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RESEARCH ARTICLE

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Determinants of related-party transactions: Evidence from China's listed companies during 2002–2006

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Abstract This study attempts to shed light on the relationship between related-party (RP) transactions and internal governance factors of China's listed companies. An analysis of a sample of 69 049 RP transactions during 2002–2006 reveals strong evidence that the likelihood of RP transactions is higher for companies with high concentration of ownership, but lower for companies with strong bargaining power of the second and third largest shareholders. There is also clear evidence showing that large compensation for outside directors is associated with greater size of RP transactions, whereas increased average compensation for the three top executives tends to decrease the number of RP transactions. Our results also reveal that the pluralism arraignment, i.e. the same person holding both positions of the board chairman and the chief executive, increases the size of RP transactions significantly. This finding suggests that pluralism reduces the balance of power in corporate governance.

Keywords related-party transactions, ownership structure, corporate governance, investor protection

摘要 为了研究我国上市公司内部治理因素对其关联交易的影响，基于 2002–2006

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年期间国内上市公司披露的 69 049 笔重大关联交易的样本，回归分析发现：上市公司股权越集中，关联交易规模就越大；独立董事津贴与关联交易规模呈现正相关关系，表明独立董事津贴的增加会导致其对关联交易监督作用的减弱；第二与第三大股东制衡力量的存在可以有效地减少关联交易；上市公司关联交易规模与高级管理人员现金薪酬成反相关关系；当董事长兼任总经理时，关联交易规模会显著增大，反映了公司经营权力的高度集中容易导致内部控制机制的失效。

关键词 关联交易，股权结构，治理结构，投资者保护

1 Introduction

The number of related-party (RP) transactions has been increasing in China's listed companies in recent years. During 2002–2006, nearly 90 percent of Chinese listed companies disclosed RP transactions in their annual financial reports. In well-known cases like the Delong Company and Nongkai scandal, the controlling shareholders expropriated wealth from minority shareholders through a large number of RP transactions. Public attention and small investors' uproar have made RP transactions a pressing issue in corporate governance in China.

RP transactions are not unique to China. Self-dealing activities of controlling shareholders for the expropriation purpose are observed around the world, and widely discussed in the literature (Shleifer and Vishny, 1997; La Porta et al., 2000; Bertrand et al., 2002; Brockman et al., 2003; Cheung et al., 2006). The term "tunneling" is used to denote the diversion of resources between companies at the expense of minority shareholders (Johnson et al., 2000). As happened in other countries, RP transactions take a variety of forms in China. Inputs and outputs are bought or sold at non-market prices. Loans are obtained at preferential terms. Assets are transferred between companies in favor of the controlling shareholders. The incentive to expropriate minority shareholders appears to be universal for controlling shareholders. A controlling shareholder who holds x% of the company's stock is not content with only x% of total company value, but wants to have x% of total company value plus private benefits extractable from the company. That is, x% (total company value – extractable private benefits) + extractable private benefits. In contrast, a minority shareholder with y% of the company's stock does not get y% of total company value, but only y% of total company value minus private benefit extractable by the controlling shareholder(s). How much private benefits can be extracted by the controlling shareholders depends on the corporate governance structure.

What is different in China lies in that most Chinese listed companies are transformed from subsidiaries of large state-owned enterprises (SOEs). Since

China's stock exchanges require profitability in the latest three-year period before IPOs, companies that go public are often parts of giant SOE groups or state holding companies, and have been face-lifted to show good financial performance. Thus, large shareholdings, and especially majority ownership, are the norm, rather than the exceptions in China. The inseparable ties of interlocking ownership and historical links make it convenient for the listed companies and their parents or connected companies to conduct RP transactions. Given such an ownership pattern, the controlling shareholders are inherited with great power to shape corporate policy and make business decisions for the listed companies. According to empirical studies by Rao (2007) and Zhang et al. (2007), a large part of RP transactions with the listed companies in China are unfairly made at non-market prices, and thus there are significant tunneling activities of China's listed companies through unfair related-party transactions.

The prevalence of RP transactions in China's listed companies is partly attributable to the legal and regulatory environments for Chinese stock markets. Unlike western countries such as the U.S., Britain and Germany, China does not have enforceable laws against self-dealing of controlling shareholders. Besides, the trading restrictions placed on certain stocks also induce controlling shareholders to divert resources from the listed companies. A typical listed company in China has two classes of share outstanding: floating and non-floating shares. Floating shares are tradable on stock exchanges. Non-floating shares, in the forms of state shares and restricted institutional shares, can only be transferred privately or through irregularly scheduled auctions. Both floating and non-floating shares offer their holders the same cash flow and voting rights per share. The controlling shareholder of a listed company normally has a large stake in non-floating shares. However, the non-floating shares of listed companies are priced at a significant discount to the floating shares of the same companies (Chen and Xiong, 2001). Since the market price of floating shares reflects the value for minority shareholders, the controlling shareholder with non-floating shares is enticed to reap private benefits at the expense of minority shareholders. Indeed, for a long time, the controlling shareholders might be more concerned with the expropriation than the market price of the floating shares. Fortunately, things began to change in the last two years. China's Securities Regulatory Commission (CSRC) has adopted a reform policy to convert non-floating shares into floating shares gradually. Such a conversion has been underway, and it is expected to complete in the next few years. Therefore, from now on, the trading restrictions on stocks will function less as a driving force for the expropriation of controlling shareholders in China.

This paper focuses on an empirical analysis of the relationship between RP transactions and internal factors underlying the corporate governance structure of China's listed companies. We examine a large sample of 69 049 transactions

between China's listed companies and their related-parties during 2002–2006. The multiple linear regression method is used to examine the impacts of the following factors on RP transactions: the concentration of ownership, the bargaining power among large shareholders, the pluralism of the board chairman and chief executive, the average compensation of three top executives, and the average compensation of outside directors.

The reminder of this paper proceeds as follows: Section 2 reviews the literature on tunneling activities and the determinants of RP transactions to formulate testable hypotheses. Section 3 discusses the sample and descriptive statistics. In Section 4, empirical results are presented and analyzed. Section 5 provides a summary of the findings and concluding remarks.

2 Literature review and hypotheses

The principal-agency problem is an essential one in corporate governance. For companies with dispersed ownership, it is concerned with how to align the interest of managers with that of shareholders, or how to make professional managers accountable to shareholders. In contrast, for companies with concentrated ownership structure, the focal question is how to resolve the conflict of interests between minority shareholders and the controlling shareholders. As Shleifer and Vishny (1997) point out, "although large investors can be very effective in solving the agency problem, they may also inefficiently redistribute wealth from other investors to themselves." The cost of concentrated ownership is that large investors can enrich themselves at the expense of other investors by abusing their control rights. The more concentrated the ownership structure, the more power the controlling shareholders will have to expropriate the minority shareholders (La Porta et al., 1999). Given the incentive and opportunity for expropriation, large shareholders are more likely to make RP transactions at the expense of minority shareholders. Since China's stock market is dominated by companies with concentrated ownership, it is appropriate to test the following hypothesis:

H1 The size of RP transactions are positively correlated with the concentration of ownership.

In the presence of several significant shareholders in a listed company, these owners usually have different stakes in RP transactions. What is best for the largest shareholder may not be best for the second or the third largest shareholder. The private benefits from expropriation may not be divided equally or fairly. The

one that receives less benefit from RP transactions would take steps to combat. Thus, the balance of power in the firm may reduce RP transactions. In other words, "control dilution is a mechanism to reduce diversion" (Bennedsen et al., 2000). Based on an empirical study of RP transactions for China's listed companies during 1998–2002, Chen and Wang (2005) find that there are more checks and balances among the controlling shareholders as the number of investors with over 10% of share in the firm increases. Consequently, the frequency and the size of RP transactions would decrease. Gao and Song (2007) also report similar findings. However, other studies (Zhu and Wang, 2004; Shao 2003) document different evidence where there is little restrictive effect of balanced ownership structure on RP transactions. Does the balance of power reduce RP transactions? It has important implications for corporate governance. We want to use more recent data to investigate it. In China, the listed companies with more than three controlling shareholders are relatively few. In fact, they account for less than 3% of all listed companies. Most listed companies have three or fewer controlling shareholders. Since the second and the third largest shareholders are the main forces for the checks and balances in the firm, their bargaining power depends on their stake in the shareholdings relative to that of the largest shareholder. Therefore, we propose the second hypothesis.

H2 The size of RP transactions is negatively correlated with the increased portion of the stock held by the second and third largest shareholders relative to that of the largest shareholder.

Aiming at supervising the public companies and protecting the investors, the outside director system has been introduced for China's listed companies. In 2001, CSRC promulgated a new rule, requiring 1/3 of the board members for a listed company to be outside directors. It also stipulates that the outside directors have the duty to supervise and monitor RP transactions of the public companies. Although the CSRC's rules are well-intended, the effectiveness of outside directors is controversial. In western countries like the U.S., the markets for the service of outside directors are well-developed. Outside directors have incentives to build reputations as experts in decision control. When internal decision control breaks down, the reputation of the outside directors involved will be damaged, which in turn devaluates their human capital (Fama and Jensen, 1983). Such a market serves as a source of both motivation and discipline for outside directors. But such a market mechanism does not appear to be working in China yet. China's stock markets are only 18 years old. The market for outside directors' services is so underdeveloped that the mechanism for directorship is lacking. The primary incentive for outside directors is the direct compensation from the

companies. It can be conjectured that the controlling shareholders may use the compensation as a means of buying off outside directors in order to expropriate small shareholders through RP transactions. Thus we propose the third hypothesis.

H3 The size of RP transactions is correlated with the average compensation of the outside directors.

The compensation of senior executives is an important factor for corporate governance. According to the incentive contract theory, RP transactions can be part of compensation scheme for managers. The firm that is engaged in RP transactions provides lower cash compensations because the managers receive the benefits of RP transactions (Holmstrom, 1979; Holmstrom and Milgrom, 1994). Alternatively, managers regard the benefits of RP transactions as a supplement to their relatively lower direct compensation, and thus they are motivated to make RP transactions (Murphy, 1999). As a mater of fact, direct cash compensations are indeed low for executives of the listed companies in China. They do find ways of making up. RP transactions are feasible vehicles to provide them the subsidy as an offset for the low direct compensation. Thus, the number of RP transactions is expected to increase when senior executives receive lower direct compensation from their company. Drawing on the above reasoning, we propose the following hypothesis.

H4 The number of RP transactions is positively correlated with the average compensation of three top executives.

According to recent studies, large shareholders demonstrate a strong propensity to maintain complete control over the listed companies in China (Pu and Liu, 2004; Gao and Song, 2007). Generally speaking, there are three levels of corporate control: shareholders' meeting, board chairman and management. In a company with concentrated ownership, the large shareholders have the majority voting rights in the shareholders' meeting, and get the rights to appoint the board members and board chairman. In effect, they have the control rights on the top two levels: the shareholders' meeting and board chairman. If the board chairman holds the position of the chief executive, the large shareholders extend their control over the management. Such concentration of decision-making power in corporate business will cause a breakdown in checks and balance of corporate governance structure. Given the failure of internal decision control, the large shareholders have a free hand to engage in RP transactions, and thus the size of RP transactions can be increased to

expropriate the minority shareholders effectively. This suggests the following hypothesis.

H5 When the same person holds both positions of the board chairman and the chief executive, the size of RP transactions is larger.

3 Data and descriptive statistics

We have collected a large sample of 69 049 RP transactions between China's listed companies and their connected-parties during 2002–2006. These data are obtained from the annual financial reports of Chinese listed companies gathered by China Center for Economic Research (http://www.ccerdata.com). Detailed descriptions of these RP transactions are also found and examined. This paper intends to make a more comprehensive analysis by using a larger sample and newer data, as compared to the recent studies on the RP transactions of China's listed companies such as Yu and Xia (2004), Chen and Wang (2005), Luo and Tang (2006), Gao and Song (2007) and Rao and He (2007).

It is proper to start with a descriptive statistics analysis of the RP transactions in China's listed companies during 2002–2006. This builds a base for us to understand the present status of the RP transactions in China, and to have a clear perspective for further investigation of their determinants.

Table 1 reports the general descriptive statistics of RP transactions in China's listed companies. In total, there are 69 049 RP transactions, amounting to over RMB 8 950 billion during 2002–2006. And the annual RP transactions had been increasing rapidly. RP transactions in 2002 alone were worth RMB 557 billion, and then it grew year by year, reaching RMB 3 380 billion in 2006, which was more than five times as much as that of 2002.

Table 1 General situation of RP transactions (RPT) in China

	2002	2003	2004	2005	2006
Number of Chinese listed companies	1 124	1 287	1 377	1 381	1 434
Firms with RPT	1 042	1 150	1 276	1 244	1 396
Proportion of firms with RPT	92.70%	89.36%	92.67%	90.08%	97.35%
Total amount of RPT (Million Yuan)	557 000	870 000	2 070 000	2 070 000	3 380 000
Average size of RPT per firm (Million Yuan)	535	757	1 620	1 660	2 420

Now, we classify our samples of the RP transactions into different types of transactions, as summarized in Table 2.

Table 2 Type of RP transactions

Type of RP transactions	Description
Goods Trading	Transactions that involve the trade of goods between the listed company and its related parties. They can be purchases by the listed company or sales or both
Assets Trading	Transactions that involve the acquisition or sale of assets between listed company and its related parties
Services Trading	Transactions that involve the trade of services between the listed company and its related parties. They can be purchases by the listed company or sales or both
Agent	Transactions that involve the agent of goods and services between the listed company and its related parties
Lease	Transactions that involve the lease of goods and assets between the listed company and its related parties
Cash payments and receipts	Transactions that involve the direct cash payments or receipts between the listed company and its related parties. Or cash guarantees between them
Assurance and mortgage	Transactions that involve the assurance and mortgage between the listed company and its related parties
Management contract	Transactions that involve the management contract between the listed company and its related parties
Research and development transaction	Transactions that involve the transfer of research and development project between the listed company and its related parties
Permit agreement	Transactions that involve the permit agreement between the listed company and its related parties
Joint venture	Transactions that involve the investment together with other related parties, and the listed company being a party to a joint venture
Others	Other transactions that is required to disclose in the annual financial report

Table 3 and 4 report descriptive statistics on the RP transactions classified by the transaction type defined in Table 2. Goods trading transactions account for the most of RP transaction, nearly 37 percent of total RP transactions during 2002–2006. Assurance and mortgage is the second most important transaction type which had been growing very rapidly during 2002–2006. The proportion of assurance and mortgage transactions increased from less than 25 percent to nearly 50 percent.

Table 3 RP transactions by transaction types (2002–2004)

	2002	2003	2004
No. of listed companies in China	1 124	1 287	1 377
No. of listed companies with RP transactions	1 042	1 150	1 276

(*To be continued*)

(*Continued*)

	2002		2003		2004	
Proportion of firms with RP transactions	92.70%		89.36%		92.67%	
No. of RP transactions	9 562		12 090		12 243	
RP transaction type	Size (Million Yuan)	Proportion	Size (Million Yuan)	Proportion	Size (Million Yuan)	Proportion
Assets Trading	51 400	9.23%	48 200	5.54%	31 500	1.52%
Services Trading	30 800	5.53%	60 400	6.95%	41 500	2.00%
Agent	1 330	0.24%	5 190	0.60%	3 930	0.19%
Lease	2 540	0.46%	985	0.11%	1 620	0.08%
Cash payments and receipts	12 100	2.18%	28 100	3.24%	20 200	0.98%
Assurance and mortgage	135 000	24.29%	173 000	19.91%	1380 000	66.53%
Management contract	100	0.02%	535	0.06%	1	0.00%
R&D transac tions	1 130	0.20%	64	0.01%	397	0.02%
Permit agreement	389	0.07%	496	0.06%	515	0.02%
Joint venture	3 900	0.70%	8 530	0.98%	7 100	0.34%
Others	12 800	2.31%	3 960	0.46%	5 380	0.26%
Annual size	557 000		870 000		2 070 000	
Average size per firm	535		757		1 620	

Table 4 RP transactions by transaction types (2005–2006)

	2005		2006			
No. of listed companies in China	1 381		1 434			
No. of listed companies with RP transactions	1 244		1 396		Total during 2002–2006	
Proportion of firms with RP transactions	90.08%		97.35%			
No. of RP transactions	15 192		19 962			
RP transaction type	Size (Million Yuan)	Proportion	Size (Million Yuan)	Proportion	Size (Million Yuan)	Proportion
Goods trading	581 000	28.06%	1 270 000	37.75%	3 280 000	36.69%
Assets trading	31 500	1.52%	54 900	1.63%	218 000	2.43%
Services trading	41 500	2.00%	113 000	3.36%	288 000	3.21%
Agent	3 930	0.19%	1 790	0.05%	16 200	0.18%
Lease	1 620	0.08%	1 870	0.06%	8 650	0.10%
Cash payments and receipts	20 200	0.98%	218 000	6.45%	298 000	3.34%

(*To be continued*)

(*Continued*)

RP transaction type	Size (Million Yuan)	Proportion	Size (Million Yuan)	Proportion	Size (Million Yuan)	Proportion
Assurance and mortgage	1 380 00	66.53%	1 680 000	49.64%	4 740 000	53.00%
Management contract	1	0.00%	921	0.03%	1 560	0.02%
R&D transactions	397	0.02%	46	0.00%	2 030	0.02%
Permit agreement	515	0.02%	800	0.02%	2 710	0.03%
Joint venture	7 100	0.34%	3 470	0.10%	30 100	0.34%
Others	5 380	0.26%	30 400	0.89%	58 000	0.65%
Annual size	2 070 000		3 380 000		8 950 000	
Average size per firm	1 660		2 420			

Table 5 reports the distribution of ownership structure in our sample. The average equity stake held by the largest shareholder is rather high, 43% in 2002, 42.5% in 2003, 41.7% in 2004, 25.9% in 2005, and 36.1% in 2006. Although the average equity stake held by the second and the third largest shareholders is relatively low, there are many second and third largest shareholders who hold 10% or more of the companies' stocks. Table 6 shows the number of companies that have one to three controlling shareholders who hold 10% or more equity stake of the company. It can be seen that most of the Chinese listed companies have fewer than three controlling shareholders, 61.61 percent with only one controlling shareholder, 29.4 percent with two controlling shareholders, and 5.93 percent with three controlling shareholders. It is obvious that the ownership structure of the Chinese listed companies is highly concentrated.

Table 5 Distribution of ownership structure

	Year	Distribution of equity stake				Sample size	Equity stake (%)	
		0–10%	10%–30%	30%–50%	>50%		Average	Median
First largest shareholder	2002	9	359	361	473	1 202	0.430	0.430
	2003	9	413	374	466	1 262	0.425	0.413
	2004	10	465	409	466	1 350	0.417	0.397
	2005	9	491	417	432	1 349	0.259	0.376
	2006	20	586	517	299	1 422	0.361	0.333
Second largest shareholder	2002	784	396	22	0	1 202	0.090	0.060
	2003	784	456	22	0	1 262	0.090	0.066
	2004	792	534	24	0	1 350	0.098	0.075
	2005	794	532	23	0	1 349	0.045	0.073
	2006	879	522	21	0	1 422	0.092	0.067

(*To be continued*)

(*Continued*)

	Year	Distribution of equity stake				Sample size	Equity stake (%)	
		0–10%	10%–30%	30%–50%	>50%		Average	Median
Third largest shareholder	2002	1 113	89	0	0	1 202	0.030	0.020
	2003	1 158	104	0	0	1 262	0.037	0.021
	2004	1 218	132	0	0	1 350	0.039	0.024
	2005	1 222	127	0	0	1 349	0.150	0.025
	2006	1 317	105	0	0	1 422	0.037	0.026

Table 6 Number of companies with controlling shareholders holding 10 percent or more equity stake

No. of controlling shareholders	0	1	2	3	>4
Sample	72	3 845	1 835	370	120
Proportion (%)	1.15	61.61	29.4	5.93	1.92

4 Regression results and analysis

This section reports evidence on how RP transactions are related to key factors underlying internal governance structures of China's listed companies.

We choose the multiple linear regression method for our analysis. Table 7 gives the definition of variables used in our regression model.

Table 7 Definition of variables

	Variable	Denotation	Definition
Dependent variable	Total Size of RP transactions	*RPT_total*	Natural Logarithmic Function of the size of annual RP transactions (Yuan)
Independent variable	**Variables of ownership structure:**		
	Level of Concentration	*Herfindahl_3*	The sum of the square of the share percentage held by the three largest share-holders
	Bargaining power between large share-holders	*Pro_holder_2_3*	The proportion of the sum of the stock held by the second and third largest share-holders to the share percentage held by the largest share-holder
	Variables of governance structure:		
	Pluralism of the position of the board chairman and the chief executive	*D*	A dummy variable, if a same person held both positions of the board chairman and chief executive, D equals to 1; else, D equals to 0

(*To be continued*)

(*Continued*)

	Variable	Denotation	Definition
	Compensation of the outside directors	*Comp_D*	Average compensation of the outside directors
	Compensation of top executives	*Comp_M*	Natural Logarithmic Function of the sum of the compensation of the three top executives
	Controlling variables:		
Independent variable	Size of the company	*Asset*	Natural Logarithmic Function of the total assets in the end of the year(yuan)
	Operation risk of the company	*Debt*	Asset-liability ratio reported in the annual financial report
	Industry	*Industry*	A dummy variable, 1 stands for financial industry while 0 for other industry

Our model is formulated as follows:

$$RPT_total = \alpha_0 + \alpha_1 Herfindahl_3 + \alpha_2 Pro_Holder_2_3 + \alpha_3 D + \alpha_4 Comp_M + \alpha_5 Comp_D + \alpha_6 Asset + \alpha_7 Debt + \alpha_8 Industry$$

Table 8 reports mean value and standard deviation on our sample data from 2002 to 2006. Mean value of *Herfindahl_3* is decreasing (0.249 7 in 2002, 0.241 7 in 2003, 0.227 8 in 2004, 0.215 6 in 2005, and 0.171 7 in 2006), showing that the equity stake of the first largest shareholders dwindles. In contrast, mean value of *Pro_holder_2_3* is increasing (0.373 1 in 2002, 0.410 5 in 2003, 0.448 5 in 2004, 0.454 4 in 2005, and 0.462 1 in 2006), indicating that the relative equity stake of the second and third to the first largest shareholder grows, and thus the bargaining power of the second and third largest shareholder is getting stronger.

Table 8 Annual statistics of main independent variables

		RPT_total	*Herfindahl_3*	*Pro_holder_2_3*	*D*	*Comp_M*	*Comp_D*	*Asset*	*Debt*
2002	Mean	18.6325	0.2497	0.3731	0.2460	11.4183	15 100	21.0775	0.4826
	Std. Dev.	1.9239	0.1489	0.4259	0.4309	0.8426	10 020	0.8492	0.3864
2003	Mean	18.6824	0.2417	0.4105	0.2443	11.6928	12 000	21.1798	0.4861
	Std. Dev.	1.9683	0.1458	0.4442	0.4299	0.8081	7 657	0.9075	0.2708
2004	Mean	18.5805	0.2278	0.4485	0.2469	11.8512	12 400	21.1906	0.5478
	Std. Dev.	2.1579	0.1419	0.4527	0.4314	0.8033	7 726	0.9658	0.6797

(*To be continued*)

(*Continued*)

		RPT_total	*Herfindahl_3*	*Pro_holder_2_3*	*D*	*Comp_M*	*Comp_D*	*Asset*	*Debt*
2005	Mean	18.7834	0.2156	0.4544	0.2383	11.5376	12 100	21.2676	0.5529
	Std. Dev.	2.1777	0.1330	0.4429	0.4262	0.9104	6 563	0.9811	0.4905
2006	Mean	19.0407	0.1717	0.4621	0.1633	11.8019	122 000	21.2932	0.6155
	Std. Dev.	2.1593	0.1174	0.4294	0.3698	0.9407	3010 000	1.0647	1.6339

Table 9 reports basic descriptive statistics and Pearson correlations of the main independent variables.

Table 9 Basic statistics and Pearson correlations of independent variables

	Mean	Std. Dev.	1	2	3	4	5	6	7
Herfindahl_3	182.792	2242.370							
Pro_holder_2_3	0.465	0.465	0.266**						
D	0.090	0.289	–0.006	0.030*					
Comp_M	11.672	0.911	0.039**	0.070**	–0.010				
Comp_D	32 642.400	1 309 000.165	–0.001	–0.003	–0.005	0.164**			
Asset	21.168	1.035	0.003	–0.193**	–0.053**	0.368**	0.004		
Debt	0.712	10.885	–0.001	0.004	–0.002	–0.042**	0.000	–0.123**	
Industry	0.000	0.041	–0.002	0.001	0.025*	0.047**	0.000	0.013	0.000

Note: *, ** represent significance at the level 0.05, 0.01, respectively (two-tailed test).

Table 10 shows the regression result of our model. Under the confidence level of 5%, the linear model is significant. Therefore, the size of RP transactions is significantly correlated with the level of concentration, the bargaining power of large share-holders, the compensation of the top executives, the compensation of the outside directors, as well as the pluralism of both the board chairman and the chief executive.

Table 10 Regression result

	Original Model		Revised Model
	Standardized Coefficients	VIF	Standardized Coefficients
Constant	–0.026*		–0.007
Herfindahl_3	0.064**	1.038	0.050**
Pro_holder_2_3	–0.129**	1.094	–0.110**
D	0.062**	1.036	0.051+
Comp_M	–0.075**	1.007	–0.035*
Comp_D	0.024*	1.203	0.023**

(*To be continued*)

(*Continued*)

	Original Model		Revised Model
	Standardized Coefficients	VIF	Standardized Coefficients
Asset	0.518**	1.230	0.533**
Debt	0.041**	1.017	0.073**
Industry	0.013	1.001	0.008
Adj.*R* square	0.267		0.421
Change of *R* square			0.154
D-W	1.048		2.037
F-statistic	262.914		424.482
Prob (*F*-statistic)	0.000		0.000

Note: + , *, ** represent significance at the level of 0.10, 0.05, 0.01 respectively (two-tailed test).

We conduct robustness checks, and the regression model is tested for three possible statistical problems, i.e. heteroscedasticity, multicollinearity, and autocorrelation. In order to examine the likely existence of heteroskedasticity, we analyze the scatter diagram of the model's student residuals and standardized predicted values of dependent variable (the fitting value of $\hat{Y}$), and find that the student residuals of each equation distribute quite evenly. Accordingly, we conclude that the model does not have the problem of heteroscedasticity. In addition, we also carry out multicollinearity test for the model. The result reveals that the VIF value of each coefficient is less than 5. Therefore, multicollinearity does not exist either. However, the D-W value of the original model is $1.048 < 2$, which demonstrates that the model has serious autocorrelation. We thus use generalized difference method to revise the model, and the D-W value (2.037) of the revised model exceeds 2, which means autocorrelation problem has been eliminated in the revised model.

Then, our hypotheses are tested based on the regression model. The standardized coefficient of *Herfindahl_3*, which is used to describe the concentration level of the ownership structure, is positive 0.064 in the original model and 0.050 in the revised model, and is significant in the confidence level of 1%. The result shows that when other variables stay unchanged, if the ownership structure is more concentrated, the size of RP transactions will be larger. This is consistent with the first hypothesis H1, RP transactions are positively correlated with the concentration of ownership.

This finding offers empirical evidence for the necessary improvement in ownership structure and the reform in investor protection law. As the most effective tool for expropriation, large size of RP transactions results from highly concentrated ownership structure. Therefore, to reduce RP transactions, it is imperative to turn highly concentrated ownership structure into decentralized ownership structure. But it is undoubtedly a long-term process. At the present

stage, it may be more feasible to enhance the bargaining power of the second and third largest shareholders through the change in the investor protection clause.

Pro_holder_2_3 is another ownership structure variable which is used to describe the bargaining power between the three largest share-holders. At the confidence level of 1%, the standardized coefficient is significant. Since the coefficient is negative (–0.110) in the revised model, the size of the RP transactions would be smaller when *Pro_holder_2_3* (the percentage of share held by the second and the third largest shareholders relative to the share percentage held by the largest shareholder) is larger as other factors stay unchanged. It supports our second hypothesis H2, the RP transactions are negatively correlated with the increased portion of share held by the second and third largest shareholders relative to the first shareholder.

Such a finding is reasonable. Each of large shareholders seeks his own self-interest. As the portions of shareholdings get close to each other, the bargaining power of individual controlling shareholders can be matched with each other. In the absence of the dominant player, it is difficult for RP transactions to be approved by the board of directors, and thus the likelihood of making RP transactions becomes lower.

The coefficient of *Com_D* is positive and significant with the confidence level of 1%. It suggests that an increase in the compensation of the independent directors tends to reduce the effectiveness of their supervisory role, and thus the size of RP transactions becomes larger.

At the confidence level of 5%, the coefficient of *Comp_M* in the revised model is significant. Since the coefficient is -0.035, the RP transactions are negatively correlated with the average compensation of three highest executives in the companies. In other words, the size of RP transactions will be larger when the average compensation for the three top executives is lower, other things being the same.

D is a dummy variable. As shown in Table 10, the coefficient of *D* is positive and significant in the confidence level of 10% in the revised model. It means that the pluralism of the board chairman and chief executive in a company increases the likelihood of a larger size of RP transactions.

The overall results demonstrate that internal governance factors play a key role in affecting the frequency and the size of RP transactions.

5 Conclusion

In this paper, we have explored the relationship between the RP transactions and internal governance factors in China's listed companies.

First, our study shows that RP transactions are positively correlated with the

concentration of ownership. In contrast, the RP transactions are negatively correlated with the bargaining power of the second and third largest shareholders.

Second, although the supervisory effect of outside directors is widely discussed in the literature, it has not come to an agreement. Our study shows that the compensation of outside directors is positively correlated with the size of RP transactions. It implies that the outside directors system in China needs reform in order to be more effective.

Third, there is strong evidence that the RP transactions are negatively correlated with the average compensation of three top executives of a company. It indicates that the executives may regard RP transactions as part of their compensation schemes.

Finally, we also find out that the pluralism arraignment in the companies increases the size of RP transactions significantly. Our conjecture is that pluralism reduces the balance of power in corporate governance, and thus RP transactions can be more easily conducted.

In summary, this study allows us to better understand how RP transactions are impacted by key internal governance factors in China's listed companies. The findings of this paper may provide valuable insights for the policy-makers to improve the investor protection law and corporate governance mechanism in China.

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