
Variable definitions.

Variable	Definition
Compensation <sub>A</sub>	Logarithm of sum of compensation of top three managers, the subscript A stands for one subsidiary A in the business group
Performance <sub>A</sub>	ROA of subsidiary A, defined as net income divided by total assets
Compensation <sub>B</sub>	Average value of the executive compensation of all of the listed subsidiaries except for firm A in the business group
Performance <sub>B</sub>	Average value of ROA of all of the listed subsidiaries except for firm A in the business group
Compensation <sub>Ind</sub>	Average value of executive compensation in firm A's industry (excluding firm A)
Performance <sub>Ind</sub>	Average value of ROA in firm A's industry (excluding firm A)
ΔCompensation <sub>A</sub>	Compensation <sub>A,t</sub> – Compensation <sub>A,t-1</sub>
ΔPerformance <sub>A</sub>	Performance <sub>A,t</sub> – Performance <sub>A,t-1</sub>
ΔCompensation <sub>B</sub>	Compensation <sub>B,t</sub> – Compensation <sub>B,t-1</sub>
ΔPerformance <sub>B</sub>	Performance <sub>B,t</sub> – Performance <sub>B,t-1</sub>
ΔPerformance <sub>B</sub> (dummy)	A dummy variable that equals 1 if Change in Performance <sub>B</sub> is larger than Change in Performance <sub>A</sub> , and 0 otherwise
ΔCompensation <sub>Ind</sub>	Compensation <sub>Ind,t</sub> – Compensation <sub>Ind,t-1</sub>
ΔPerformance <sub>Ind</sub>	Performance <sub>Ind,t</sub> – Performance <sub>Ind,t-1</sub>
Lagged Performance <sub>A</sub>	Subsidiary A's ROA in the previous year, that is, Performance <sub>A,t-1</sub>
Lagged Compensation <sub>A</sub>	Subsidiary A's executive compensation in the past year, that is, Compensation <sub>A,t-1</sub>
Size	Logarithm of total assets at the end of the year
Lev	Total debt to total assets at the end of the year
Top 1	Percentage of shares held by the largest shareholder
Independent	Percentage of independent directors on the board
Dual	Dummy variable that equals 1 if the chairman and CEO are the same person, and 0 otherwise
MShare	Percentage of shares held by management
Index	The marketization index from <a href="#">Fan and Wang (2011)</a>
Location	Includes two dummy variables, Center and West. If the location of the company belongs to the central area in China, Center equals 1 and 0 otherwise. If the location belongs to the west area, West equals 1 and 0 otherwise
Year	Year dummy variables
Industry	Industry dummy variables based on the CSRC classifications

Table 2  
Descriptive statistics.

Variable	N	Mean	Std	Min	Median	Max
Compensation <sub>A</sub>	4124	13.710	0.822	11.450	13.760	16.050
Performance <sub>A</sub>	4124	0.028	0.066	-0.291	0.030	0.198
Compensation <sub>B</sub>	4124	13.820	0.744	11.740	13.870	15.740
Performance <sub>B</sub>	4124	0.028	0.054	-0.243	0.030	0.174
Compensation <sub>Ind</sub>	4124	13.860	0.398	12.750	13.930	14.780
Performance <sub>Ind</sub>	4124	0.142	0.959	-0.383	0.035	7.813
ΔCompensation <sub>A</sub>	4124	0.136	0.355	-1.026	0.093	1.405
ΔPerformance <sub>A</sub>	4124	-0.003	0.067	-0.284	-0.001	0.273
ΔCompensation <sub>B</sub>	4124	0.141	0.332	-0.892	0.113	1.386
ΔPerformance <sub>B</sub>	4124	-0.003	0.065	-0.329	-0.001	0.274
ΔCompensation <sub>Ind</sub>	4124	0.127	0.106	-0.182	0.124	0.551
ΔPerformance <sub>Ind</sub>	4124	0.122	1.024	-1.223	0.001	7.996
Lagged Performance <sub>A</sub>	4124	0.031	0.064	-0.272	0.032	0.195
Lagged Compensation <sub>A</sub>	4124	13.570	0.845	11.230	13.610	15.990
Size	4124	21.930	1.319	19.000	21.780	27.750
Top 1	4124	0.398	0.159	0.092	0.391	0.779
Lev <sub>A</sub>	4124	0.534	0.212	0.067	0.542	1.293
Independent	4124	0.357	0.047	0.231	0.333	0.556
MShare	4124	0.002	0.010	0.000	0.000	0.084
Dual	4124	0.095	0.294	0.000	0.000	1.000



Table 3  
Distribution of business groups by year.

Year	All firms	SOBGs	Percentage (%)	Non-SOBGs	Percentage (%)	$N = 2$	Percentage (%)
2004	359	302	84.12	57	15.88	131	36.49
2005	392	330	84.18	62	15.82	160	40.82
2006	393	334	84.99	59	15.01	160	40.71
2007	403	336	83.37	67	16.63	146	36.23
2008	441	374	84.81	67	15.19	163	36.96
2009	480	407	84.79	73	15.21	183	38.13
2010	516	432	83.72	84	16.28	201	38.95
2011	566	469	82.86	97	17.14	229	40.46
2012	574	478	83.28	96	16.72	228	39.72
Total	4124	3462	83.95	662	16.05	1601	38.82

Table 4  
Correlation matrix of the main variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) $\Delta Compensation_A$	1	0.154 <sup>***</sup>	0.055 <sup>***</sup>	0.180 <sup>**</sup>	0.042 <sup>**</sup>	-0.090 <sup>***</sup>	0.102 <sup>***</sup>	0.056 <sup>***</sup>	0.190 <sup>***</sup>
(2) $Performance_A$	0.103 <sup>***</sup>	1	0.178 <sup>***</sup>	0.389 <sup>***</sup>	0.081 <sup>***</sup>	-0.196 <sup>***</sup>	0.049 <sup>**</sup>	0.051 <sup>**</sup>	0.077 <sup>***</sup>
(3) $Performance_B$	0.047 <sup>**</sup>	0.276 <sup>***</sup>	1	0.090 <sup>***</sup>	0.411 <sup>***</sup>	0.215 <sup>***</sup>	0.148 <sup>***</sup>	0.071 <sup>***</sup>	0.107 <sup>***</sup>
(4) $\Delta Performance_A$	0.109 <sup>***</sup>	0.527 <sup>***</sup>	0.127 <sup>***</sup>	1	0.159 <sup>***</sup>	-0.516 <sup>***</sup>	0.050 <sup>**</sup>	0.147 <sup>***</sup>	0.126 <sup>***</sup>
(5) $\Delta Performance_B$	0.014	0.118 <sup>***</sup>	0.517 <sup>***</sup>	0.175 <sup>***</sup>	1	0.497 <sup>***</sup>	0.147 <sup>***</sup>	0.153 <sup>***</sup>	0.144 <sup>***</sup>
(6) $\Delta Performance_B$ (dummy)	-0.083 <sup>***</sup>	-0.214 <sup>***</sup>	0.208 <sup>***</sup>	-0.413 <sup>***</sup>	0.375 <sup>***</sup>	1	0.069 <sup>***</sup>	0.015	0.017
(7) $\Delta Compensation_B$	0.085 <sup>***</sup>	0.045 <sup>**</sup>	0.084 <sup>***</sup>	0.025	0.046 <sup>**</sup>	0.056 <sup>***</sup>	1	0.062 <sup>***</sup>	0.147 <sup>***</sup>
(8) $\Delta Performance_{Ind}$	-0.008	-0.030	-0.049 <sup>**</sup>	-0.010	-0.030	-0.021	-0.003	1	0.285 <sup>***</sup>
(9) $\Delta Compensation_{Ind}$	0.158 <sup>***</sup>	0.072 <sup>***</sup>	0.098 <sup>***</sup>	0.059 <sup>***</sup>	0.085 <sup>***</sup>	0.019	0.126 <sup>***</sup>	0.074 <sup>***</sup>	1

Note: The lower diagonal presents Pearson coefficients and the higher diagonal shows Spearman coefficients.

\* Indicate significance at the 10% level.

\*\*\* Indicate significance at the 1% level.

\*\* Indicate significance at the 5% level.

as high as 83% annually, which means that the majority of Chinese business groups are state-owned groups. Notably, about 40% of the business groups have only two listed subsidiaries.

Table 4 shows the correlation analysis of the main variables.  $\Delta Compensation_A$  is positively correlated with both  $Performance_A$  and  $Performance_B$ , the performance of all subsidiaries in the same group, which is influenced by internal capital markets. Thus, we generate a dummy variable  $\Delta Performance_B$  (dummy) that equals one when  $\Delta Performance_B$  is larger than  $\Delta Performance_A$  in the same business group, and zero otherwise.  $\Delta Performance_B$  (dummy) is negatively correlated with  $\Delta Compensation_A$ , suggesting that when firm A performs worse than firm B, firm A's executive compensation is lower, which supports our hypothesis H1.  $\Delta Compensation_B$  and  $\Delta Compensation_A$  are positively correlated, which shows that executive compensation amounts among different subsidiaries in the same group change in the same direction, indicating that compensation fairness is taken into consideration when determining executive compensation in Chinese business groups.

#### 4.2. Decision mechanism of executive compensation in business groups

We first investigate whether the executive compensation of one subsidiary is influenced by the performance of other subsidiaries in the same business group.

Table 5 presents the results.<sup>4</sup> In the first step, we run the regression with the subsample that only has two listed subsidiaries in the same business group (columns 1–2), which shows that the coefficient of  $\Delta Performance_B$  is negative but insignificant, and the coefficient of  $\Delta Performance_B$  (dummy) is significantly

<sup>4</sup> We only report the results using the Change Model. In an untabulated test, we run the regression using the Level Model and obtain the same results.

Table 5  
Regression of executive compensation on RPE in business groups using ROA.

Variables	$\Delta Compensation_A$ (change model)			
	Subsample with only two subsidiaries ( $N = 2$ )		All firms	
	(1)	(2)	(3)	(4)
$\Delta Performance_B$	-0.032 (-0.24)		-0.125 (-1.41)	
$\Delta Performance_B$ (dummy)		-0.044** (-2.39)		-0.040*** (-3.57)
$\Delta Performance_A$	0.617*** (3.52)	0.491*** (2.63)	0.769*** (7.09)	0.621*** (5.35)
$\Delta Performance_{Ind}$	-0.006 (-0.73)	-0.005 (-0.68)	-0.0003 (-0.07)	-0.0003 (-0.07)
$\Delta Compensation_B$	0.049** (2.07)	0.053** (2.23)	0.044*** (2.72)	0.047*** (2.89)
$\Delta Compensation_{Ind}$	0.326*** (3.65)	0.324*** (3.63)	0.234*** (3.95)	0.235*** (3.99)
Lagged Performance <sub>A</sub>	0.612*** (2.70)	0.618*** (2.74)	0.753*** (5.66)	0.750*** (5.64)
Lagged Compensation <sub>A</sub>	-0.197*** (-10.88)	-0.197*** (-10.94)	-0.197*** (-16.91)	-0.197*** (-16.91)
Size	0.062*** (6.25)	0.062*** (6.24)	0.051*** (9.10)	0.051*** (9.09)
Top 1	-0.033 (-0.59)	-0.031 (-0.56)	-0.080** (-2.33)	-0.078** (-2.27)
Lev	-0.002 (-0.03)	-0.001 (-0.02)	0.004 (0.12)	0.005 (0.14)
Independent	-0.174 (-1.06)	-0.172 (-1.04)	-0.0210 (-0.20)	-0.019 (-0.17)
MShare	1.018 (1.26)	0.983 (1.23)	-0.034 (-0.06)	-0.025 (-0.05)
Dual	0.026 (1.01)	0.024 (0.93)	0.023 (1.27)	0.022 (1.20)
Constant	1.461*** (5.83)	1.485*** (5.93)	1.725*** (11.29)	1.738*** (11.43)
Location	Control	Control	Control	Control
Year	Control	Control	Control	Control
Industry	Control	Control	Control	Control
Observations	1601	1601	4124	4124
Adjusted R-squared	0.160	0.163	0.154	0.156
F	6.454	6.698	14.71	15.28

Notes: The regression results follow the cluster method (by company) and we report robust  $t$  values.

Columns 1 and 2 are the results using the subsample of business groups with only two listed subsidiaries, and columns 3 and 4 are the results using the whole sample of business groups. The variables are defined in Table 1.

\* Represent significance at the 10% levels (two-tailed).

\*\* Represent significance at the 5% level (two-tailed).

\*\*\* Represent significance at the 1% level (two-tailed).

negative at the 5% level. We then run the regression using all of the observations, and the results (columns 3–4) are the same. These results show that when firm *A* performs worse than another firm *B* in the same group, the change in executive compensation of firm *A* is significantly lower. Thus the RPE mechanism exists in the executive compensation of business groups, which supports hypothesis H1.

For the control variables, the coefficient of  $\Delta Performance_{Ind}$  is negative but insignificant. This result shows that executive compensation in business groups rarely depends on the performance of the industry. The result is similar to that of Li et al. (2013), who find that very few companies choose industry performance to evaluate the performance of their executives in China. The coefficient of  $\Delta Compensation_B$  is significantly positive, which shows that the executive compensation of other subsidiaries in the same group is chosen as the compensation peer group. Similar to Bizjak et al. (2008, 2011), the coefficient of  $\Delta Compensation_{Ind}$  is significantly positive. This result shows that, for executive compensation, business groups also use industry compensation peer groups as a benchmark.

#### 4.3. Moderating effect of ownership type

Panel A of Table 6 presents the results when the sample is divided based on the ownership type of the business groups. In columns 1 and 2, the coefficient of  $\Delta Performance_B$  is positive in the subsample of SOBGs but significantly negative in the subsample of non-SOBGs. In columns 3 and 4, the coefficient of  $\Delta Performance_B$  (dummy) is negative in SOBGs and non-SOBGs, but the value of non-SOBGs is significantly larger than that of SOBGs. Therefore, hypothesis H2 is supported. In non-SOBGs, subsidiaries are more likely to adopt the RPE mechanism for executive compensation. Besides, the coefficient of  $\Delta Compensation_B$  is significantly positive only in SOBGs, showing that pay fairness is emphasized more in the determination of executive compensation in state-owned firms. That is, SOBGs are more likely to use other subsidiaries' compensation as their benchmark in determining executive compensation.

#### 4.4. Moderating effect of the level of marketization

Next, we test the moderating effect of the level of marketization. Following the literature (Fan et al., 2011), we use the National Economic Research Institute (NERI) Index as a proxy for China's marketization. The Index is comprised of several dimensions, namely the relationship between the government and the market, the development of the non-state sector, the development of factor markets, the development of product markets, and the development of market intermediaries and the legal environment. The NERI Index has been developed by Fan and Wang since 2001 to reflect conditions in the 30 provinces of China (excluding Tibet). The NERI Index captures the process of institutional transition in the provinces. We divide the sample based on the median value of marketization and run the basic regression accordingly. The results are reported in Panel B of Table 6.

We can see that the coefficients of  $\Delta Performance_B$  and  $\Delta Performance_B$  (dummy) are both significantly negative only with a higher level of marketization, which means that group companies are more likely to use the RPE mechanism only when the market economy is highly developed. Moreover, the coefficient of  $\Delta Compensation_B$  is significantly positive only when the degree of marketization is high, meaning that the executive compensation of one subsidiary is more likely to use other subsidiaries' compensation as their benchmark with more developed marketization. When a company is faced with intense market competition, it is very important for the company to retain its talent, which requires the company to ensure that executives feel they have been fairly paid.

#### 4.5. Robustness tests

We perform the following robustness tests to make sure our results are robust and convincing.

##### 4.5.1. Influence of earnings management

According to Schipper (1989), managers have the motivation to pursue their own benefits through earnings management. The problem is more severe in transition economies with insider control problems and in

Table 6  
Moderating effects of ownership type and level of marketization.

Variables	$\Delta Compensation_A$ (all firms)							
	Panel A: Ownership type				Panel B: Level of marketization			
	SOBGs	Non-SOBGs	SOBGs	Non-SOBGs	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta Performance_B$	0.026 (0.25)	-0.395** (-2.39)			-0.172* (-1.69)	0.069 (0.39)		
$\Delta Performance_B$ (dummy)			-0.024** (-1.99)	-0.113*** (-3.72)			-0.044*** (-3.52)	-0.026 (-1.04)
$\Delta Performance_A$	0.867*** (6.99)	0.583** (2.55)	0.785*** (5.88)	0.177 (0.73)	0.738*** (6.12)	0.895*** (3.49)	0.561*** (4.37)	0.815*** (2.98)
$\Delta Performance_{Ind}$	0.002 (0.41)	-0.012 (-0.82)	0.002 (0.36)	-0.014 (-0.99)	0.001 (0.09)	0.008 (0.29)	0.001 (0.11)	0.007 (0.25)
$\Delta Compensation_B$	0.039** (2.08)	0.042 (1.18)	0.042** (2.23)	0.048 (1.33)	0.062*** (3.37)	-0.005 (-0.12)	0.064*** (3.51)	-0.002 (-0.05)
$\Delta Compensation_{Ind}$	0.197*** (2.96)	0.370*** (2.68)	0.198*** (2.98)	0.386*** (2.88)	0.252*** (3.69)	0.172 (1.38)	0.252*** (3.71)	0.180 (1.46)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
P-value for difference on $\Delta Performance_B$	0.028		0.005		0.231		0.504	
Observations	3462		662		3162		962	
Adjusted R-squared	0.157	0.143	0.158	0.155	0.154	0.156	0.156	0.156
F	12.83	3.291	13.06	3.786	11.27	4.59	11.74	4.69

Notes: The regression results follow the cluster method (by company) and we report robust  $t$  values.

Panel A presents the results divided into SOBGs and non-SOBGs, and Panel B presents the results based on the level of marketization.

\* Represent significance at the 10% level (two-tailed).

\*\* Represent significance at the 5% level (two-tailed).

\*\*\* Represent significance at the 1% level (two-tailed).

countries with poor protection of property rights (Leuz et al., 2003). In China, due to poor legal protection (Allena et al., 2005; Jiang et al., 2010), the phenomenon of earnings management is very serious and earnings quality is quite low (Wang and Wu, 2011; Fung et al., 2013). To control for the influence of earnings management, we follow Firth et al. (2006) in using return on sales (ROS) to measure accounting performance. Because operating income and sales are less susceptible to manipulation than net profit and total assets, respectively, ROS is a cleaner measure of accounting performance.

Table 7 presents the results when performance is measured by ROS. In the full sample regression, the coefficient of  $\Delta Performance_B$  (dummy) is significantly negative, supporting hypothesis H1 that the RPE mechanism exists in business groups. The moderating effects of ownership type and the level of marketization are also the same as before.

#### 4.5.2. Market performance

Generally, the evaluation measures of performance in executive compensation contracts use both accounting performance and market performance. In this section, we use the annual stock return adjusted by the market return (RET) to measure market performance. RET is defined as  $(\prod_{t=1}^{12} (1 + R_{it}) - \prod_{t=1}^{12} (1 + R_{mt}))$ , where  $R_{it}$  is the monthly stock return after considering cash dividend reinvestments, and  $R_{mt}$  is the monthly market stock return. The period runs from January to December every year.

Table 8 presents the results. The coefficient of  $\Delta Performance_B$  and  $\Delta Performance_B$  (dummy) are both negative but insignificant, and the results of the subgroup regressions have no significant differences (unreported). Li et al. (2013) conduct a survey of executive compensation contracts in China's listed companies and find that accounting earnings are typically used in executive compensation contracts, with few firms using stock returns

Table 7  
Regression of executive compensation on RPE in business groups using ROS.

Dependent Var. <i>Change in Compensation<sub>A</sub></i>	Independent Vars.					
	$\Delta Performance_B$			$\Delta Performance_B$ (dummy)		
	Coefficient	<i>t</i> -Stat.	<i>R</i> <sup>2</sup> (%)	Coefficient	<i>t</i> -Stat.	<i>R</i> <sup>2</sup> (%)
Panel A: All Firms	0.018	0.52	14.9	-0.025**	-2.29	15.0
Panel B: Subsample divided by ownership type						
SOBGs	0.068*	1.74	15.0	-0.012	-1.06	15.0
Non-SOBGs	-0.085	-1.23	14.1	-0.084***	-2.83	15.0
P-value for difference		0.049			0.022	
Panel C: Subsample divided by the level of marketization						
High level	-0.006	-0.16	14.7	-0.032***	-2.67	14.9
Low level	0.139	1.41	15.9	0.001	0.05	15.6
P-value for difference		0.160			0.219	

Notes: The regression results follow the cluster method (by company) and we report robust *t* values.

The results present executive compensation on RPE in business groups using the ROS performance measure, and we only report the coefficients of  $\Delta Performance_B$  and  $\Delta Performance_B$  (dummy) in the table. The variables are defined in Table 1.

\* Represent significance at the 10% level (two-tailed).

\*\* Represent significance at the 5% level (two-tailed).

\*\*\* Represent significance at the 1% level (two-tailed).

Table 8  
Regression of executive compensation on RPE in business groups using RET.

	$\Delta Compensation_A$			
	Subsample with <i>N</i> = 2		All firms	
	(1)	(2)	(3)	(4)
$\Delta Performance_B$	0.002 (0.18)		-0.015* (-1.82)	
$\Delta Performance_B$ (dummy)		-0.012 (-0.61)		-0.017 (-1.36)
$\Delta Performance_A$	0.005 (0.29)	0.002 (0.10)	0.033*** (2.98)	0.024** (2.08)
$\Delta Performance_{Ind}$	0.011 (0.27)	0.012 (0.30)	0.009 (0.36)	0.006 (0.24)
$\Delta Compensation_B$	0.049** (2.08)	0.048** (2.04)	0.042** (2.56)	0.043*** (2.59)
$\Delta Compensation_{Ind}$	0.316*** (3.42)	0.314*** (3.40)	0.226*** (3.74)	0.225*** (3.72)
Other variables	Control	Control	Control	Control
Observations	1542	1542	3976	3976
Adjusted R-squared	0.154	0.155	0.147	0.147
F	6.089	6.112	13.65	13.55

Notes: The regression results follow the cluster method (by company), and we report robust *t* values.

The results present the regression of executive compensation on RPE in business groups using market performance RET, and we only report the coefficients of the main independent variables in the table. The variables are defined in Table 1.

\* Represent significance at the 10% level (two-tailed).

\*\* Represent significance at the 5% level (two-tailed).

\*\*\* Represent significance at the 1% level (two-tailed).

Table 9  
Regression of executive compensation on RPE in business groups using an alternative compensation measure.

	$\Delta Compensation_A$ (alternative measure of compensation)			
	Subsample with $N = 2$		All firms	
	(1)	(2)	(3)	(4)
$\Delta Performance_B$	-0.195 (-1.20)		-0.197* (-1.75)	
$\Delta Performance_B$ (dummy)		-0.040 (-1.57)		-0.037** (-2.31)
$\Delta Performance_A$	0.366** (1.99)	0.211 (1.08)	0.521*** (4.16)	0.375*** (2.74)
$\Delta Performance_{Ind}$	0.001 (0.07)	0.001 (0.08)	0.001 (0.13)	0.001 (0.14)
$\Delta Compensation_B$	0.065** (2.45)	0.065** (2.44)	0.041** (2.30)	0.041** (2.32)
$\Delta Compensation_{Ind}$	0.291** (2.10)	0.289** (2.08)	0.340*** (3.81)	0.340*** (3.82)
Other variables	Control	Control	Control	Control
Observations	1448	1448	3772	3772
Adjusted R-squared	0.154	0.155	0.161	0.161
F	6.403	6.424	16.07	16.17

Notes: The regression results follow the cluster method (by company), and we report robust  $t$  values.

The results present executive compensation on RPE in business groups using an alternative measure of executive compensation, and we only report the coefficients of the main independent variables in the table. The variables are defined in Table 1.

\* Represent significance at the 10% level (two-tailed).

\*\* Represent significance at the 5% level (two-tailed).

\*\*\* Represent significance at the 1% level (two-tailed).

to evaluate their executives. Therefore, our findings are the same as those of Li et al. (2013). The Chinese capital market has not been developing for long, so the efficiency of the market may not be as great as in the markets of developed countries, which may also explain our findings.

#### 4.5.3. Alternative measure of executive compensation

In China, executives include both top managers and directors. We use the logarithm of the sum of the compensation of the top three directors to measure executive compensation, and get the same results as before (see Table 9).

#### 4.5.4. Influence of intra-group transactions

The literature identifies tunneling behavior by controlling shareholders in business groups (Bae et al., 2002; Bertrand et al., 2002). Because of the poor legal system and the existing dominant shareholders in companies, China is an environment that is highly conducive to tunneling behavior (Jiang et al., 2010). Intra-group transactions will affect the performance of subsidiaries and executive compensation, so it is necessary to control for this factor. Following Jiang et al. (2010), we use the other receivables from parent companies or their affiliated companies to measure controlling shareholders' tunneling behavior, and the results (unreported) remain unchanged.

## 5. Conclusion

It is important to investigate how executive compensation in different subsidiaries is determined in business groups. Using unique data on business groups in China from 2003 to 2012, we shed light on the decision mechanism of executive compensation in business groups. Our results show that the RPE mechanism exists in

executive compensation in business groups. Specifically, when one subsidiary performs worse than other subsidiaries in the same business group, executive compensation is significantly lower in that subsidiary than in others. In addition, we find that the ownership type of business groups and the level of marketization play an important role in determining executive compensation in the groups. When the business groups are non-SOBGs and the level of marketization under which the group operates is high, business groups are more likely to adopt the RPE mechanism in executive compensation. Our research enriches the literature on executive compensation and addresses the gap in the literature on business groups.

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