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Multiple large shareholders and absinvestment among Chinese listed firms

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Abstract

Purpose – This study employees cash flow rights and the contestability of multiple large shareholders to explore the impact of multiple large shareholders on investment efficiency in Chinese setting.

Theoretical framework – We introduce Asymmetric Information Theory and Theory of Principal and Agent o support our study.

Design/methodology/approach – Empirical study (including PSM method, IV method, threshold method and so on) is used in this study. Moreover, this paper selects the non-financial listed companies of A share enlisted in both the Shanghai and the Shenzhen Stock Markets from the period of 2007 to 2016 as the sample.

Findings – Our findings show a positive correlation between multiple large shareholders and absinvestment among Chinese listed firms.

Practical & social implications of research – Different from the previous views that multiple large shareholders have positive governance effects, we provide evidence that multiple large shareholders have negative governance effects. And we provide new evidence that controlling shareholders would collude with multiple large shareholders to seek for excess private benefits by enhancing enterprise absinvestment.

Originality/value – This study contributes to the literature in several important ways. First, it shows a positive correlation between multiple large shareholders and absinvestment, which extends the research of Jiang et al. (2018), which found that multiple large shareholders can profoundly enhance investment efficiency. Second, this paper is the first to introduce a threshold model to study the impact of controlling shareholders on the relation between multiple large shareholders and absinvestent, demonstrating that the positive relation between them is strengthened by promoting the governance effect of controlling shareholders.

Keywords: Multiple large shareholders, controlling shareholders, absinvestment, collusion, threshold model.

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1 Introduction

The multiple ownership structure has been highly praised by scholars in recent years. This kind of structure allows large shareholders to try to improve their control rights, stimulate supervision vitality, create a power balance, and curb insider tunneling behaviors with specific mechanisms related to firm value premiums (Maury and Pajuste, 2005; Laeven and Levine, 2008; Attig et al., 2009, 2013; Boateng and Huang, 2017). Thus, compared to companies with decentralized and concentrated ownership structures, firms with multiple ownership structures show better governance performance. However, in practice, shareholder "collusion and violation" incidents, such as the illegal "card raising" of S&P pharmaceuticals, have repeatedly emerged, and large shareholders often pursue excessive private interests by forming interest alliances. However, the existing literature mainly focuses on the checks and balances of large shareholders, but does not establish a valid framework to explain the collusion of shareholders (Su et al., 2008). In particular, there is a lack of empirical evidence on whether the multiple ownership structure has disadvantages or not. Therefore, our research attempts to fill this gap.

Agency theory argues that absinvestment is an important way for managers and shareholders to pursue their own private interests. According to the agent-principal problem, managers use control rights to pursue their private interests, such as seeking a "quiet life," salary manipulation, building a private empire, and increasing enterprise risk taking, which results in serious agency problems (Li and Tang, 2010; Stulz, 1990), thus reducing the efficiency of enterprise investment. According to the principal-principal problem, controlling shareholders can make their control rights deviate from their cash flow rights through a pyramid structure, cross shareholding, different rights of the same share and so on, so as to obtain control rights beyond ownership (Lemmon and Lins, 2003; Almeida and Wolfenzon, 2006). Considering the excessive control of resources (Wang, 2009), maintenance of control rights and holding costs (Filatotchev et al., 2008), lower investment barriers (Wu and Wang, 2005), the level of risk tolerance and other factors (Zhang, 1998), controlling shareholders with excess control rights have enough power and ability to drive enterprises to make absinvestment decisions, so as to obtain their own private benefits. Consequently, the essence of absinvestment is a redistribution behavior in which the subject with control rights can grab the controlling resources and expropriate the wealth of other interested subjects. Non-controlling large shareholders have the ability and opportunity to obtain excess control rights due to information asymmetry. In this context, would non-controlling large shareholders continue to mitigate the two kinds of agency problems to improve investment efficiency, or would they pursue private benefits through absinvestment activities as part of the subject with control rights? This is a topic worth exploring in depth.

In order to explore the relationship between the multiple ownership structure and absinvestment, this study uses a sample of Chinese listed companies and their unique governance characteristics to investigate the impact of multiple large shareholders on enterprise investment. First, as the largest developing country in the world, China's economy has been growing rapidly for a long time, and there are numerous investment opportunities in these listed companies. Second, although the ownership structure has changed from the traditional "*yigududa*" to multiple large shareholders after the non-tradable shares reform, the current ownership structure is still relatively concentrated (Faccio and Lang, 2002; Sun and Tong, 2003), and controlling shareholders are still dominant in companies, which provides multiple large shareholders with the motivation and ability to supervise controlling shareholders so as to protect their own interests. Third, due to the imperfect protection mechanism for minority shareholders and the limited role of the takeover market and independent director system in restricting the tunneling behaviors of large shareholders (Jiang et al., 2010; Peng et al., 2011), multiple large shareholders may collude with controlling shareholders to expropriate minority shareholders' interests. In other words, these characteristics provide various opportunities for the multiple ownership structure to influence enterprise investment.

To explore the impact of the multiple ownership structure on enterprise investment, this paper conducts an in-depth study by answering the following two questions. First, do multiple large shareholders increase or decrease absinvestment? To answer this question, this study uses cash flow rights and contestability to measure the governance effect of multiple large shareholders and employs a prospective investment model to calculate absinvestment. The results show that multiple large shareholders can significantly improve absinvestment. Our findings are also robust to alternative dependent and independent variables and to different model specifications.

Second, would controlling shareholders collude with multiple large shareholders to increase absinvestment? To answer this question, this paper introduces a threshold model to explore the impact of controlling shareholders on multiple large shareholders and absinvestment to determine whether controlling shareholders would collude with multiple large shareholders to seek excess private benefits. We show that controlling shareholder governance can strengthen the positive correlation between multiple ownership structure and absinvestment, which means that controlling shareholders would collude with multiple large shareholders to pursue their self-interests by increasing a firm's absinvestment.

This study contributes to the literature in several important ways. First, it shows a positive correlation between multiple large shareholders and absinvestment, which extends the research of Jiang et al. (2018), which found that multiple large shareholders can significantly improve investment efficiency. Second, this paper is the first to introduce a threshold model to study the impact of controlling shareholders on the relationship between multiple large shareholders and absinvestment, showing that the positive relationship between them is strengthened by promoting the governance effect of controlling shareholders. Third, this paper provides new evidence that controlling shareholders would collude with multiple large shareholders to seek excess private benefits by increasing enterprise absinvestment, which extends the research of Konijn et al. (2011), which proved that multiple large shareholders are entrenched against controlling shareholders.

The rest of this paper is organized as follows. Section 2 outlines the theoretical analysis and develops the hypotheses. Section 3 describes the methods and data. Section 4 reports the empirical evidence. Section 5 presents the further investigation. Section 6 presents our conclusions.

2 Theoretical analysis and hypotheses

In a perfect market, an enterprise's optimal investment level should make the marginal income equal to the marginal cost (Modigliani and Miller, 1958). However, in practice, realistic frictions cause firms to exhibit absinvestment behavior (over-investment and under-investment), thus deviating from the optimal investment level. In order to explore the internal logic of absinvestment behavior, Jensen and Meckling (1976) started from the ownership decentralization assumption and pointed out that managers make decisions to maximize their own interests, which may go against the principle of investor interest maximization, resulting in "moral failure behavior." Jensen (1986) showed that managers would not distribute a large amount of free cash to shareholders, but would rather use it to expand the size of the firm in order to obtain more control rights and higher salaries, resulting in serious absinvestment behavior. Murphy (1985) proved that managers would blindly expand the size of the firm with the aim of obtaining excessive control over resources, resulting in serious absinvestment behavior. Morck et al. (1988) indicated that in addition to obtaining excessive control rights, managers are likely to prefer more resources for the projects that are beneficial to their own development in order to ensure job security, and these projects often do not aim at enterprise value maximization. Moreover, in order to seek excessive in-service consumption, some managers may also make absinvestment decisions (Stulz, 1990).

The above studies have shown that as ownership concentration increases, shareholders' monitoring of managers' control rights will also increase, which mitigates the enterprise absinvestment behavior caused by the agency conflict between shareholders and managers. However, Claessens et al. found that this is not the case. When ownership is highly concentrated, controlling shareholders can gain control over ownership by means of a pyramid structure, cross-shareholding and having the same share with various rights, which separates the control rights and cash flow rights of controlling shareholders, and controlling shareholders have the motivation and ability to seek private benefits with their excess control rights, resulting in absinvestment (La Porta et al., 1999; Dyck and Zingales, 2004; Aggarwal and Samwick, 2006). From the perspective of risk tolerance, Zhang (1998) demonstrated that risk-averse controlling shareholders would reduce enterprise investment efficiency. In addition, the maintenance of control rights and holding costs also lead to enterprise absinvestment (Filatotchev et al., 2008). These studies show that the agent-principal problem between shareholders in the mode of ownership concentration, and the private interest behavior of controlling shareholders, are the root of enterprise absinvestment.

In fact, in addition to ownership decentralization and ownership concentration, multiple ownership structures also widely exist. Previous studies have shown that a multiple ownership structure has competing governance effects, namely a supervision effect and an entrenchment

effect. The supervision effect illustrates that a multiple ownership structure can alleviate the two kinds of agency problems by monitoring the private interest behavior of managers and controlling shareholders, thus moderating enterprise absinvestment. The research of Attig et al. (2009) and Boubaker and Sami (2011) pointed out that a multiple ownership structure can mitigate the agency conflict of internal and external shareholders by effectively improving the environmental quality of enterprise information. García-Meca et al. (2015) and Perryman et al. (2016) believed that large shareholders with different backgrounds and knowledge can bring new perspectives to corporate decision-making and improve the efficiency of supervision and decision-making. Moreover, large shareholders with different identities and backgrounds, from different industries and in different supply chain positions can obtain information about the prospects of the industry and enterprise, and they are more likely to recognize the private interest behavior of managers and controlling shareholders, and thus have stronger supervisory abilities (Attig et al., 2009). Furthermore, the "exit threat" of large shareholders can also effectively constrain the private interest behavior of managers and controlling shareholders (Edmans and Manso, 2011; Bharath et al., 2013). Based on the above studies, we propose the following hypothesis:

H1: When multiple large shareholders play a monitoring role, absinvestment is moderated.

The entrenchment effect occurs because of incomplete contracts and information asymmetry between inside and outside the enterprise, where controlling shareholders, large shareholders, and managers who share control rights have a strong conspiratorial motivation to pursue private interests (Bae et al., 2012; Bena and Ortizmolina, 2013). In addition, the legal protection of minority shareholders in the Chinese market is still weak, and the limited effect of the takeover market and independent directors in limiting tunneling behavior makes it easier for multiple large shareholders to collude with controlling shareholders to pursue self-interests (Jiang et al., 2010; Peng et al., 2011), along with more serious absinvestment. Moreover, in an imperfect market, absinvestment does not always lead to a decrease in firm value; on the contrary, it may bring about higher benefits because of its high risk. The higher benefits are often enjoyed only by shareholders, and most of the investment costs are passed on to stakeholders such as creditors (Jensen and Meckling, 1976). In this context, we propose the following hypothesis.

H2: When multiple large shareholders play an entrenchment role, absinvestment increases. (Figure 1).

3 Methods and data

3.1 Methods

Considering the monitoring effect and entrenchment effect of multiple large shareholders, we construct the panel data model as follows.

$$Absinvestment_{i,t}=\beta_0+\beta_1 NCLSs_{i,t}+\beta_2 control_{i,t}+\varepsilon_{i,t} \quad (1)$$

where inefficient investment is measured by *Absinvestment*; *NCLSs* is the independent variable including the cash flow rights and contestability of multiple large shareholders; and ε is the residual error. The robust standard error is used to control for potential serial correlation and heteroscedasticity.

To calculate *Absinvestment*, we follow the expected investment model of Richardson (2006).

$$\begin{aligned} Newinvestment_{i,t}=&\beta_1+\beta_2 Return_{i,t-1}+\\ &\beta_3 Tobin's\ Q_{i,t-1}+\beta_4 Cash_{i,t-1}+\\ &\beta_5 CS_{i,t-1}+\beta_6 Age_{i,t-1}\\ &+\beta_7 Leverage_{i,t-1}+\beta_8 Ln\_Assets_{i,t-1}+\\ &\beta_9 Newinvestment_{i,t-1}+\gamma_t+\delta_t+\varepsilon_{i,t} \end{aligned} \quad (2)$$

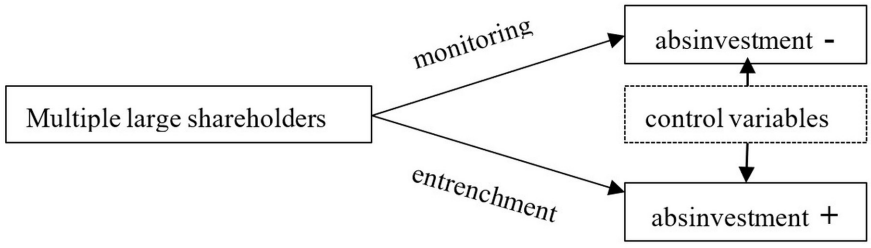

Figure 1. Conceptual structure and relationships among variables

where *Newinvestment* is the newly increased investment expenditure after the standardization of total assets in the current year, and this newly increased investment expenditure = expenditure on the purchase of fixed assets, intangible assets and other long-term assets + net cash paid by subsidiaries and other business units – net cash from the disposal of fixed assets, intangible assets and other long-term assets – net cash from the disposal of subsidiaries and other business units – depreciation and amortization of the current period; *Return* is the annual rate of return on an individual share; *Cash* is the currency capital after standardizing total assets; and γ_t and δ_t are the annual effect and the industry effect, respectively. Equation 2 calculates the optimal investment in the current year using the data of the first lagged period, that is, the expected investment level. The residual error is unexpected investment expenditure, that is, absinvestment.

In this paper, *NCLSs* is the independent variable, defined as the second and third largest groups of shareholders. To fully measure the governance effect of multiple large shareholders, the measurement index captures two aspects according to Attig et al. (2009, 2013). First, we use cash flow rights, which relate to the shareholding ratio of the second and third largest shareholders (*CF3*). Second, we employ the contestability of control rights, which is equal to the cash flow rights of multiple large shareholders divided by the cash flow rights of the controlling shareholders (*Contest3*). Additionally, for the robustness test, we use the cash flow rights of the second largest shareholder (*CF2*) and the contestability of control rights, which is equal to the cash flow rights of the second largest shareholder divided by the cash flow rights of the controlling shareholders (*Contest2*), and the dummy variable for multiple large shareholders (*MLS_dummy*), where *MLS_dummy* is a dummy variable that takes the value of 1 when there are multiple large shareholders with a shareholding ratio of more than 5% and 0 otherwise.

To examine the impact of multiple large shareholders on investment efficiency, we select the following control variables: firm value (*Tobin's Q*), free cash flow (*FCF*), cash flow rights of controlling shareholders (*CS*), affiliated director of controlling shareholders (*ABCS*), listed years (*Age*), asset-to-liability ratio (*Leverage*), firm size (*Ln_Assets*), and firm nature (*State*).

The definitions of the variables are shown in Table 1.

3.2 Data sources

The data in this paper are from the non-financial A-share listed companies in both the Shanghai and Shenzhen stock markets (Supplementary Data 1 – database). Specifically, we use the data period from 2007 to 2016 because the new accounting standards were adopted in 2007. In addition, we choose companies listed before December 31st, 2006, to avoid the impact of data changes in the first year of listing on the research results, and eliminate companies whose asset-to-liability ratio is greater than 100% to reduce the effect of other factors on firm value. Finally, 10120 firm-year observations are confirmed as the final sample in this paper.

In addition, in order to more accurately measure the corporate governance effect of multiple large shareholders, and to avoid the influence of some blockholders associated with the controlling shareholder, such as relational blockholders via ownership, kinship, work, or agreements, which has been proven to affect the governance effect of multiple large shareholders (Cheng et al., 2013), we establish the information base as the CSMAR database and annual reports of Chinese listed firms, manually collecting the relationship information of large shareholders and the corporate control chain from annual reports. We treat the relational blockholders as a whole, aggregate their shareholdings, and rearrange the top three shareholders.

3.3 Descriptive statistics and correlation analysis

Table 2 presents the results of descriptive statistics and correlation analysis of the key variables. Rows 2 and 3 report the descriptive statistics, among which the average value of *CF3* is 8.12% and the average value of *Contest3* is 29.82%, indicating that multiple large shareholders have an important influence on firm decision-making. The average value of *CS* is 37.68%, which shows that the ownership structure of Chinese listed companies is still concentrated. Rows 4 to 15 describe the results of the correlation coefficients, and the results are all less than 0.5, which means that there is no serious multicollinearity problem in this paper. Furthermore, there are some interesting findings in that the proxies of *CF3* and *Contest3* are significantly positively associated with *absinvestment*, which indicates that multiple large shareholders play a passive role by increasing a firm's absinvestment (Supplementary Data 2 – do file).

Table 1
Variable definition

Categories	Variable	Symbol	Definition
Dependent variables	Absinvestment	*Absinvestment*	*Absinvestment* = the absolute value of the residuals in model 2
	Over-investment	*Over-investment*	*Over-investment* = the positive value of the residuals in model 2
	Under-investment	*Under-investment*	*Under-investment*= the negative value of the residuals in model 2
Independent variables	Cash flow right of multiple large shareholders	*CF3*	*CF3* = shareholding ratio of the second and third largest shareholders (not related with controlling shareholders)
	Contestability of control right	*Contest3*	*Contest3* = shareholding ratio of multiple large shareholders/shareholding ratio of controlling shareholders
	Cash flow rights of the second largest shareholder	*CF2*	*CF2* = shareholding ratio of the second largest shareholder (not related with controlling shareholders)
	Contestability between the second largest shareholder and controlling shareholders	*Contest2*	*Contest2* = shareholding ratio of the second largest shareholder/shareholding ratio of controlling shareholders
	The dummy variable for multiple large shareholders	*MLS_dummy*	*MLS_dummy* = 1 if there are multiple large shareholders with a shareholding ratio of more than 5%, otherwise *MLS_dummy* = 0
Control variables	Firm value	*Tobin's Q*	*TQ* = market value + total liabilities/total assets
	Firm size	*Ln_Assets*	*Ln_Assets* = natural logarithm of total assets
	Asset-to-liability ratio	*Leverage*	*Leverage* = total liabilities/total assets
	Years listed	*Age*	*Age* = natural logarithm of years listed of a listed firm
	Firm growth	*Growth*	*Growth* = growth rate of sales revenue
	Free cash flow	*FCF*	*FCF* = natural logarithm of free cash flow
	Firm nature	*State*	*State* = 1 if the ultimate owner of the listed firm is the State or a state-owned shareholder), otherwise *State* = 0
Moderating variables	Cash flow rights of controlling shareholders	*CS*	*CS* = shareholder ratio of the largest shareholder
	Affiliated director of controlling shareholders	*ABCS*	*ABCS* = number of affiliated directors of controlling shareholders/board size
	The degree of separation between the ownership and controlling rights of controlling shareholders	*Separation*	*Separation* = the controlling rights of controlling shareholders - the ownership rights of controlling shareholders

Table 2
Descriptive statistics and correlation analysis of key variables

	Mean	***Std.dev***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***
1 Absinvestment	3.450	4.611	1.000											
2 CF3	8.123	7.553	**0.069**	1.000										
3 Contest3	29.823	35.020	**0.059**	**0.833**	1.000									
4 Tobin's Q	2.493	2.592	**0.119**	**0.078**	**0.117**	1.000								
5 FCF	4.342	9.099	**-0.030**	0.008	**-0.026**	0.011	1.000							
6 Age	2.604	0.349	**-0.042**	**-0.058**	-0.012	**0.019**	**-0.075**	1.000						
7 CS	37.676	15.885	**-0.036**	**-0.314**	**-0.560**	**-0.121**	**0.083**	**-0.098**	1.000					
8 ABCS	27.246	18.084	**-0.026**	**-0.221**	**-0.298**	**-0.086**	**0.035**	**0.030**	**0.356**	1.000				
9 Growth	2.072	149.213	-0.001	0.013	0.004	-0.005	-0.015	0.007	0.011	-0.004	1.000			
10 Leverage	52.405	49.454	**-0.019**	-0.012	**-0.018**	**0.320**	**-0.053**	**0.020**	**0.014**	0.011	0.008	1.000		
11 Ln_Assets	22.147	1.283	**-0.098**	**-0.059**	**-0.153**	**-0.403**	**0.037**	**0.133**	**0.344**	**0.208**	**0.022**	**0.106**	1.000	
12 State	0.623	0.485	**-0.055**	**-0.091**	**-0.169**	**-0.128**	**0.036**	**-0.033**	**0.243**	**0.200**	-0.013	**0.021**	**0.183**	1.000

The numbers in bold indicate statistical significance at the 10% level.

4 Empirical results

4.1 Main test

Table 3 describes the regression results of the relationship between multiple large shareholders and absinvestment by using Equation 1. Models 1 and 2 illustrate the impact of multiple large shareholders on absinvestment without control variables, showing that cash flow rights (*CF3:* β=0.059, ρ<0.01) and contestability (*Con3:* β=0.008, ρ<0.01) are both significantly positively associated with absinvestment at the 1% level, indicating that the level of absinvestment would be greatly improved by promoting the governance effect of multiple large shareholders. Models 3 and 4 illustrate the impact of multiple large shareholders on absinvestment with control variables, revealing that cash flow rights (*CF3:* β=0.059, ρ<0.01) and contestability (*Con3:* β=0.008, ρ<0.01) are both significantly positively associated with absinvestment at the 1% level, suggesting that the level of absinvestment would be greatly improved by promoting the governance effect of multiple large shareholders. In conclusion, the level of absinvestment would be greatly improved by promoting the governance effect of multiple large shareholders. Therefore, Hypothesis 2 is confirmed.

4.2 Endogenous control

While our main results have provided some interesting insights into the impact of multiple large shareholders on absinvestment, it is necessary to take the endogenous problem into consideration. Therefore, in order to mitigate the influence of endogenous problems

Table 3
The impact of multiple large shareholders on absinvestment

Variable	Dependent variable: *Absinvestment*			
	(1)	(2)	(3)	(4)
CF3	0.059***		0.059***	
	(6.315)		(5.933)	
Contest3		0.008***		0.008***
		(3.859)		(3.492)
Tobin's Q			0.242***	0.248***
			(8.237)	(8.441)
FCF			-0.032***	-0.032***
			(-5.832)	(-5.801)
Age			-0.692	-0.882
			(-1.060)	(-1.352)
CS			0.012*	0.010
			(1.671)	(1.322)
ABCS			0.010**	0.009**
			(2.411)	(2.247)
Growth			-0.000	-0.000
			(-0.443)	(-0.366)
Leverage			-0.006***	-0.007***
			(-5.508)	(-5.670)
Ln_Assets			0.210*	0.283**
			(1.897)	(2.575)
State			-0.630***	-0.637***
			(-3.099)	(-3.129)
Cons	2.145**	2.415***	-1.424	-2.250
	(2.473)	(2.786)	(-0.507)	(-0.802)
Industry and year	Yes	Yes	Yes	Yes
Sample size	10120	10120	10120	10120
R2	0.016	0.018	0.031	0.029
F-value	5.12***	6.03***	7.95***	7.31***

*, **, *** indicate statistical significance at 10%, 5% and 1%, respectively.

on the results, we employ the propensity score matching (PSM) method and the instrumental variable (IV) method.

Using PSM, we construct a matched sample including a subsample with multiple large shareholders (at the 5% threshold) and a subsample with other types of shareholders to limit the influence of sample differences on the results. Specifically, after controlling for the industry and year effects, we determine the propensity score by using the nearest neighbor matching method without replacement to choose the firm that is the closest in terms of the probability of being owned by multiple large shareholders. The probability is estimated using the probit model, and the dependent variable of the regression test is *MLS_dummy*, and the independent variables include *Tobin's Q*, *Ln_Assets*, *Leverage*, *Age*, and industry and year dummy variables (Demsetz and Lehn, 1985; Faccio et al., 2011). Finally, we obtain 7114 firm-year observations, equally distributed between firms with multiple large shareholders and others.

Table 4 shows the influence of multiple large shareholders on enterprise investment efficiency using the PSM method. Model 1 shows the results of the probit model. From it, we can see that the coefficients of *Ln_Assets* and *Age* are all significant negative at the 1% level, suggesting that it is more possible for smaller and emerging companies to have more multiple large shareholders than large and mature companies (Ben-Nasr et al., 2015), and the reasons may be related to the high cost of obtaining a large number of shares in large and mature companies (Demsetz and Lehn, 1985). Model 2 explores the relationship between the cash flow rights of multiple large shareholders and absinvestment, indicating that there is a profound positive relationship between them (*CF3:* β=0.031, ρ<0.01). Model 3 examines the relationship between the contestability of controlling large shareholders and absinvestment, showing that there is a profound positive relationship between them (*Contest3:* β=0.004, ρ<0.05). In conclusion, the PSM results show

Table 4
The PSM results

	PSM	**Dependent variable: *Absinvestment***	
	(1) *MLS_dummy*	**(2) *CF3***	**(3) *Contest3***
Independent variables		0.031***	0.004**
		-4.127	-2.359
Tobin's Q	0.015	0.182***	0.188***
	-1.480	-5.903	-6.072
FCF		-0.030***	-0.030***
		(-4.927)	(-4.889)
Age	-0.225***	0.195	0.134
	(-2.730)	(0.904)	(0.623)
CS		0.005	0.007
		-1.320	-1.496
ABCS		0.002	0.001
		(0.547)	(0.366)
Growth		-0.001	-0.001
		(-0.623)	(-0.564)
Leverage	-0.001	-0.009***	-0.009***
	(-0.831)	(-2.805)	(-2.749)
Ln_Assets	-0.124***	-0.116**	-0.123**
	(-5.980)	(-2.084)	(-2.201)
State		-0.502***	-0.500***
		(-4.393)	(-4.369)
Cons		4.659***	5.081***
		-3.486	-38.079
Industry and year	Yes	Yes	Yes
Sample size	10120	7114	7114
Pseudo- R^2 /Adjusted R^2	0.018	0.043	0.041
Wald χ^2/F-value	241.75***	10.09***	9.75***

, * indicate statistical significance at the 5% and 1%, respectively.

that multiple large shareholders can significantly improve absinvestment.

Additionally, following Mishra (2011) and Paligorova and Xu (2012), we use a two-stage instrumental variable approach with the industry-year average values for the *CF3* variables as the instrumental variables. These instrumental variables capture the natural tendency of multiple large shareholders to be present in firms that engage in similar types of activities. The special feature of these instruments is that they are correlated with an individual firm's ownership structure, but it is unlikely that the change in the ownership structure of one firm will affect the average ownership structure of the entire industry.

Table 5 displays the results of the IV method. Specifically, in Panel A, the coefficients (*IV-CF3:* β=0.720, ρ<0.01; *IV-Contest3:* β=2.440, ρ<0.01) are all significant at the 1% level, demonstrating that the instrumental variable used in this paper is effective. In Panel B, the coefficients of cash flow rights (*CF3:* β=0.141, ρ<0.05) and contestability (*Contest3:* β=0.042, ρ<0.05) are all significant at the 5% level, showing a profound positive relationship between the cash flow rights and contestability of multiple large shareholders and absinvestment, which demonstrates that the level of absinvestment could be greatly increased by promoting the governance effect of multiple large shareholders.

Table 5
The results of the IV method

	Dependent variable: *Absinvestment*	
	(1) *CF3*	**(2) *Contest3***
Panel A:first-order lag		
IV1-CF3	0.720***	
	(17.100)	
IV1-Contest3		2.440***
		(13.740)
Panel B:second-order lag		
CF3	0.141**	
	(2.511)	
Contest3		0.042**
		(2.491)
Tobin's Q	0.192***	0.185***
	(6.058)	(5.518)
FCF	-0.033***	-0.031***
	(-5.881)	(-5.484)
Age	-1.102***	-1.103***
	(-2.971)	(-2.952)
CS	0.030**	0.060**
	(1.989)	(2.255)
ABCS	0.012***	0.014***
	(2.690)	(2.837)
Growth	-0.000	-0.000
	(-0.481)	(-0.273)
Leverage	-0.005***	-0.005***
	(-3.913)	(-3.438)
Ln_Assets	-0.056	-0.050
	(-0.319)	(-0.286)
State	-0.553***	-0.582***
	(-2.732)	(-2.832)
Cons	5.214**	3.843*
	(2.198)	(1.822)
Sample size	10120	10120
R2	0.013	0.017
Wald $\chi 2$	6711.34***	6600.44***

*, **, *** indicate statistical significance at 10%, 5% and 1%, respectively.

4.3 Robustness check

To ensure that our results are robust, we conducted a series of sensitivity tests from the following perspectives: (1) sample adjustment, which eliminates those companies whose absinvestment level is less than 10%; (2) independent variable substitution, which uses *MLS_dummy*, *CF2* and *Contest2* to represent the governance effect of multiple large shareholders; and (3) different regression models, which employ ordinary least squares (OLS), random effects (RE), Tobit (Tobit), and weighted least squares (WLS). Table 6 presents the results of sample adjustment and independent variable substitution, and Table 7 describe the results of different regression models. The results show that our main findings are robust.

5 Further study

5.1 When and how other governance mechanisms affect multiple large shareholders

Corporate governance encompasses a set of systems or mechanisms, formal or informal, internal or external, and the interaction between them enables companies to operate. Effective corporate governance is a key link to attract investors, improve decision-making efficiency and create corporate value, and it is also a guarantee to coordinate stakeholders. Overuse of one of the governance systems may not achieve an effective governance effect or even have a negative governance effect (Agrawal and Knoeber, 1996). Therefore, the optimal governance system should be the multiple combination of the interaction of different governance systems, where each can supplement or replace the other. To ensure good company operations, it

Table 6
The results of sample adjustment and independent variable substitution

Variable	Cut the sample by 10%		Independent variable substitution		
	(1) *CF3*	(2) *Contest3*	(3) *MLS_dummy*	(4) *CF2*	(5) *Contest2*
Independent variables	0.068***	0.009***	0.650***	0.061***	0.010***
	(6.164)	(3.576)	(4.593)	(4.941)	(3.169)
Tobin's Q	0.258***	0.266***	0.252***	0.248***	0.251***
	(8.215)	(8.432)	(8.578)	(8.431)	(8.526)
FCF	-0.034***	-0.034***	-0.032***	-0.033***	-0.033***
	(-5.635)	(-5.606)	(-5.820)	(-5.849)	(-5.829)
Age	-0.574	-0.778	-0.848	-0.816	-0.926
	(-0.814)	(-1.105)	(-1.300)	(-1.251)	(-1.420)
CS	0.014*	0.012	0.005	0.008	0.008
	(1.798)	(1.398)	(0.655)	(1.151)	(1.069)
ABCS	0.010**	0.009**	0.009**	0.009**	0.009**
	(2.239)	(2.057)	(2.265)	(2.328)	(2.222)
Growth	-0.001	-0.001	-0.000	-0.000	-0.000
	(-0.550)	(-0.250)	(-0.448)	(-0.380)	(-0.341)
Leverage	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***
	(-5.593)	(-5.770)	(-5.745)	(-5.674)	(-5.751)
Ln_Assets	0.169	0.252**	0.279**	0.253**	0.297***
	(1.409)	(2.111)	(2.560)	(2.306)	(2.712)
State	-0.682***	-0.686***	-0.630***	-0.634***	-0.636***
	(-3.064)	(-3.080)	(-3.095)	(-3.116)	(-3.124)
Cons	-0.523	-1.473	-2.107	-1.798	-2.327
	(-0.172)	(-0.485)	(-0.751)	(-0.640)	(-0.829)
Industry and year	Yes	Yes	Yes	Yes	Yes
Sample size	9108	9108	10120	10120	10120
R2	0.033	0.030	0.030	0.030	0.029
F-value	7.39***	6.69***	7.56***	7.65***	7.25***

*, **, *** indicate statistical significance at 10%, 5% and 1%, respectively.

is important for managers to understand these systems and the interactions among them. Among internal governance systems, controlling shareholders are undoubtedly the most important ones that would influence the governance of multiple large shareholders. Thus, this paper introduces controlling shareholders to study their impact on multiple large shareholder governance, using cash flow rights and affiliated directors of controlling shareholders to measure the governance effect of controlling shareholders.

Table 8 shows the impact of controlling shareholders on the relationship between multiple large shareholders and absinvestment. As shown in Model 1, when the cash flow rights of controlling shareholders are lower, the coefficient of multiple large shareholders is 0.030, and when the cash flow rights of controlling shareholders are higher, the coefficient of multiple large shareholders is 0.057, demonstrating that increasing the cash flow rights of controlling shareholders can greatly strengthen the positive relationship between multiple large shareholder governance and absinvestment (0.057>0.030).

As seen in Model 2, when the ratio of affiliated directors of controlling shareholders is lower, the coefficient of multiple large shareholders is 0.047, and when the ratio of affiliated directors of controlling shareholders is higher, the coefficient of multiple large shareholders is 0.357, indicating that increasing the ratio of affiliated directors of controlling shareholders can greatly strengthen the positive relationship between multiple large shareholders and absinvestment (0.357>0.047).

As shown in Model 3, when the cash flow rights of controlling shareholders are lower, the coefficient of multiple large shareholders is 0.001, which is not significant, indicating that there is no threshold value. This result is inconsistent with the result of Model 1, and the reason for this lies in the serious multicollinearity between the controlling power competitiveness of multiple large shareholders and the cash

Table 7
The results of different regression models

Variable	OLS		RE		Tobit		WLS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CF3	0.027***		0.038***		0.027***		0.041***	
	(3.256)		(5.126)		(4.255)		(4.884)	
Contest3		0.004**		0.006***		0.004***		0.007***
		(3.256)		(3.143)		(2.663)		(3.436)
Tobin's Q	0.230***	0.230***	0.231***	0.234***	0.230***	0.231***	0.045***	0.050***
	(4.472)	(4.472)	(9.455)	(9.551)	(10.329)	(10.384)	(5.196)	(5.806)
FCF	-0.027*	-0.027*	-0.030***	-0.030***	-0.027***	-0.027***	-0.099***	-0.095***
	(-1.851)	(-1.852)	(-5.794)	(-5.744)	(-5.330)	(-5.277)	(-22.666)	(-21.615)
Age	-0.003	-0.041	-0.029	-0.087	-0.003	-0.041	1.452***	1.398***
	(-0.017)	(-0.234)	(-0.123)	(-0.366)	(-0.017)	(-0.230)	(5.317)	(5.099)
CS	-0.001	-0.001	0.001	0.002	-0.001	-0.000	-0.004	-0.004
	(-0.287)	(-0.017)	(0.338)	(0.480)	(-0.307)	(-0.018)	(-0.741)	(-0.730)
ABCS	0.003	0.003	0.005	0.004	0.003	0.002	0.005	0.003
	(1.124)	(0.955)	(1.579)	(1.392)	(1.083)	(0.916)	(1.138)	(0.700)
Growth	-0.001***	-0.001***	-0.000	-0.000	-0.000	-0.000	0.001	0.001
	(-5.890)	(-5.2061)	(-0.493)	(-0.432)	(-0.623)	(-0.576)	(0.423)	(0.298)
Leverage	-0.005***	-0.005***	-0.006***	-0.006***	-0.005***	-0.005***	-0.001	-0.002*
	(-3.993)	(-4.033)	(-5.340)	(-5.409)	(-4.783)	(-4.812)	(-1.491)	(-1.721)
Ln_Assets	-0.062	-0.056	-0.027	-0.013	-0.062	-0.056	-0.058	0.001
	(-0.968)	(-0.869)	(-0.459)	(-0.216)	(-1.336)	(-1.203)	(-0.889)	(0.016)
State	-0.545***	-0.544***	-0.564***	-0.564***	-0.545***	-0.544***	-0.030	0.053
	(-5.476)	(-5.463)	(-4.577)	(-4.572)	(-5.473)	(-5.453)	(-0.201)	(0.350)
Cons	4.564***	4.579***	3.589***	3.531**	4.564***	4.579***	0.287	-0.516
	(3.015)	(3.028)	(2.603)	(2.559)	(4.173)	(4.181)	(0.185)	(-0.330)
Industry and year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	10120	10120	10120	10120	10120	10120	10120	10120
R2	0.045	0.044	0.027	0.025	0.08	0.08	0.115	0.114
F-value (Wald χ2)	10.68***	10.40***	374.54***	357.82***	463.06***	452.07***	35.34***	35.06***

*, **, *** indicate statistical significance at 10%, 5% and 1%, respectively.

flow rights of controlling shareholders, with a correlation coefficient of -0.560 (see Table 2). In order to solve this problem, this chapter employs the degree of separation between the ownership and controlling rights of controlling shareholders to replace the cash flow rights of controlling shareholders, and the results are shown in Model 5. As this model shows, when the degree of separation is lower, the coefficient of multiple large shareholders is 0.042, and when the degree of separation is higher, the coefficient of multiple large shareholders is 0.091. It is obvious that 0.042<0.091, which shows that increasing the degree of separation can significantly strengthen the positive correlation between multiple large shareholders and corporate value, and this result is consistent with that of Model 1.

As shown in Model 4, when the ratio of affiliated directors of controlling shareholders is lower, the coefficient of multiple large shareholders is 0.006, and when the ratio of affiliated directors of controlling shareholders is higher, the coefficient of multiple large shareholders is 0.103, indicating that increasing the ratio of affiliated directors of controlling shareholders can greatly strengthen the positive relationship between multiple large shareholders and absinvestment (0.103>0.006).

Consequently, the results of Table 8 imply that increasing the cash flow rights and the ratio of affiliated directors of controlling shareholders can greatly strengthen the positive relationship between multiple large shareholder governance and absinvestment. The reason for this may be that the benefits created by increasing absinvestment are generally enjoyed by shareholders, especially by large shareholders, but the losses are not leveled against shareholders alone, and most of them are passed on to external stakeholders such as

Table 8
The results of other governance systems

Variable	*absinvestment*		Variable	*absinvestment*		
	(1)	(2)		(3)	(4)	(5)*Separation*
	CS	***ABCS***		***CS***	***ABCS***	
Tobin's Q	0.222***	0.213***	*Tobin's Q*	0.220***	0.220***	0.215***
	-8.268	-7.943		-8.308	-8.177	-8.014
FCF	-0.032***	-0.033***	*FCF*	-0.033***	-0.032***	-0.033***
	(-5.862)	(-5.874)		(-5.879)	(-5.830)	(-5.950)
Age	-1.586***	-1.510***	*Age*	-1.596***	-1.640***	-1.503***
	(-6.511)	(-6.067)		(-6.569)	(-6.631)	(-6.025)
CS		0.012	*CS*		0.012	0.010
		-1.631			-1.615	-1.466
ABCS	0.010**		*ABCS*	0.009**		0.009**
	-2.504			-2.327		-2.187
Growth	-0.001	-0.001	*Growth*	-0.001	-0.001	-0.001
	(-0.410)	(-0.368)		(-0.369)	(-0.321)	(0.351)
Leverage	-0.006***	-0.006***	*Leverage*	-0.006***	-0.006***	-0.006***
	(-5.278)	(-5.074)		(-5.351)	(-5.242)	(-5.021)
Ln_Assets	0.203**	0.137	*Ln_Assets*	0.203	0.208**	0.150
	-2.002	-1.305		-12.023	-1.988	(1.423)-
State	-0.512**	-0.541***	*State*	-0.513***	-0.533***	0.485**
	(-2.551)	(-2.692)		(-2.549)	(-2.649)	(-2.409)
*CF3*I*			*Contest3*I*			
1	0.030**	0.047***	*1*	0.001	0.006***	0.042***
	-2.020	-4.521		(0.470)	-2.720	-3.700
2	0.199***	0.100***	*2*	0.020***	0.022***	0.091***
	-8.886	-7.662		-7.185	-6.283	-7.722
3	0.057***	0.357***	*3*		0.103***	
	-5.804	-4.335			-3.107	
Sample size	10120	10120	Sample size	10120	10120	10120
R2	0.028	0.026	R2	0.024	0.023	0.024
F-value	23.82***	21.61***	F-value	22.45***	19.26***	20.73***

, * indicate statistical significance at the 5% and 1%, respectively.

creditors and suppliers, so the benefits far exceed the costs. As a result, it is natural for controlling shareholders and multiple large shareholders to form a coalition to increase absinvestment, which strengthens the positive relationship between multiple large shareholders and absinvestment by controlling shareholders.

5.2 Heterogeneity analysis

5.2.1 *Analysis with different agency problems*

The long-term coexistence of state-owned enterprises and non-state-owned enterprises in China's capital market is a distinctive feature. Specifically, most Chinese listed companies have been converted from state-owned enterprises, and state-owned shares still play an important role in these companies (Liu et al., 2015). Meanwhile, with the development of the market economy, non-state-owned enterprises have made great contributions to national economic growth (Allen et al., 2005; Ding et al., 2007). In our sample, 62.26% of the listed companies are state-owned, and 37.74% of them are non-state-owned enterprises. Because of the different characteristics of state-owned enterprises and non-state-owned enterprises, state-owned enterprises face more serious agency problems of the first type, and non-state-owned enterprises face more serious agency problems of the second type. Therefore, it is necessary to explore multiple large shareholder governance in both state-owned and non-state-owned enterprises. Thus, we divide the companies of our sample into state-owned and

non-state-owned companies to examine the relationship between multiple large shareholder governance and absinvestment given different agency problems.

Table 9 shows the impact of multiple large shareholder governance on absinvestment in state-owned and non-state-owned enterprises, and the results show that multiple large shareholder governance would significantly increase the absinvestment level in both state-owned (Model 1: β=0.037, ρ<0.01; Model 2: β=0.006, ρ<0.10) and non-state-owned (Model 3: β=0.096, ρ<0.01; Model 4: β=0.011, ρ<0.01) enterprises, suggesting a positive effect of multiple large shareholder governance robust to the firm's nature.

5.2.2 *Analysis with over-investment and under-investment*

Furthermore, we divide absinvestment into over-investment and under-investment to determine whether the multiple ownership structure affects absinvestment through over-investment or under-investment. Specifically, over-investment refers to the investment activities for those unprofitable projects or high-risk projects that would harm the firm's benefits, and under-investment refers to the investment activities for those abandoned projects with a positive net present value that would harm the firm's benefits. We obtain 4291 samples with over-investment activities and 5829 samples with under-investment activities. Agency theory has shown that large shareholders are in an superior informational position compared to minority shareholders, and they may not always seek to maximize enterprise benefits, but rather seek private benefits of control at the expense of minority shareholders when making decisions (Johnson et al., 2000). The private benefits of control come from the company's controlling resources, and over-investment can significantly increase the resources controlled by

Table 9
The results of firm nature

Variable	State-owned firm		Non-state-owned firm	
	(1)	(2)	(3)	(4)
CF3	0.037***		0.096***	
	(2.901)		(5.325)	
Contest3		0.006*		0.011***
		(1.668)		(2.804)
Tobin's Q	0.184***	0.186***	0.196***	0.215***
	(4.130)	(4.170)	(4.101)	(4.508)
FCF	-0.049***	-0.049***	-0.009	-0.009
	(-6.998)	(-6.985)	(-0.984)	(-0.950)
Age	-0.363	-0.465	-1.215	-1.557
	(-0.511)	(-0.655)	(-0.848)	(-1.084)
CS	-0.003	-0.006	0.031**	0.029**
	(-0.286)	(-0.569)	(2.577)	(2.209)
ABCS	0.010**	0.010**	0.011	0.010
	(2.182)	(2.097)	(1.376)	(1.196)
Growth	-0.001	-0.000	-0.000	-0.000
	(-0.368)	(-0.219)	(-0.388)	(-0.337)
Leverage	-0.019***	-0.020***	-0.005***	-0.005***
	(-3.684)	(-3.833)	(-3.108)	(-3.443)
Ln_Assets	0.232	0.272*	0.348*	0.468**
	(1.641)	(1.928)	(1.776)	(2.402)
Cons	0.024	-0.305	-6.151	-7.541
	(0.007)	(-0.086)	(-1.159)	(-1.418)
Industry and year	Yes	Yes	Yes	Yes
Sample size	6301	3819	6301	3819
R2	0.036	0.035	0.040	0.034
F-value	6.05***	5.88***	3.96***	3.33***

*, **, *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 10
The results of over-investment and under-investment

Variable	*Over-investment*		*Under-investment*	
	(1)	(2)	(3)	(4)
CF3	0.081***		0.018	
	(4.360)		(1.488)	
Contest3		0.011***		0.003
		(2.753)		(0.869)
Tobin's Q	0.200***	0.215***	0.205***	0.206***
	(2.765)	(2.963)	(6.633)	(6.653)
FCF	0.018	0.019*	-0.053***	-0.053***
	(1.597)	(1.705)	(-8.662)	(-8.684)
Age	0.317	0.021	-1.152	-1.201
	(0.244)	(0.016)	(-1.568)	(-1.636)
CS	0.018	0.016	-0.002	-0.003
	(1.308)	(1.129)	(-0.254)	(-0.305)
ABCS	0.007	0.006	0.009**	0.009**
	(0.909)	(0.781)	(2.044)	(2.004)
Growth	-0.000	-0.000	-0.010	-0.009
	(-0.367)	(-0.261)	(-0.815)	(-0.726)
Leverage	-0.031***	-0.034***	-0.005***	-0.005***
	(-3.797)	(-4.109)	(-4.810)	(-4.830)
Ln_Assets	1.027***	1.139***	-0.488***	-0.468***
	(4.800)	(5.382)	(-3.777)	(-3.644)
State	-0.389	-0.402	-0.519**	-0.521**
	(-0.989)	(-1.021)	(-2.260)	(-2.269)
Cons	-18.657***	-19.901***	13.949***	13.731***
	(-3.464)	(-3.696)	(4.307)	(4.246)
Industry and year	Yes	Yes	Yes	Yes
Sample size	4291	4291	5829	5829
R2	0.040	0.037	0.056	0.055
F-value	3.92***	3.58***	7.64***	7.60***

*, **, *** indicate statistical significance at 10%, 5% and 1%, respectively.

large shareholders, therefore, large shareholders are more likely to over-invest considering the private benefits of control, indicating that a multiple ownership structure can significantly increase over-investment. Meanwhile, because of the information asymmetry as well as the agency problem between shareholders and creditors, shareholders will not adopt new investment projects at the expense of their own interests in order to compensate creditors, and they lack enthusiasm to choose these projects, indicating that the multiple ownership structure will not influence under-investment.

Table 10 shows the impact of multiple large shareholders on absinvestment in over-investing (Model 1 and 2) and under-investing (Model 3 and 4) enterprises, and the results show that multiple large shareholders would significantly increase over-investment (Model 1: β=0.081, ρ<0.01; Model 2: β=0.011, ρ<0.01). Meanwhile, the results of Model 3 and 4 suggest that multiple large shareholders have no significant influence on under-investment (Model 3: β=0.018, ρ>0.10; Model 4: β=0.003, ρ>0.10). These results are consistent with our analysis above.

6 Conclusions

Previous empirical evidence indicates that multiple large shareholders can reduce insider tunneling activities by improving control rights, stimulating supervision vitality, ensuring a power balance, and playing a pivotal monitoring role. However, these findings fail to explain the collusion among major shareholders and the use of excessive control rights to expropriate the interests of minority shareholders. Thus, this paper sheds light on collusion. To the best of our knowledge, no study has

systematically explored the potential role of multiple large shareholders in enterprise investment. To fill this gap, this study investigates the impact of multiple large shareholders on absinvestment.

This study employs cash flow rights and the contestability of multiple large shareholders to explore the impact of multiple large shareholders on investment efficiency in the Chinese setting. The empirical study shows a profound positive relationship between both cash flow rights and the contestability of multiple large shareholders and absinvestment levels, demonstrating that multiple large shareholders can significantly increase the absinvestment level of listed companies. The results are robust even after controlling for endogenous problems, making sample adjustments and independent variable substitutions, and exploring different regression models and firm natures. Furthermore, this paper employs the threshold model to study the governance effect of controlling shareholders on multiple large shareholders, which demonstrates that the positive correlation between multiple large shareholders and absinvestment is strengthened by promoting the governance effect of controlling shareholders. We conclude that collusion between controlling shareholders and multiple large shareholders will worsen absinvestment. In addition, the heterogeneity analysis shows that firm nature does not affect the significant positive correlation between the multiple ownership structure and absinvestment, and the influence of a multiple ownership structure on absinvestment is realized through over-investment.

Despite some interesting findings, there are some limitations to this study. One of the most important limitations is that it ignores the influence of the identity of multiple large shareholders and whether they are institutional investors or not. We suspect that the impact on the role of multiple large shareholders varies with identity. Another important issue arising from this paper is that we consider multiple large shareholders as acting in concert. In the Chinese context, although we have reformed the shareholder structure of listed companies, the ownership structure is still concentrated. Therefore, we suspect that the optimal strategy for multiple large shareholders is to act in concert.

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Supplementary Material

Supplementary material accompanies this paper.

Supplementary data 1. Database.

Supplementary data 2. Do file.

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