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State ownership and firm performance: Empirical evidence from Chinese listed companies

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ABSTRACT

While the relationship between state ownership and firm performance has been widely researched, the empirical evidence has provided mixed results. This study applies panel data regression techniques to 10,639 firm-year observations of non-financial Chinese listed firms during 2003–2010 to examine the relationship between state ownership and firm performance. The results show that state ownership has a U-shaped relationship with firm performance. The Split Share Structure Reform in 2005–2006 played a positive role in enhancing the relationship between state ownership and firm profitability ratios. Although state ownership decreased significantly after 2006, it remains high in strategically important industry sectors such as the oil, natural gas and mining sector and the publishing, broadcasting and media sector. The findings reveal that a higher level of state ownership is superior to a dispersed ownership structure due to the benefits of government support and political connections. The Split Share Structure Reform made previously non-tradable shares legally tradable, improving corporate governance and reducing the negative effect of non-tradable state shares.

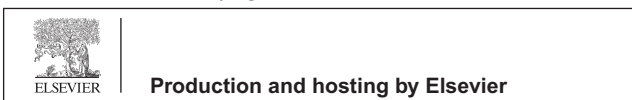
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1. Introduction

While the relationship between state ownership and firm performance has been widely researched, the empirical evidence has provided mixed results. China's economy has been developing quickly since its

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economic reform in the early 1980s, which makes research in this market intriguing. Because the Chinese government privatized small- and medium-sized state owned enterprises (SOEs) and corporatized large SOEs during the reforms, many Chinese public listed companies (PLCs) have a high level of state ownership. China initiated the Split Share Structure Reform during 2005–2006 and state shareholdings have since decreased. Chinese companies normally have a concentrated ownership structure, limited disclosure, poor investor protection, and reliance on the banking system. This paper attempts to answer the following questions. Is state ownership related to firm performance for Chinese PLCs? How has Chinese PLC state ownership changed since the Split Share Structure Reform? Did the Split Share Structure Reform play a positive role in moderating the relationship between state ownership and firm performance?

This study examines the relationship between state ownership and firm performance for Chinese PLCs. Panel data regression techniques are used to examine the relationship between state ownership and firm performance for 10,639 firm-year observations of non-financial Chinese PLCs during 2003–2010. The results show that state ownership has a U-shaped relationship with firm performance. The Split Share Structure Reform in 2005–2006 played a positive role in enhancing the relationship between state ownership and firm profitability ratios. Although state ownership decreased significantly after 2006, it remains high in strategically important industry sectors such as the oil, natural gas and mining sector and the publishing, broadcasting and media sector. The findings reveal that a higher level of state ownership is superior to a dispersed ownership structure due to the benefits of government support and political connections. The Split Share Structure Reform made previously non-tradable shares legally tradable, improving corporate governance and reducing the negative effect of non-tradable state shares.

The remainder of this paper is organized as follows. Section 2 introduces the literature in this area, the relevant theoretical frameworks, and empirical evidence. Sections 3 and 4 describe the model design and define the variables. In Section 5, panel data regressions are used to examine the relationship and the regression results are reported. Finally, conclusions and policy implications are offered in Section 6.

2. Literature review

Modern corporations face the issue of separation of ownership and control. It is desirable to monitor management to ensure it acts in shareholders' interests. While the biggest shareholder and block shareholders have the resources and incentives to supervise the work of management, a dispersed shareholding structure suffers from the "free-rider" problem. In general, the corporate governance literature has identified block ownership as an influential mechanism that mitigates the agency problem between managers and shareholders (Shleifer and Vishny, 1997; Claessens and Djankov, 1999). Large shareholders provide at least a partial solution to the free-rider problem of small investors, but blockholder ownership above a certain level may lead to the entrenchment of owner-managers that expropriate the wealth of minority shareholders (Fama and Jensen, 1983; Morck et al., 1989; Shleifer and Vishny, 1997).

The belief in public ownership inefficiency is underlined by the property rights perspective in economics (Martin and Parker, 1997; Villalonga, 2000) and the residual claimant theory (Rowthorn and Chang, 1993). The property rights theory claims that such rights in the private sector are more clearly defined than in the public sector, and thus, the incentive for seeking profits by private owners leads to more effective monitoring of management performance (Alchian, 1965; McCormick and Meiners, 1988).

In the US and UK, although ownership structures are dispersed, minority shareholders' rights are protected by a well-developed legal infrastructure, managerial labor market, and active takeover markets. A review of the literature on corporate governance issues in Asia by Claessens and Fan (2002) confirms the limited protection of minority shareholders' rights in Asia and the agency problems exacerbated by the low corporate transparency associated with rent-seeking and relationship-based transactions, extensive group structures, and risky financial structures. Chinese companies normally have a concentrated ownership structure, limited disclosure, poor investor protection, and reliance on the banking system. Law enforcement is quite weak. The large block shareholders for Chinese PLCs include private, state, or institutional shareholders. Because the Chinese government privatized small- and medium-sized SOEs and corporatized large SOEs during China's economic reforms, many Chinese public listed companies have high levels of state ownership. As the state is a major block shareholder of Chinese PLCs, this study identifies the role played by state ownership in firm

performance. It explores whether state ownership hinders or improves firm performance for Chinese PLCs in the new millennium.

The subject of state ownership has inspired many empirical studies. However, the empirical evidence for the relationship between state ownership and firm performance has been mixed. Table 1 summarizes a few key studies and their findings. Qi et al. (2000) examine a sample of Shanghai Stock Exchange-listed Chinese firms from 1991 to 1996 and conclude that state equity ownership is negatively related to operating performance. Further, Sun et al. (2002) examine a sample of Chinese listed firms from 1994 to 1997 and conclude that state equity ownership has an inverted U-shaped or concave relationship with market performance. They reason that government political support and business connections provided through state ownership are valuable and necessary to vitalize performance. However, Ng et al. (2009) and Hess et al. (2010), who examine Chinese listed firms from 1996 to 2003 and 2000 to 2004, respectively, both find a convex relationship between state ownership and market performance. This is inconsistent with the relationship found by Sun et al. (2002). Therefore, the relationship between state ownership and Chinese firm performance is unresolved.

The mixed empirical results may be attributable to different model specifications, firm performance measurements, and sample selection techniques. While Jiang et al. (2008) apply OLS regressions to cross-sectional data from 2004, Hess et al. (2010) use two-stage least squares analysis on balanced panel data. Hovey et al. (2003) randomly select 97 Chinese PLCs, while Wei et al. (2005) include all non-financial PLCs. Most studies have used financial ratios or market-based indicators to measure firm performance. Wei and Varela (2003) also use share returns and Lin et al. (2009) use firm efficiency. The implications of state ownership on firm performance may vary, as the performance indicators measure different aspects of firm performance. Sun et al. (2002) and Wei (2007) use the market to book ratio (MBR) as a market-based indicator. Both studies find a concave relationship between state ownership and firm performance. Some researchers have used Tobin's Q to reveal a convex relationship (e.g., Wei and Varela, 2003; Ng et al., 2009; Hess et al., 2010). China's stock prices have been extremely volatile and contain a large noise component (Xu and Wang, 1999). Measures that incorporate share price information such as share returns, the MBR or Tobin's Q are problematic in China (Jiang et al., 2008). It is an issue of the construct validity of the market-based indicators in China. As it is less noisy, the Tobin's Q measurement is better than the MBR.

Chinese PLCs experienced a great institutional change in the new century, and it is therefore imperative to conduct empirical tests on PLCs in relation to that change. In 2005–2006, Chinese authorities launched the Split Share Structure Reform program on the country's capital markets, aiming to eliminate non-tradable shares. China opened the Shanghai and Shenzhen Stock Exchange markets in 1990 and 1991, respectively, and began to develop its capital markets. A peculiarity of the Chinese markets is that only about one third of the shares in listed companies are legally tradable. When the Chinese government reformed SOEs to shareholding companies, various share ownership types were created, such as state shares, legal person shares, and A-shares. Unlike A-shares, state and legal person shares are not legally tradable and are usually government owned. They typically belong to the State or to domestic institutions ultimately owned by central or local governments. A split share structure was created because while these two classes of shares had different prices, they shared the same voting, cash flow, and other legal rights. The non-tradable shares can be transferred through negotiation or auction, but not in the open markets.

Non-tradable shares have long been considered a major hurdle to domestic financial market development (Beltratti et al., 2012). The existence of state and legal person shares has created a few problems. Because they are mostly government owned, the standard principal-agent problem is compounded by a multiple-principal problem, as government owners may pursue different objectives that do not necessarily relate to profit maximization. Because the majority of total shares comprise state and legal person shares, which are non-tradable, an outside market under corporate control was precluded (Jiang et al., 2008). The major shareholders were relatively indifferent to stock price movements, and the limited free float made the domestic market extremely illiquid and volatile (Beltratti et al., 2012).

Such problems triggered the share reform. At the beginning of 2005, about two thirds of the Chinese stock market comprised non-tradable shares. In April 2005, the Chinese government announced the Split Share Structure Reform, aiming to eliminate non-tradable shares by the end of 2006. The reform obliged the holders of non-tradable shares to compensate the holders of tradable shares in exchange for the right to sell their shares, typically in the forms of bonus shares, cash compensations, and options. To facilitate the reform, a

Table 1
Summary of previous key studies on state ownership and firm performance.

Authors	Sample size	Sample period	Firm performance measurement	Main findings
Qi et al. (2000)	774 firm observations of Shanghai Stock Exchange-listed Chinese PLCs	1991–1996	ROE	State equity ownership is negatively related to operating performance
Xu and Wang (1999)	668 firm observations of listed Chinese firms	1993–1995	MBR, ROE, ROA	Firm profitability is positively related to the proportion of legal person shares and either negatively or unrelated to the proportions of state shares and tradable A-shares
Sun et al. (2002)	1877 firm-year observations of Chinese PLCs	1994–1997	MBR, ROA, ROE	State equity ownership has an inverted U-shaped relationship with performance
Sun and Tong (2003)	634 SOEs listed on China's two exchanges	1994–1998	MBR, ROS, operating income per sales (EBITS)	State ownership has a negative impact on firm performance and legal person ownership has a positive impact on firm performance after privatization
Wei and Varela (2003)	Chinese public listed firms	1994–1996	Tobin's Q , share price returns	State equity ownership has a U-shaped relationship with firm performance.
Tian and Estrin (2008)	9594 firm-year observations of Chinese PLCs	1994–2004	Tobin's Q , ROA	Government ownership has a U-shaped relationship with corporate value
Wei et al. (2005)	5284 firm-years of China's partially privatized former SOEs	1991–2001	Tobin's Q	State equity ownership has a U-shaped relationship with firm performance
Ng et al. (2009)	4315 firm-year observations of newly listed Chinese firms	1996–2003	Tobin's Q , ROA, ROE	There is a convex relationship between state ownership and performance showing benefits from strong privatization and state control
Hovey et al. (2003)	97 randomly selected Chinese PLCs	1997–1999	Tobin's Q	State ownership or ownership concentration is not related to firm value
Wei (2007)	276 Chinese PLCs	1999–2002	MBV ^a , MBS ^b , ROA, gross profit margin	The relationship between state-owned shareholdings and corporate performance is non-linear. When the proportion of state-owned shares is relatively small, there is no negative relationship. When the proportion is above 50%, state-owned shareholdings have a significant negative impact on company performance
Lin et al. (2009)	461 Chinese public listed manufacturing firms	1999–2002	Firm efficiency	State ownership is negatively related to firm efficiency. The relationship between ownership concentration and firm efficiency is U-shaped
Gunasekarage et al. (2007)	1034 Chinese PLCs	2000–2004	Tobin's Q , MBR	The relationship between state ownership and firm value is U-shaped. A balanced leadership structure enhances firm performance
Hess et al. (2010)	Balanced sample of 5170 firm-years of 1034 Chinese PLCs	2000–2004	Tobin's Q	The findings reconfirm the U-shaped relationship between state ownership and firm performance. For some companies without, or with very low, state ownership, there is some evidence that large private block shareholdings might be to the detriment of firm value
Jiang et al. (2008)	794/821 listed companies on the Shanghai Stock Exchange	2004	ROA, ROE, ROS and REITA ^c	The government-owned share proportion is found to have exerted a linear and positive impact on firm performance

^a The market value of equity plus the book value of debt divided by the book value of equity.

^b The market value of equity plus total debt divided by sales.

^c The ratio of earnings before interest minus taxes to assets.

series of measures were taken to address the issue of price volatility and stabilize the stock market. The lockup period was at least 1 year for holders of non-tradable shares after they obtain the liquidity right to convert their shares into tradable shares. Furthermore, in the 2 years after the expiration of the lockup, a holder of non-tradable shares cannot trade more than 5% (10%) of the company's total share capital within 1 year (2 years). By mid-2006, this conversion process had been completed by 94% of listed companies (People's Daily, 2006). It increased the tradable share proportion and signaled the beginning of the decline in government-owned shares. The short-term investor response has been extremely positive amid expectations of improved corporate governance and a greater focus on profit maximization (Jiang et al., 2008).

The key purpose of this study is to examine the effects of state ownership on firm performance using a larger and more recent sample of 10,639 firm-year observations of Chinese public listed firms during 2003–2010. This study contributes to the literature by examining the effect of the Split Share Structure Reform on the relationship between state ownership and firm performance and by providing the most recent empirical evidence for Chinese public listed companies.

3. Model design

We use panel data regressions to test the relationship between state ownership and firm performance. Panel data include repeated measures of one or more variables on one or more firms (repeated cross-sectional time series). It is more informative (more variability, less collinearity, more degrees of freedom), and the estimates are more efficient. Panel data also allow for control of individual unobserved heterogeneity (Wooldridge, 2003).

The econometric model is specified as follows:

$$\text{Perf}_{it} = \beta X_{it} + \alpha_i + \gamma_t + \varepsilon_{it} \quad (1)$$

Here, Perf_{it} represents dependent variables to measure firm performance for firm i at time t , including return on assets (ROA), return on equity (ROE), and Tobin's Q . X_{it} is a vector of variables including board and firm characteristics such as state ownership, director ownership, director compensation, debt ratio, and firm size. These variables have been commonly used in corporate governance literature. β represents the coefficients to be estimated, and ε_{it} is the error term. α_i is the firm fixed effect, and γ_t is the year fixed effect.

We use panel data analysis techniques to analyze the implications of state ownership on firm performance. In examining the repeated cross-section of observations, panel data are better suited to study the dynamics of change (Gujarati, 2003). The panel data include fixed effects (FE) and random effects (RE) estimators. If the regressors are correlated with individual unobserved effects (a^i), the FE estimator is consistent, but the RE estimator is not consistent. If the regressors are uncorrelated with a^i , the FE estimator is still consistent albeit inefficient, and the RE estimator is consistent and efficient (Baum, 2006). Therefore, we may consider these two alternatives in the Hausman test framework, fitting both models, and comparing their common coefficient estimates. In this paper, FE and RE are compared using the Hausman test and the results are reported.

4. Variable definitions

Financial performance refers to a company's ability to generate new resources from day-to-day operations over a given timeframe. A company's performance is gauged by its net income and cash from operations. This study uses ROA and ROE to measure profitability. ROA is calculated by dividing total profits plus financial expenses by average total assets. Average total assets are the average of beginning total assets plus ending total assets. ROE is obtained by dividing net profits by average shareholders' equity. Average shareholders' equity is the average of ending shareholders' equity from last year plus ending shareholders' equity in the present year. Tobin's Q is defined as the ratio of market value to ending total assets, where market value is the sum of the market value of equity and the market value of net debt. Net assets are used to calculate the market value of non-negotiable equity.

State ownership is the percentage of state ownership. Director compensation is measured as the total emolument of the top three directors. The yearly emolument of the top three highest board members are disclosed in Chinese listed companies' annual reports. Board ownership is measured as total directors' ownership

percentage. Managerial and board equity ownership have long been recognized as means of aligning shareholder and management interests. Total liabilities divided by total assets is used to measure the debt ratio. Firm size is measured by the book value of firm assets.

Previous empirical evidence shows that state ownership has a quadratic function with firm performance (Wei et al., 2005; Gunasekarage et al., 2007; Tian and Estrin, 2008). As such, the quadratic function is tested in the regression models. This study is also interested in examining the effect of the Split Share Structure Reform on the relationship between state ownership and firm performance. A reform dummy variable is created: equal to one for years from 2006 onwards, and 0 otherwise. An interaction term between state ownership and the reform dummy is then created to capture the effect of the reform. The research includes panel data regressions with state ownership, the reform dummy, the interaction term and other board and firm characteristics as independent variables, and ROA, ROE, and Tobin's Q as dependent variables.

5. Data analysis

The data set is taken from the China Stock Market and Accounting Research (CSMAR) database¹ and covers all Chinese public listed companies from 2003 to 2010, excluding companies in the finance industry and those that only issued B-shares. Chinese companies may issue three types of tradable shares. Tradable A-shares are listed on the two domestic stock exchanges (Shanghai and Shenzhen) to domestic investors and denominated in Chinese renminbi (RMB). B-shares are issued to foreign investors and traded in either US or Hong Kong dollars. Further, a Chinese company may also trade on the Hong Kong Stock Exchange and issue H-shares. This study deals with Chinese PLCs that issue A-shares in domestic stock exchanges (Conyon and He, 2011). The data of companies that received special treatment or had incomplete data or extreme values were excluded. The final sample size is 10,639 firm-year observations. To remove the effect of outliers, we winsorize the firm performance variables.² Winsorization is commonly used in corporate governance literature, such as studies by Erkens et al. (2012) and Liu et al. (2012).

5.1. Descriptive data

After the Third Plenum of the 11th CPC Central Committee's adoption of reform and opening-up policies in 1978, China started its market-driven economic reforms. The first stock market was set up in Shanghai in 1990, and in 1991, a second stock market was set up in Shenzhen. Panel A of Table 2 shows the data from 1991 to 2001 as a summary of the statistics from a study by Wei et al. (2005). We can clearly see the development of the Chinese PLCs and the state ownership percentages since 1991. The number of Chinese PLCs included in the study by Wei et al. (2005) begins at nine in 1991, rises to 25 in 1992, and quickly develops into over 1000 in 2001. Average state ownership from 1991 to 2001 varies from 20.6 to 33.4%.

Panel B shows that state ownership has been declining, particularly since the 2006 Split Share Structure Reform. Average ROA and ROE reveal that firm performance dipped in 2008 due to the financial crisis and began to recover in 2009. Panel C shows that with the exception of the finance industry, there are 12 industries according to guidance on the CSRC's Industry Classification of Listed Companies (2001 version), and 58.43% of observations are in the manufacturing sector. After the Split Share Structure Reform, the average state ownership from 2006 to 2010 became much lower compared with that during 2003–2005, except for the publishing, broadcasting, and media industry sector. State ownership decreased significantly after 2006, but remains high in strategically important sectors such as the oil, natural gas and mining sector and the publishing, broadcasting and media industry sector. Wei and Varela (2003) find that firm size and strategic industry status are the main determinants of state ownership. Ng et al. (2009) study newly listed companies from 1996 to 2003 and find that strategically important industries such as mining and exploitation have positive relationships with state ownership. In their study, mining and exploitation is the same industry as the oil,

¹ The CSMAR database is designed by the China Accounting and Finance Research Centre of The Hong Kong Polytechnic University and developed by Shenzhen GTA Information Technology Corporation Limited.

² We winsorize ROA and ROE at the 2.5% level in both tails of the distribution, and Tobin's Q at the 2.5% level only at the right tail of the distribution.

Table 2
Descriptive data.

Year	No. of observations	State ownership	Year	No. of observations	State ownership	ROA	ROE	Tobin's <i>Q</i>
<i>Panel A: Summary statistics of non-financial Chinese PLCs from Wei et al. (2005)</i>			<i>Panel B: Descriptive statistics by year</i>					
1991	9	0.278						
1992	25	0.206						
1993	93	0.284						
1994	259	0.321	2003	1076	0.375	0.053	0.056	1.241
1995	285	0.309	2004	1180	0.358	0.056	0.059	1.127
1996	377	0.313	2005	1189	0.344	0.047	0.043	1.039
1997	663	0.313	2006	1232	0.296	0.060	0.07	1.261
1998	767	0.293	2007	1348	0.259	0.080	0.103	2.133
1999	861	0.281	2008	1429	0.223	0.063	0.073	1.291
2000	880	0.316	2009	1325	0.128	0.070	0.092	2.135
2001	1065	0.334	2010	1860	0.091	0.077	0.101	2.151
Industry	Sample size	Percent	Average state ownership 2003–2005		Average state ownership 2006–2010			
<i>Panel C: Sample size and state ownership according to industry classification</i>								
Agriculture, forestry, grazing, and fishing	232	2.18	0.373		0.155			
Oil, natural gas, and mining	225	2.11	0.565		0.407			
Manufacturing	6216	58.43	0.363		0.176			
Electricity, gas, and water supply	437	4.11	0.474		0.312			
Civil engineering and construction	230	2.16	0.467		0.239			
Transportation and storage	468	4.4	0.467		0.331			
Information technology	671	6.31	0.262		0.118			
Wholesale and retail	650	6.11	0.365		0.178			
Real estate	541	5.09	0.296		0.168			
Public service	334	3.14	0.399		0.255			
Publishing, broadcasting, and media	69	0.65	0.324		0.341			
Conglomerates	566	5.32	0.193		0.101			
	10,639	100						
Variable	Mean	Median	Std. dev.		Min	Max		
<i>Panel D: Summary statistics</i>								
State ownership	0.245	0.187	0.251		0	0.971		
ROA	0.065	0.059	0.058		−0.090	0.212		
ROE	0.077	0.077	0.110		−0.296	0.321		
Tobin's <i>Q</i>	1.598	1.287	0.834		0.477	4.570		
Board ownership	0.038	0.00001	0.122		0	0.748		
Log of board salary	14.332	14.346	0.937		0	22.385		
Log of assets	21.494	21.36	1.143		17.497	28.138		
Debt ratio	0.478	0.492	0.195		0.008	0.999		

Notes: ROA: (total profits + financial expenses)/average total assets. ROE: net profits/average shareholders' equity. Tobin's *Q*: ratio of market value to ending total assets, where the market value is the sum of the market value of equity and the market value of net debt. State ownership: state shareholding percentage. Board ownership: board share ownership percentage. Log of board salary: log of the total emolument of the top three directors. Log of assets: log of firm assets. Debt ratio: total liabilities/total assets.

natural gas, and mining sector in this paper. The publishing, broadcasting, and media sector also has a positive relationship with state ownership, although its sample size is small in the study by Ng et al. (2009). The result from this study shows that the strategic importance of sectors such as the oil, natural gas and mining sector and the publishing, broadcasting and media sector remains a significant factor in determining state ownership. Panel D presents the summary statistics of the variables. Average state ownership is 24.5% and it decreased from 37.5% in 2003 to 9.1% in 2010 as shown in Panel B. Average ROA, ROE and

Table 3
Correlation matrix.

	ROA	ROE	Tobin's <i>Q</i>	State ownership	Board ownership	Log of board salary	Log of assets	Debt ratio
ROA	1							
ROE	0.882	1						
Tobin's <i>Q</i>	0.242	0.169	1					
State ownership	-0.041	-0.04	-0.318	1				
Board ownership	0.189	0.127	0.094	-0.282	1			
Log of board salary	0.291	0.307	0.100	-0.113	0.067	1		
Log of assets	0.140	0.210	-0.242	0.161	-0.179	0.460	1	
Debt ratio	-0.327	-0.151	-0.239	0.05	-0.263	0.015	0.308	1

Notes: ROA: (total profits + financial expenses)/average total assets. ROE: net profits/average shareholders' equity. Tobin's *Q*: ratio of market value to ending total assets, where the market value is the sum of the market value of equity and the market value of net debt. State ownership: state shareholding percentage. Board ownership: board share ownership percentage. Log of board salary: log of the total salary of the top three directors. Log of assets: log of firm assets. Debt ratio: total liabilities/total assets.

Tobin's *Q* are 6.5%, 7.7% and 1.598, respectively.³ Average board ownership is 3.8%, and the average debt ratio is 47.8%.

The term “multicollinearity” refers to situations where two or more variables can be linearly related. Multicollinearity can result in numerically unstable estimates of the regression coefficients. Table 3 reveals that the correlations of each pairwise variable are low, except for ROA and ROE.

5.2. Regression analysis

We use a Hausman test to identify whether the fixed effects model is better than the random effects model. In this case, it is, and so the fixed effects results are reported. When presenting the results, Models 1, 3, and 5 include the quadratic terms of state ownership. In Models 2, 4 and 6, the state ownership reform variable is added to test the effect of the reform (see Table 4).

Model 1 reveals a U-shaped relationship between state ownership and ROA. The reflection point based on Model 1 is 32%. State ownership is initially negatively related to ROA, but after this point, more state ownership begins to have positive implications for ROA. The reform dummy and state ownership/reform dummy interaction term are added in Model 2, and both are positively related to ROA. This implies that the Split Share Structure Reform has a positive effect on ROA and on the relationship between state ownership and ROA. In Model 3, a U-shaped relationship between state ownership and ROE is revealed. The reflection point based on Model 3 is 31.44%. As such, Models 1 and 3 provide consistent evidence that for Chinese PLCs, state ownership is initially negatively related to firm performance, and when state ownership is above a certain level (about 32%), it begins to have positive implications for firm performance.

In the Chinese context, investor protection is poor, and the legal system and regulatory enforcement are quite weak. Chinese public listed companies that have lower state shareholding levels may have large controlling shareholder or mixed/dispersed ownership structures. Dispersed ownership creates a free-rider problem, as small investors do not have the incentives or resources to control and monitor management. Ng et al. (2009) find that Chinese firms with mixed control perform significantly poorer than state or privately controlled firms due to issues such as ownership and agent incentive/control ambiguity. Chinese PLCs typically have a large controlling shareholder who has the ability to supervise and the power to tunnel wealth from small outside investors (Huyghebaert and Wang, 2012). The goal of maximizing private benefits becomes easier to realize as the power of the dominant owners in the listed companies rises (Claessens et al., 2000; La Porta et al., 1999). Hence, lower levels of state ownership have negative implications for firm performance. When the state ownership level is high, bureaucrats put more effort into firms in which they have large holdings. SOEs may

³ The mean and maximum values of the three firm performance variables may be lower than those presented in similar studies because they are winsorized.

Table 4
Panel data regressions of firm performance: 2003–2010.

Dependent variables	ROA	ROA	ROE	ROE	Tobin's <i>Q</i>	Tobin's <i>Q</i>
Independent variables	FE coef.	FE coef.	FE coef.	FE coef.	FE coef.	FE coef.
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
State ownership	−0.066***	−0.077***	−0.122***	−0.158***	−0.857***	−0.246
State ownership ²	0.103***	0.114***	0.194***	0.23***	0.938***	0.339
Reform		0.005**		0.003		0.267***
State ownership × Reform		0.009**		0.027***		−0.454***
Board ownership	0.074***	0.072***	0.142***	0.137***	−1.7***	−1.61***
Log of board salary	0.008***	0.008***	0.014***	0.014***	0.056***	0.057***
Log of assets	0.01***	0.01***	0.033***	0.032***	−0.493***	−0.48***
Debt ratio	−0.135***	−0.135***	−0.221***	−0.222***	−0.408***	−0.398***
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−0.213***	−0.205***	−0.726***	−0.702***	11.2***	10.8***
<i>R</i> ²	0.142	0.142	0.104	0.105	0.559	0.562
<i>N</i>	10,639	10,639	10,639	10,639	10,639	10,639

Notes: ROA: (total profits + financial expenses)/average total assets. ROE: net profits/average shareholders' equity. Tobin's *Q*: ratio of market value to ending total assets, where market value is the sum of the market value of equity and the market value of net debt. State ownership: state shareholding percentage. State ownership²: square term of state shareholding percentage. Reform: equals 1 for years from 2006 onwards, and 0 otherwise. State ownership × Reform: interaction term of state ownership with the reform dummy. Board ownership: board share ownership percentage. Log of board salary: log of the total emolument of the top three directors. Log of assets: log of firm assets. Debt ratio: total liabilities/total assets.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

also gain preferential treatment from the government such as preferential loans and large product orders (Tian and Estrin, 2008; Sun et al., 2002). The markets in China do not always operate openly and fairly, and this has given politicians the ability to provide firms with privileged access to resources (Che and Qian, 1998). Firms dominated by the various state players maintain a greater respect by the market and outperform those with lower state blockholding levels (Hess et al., 2010). At high state shareholding levels, the state provides more resources and greater authority compared with small investors under a dispersed ownership structure. Thus, a higher level of state shareholding is superior to a dispersed ownership structure for Chinese PLCs, as it mitigates the free-rider problem of small investors. A high state ownership level has positive implications for firm performance.

Wei and Varela (2003), Wei et al. (2005), Gunasekarage et al. (2007) and Tian and Estrin (2008) examine Chinese listed firms from 1994–1996, 1991–2001, 2000–2004 and 1994–2000, respectively, and all find a U-shaped relationship between state ownership and market performance. Based on the most recent data from 2003 to 2010, the results of this paper are consistent with these four studies. The results reveal that the government acting as owner can improve corporate value in China, particularly if its shareholding is large enough. As it results in preferential treatment from the government, state-based governance may be superior to a government vacuum under dispersed shareholding structures (Tian and Estrin, 2008).

In Model 4, the reform dummy is not significant, and the state ownership reform variable again shows a significant positive sign. China's unique split share structure and the existence of non-tradable shares introduced more agency problems and rendered its capital market more conflicted than other emerging markets. A reduction in government ownership may act to alleviate the multiple-principal problem (Jiang et al., 2008) and improve corporate governance and stock market efficiency. Covering 2002–2008, Tseng (2012) finds that the Split Share Structure Reform did play a positive role in alleviating the agency problems of listed firms in China. Based on data from 2004 to 2008, Yu and Xu (2010) find that the Split Share Structure Reform improved firm performance. Liao et al. (2012) find significant improvements in listed SOEs' outputs, profitability, employment, productive efficiency, and governance after the reform. The market mechanism that helped to strike a balance between government agendas and public investor interests has played an important and positive role in its success.

The Split Share Structure Reform abolished the trading restrictions on non-tradable shares. As a result, state shareholders' wealth has become more sensitive to share price movements, and their conflicts of interests with private shareholders and information asymmetry have been reduced (Hou et al., 2012). Hou et al. (2012) find that share price informativeness has increased and that the reform has benefited the information environment and minority shareholders in China's stock market. The Split Share Structure Reform made non-tradable shares legally tradable, which has improved corporate governance, reduced the negative effect of non-tradable state shares and placed a greater focus on profit maximization. Thus, it has played a positive role in moderating the relationship between state ownership and firm profitability ratios.

Model 5 reveals a U-shaped relationship between state ownership and Tobin's Q . In Model 6, the reform dummy is positively related to Tobin's Q and the state ownership reform variable is negatively related to Tobin's Q . The price of non-tradable state and legal person shares, based on book value, is lower than the price of tradable shares. Compensation is normally made in the form of additional tradable shares distributed to shareholders. As a result, the percentage of tradable shares increases and the percentage of non-tradable shares reduces. The market's reaction to the Split Share Structure Reform was positive, as shown in a study by Beltratti et al. (2012), which further shows that the reform was beneficial. The market rose 40% in the first 4 months of 2007, immediately after the completion of the Split Share Structure Reform for the entire stock market (Beltratti and Bortolotti, 2007). In late 2007 and during 2008, the A-share prices in the Shanghai and Shenzhen Stock Exchanges began to fall, due largely to the global credit crunch and in small part to the building of risk premiums related to fears of large-scale state share disposals (McGuinness, 2009). During the reform, a series of measures were taken to limit the liquidity from expanding too fast and mitigate the huge volatility in the stock market. All of the non-tradable shares could only be fully tradable over the 3 years following the ratification of the compensation plan. The 3 years have since passed, and some Chinese PLCs have reduced their state ownership to zero in 2009–2010. Since 2005, the percentage of state ownership has decreased year by year, and the negative coefficient of the state ownership reform variable indicates that the reform had a negative effect on the relationship between state ownership and market valuation due to various factors such as the excess liquidity caused by state share disposals and global credit crunch factors.

Across the four models, the control variables, log of board salary, and board ownership are positively related to firm performance. As important incentive alignment mechanisms, board salary and ownership have played a positive role in aligning board members' objectives with those of the companies. Managers and directors whose personal wealth is significantly linked to the value of their firms have an incentive to act in the interests of outside shareholders. Crespi-Cladera and Gispert (2003) and Henry (2008) find a positive relationship between company performance and board remuneration. Schmid and Zimmermann (2008) find an inverted U-shaped relationship between directors' and officers' shareholdings and firm value. He (2008) finds a positive relationship between board ownership and firm performance. Firm size, as measured by the log of firm assets, is positively related to the firm's profitability ratios. A firm's assets or employee numbers have been widely used in the literature to measure firm size, as in studies by Judge et al. (2003), Dahya and McConnell (2007), Ehikioya (2009), Faleye (2007) and Elsayed (2007). Debt ratios are negatively related to firm performance, consistent with numerous other studies (e.g., Hossain et al., 2001; Jackling and Johl, 2009; Li and Wong, 2003; Panasian et al., 2008).

6. Conclusion and policy implication

This study applies panel data regression techniques to examine the relationship between state ownership and firm performance for 10,639 firm-year observations of non-financial Chinese public listed firms during 2003–2010. The results show that state ownership has a U-shaped relationship with firm performance. The Split Share Structure Reform in 2005–2006 played a positive role in enhancing the relationship between state ownership and firm profitability ratios. Although state ownership decreased significantly after 2006, it has remained high in strategically important industry sectors such as the oil, natural gas and mining sector and the publishing, broadcasting and media sector.

Shleifer and Vishny (1997) identify concentrated ownership as an essential element of a good corporate governance system. Unlike diversified investors who own an insignificant fraction of outstanding equity, the large equity positions held by blockholders effectively give them some control over the firms in which they

invest. This study provides further evidence and reveals that a higher level of state ownership plays a positive role in enhancing firm performance. In the Chinese context, investor protection is poor and law enforcement is quite weak. The state, being the large shareholder, can provide support in terms of financing and resources. A higher level of state shareholding is superior to a dispersed ownership structure, as the latter suffers from a free-rider problem. At a higher state ownership level, state-based governance may be superior to a governance vacuum under a dispersed shareholding structure (Tian and Estrin, 2008).

The Split Share Structure Reform abolished the trading restrictions on non-tradable shares. It has played a positive role in alleviating the agency problems of listed companies in China (Tseng, 2012) and multiple-principal problems through its reduction of state ownership (Jiang et al., 2008). As a result, it has improved corporate governance and reduced the negative effects of non-tradable state shares and played a positive role in moderating the relationship between state ownership and firm profitability ratios.

This paper's results reveal that the state shareholder offers both a "grabbing hand" and a "helping hand" to Chinese PLCs. The Split Share Structure Reform has played a positive role in enhancing the relationship between state ownership and firm profitability ratios. The results from this paper provide practical guidelines for optimal ownership structures to enhance Chinese PLCs' financial performance. The policy implication is that along with the privatization of SOEs, strengthening institutions and sound reforms are also crucial for the development of China's stock market.

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Corporate governance and firm value: Evidence from Chinese state-controlled listed firms

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ABSTRACT

The association between corporate governance and firm value has been extensively studied in Chinese listed firms. Based on the characteristics of their ultimate shareholders, Chinese listed firms can be categorised as (1) central state-controlled, (2) local state-controlled or (3) non-state-controlled. Some scholars have described Chinese government policy as ‘*zhuada fangxiao*’, thus suggesting that the corporate governance mechanisms (CGMs) of central state-controlled listed firms (SCLFs) are better than those of local state-controlled listed firms. Therefore, this paper specifically examines the influence of CGMs on the value of central SCLFs and local SCLFs. Analysis of 2006 firm-year observations from 2007 to 2009 suggests that the aggregate ownership of other large shareholders and the remuneration of top executives exhibit different effects on firm value in central and local SCLFs. The results also provide evidence that there is no endogenous effect of firm value on the ownership of the largest shareholder in central and local SCLFs.

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1. Introduction

1.1. Historical development

Since launching its open door policy in 1978, the Chinese government has continued to reform the corporate policies of state-owned enterprises (SOEs) and has improved connections between the state economy and the market economy. As SOEs are a substantial part of the national economy and of government revenue, the Chinese government has gradually privatized SOEs to raise funds for expansions and to increase efficiency. The history of this gradual transformation of Chinese SOEs is summarized in Table 1.

Most Chinese listed firms were established through the privatization of SOEs. To maintain their dominant position, equity in listed firms is divided into A-shares, B-shares, H-shares, state-owned shares, institutional shares, employee shares and other shares, but only A-, B- and H-shares can be freely traded. A- and B-shares are generally traded on two domestic stock exchanges whereas H-shares are traded on the Hong Kong Stock Exchange. Before the share reform¹ of 2005, state shares could not be traded on any stock exchange (i.e., they were non-tradable shares). Table 2 illustrates the percentage of state-owned shares from 2001 to 2007. The average percentage of state-owned shares between 2001 and 2005 (before the share reform) was approximately 46.5% of the total shares but the percentage of state-owned shares decreased to 26.9% in 2007.

1.2. Motivation of the study

Traditional SOEs were initially ideological organizations created as work units (*gongzuo danwei*) to serve social and political purposes rather than to meet economic objectives. The primary stakeholders of SOEs were public officials, government bureaucrats and top managers appointed to run the SOEs, who enjoyed the same privileges as state cadres (*guojia ganbu*). Secondary stakeholders were the SOEs' workers, who expected an 'iron rice bowl' (*tiefanwan*) with cradle-to-grave benefits (Hua et al., 2006).

State ownership is widely viewed as, and has been repeatedly demonstrated to be, inefficient (Boycko et al., 1995). Both the profit motives and the political motives of government officials have the potential to significantly distort objective policy (Trebilcock and Iacobucci, 2003). Recognizing these potential problems, the Chinese government has been gradually privatizing its SOEs, either through management buyouts or by going public (i.e., by listing them on the Chinese and Hong Kong stock markets).

1.2.1. Reform of state-owned enterprises (*zhuada fangxiao* policy)

The early economic reform that introduced the price system and profit incentives to SOEs did not significantly improve their performance. Consequently, President Jiang Zemin announced the *zhuada fangxiao* policy (grasp the large, release the small) at the Fifteenth Communist Party Congress in 1997. Under this policy, the central government retained ownership of SOEs that (1) produce defence goods and services, (2) are in industrial sectors targeted for economic development or (3) are insolvent, but employed millions of employees.² The central government decided that the state should withdraw from the competitive sectors of the national economy and only concentrate on strategic industries. The *zhuada fangxiao* strategy was therefore announced as the guiding principle for SOE reform, which after various experiments at local levels has been interpreted as privatizing all but the largest SOEs controlled by the central government or the central SOEs (Leng, 2009).

¹ Before the share reform, state-owned and legal person shares (normally including those shares held by the largest shareholders) were non-tradable on any stock exchange. The share reform involved a capital reorganization that converted non-tradable shares into tradable ones.

² Extracted from the report 'Five challenges that China must overcome to sustain economic growth', released by the Joint Economic Committee of the United States Congress in July 2006. Available from the website: <http://www3.nccu.edu.tw/~hmlie/social%20insurance%20in%20china/paper/FIVE%20CHALLENGES%20THAT%20CHINA%20MUST%20OVERCOME.pdf>, accessed 27 July 2012.

Table 1
The reform process and its results for Chinese SOEs.

Reformation time	1978–1985	1986–1991	1992–2002	2003–Present
Main content	Decision-making rights delegated to factory directors who make profits from the SOEs Expanded management autonomy	Management responsibility system Separation of ownership and management authority	Modern corporate system; ‘corporatization’ introduced, reform enacted and laws strengthened	Establishment of State-owned Assets Supervision and Administration Commission Enhanced supervision and service of state-owned assets
Results	Performance evaluation No corporate governance system in place; lack of external environment needed for reform.	Short-term performance focus Excessive government administration Increased corruption	Despite some achievements, ownership of state-owned assets is still an issue	Emphasis on the core political role of the Chinese Communist Party in the corporate governance system

Adopted from Cho and Huang (2010).

Table 2
Share ownership (2001–2007).

	2001	2002	2003	2004	2005	2006	2007
State-owned shares	241,061	277,343	304,653	334,420	343,334	458,821	603,388
Other non-tradable shares	99,423	106,512	111,423	122,805	128,140	350,773	610,441
Total non-tradable shares	340,484	383,855	416,076	457,225	471,474	809,594	1,213,829
Tradable shares	181,317	203,690	226,770	257,718	291,477	683,041	1,033,149
Total shares	521,801	587,545	642,846	714,943	762,951	1,492,635	2,246,978
Percentage of state-owned shares	46.2%	47.2%	47.4%	46.8%	45.0%	30.7%	26.9%

Unit: Million shares.

Extracted from the China Securities Regulatory Commission, 2008 *Almanac of Chinese Listed Companies*, Table 7 – Capital Structure Figures (1992–2007).

1.2.2. What is *zhuada fangxiao*?

Chinese scholars (e.g., Leng, 2009; Wang, 2010) have described the current policy as *zhuada fangxiao*, in which central SOEs are subject to a ‘grasp the large’ (*zhuada*) scheme in which the state owner retains control. Local SOEs are managed under the ‘release the small’ (*fangxiao*) scheme, aimed at introducing foreign and private capital and creating more complete privatization (Leng, 2009).

According to Leng (2009), in July 2007 there were 155 large SOEs owned and directly controlled by the central government, and these SOEs were generally in strategic sectors and industries such as oil, telecommunications, civil aviation, highway, steel and power. The State-owned Assets Supervision and Administration Commission (SASAC) took actions to implement a strategy of ‘grasping the large’ (*zhuada*) aimed at building the global competitiveness of the central SOEs. The major schemes adopted by the SASAC to implement the *zhuada* strategy include:

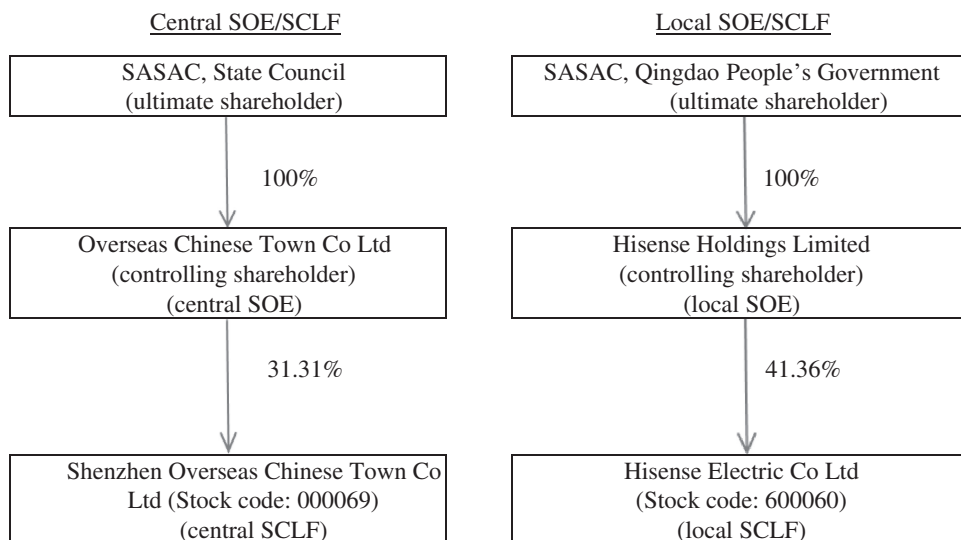
- encouraging industrial rationalization to achieve operational integration and capacity expansion;
- introducing competition to state monopolies in strategic sectors;
- consolidating ‘core business lines’ and decoupling ancillary operations; and

- “Going out”: overseas investment and expansion (Leng, 2009).

The mandate of the SASAC is to represent the state owner in China’s largest SOEs under central government control (central SOEs), with a primary responsibility for maintaining and increasing the value of state assets in these firms. In June 2003, local governments were granted the *de facto* ownership rights to local SOEs. This means that local governments now enjoy the status of owners of the state assets under their control and have the right to transfer or auction off these assets and to make personnel decisions in local SOEs without first having to obtain approval from central government (Leng, 2009), i.e., the *fangxiao* policy. For Chinese state-owned small and medium enterprises (SMEs), which are usually controlled by local governments, corporate governance reform has gradually been taking place and some meaningful results have been achieved (Leng, 2009). Through ownership restructuring guided by the *fangxiao* policy, the majority of Chinese state-owned SMEs have been privatized by insiders, including former managers and employees, and consequently some state-owned SMEs are now under the control of their respective local governments. Nevertheless, Wang and Xiao (2009) argue that local governments have a strong incentive to impose policies on the firms under their control, especially when they are experiencing fiscal difficulties.

1.2.3. Establishment of the state-assets management system

SOEs are considered to be owned by the Chinese people but managed by politicians, resulting in a typical agency problem, i.e., the separation of ownership and control. For administrative purposes, certain SOEs, particularly the largest ones (hereinafter central SOEs), are under the supervision of central government elements including the State Council, its ministries and the SASAC. In contrast, many smaller SOEs (hereinafter local SOEs) are under the supervision of local governments and their respective SASACs. Under current policy,³ both the central government and the various local governments are presumed to exercise investors’ rights on behalf of the state. Both central and local SOEs further split this structure when they undertake IPOs, i.e., by forming central state-controlled listed firms (hereinafter central SCLFs) and local state-controlled listed firms (hereinafter local SCLFs). Examples of the organizational structures of these two types of listed firms are set out in the following diagram.



³ See Provisional Regulations on the Supervision and Administration of Assets in State-owned Enterprises and Provisional Methods on the Transfer of Assets in State-owned Enterprises, promulgated by the State Council in 2003.

1.2.4. Corporate governance of SCLFs

Although both central government and relevant local governments play the role of shareholders in all SOEs, their actions and motivations are quite different. The Research Centre of the Shanghai Stock Exchange (2006) stated that the CGMs of central SOEs are better than those of local SOEs, because the largest shareholders of the former do not have strong incentives to expropriate profits and the central government, as the ultimate shareholder, has implemented restrictions on the activities of the largest shareholders. However, it has been reported that the largest shareholders of local SCLFs usually tunnel the listed firms to subsidise public expenditure or provide retirement benefits to ex-employees at the expense of other shareholders (e.g., see the case studies on Northeast Electrical and Jiugui in Appendix A). It is well established that some SOEs do not follow the rules and regulations.⁴ Appendix A presents the details of three Chinese listed firms with respect to propping, tunnelling and business dependence among the largest shareholders (controlling party). It is on this basis that the corporate performance of Chinese listed firms is materially manipulated.

Several scholars have investigated the association between CGMs and firm value in Chinese listed firms (e.g., Chen, 2001; Bai et al., 2004; Wang and Xiao, 2009; Xia, 2008). However, these studies ignore the dominant influence of SOEs in the capital market and thus mainly investigate the full population of Chinese listed firms without deeply analysing the characteristics of the ultimate shareholders in these listed firms. Table 3 presents the percentage of firms in which the state is the ultimate controller in China in comparison with seven other countries. It indicates that in most countries (except Singapore), SOEs amount to an insignificant proportion of their respective capital markets, and in China, the percentage of SCLFs and non-SCLFs amount to 63.15% and 36.85%, respectively.

The above discussion leads us to consider the potential heterogeneous associations between CGMs and the value of Chinese listed firms. However, Wang and Xiao (2009) claim that local governments have a strong incentive to impose policies on the firms under their control. Chen and Zhu (2007) and the Shanghai Stock Exchange (2006) further emphasise that central government and local governments manage their listed firms differently. Hua and Liu (2009) argue that the central government has exercised tight control over central SCLFs while local governments have higher motivation for both propping and tunnelling their listed firms for the respective purposes of placement of new shares and expropriation. Chen and Zhu (2007) study Zhengzhou Yutong Bus Co., Ltd. (stock code: 600066) from 2001 to 2004 and note that its senior management and local government (Zhengzhou City Government) cooperated to escape the control of central government and tunnelled the listed firm. They also study Jiuqi Liquor Co Ltd (stock code: 000799) and note that the local government (Xiangxi Autonomous Government) tunnelled the listed firm for social welfare in that region in 2003.

The Shanghai Stock Exchange (2006) also claims that the CGMs of central SCLFs are better than those of local SCLFs because central government, as the largest shareholder, does not have an incentive to expropriate profits, but imposes strict supervision on central SCLFs. In addition to Zhengzhou Yutong Bus, Chen and Zhu (2007) also study Hunan Dongting Aquaculture Co., Ltd. (hereafter Dongting Aquaculture) (currently known as Dahu Aquaculture Co., Ltd.; stock code: 600257) and explain that in the past, the number of IPOs in each region was highly regulated by the central government through the adoption of a quota system for raising funds in China. Chen and Zhu (2007) suspect that to obtain listing status in the Dongting Aquaculture case, the local government colluded with the second largest shareholder to reorganise their businesses for the IPO (*kunbang shangshi*⁵). After the IPO, the second large shareholder tunnelled about 17% of the IPO proceeds, totalling RMB57 million, from 2000 to 2002, but the largest and third largest shareholders did not.

⁴ In October 2005, the Ministry of Finance issued a notice concerning the quality of listed firms. This notice required that (1) all advances made by listed firms to their related parties had to be fully settled prior to 31 December 2006, and (2) RPTs must be fully disclosed to the public. However, on 7 January 2007 the Chinese Securities Regulatory Commission announced that 17 listed firms could not repay their debts by the deadline. Of the 17 listed firms, five were SOEs, including Sanjiu, mentioned in Appendix A, with debt amounting to RMB 4.7 billion (51.4% of total outstanding debt).

⁵ Chen and Zhu (2007) describe bundled listing, or *kunbang shangshi*, as the merging of two or more businesses for the purpose of IPO, and these businesses may be either independent or engaged in different industries. The owners of these businesses, therefore, are the promoters of the listed firm. Chen and Zhu (2007) further identify two main reasons for *kunbang shangshi*: (1) the listed firm can enlarge its size before the IPO, thereby increasing the funds raised, and (2) local government can effectively utilise each unit of the listing quota (listed firms) that was assigned by the central government.

It is unclear from the response to professional advice from the Shanghai Stock Exchange (2006) as mentioned above, and from the case studies by Chen and Zhu (2007), whether the CGMs of these two types of firms are similar or different. The purpose of this paper is to investigate differences in the CGMs of central and local SCLFs and the effect of CGMs on firm value in these SCLFs. This paper examines financial information from 2007 to 2009, which reflects a more up-to-date situation in Chinese capital markets because in 2006 there was a significant change in the institutional framework (including amendments to the Company Law and Securities Law and a new Chinese Accounting System) and many Chinese listed firms completed the share reform.

2. Literature review

Jensen and Meckling (1976) examine the circumstances of contemporary listed firms and those with external financing and find strong evidence for the separation of control and ownership. Fama and Jensen (1983) also determine that efficient control of agency problems is strongly affected by the size and nature of the organization. In an empirical study, La Porta et al. (2002) find that strong investor protection is associated with effective corporate governance, as reflected in valuable and broad financial markets, the dispersed ownership of shares and the efficient allocation of capital across enterprises.

Further, Morey et al. (2009) show that improvement in corporate governance results in significantly higher valuations in emerging markets. A number of studies on Chinese listed firms also find a positive association between the levels of corporate governance and firm value (e.g., Chen et al., 2004a; Wei, 2007; Cheung et al., 2010).

2.1. Largest shareholder and corporate governance in China⁶

The presence of the largest shareholder can have both positive and negative effects on firm value. If shareholders are able to participate in corporate operations, they can monitor the actions of the directors and management of the firm – the monitoring effect (Shleifer and Vishny, 1997). However, in line with the increase in ownership percentage, the largest shareholder can control and dominate the firm to become the controlling shareholder, which results in the deviation of control rights from cash flow rights (La Porta et al., 2002). A number of studies have empirically demonstrated that large shareholders can extract private benefits through tunnelling (e.g., Johnson et al., 2000; Gao et al., 2006).

In SCLFs the government acts in two conflicting roles, as both the largest shareholder and as a regulator. Hence it is uncertain whether the state can effectively enforce the law and monitor the fraudulent acts of large shareholders, which are unfavourable to other shareholders (Bannerjee, 1997; Hart et al., 1997). Chen (2001) further demonstrates that shares held by the state play a negative role in corporate governance, whereas domestic institutional and managerial shareholdings improve the value of firms, based on firms in 1997.

Wang and Xiao (2009) find that firm value increases when some control rights are decentralised from the government to the SOE, and decentralization significantly improves the performance of local government-controlled firms but not central government-controlled firms, indicating that firm value is negatively related to the extent of government control. Nevertheless, Xu and Wang (2006) demonstrate a significant M-shaped relationship between ownership of the largest shareholder and firm value. Li et al. (2004) and Chen et al. (2004a) further demonstrate an inverse U-shaped relationship between the percentage of shares held by the largest shareholders and the magnitude of tunnelling⁷ in Chinese listed firms. Bai et al. (2004) find that the higher the degree of concentration among other large shareholders, the higher the firm value, because

⁶ It is commonly believed that the terms largest shareholder and controlling shareholder can be used interchangeably. However, Chinese Law (2005) states that a controlling shareholder is one who holds more than 50% of the equity interests and/or voting rights of a company (Article 217(2)). Similarly, a large shareholder who holds a very small amount of the voting rights cannot control the company (e.g., Minseng Bank). The authors cautiously consider the use of these two terms in this paper.

⁷ Tunnelling is defined as the transfer of assets and/or profits out of a firm for the benefit of controlling shareholders (Johnson et al., 2000). Many scholars have asserted that controlling shareholders treat listed firms as ‘sources of finance’ or ‘vehicles’ to obtain funds from the public (e.g., Friedman et al., 2003; Bai et al., 2005).

potential competition for corporate control and the constraints imposed by other shareholders on the largest shareholder's aspiration to tunnel are important determinants of firm value. However, Gao et al. (2006) demonstrate that other major shareholders cannot prohibit tunnelling, whereas management and institutional investors can.

2.2. *Internal management structure*

Internal management structure refers to the board of directors and top executives of listed firms. Jensen and Meckling (1976) and Shleifer and Vishny (1997) describe the agency relationship between the board of directors (agent) and shareholders (principal). Internal management structure has been found to have several effects on corporate performance as follows.

Board structure – The relationship between board size and firm value remains inconclusive. Peng and Luo (2000) argue that Chinese firms with large boards are likely to benefit from a wider range of views and external connections, whereas Cho and Rui (2009) find a negative relationship between board size and firm value. Further, from an agency perspective, independent directors are expected to play a more active and effective monitoring role than executive directors (Fama and Jensen, 1983). Cho and Rui (2009) find a positive relationship between the proportion of independent directors on the board and firm value, whereas Bai et al. (2004) find no significant association.

Separate role of CEO and chairman – Professional recommendations and some scholars (e.g., Bai et al., 2004; Gao et al., 2006) consider that separation of the CEO and chairman of the board results in greater transparency of corporate information, and therefore the improvement of internal CGMs.

Management incentives – The motivation and reward of top-level management seems to be a crucial factor in the commercial success of firms and is something that is seen to be impeding the privatization of SOEs in China. However, Gao et al. (2006) conclude that management shareholders could restrict the tunnelling of the largest shareholders in Chinese listed firms. Buck et al. (2008) find that in China, executive pay and firm performance mutually affect one another through reward and motivation. Typically, reward systems based on economic performance are small in magnitude in China (Firth et al., 2008) and it is believed that such systems do not motivate managers. However, Yang et al. (2009) point out that management remuneration is positively associated with the corporate performance of Chinese listed firms from 2005 to 2007.

2.3. *Corporate governance monitoring mechanisms*

Corporate governance monitoring mechanisms (CGMMs) are an external form of CGMs, including the legal and market environment. Zhang and Wang (2007) empirically demonstrate that the transparency of corporations has a significant effect on investors' actions and on stock prices.

Audit quality – Several studies (e.g., Chen et al., 2001; Gul et al., 2010) find that bigger audit firms with higher reputations provide better audit quality, which results in improved corporate transparency and corporate governance.

Marketization – Gao et al. (2006) demonstrate that an increase in the transparency of corporate information and the operation of listed firms in an open commodity market can restrict tunnelling. Enterprises in developed regions⁸ have better corporate governance. Furthermore, Chan, Liu and Wang (2010) find that companies in institutionally weak regions that switch to a local auditor after receiving a qualified opinion succeed in opinion shopping. In developed regions, the government's influence is lower than in other regions and commodity and senior personnel markets are quite open (Fan et al., 2007). In contrast, Gao and Kling (2008) find no significant association between marketization and the magnitude of tunnelling. Nevertheless, several case studies have shown that local governments use political issues to actively influence listed firms (see the Wuliangye case in Appendix A).

⁸ Gao and Kling (2008) consider Beijing, Tianjin, Shanghai, Jiangsu, Zhejiang, Fujian and Guangdong as the developed eastern coastal region, which exhibits better governance structures.

Bank borrowings – It is believed that banks, being sophisticated lenders, can closely monitor the operations of their borrowers. However, Perotti and Thadden (2000) find that lenders prefer less information dissemination, whereas shareholder-run firms prefer greater transparency. Therefore, it is uncertain whether investors would perceive the increase in the magnitude of bank borrowings of Chinese listed firms as having a positive or negative effect on firm value.

Dual listing – Dual-listed firms are expected to exhibit higher corporate governance. Choi and Kim (2002) state that the Korean Stock Exchange may supplement the enforcement of foreign exchange listing provisions within Korea to increase the value to Korean investors of having a Korean firm select the protection provided in foreign jurisdictions. Chen (2008) indicates that firms listed in a capital market with fuller information disclosure and stringent investor protection laws leads to more effective corporate governance. As Chinese firms can also be dual-listed as B-shares (listed in China for foreign investors) and H-shares (listed in Hong Kong), these dual listing arrangements are assumed to improve the transparency of corporate information (Bai et al., 2004).

2.4. Institutional isomorphism

Section 1.4 describes the Chinese government policy of *zhuada fangxia* on the governance of central and local SCLFs. DiMaggio and Powell (1983) mention that rational actors make their organizations increasingly similar as they try to change them. They further suggest three mechanisms of institutional isomorphic change: (1) *coercive* isomorphism that stems from political influence and the problem of legitimacy, (2) *mimetic* isomorphism resulting from standard responses to uncertainty and (3) *normative* isomorphism, associated with professionalization. Therefore, it is suggested that the CGMs of central and local SCLFs are not similar to each other because the effect of the government's *zhuada fangxiao* policy on their governance structures may be different.

3. Hypothesis development

3.1. Corporate governance mechanisms

Section 2 describes the potential effect of CGMs on firm value. From the results of certain cases, together with the *zhuada fangxiao* policy described in Section 1.4 and the principle of institutional isomorphism in Section 2.4, it seems that the CGMs of central and local SCLFs are dissimilar, possibly because the same CGM may have different effects on central and local SCLFs (e.g., ownership of the largest shareholder), and/or the nature of the particular CGMs of these two categories differ (e.g., the largest shareholder of a local SCLF may tunnel the listed firm whereas central government may not). Accordingly, it is expected that there will be a significant difference in the effect of CGMs on firm value in central and local SCLFs.

This paper classifies ownership structure and internal management structure as internal CGMs, and corporate governance monitoring mechanisms as external CGMs. Therefore, Hypothesis 1 is proposed:

H1. Central and local SCLFs differ in their internal and external CGMs.

Further, some previous studies (e.g., Morey et al., 2009; Chen et al., 2004a; Wei, 2007; Cheung et al., 2010) find a positive association between the level of corporate governance and firm value. As the CGMs of central SCLFs may be different from those of local ones (see Hypothesis 1 above), Hypothesis 2 is proposed:

H2. CGMs have different effects on firm value in central and local SCLFs.

Table 3
Percentage of firms with the state as the ultimate controller.

	China	HK	UK	Germany	Japan	France	Singapore
State (%)	63.15	1.40	0.08	6.30	0.80	5.11	23.50
Non-state (%)	36.85	96.80	99.20	93.70	99.20	84.89	76.50

Extracted from Li and Zhang (2010).

Table 4
Variable descriptions.

TQ	Tobin-Q value as a ratio of the market value of equity of a firm to the book value of its assets
TQ70	TQ x 70%
TQ80	TQ x 80%
<i>Internal CGMs</i>	
TOPSHARE	Percentage of shares held by the largest shareholder
TOPSHARE ²	Square of TOPSHARE
SHARE2_5	Aggregate percentage of shares held by the second to fifth large shareholders
TOPEXE_SHARE	Percentage of shares held by top executives (including directors)
TOPEXE_REMUN	Percentage of total emoluments of top executives to total sales of the listed firm
lnBOD	Natural logarithm of the number of directors on the board
SEP_CAP	Dummy variable that takes the value of 1 if the chairperson of the board and the CEO are two separate persons, and 0 otherwise
<i>External CGMs</i>	
BIG12	Dummy variable that takes the value of 1 if the engaged auditor is one of the Big 12 audit firms ^a , and 0 otherwise
DUAL_LIST	Dummy variable that takes the value of 1 if the listed firm is also has B-shares or H-shares, and 0 otherwise
MI	Dummy variable that takes the value of 1 if the listed firm is registered in the eastern coastal area (as defined by Gao and Kling, 2008), and 0 otherwise
GEARING	Percentage of total bank and other loans to the total assets of the listed firm
<i>Control variables</i>	
lnTA	Natural logarithm of the total assets of the listed firm
ROA	Profit(loss) for the year/total assets at year end
FIXED_EFFECTS	Dummy variables controlling for the fixed effects of calendar years and industries

^a Previous foreign scholars have adopted Big 4 and non-Big 4 auditors to proxy for high and low quality, respectively (e.g., Chen et al., 2001; Simunic and Wu, 2009). Some domestic scholars have adopted Big 10 and non-Big 10 auditors (e.g., Lin et al., 2009; Lin and Liu, 2009). In this paper, the authors adopt the 'Big 12' auditors as these are the firms that are eligible to act as reporting accountants and auditors for Chinese incorporated firms listed in Hong Kong. The Big 12 auditors are BDO China Shu Lun Pan, Tian Jian (Pan-China), BDO Guangdong Dahua Delu (Shenzhen), Shine Wing, Ernst & Young, Crowe Horwath, Grant Thornton Jingdu Tianhua, PricewaterhouseCoopers, Deloitte, KPMG, RSM China and Daxin. They have been allowed by the Ministry of Finance and the Chinese Securities Regulatory Commission to conduct statutory audits on H-share listed firms since December 2010. Other than Grant Thornton Jingdu Tianhua and Daxin, the remaining 10 audit firms are those which are regarded by domestic scholars as a proxy for good audit quality.

3.2. Regression model

The regression model of this paper is shown in Eq. (1) and the variables are defined in Table 4.^{9,10}

$$\begin{aligned}
 \text{TQ(or TQ70, TQ80)}_{i,t} = & \beta_0 + \beta_1 \text{TOPSHARE}_{i,t} + \beta_2 \text{TOPSHARE}_{i,t}^2 + \beta_3 \text{SHARE2.5}_{i,t} \\
 & + \beta_4 \text{TOPEXE_SHARE}_{i,t} + \beta_5 \text{TOPEXE_REMUN}_{i,t} + \beta_6 \text{lnBOD}_{i,t} \\
 & + \beta_7 \text{SEP_CAP}_{i,t} + \beta_8 \text{BIG12}_{i,t} + \beta_9 \text{DUAL_LIST}_{i,t} + \beta_{10} \text{MI}_{i,t} \\
 & + \beta_{11} \text{GEARING}_{i,t} + \beta_{12} \text{lnTA}_{i,t} + \beta_{13} \text{ROA}_{i,t} + \varepsilon_{i,t}
 \end{aligned} \tag{1}$$

where ε is the random error term of the model; i is the i th firm and t is the year.

⁹ The authors follow the approach of Bai et al. (2004) in using three different measures of firm value, namely TQ, TQ70 and TQ80, as the dependent variables because previously the non-tradable portion of Chinese listed firms had an average illiquidity discount of between 70% and 80% when they were traded in the informal market. TQ70 and TQ80 are used in the sensitivity tests.

¹⁰ Some previous studies (e.g., Bai et al., 2004; Cho and Rui, 2009) include the proportion of outside (independent) directors as one of the measures of the effectiveness of the board structure. The authors carefully considered that in current practice, there should be at least two independent directors on the board and at least one third of the board should be filled by independent directors in accordance with Article 3 of the Code of Corporate Governance for Listed Companies in China (2001). In the pre-test, the proportion of independent directors on the board showed a positive but non-significant association with firm value, hence it is meaningless to merely include such a proportion as one of the independent variables in this regression equation. The authors alternatively considered including a dummy variable to represent firms with a majority (at least half) of independent directors on the board, but note that only 13 (3%) and 53 (3.3%) firm-year observations in central and local SCLFs, respectively, have a majority of independent directors on their board, representing an insignificant proportion of the sample. Therefore, the authors concluded that in current practice, the proportion of independent directors on the board reflects compliance with the listing rules and is not a key corporate governance mechanism, and accordingly, this paper excludes it.

Table 5
Details of the sample.

					Number of firm-year observations
Raw sample					4,913
Less:	Firms engaged in financial sector				85
	Firms under ST status				186
	Firms that announced their annual results after 30 April the following year				18
	Firms with missing variables				1201
Total available firm-year observations					3423
Less:	Non-SCLFs				1417
Total number of state-controlled listed firms					2006
Represented by:					
Central SCLFs (Panel A)					423
Local SCLFs (Panel B)					1583
Total number of state-controlled listed firms					2006
Distribution by year:					
			Central SCLFs (Panel A)	Local SCLFs (Panel B)	Total
Number of firm-year observations					
2007			138	500	638
2008			149	486	635
2009			136	597	733
Total			423	1583	2006
Distribution by listing status:					
Number of firm-year observations	2007	2008	2009	Total	%
<u>Central SCLFs (Panel A)</u>					
Dual-listed as A- and B-shares	12	12	6	30	7
Dual-listed as A- and H-shares	5	8	5	18	4
Total of dual-listed firms	17	20	11	48	11
Listed as A-shares only	121	129	125	375	89
Total number of central SCLFs	138	149	136	423	100
<u>Local SCLFs (Panel B)</u>					
Dual-listed as A- and B-shares	32	29	28	89	6
Dual-listed as A- and H-shares	12	12	13	37	2
Total of dual-listed firms	44	41	41	126	8
Listed as A-shares only	456	445	556	1457	92
Total number of local SCLFs	500	486	597	1583	100

Distribution by industry:

Number of firm-year observations	2007	2008	2009	Total	%
<u>Central SCLFs (Panel A)</u>					
A - agricultural	2	1	1	4	1
B - mining	1	3	4	8	2
C - manufacturing	79	83	73	235	56
D - production and supply of electricity and gas	3	4	5	12	3
E - construction	3	3	4	10	2
F - transportation and storage	5	7	6	18	4
G - information technology	10	7	12	29	7
H - wholesale and retail	10	14	10	34	8
J - property developer	8	8	9	25	6
K - social services	9	10	3	22	5
L - media	-	1	1	2	-
M- others	8	8	8	24	6
Total number of central SCLFs	138	149	136	423	100
<u>Local SCLFs (Panel B)</u>					
A - agricultural	15	11	15	41	3
B - mining	12	15	16	43	3
C - manufacturing	288	291	346	925	58
D - production and supply of electricity and gas	32	17	19	68	4
E - construction	12	11	12	35	2
F - transportation and storage	23	21	26	70	4
G - information technology	27	28	45	100	6
H - wholesale and retail	30	26	35	91	6
J - property developer	24	24	30	78	5
K - social services	9	15	19	43	3
L - media	5	3	4	12	1
M- others	23	24	30	77	5
Total number of local SCLFs	500	486	597	1583	100

4. Research method, results and interpretation

4.1. Data source and sample selection

Table 5 presents the details of the sample. Our sample period covers 3 years, from 2007 to 2009, and the data was obtained from the China Stock Market and Accounting Research Data Base (CSMAR). There

Table 6.1
Descriptive statistics.

	Number	Minimum	Maximum	Mean	Std. Dev.
<i>Central SCLFs (Panel A)</i>					
TQ	423	0.170	10.854	2.090	1.524
TQ70	423	0.120	7.590	1.463	1.067
TQ80	423	0.140	8.670	1.672	1.219
TOPSHARE	423	0.080	0.860	0.374	0.158
TOPSHARE ²	423	0.010	0.740	0.164	0.131
SHARE2_5	423	0.010	0.610	0.148	0.116
TOPEXE_SHARE	423	0.000	0.190	0.002	0.016
TOPEXE_REMUN	423	0.000	0.520	0.047	0.073
lnBOD	423	1.610	2.710	2.189	0.212
SEP_CAP	423	0.000	1.000	0.305	0.461
BIG12	423	0.000	1.000	0.416	0.493
DUAL_LIST	423	0.000	1.000	0.104	0.306
MI	423	0.000	1.000	0.584	0.493
GEARING	423	0.000	0.660	0.193	0.143
lnTA	423	18.830	28.000	21.790	1.372
ROA	423	0.000	0.390	0.053	0.050
<i>Local SCLFs (Panel B)</i>					
TQ	1583	0.180	252.910	2.401	6.879
TQ70	1583	0.130	177.040	1.681	4.816
TQ80	1583	0.140	202.330	1.921	5.504
TOPSHARE	1583	0.010	0.850	0.364	0.151
TOPSHARE ²	1583	0.000	0.720	0.156	0.122
SHARE2_5	1583	0.010	0.560	0.149	0.112
TOPEXE_SHARE	1583	0.000	0.540	0.006	0.036
TOPEXE_REMUN	1583	0.000	0.780	0.049	0.079
lnBOD	1583	0.690	2.890	2.210	0.210
SEP_CAP	1583	0.000	1.000	0.370	0.483
BIG12	1583	0.000	1.000	0.447	0.497
DUAL_LIST	1583	0.000	1.000	0.079	0.270
MI	1583	0.000	1.000	0.557	0.497
GEARING	1583	0.000	1.310	0.203	0.148
lnTA	1583	15.420	27.490	21.677	1.173
ROA	1583	0.000	2.340	0.055	0.090

Table 6.2
Descriptive statistics – Frequency of dummy variables.

Frequency of dummy variables	Central SCLFs (Panel A)		Local SCLFs (Panel B)		Total	
	No.	%	No.	%	No.	%
SEP_CAP (equal to 1)	131	30.5	998	37.0	1290	35.7
BIG12 (equal to 1)	176	41.6	708	44.7	884	44.1
DUAL_LIST (equal to 1)	44	10.4	125	7.9	169	8.4
MI (equal to 1)	247	58.4	882	55.7	1129	56.3

are 4913 firm-year observations for these 3 years, of which 85 observations from the financial sector¹¹ and 1201 observations with missing variables are excluded. A further 186 observations under ST status¹² and 18 observations that failed to announce their annual reports by the following 30 April are also excluded. Our final sample contains 3423 firm-year observations, representing 423 central SCLFs, 1583 local SCLFs and 1417 non-SCLFs, respectively.

¹¹ The authors adopted the general academic practice of eliminating financial sector firms (Industry Code I).

¹² Firms that failed to comply with the relevant law and regulations to release their annual reports on time and those under special treatment (ST) are removed to reduce bias.

4.2. Descriptive statistics

Table 6.1 presents the descriptive statistics of the variables. The means of TQ, the dependent variable, are 2.09 in Panel A and 2.40 in Panel B, respectively, indicating that firm value for central SCLFs (Panel A) is, in general, lower than that of local SCLFs (Panel B) during these 3 years. The means of TOPSHARE are approximately 37.4% in Panel A and 36.4% in Panel B, while those of SHARE2_5 are approximately 14.8% and 14.9% in Panels A and B. The ownership structures of these two panels are similar to those of Chinese listed firms before the share reform and it is likely that the largest shareholders are rarely challenged by other shareholders on important issues (La Porta et al., 2002). The mean of TOPEXE_SHARE in Panel B is 0.6%, higher than the 0.2% in Panel A, indicating that the top executives of local SCLFs are more motivated than those of central SCLFs. TOPEXE_SHARE in local SCLFs is higher than that in central SCLFs, possibly because ownership by the top executives of large SOEs (mostly central SCLFs) was not previously permitted.¹³ Overall, however, the average percentages of shares held by directors is still very low in both groups. TOPEXE_REMUN in Panel B is 4.9%, slightly higher than the 4.7% in Panel A, indicating that in both central and local SCLFs, the remuneration of top executives is related to firm size (turnover). The means of lnTA are 21.790 in Panel A and 21.677 in Panel B, indicating that in our sample the firm size of central SCLFs is generally higher than that of local SCLFs. There are no significant differences between the means of the other variables in these two panels.

Table 6.2 reports the frequencies of the dummy variables. For SEP_CAP, the frequency is 30.5% in Panel A and 37.0% in Panel B, indicating that the chairperson of the board and the CEO are separate people in less than 40% of the SCLFs, even though it is professionally recommended that these two roles should be held by different people. For BIG12, the frequency is 41.6% in Panel A and 44.7% in Panel B, indicating that less than half of the listed SCLFs engage Big 12 auditors, possibly because non-Big 12 auditors are more familiar with Chinese listed firms. For DUAL_LIST, the frequency is 10.4% in Panel A and 7.9% in Panel B, indicating that central SCLFs also intend to raise funds from foreign investors and, from the records of the Stock Exchange of Hong Kong, the giant H-share companies are also listed as A-shares in China (e.g., Big 4 banks and the giant telecommunication service providers). For MI, the frequency is 58.4% in Panel A and 55.7% in Panel B, indicating that slightly more than half of the listed SCLFs are registered in the eastern coastal (more developed) region.

Table 7 reports correlation coefficients. The statistics in Panel A show significant positive correlations between TQ and TOPEXE_SHARE and ROA, but negative correlations between TQ and lnBOD, GEARING and lnTA. The statistics in Panel B show significant positive correlations between TQ and TOPEXE_REMUN and ROA, but significant negative correlations between TQ and TOPSHARE and lnTA. The correlation coefficients between the independent variables are generally low, indicating that multicollinearity is unlikely to be a serious problem in the interpretation of the results.¹⁴

4.3. Comparison of firm value and corporate governance mechanisms

Tables 6.1 and 6.2 provide some preliminary signs that firm value and CGMs do differ between central and local SCLFs. A one-way ANOVA was run to investigate whether the above mean results for firm value and CGMs are significantly different among central, local and non-SCLFs. The ANOVA results presented in Table 8 suggest that TOPSHARE, TOPEXE_SHARE, lnBOD, SEP_CAP and GEARING are the key differences between the CGMs of central, local and non-SCLFs. These results provide further support to our initial claim that the CGMs of central and local SCLFs differ.

¹³ The ownership of top executives in large SOEs has been permitted in accordance with 'Provisional Regulations on state-owned property rights transfer to management', promulgated by SASAC of State Council on 11 April 2005.

¹⁴ The natural logarithm of the total sales of Chinese listed firms (lnSALES) was also considered as a control variable for the firm size of these listed firms. As the correlation coefficient between lnSALES and lnTA is extremely high (0.856 at the 1% significance level) in pre-testing, we selected lnTA only as a control variable for business size.

Table 7
Correlations.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Central SCLFs (Panel A)															
TQ (1)	1														
TQ70 (2)	1.000**	1													
TQ80 (3)	1.000**	1.000**	1												
TOPSHARE (4)	-0.460	-0.046	-0.046	1											
TOPSHARE ² (5)	-0.045	-0.045	-0.045	0.972**	1										
SHARE2_5 (6)	0.083	0.083	0.083	-0.337**	-0.339**	1									
TOPEX_SHARE (7)	0.128**	0.128	0.128	-0.084	-0.084	0.100*	1								
TOPEX_REMUN (8)	0.045	0.045	0.045	-0.077	-0.077	-0.075	-0.030	1							
lnBOD (9)	-0.164**	-0.164**	-0.164**	0.000	0.003	0.187*	-0.060	-0.105*	1						
SEP_CAP (10)	0.091	0.091	0.091	-0.107*	-0.087	0.027	-0.090	-0.068	-0.125*	1					
BIG12 (11)	-0.060	-0.060	-0.060	0.081	0.109*	0.104*	0.058	-0.079	0.190**	-0.028	1				
DUAL_LIST (12)	-0.044	-0.044	-0.044	0.099	0.142**	0.131**	-0.460	-0.106*	0.197**	-0.091	0.199**	1			
MI (13)	0.018	0.018	0.018	0.094	0.106*	0.066	0.115*	0.008	-0.010	0.111*	0.148**	0.146**	1		
GEARING (14)	-0.338**	-0.338**	-0.338**	-0.045	-0.039	-0.049	0.070	0.098*	0.009	0.057	0.020	0.020	-0.044	1	
lnTA (15)	-0.449**	-0.449**	-0.449**	0.283	0.343**	0.063	-0.094	-0.347**	0.323**	-0.081	0.312**	0.412**	0.104*	0.205**	1
ROA	0.464**	0.464**	0.464**	0.051	0.070	0.101*	0.189**	-0.352**	0.016	0.006	0.101*	-0.052	-0.058	-0.356**	-0.0038
Local SCLFs (Panel B)															
TQ (1)	1														
TQ70 (2)	1.000**	1													
TQ80 (3)	1.000**	1.000**	1												
TOPSHARE (4)	-0.074**	-0.074**	-0.074**	1											
TOPSHARE ² (5)	-0.043	0.043	-0.043	0.975**	1										
SHARE2_5 (6)	0.012	0.012	0.012	-0.334**	-0.349**	1									
TOPEX_SHARE (7)	0.026	0.026	0.026	-0.071**	-0.074**	0.197**	1								
TOPEX_REMUN (8)	0.075**	0.075**	0.075**	-0.179*	-0.182	-0.013	-0.002	1							
lnBOD (9)	-0.033	-0.033	-0.033	-0.021	-0.016	0.045	-0.049	-0.039	-0.002	1					
SEP_CAP (10)	0.042	0.042	0.042	-0.082**	-0.071**	-0.056*	-0.137**	-0.002	-0.100**	-0.100**	1				
BIG12 (11)	0.032	0.032	0.032	0.117**	0.121**	0.027	0.011	-0.029	0.044	-0.017	0.044	1			
DUAL_LIST (12)	-0.015	-0.015	-0.015	0.034	0.039	0.146**	-0.049	-0.030	0.113**	-0.074**	0.118**	0.110**	1		
MI (13)	0.041	0.041	0.041	-0.025	-0.027	0.119**	0.036	0.057	-0.078**	0.058*	0.116**	0.110**	0.110**	1	
GEARING (14)	-0.026	-0.026	-0.026	-0.041	-0.043	-0.088**	-0.083	0.029	0.087**	0.006	0.012	-0.004	-0.093**	0.012	1
lnTA (15)	-0.261**	-0.261**	-0.261**	0.277**	0.300**	-0.105**	-0.084**	-0.315**	0.285**	-0.065**	0.146**	0.282**	-0.034	0.171**	0.171**
ROA	0.455**	0.455**	0.455**	-0.023	-0.023	0.017	0.057	-0.190**	0.000	0.046	0.074**	0.000	0.068**	-0.035	-0.132**

* Correlation is significant at the 5% level (two-tailed);

** Correlation is significant at the 1% level (two-tailed).

Table 8
ANOVA of variables by central, local and non-SCLFs.

		Sum of Squares	df	Mean Square	F	Sig.
TQ	Between Groups	110.386	2	55.193	2.397	0.091*
	Within Groups	78734.255	3420	23.022		
	Total	78844.642	3422			
TOPSHARE	Between Groups	0.137	2	0.068	2.889	0.056*
	Within Groups	80.992	3420	0.024		
	Total	81.129	3422			
TOPSHARE ²	Between Groups	0.098	2	0.049	3.114	0.045**
	Within Groups	53.860	3420	0.016		
	Total	53.959	3422			
SHARE2_5	Between Groups	0.002	2	0.001	0.070	0.933
	Within Groups	43.373	3420	0.013		
	Total	43.375	3422			
TOPEXE_SHARE	Between Groups	0.025	2	0.012	6.608	0.001***
	Within Groups	6.341	3420	0.002		
	Total	6.366	3422			
TOPEXE-REMUN	Between Groups	0.008	2	0.004	0.619	0.538
	Within Groups	22.729	3420	0.007		
	Total	22.737	3422			
lnBOD	Between Groups	0.323	2	0.162	3.758	0.023**
	Within Groups	147.024	3420	0.043		
	Total	147.347	3422			
SEP_CAP	Between Groups	7.088	2	3.544	16.385	0.000***
	Within Groups	739.778	3420	0.216		
	Total	746.866	3422			
BIG12	Between Groups	0.467	2	0.233	0.944	0.389
	Within Groups	845.339	3420	0.247		
	Total	845.805	3422			
DUAL_LIST	Between Groups	0.232	2	0.116	1.540	0.215
	Within Groups	257.700	3420	0.075		
	Total	257.932	3422			
MI	Between Groups	0.575	2	0.287	1.164	0.313
	Within Groups	845.014	3420	0.247		
	Total	845.589	3422			
GEARING	Between Groups	0.102	2	0.051	2.347	0.096*
	Within Groups	74.226	3420	0.022		
	Total	74.328	3422			
lnTA	Between Groups	5.990	2	2.995	2.079	0.125
	Within Groups	4926.209	3420	1.440		
	Total	4932.199	3422			
ROA	Between Groups	0.024	2	0.012	2.432	0.088*
	Within Groups	16.616	3420	0.005		
	Total	16.639	3422			

Sample firms are classified into three groups: (1) central SCLFs, (2) local SCLFs and (3) non-SCLFs.

* Indicate significance at the 10% level (two tailed).

** Indicate significance at the 5% level (two tailed).

*** Indicate significance at the 1% level (two tailed).

Table 9

Regression results: corporate governance mechanisms and firm value in central SCLFs.

	Expected sign	Sensitivity Tests			
		TQ	TQ	TQ70	TQ80
TOPSHARE	?	−2.390 (0.120)		−1.673 (0.120)	−1.912 (0.120)
TOPSHARE ²	?	3.911** (0.041)		2.737** (0.041)	3.128** (0.041)
SHARE2_5	?	1.613*** (0.003)		1.129*** (0.003)	1.291*** (0.003)
TOPEXE_SHARE	+	−0.517 (0.879)	0.090 (0.979)	−0.362 (0.879)	−0.414 (0.879)
TOPEXE_REMUN	+	0.885 (0.306)	1.105 (0.203)	0.619 (0.306)	0.708 (0.306)
lnBOD	+	−0.359 (0.203)	−0.330 (0.241)	−0.252 (0.203)	−0.287 (0.203)
SEP_CAP	+	0.111 (0.369)	0.141 (0.252)	0.078 (0.369)	0.089 (0.369)
BIG12	+	0.060 (0.609)	0.085 (0.475)	0.042 (0.609)	0.048 (0.609)
DUAL_LIST	+	0.853*** (0.000)	0.956*** (0.000)	0.597*** (0.000)	0.682*** (0.000)
MI	+	−0.076 (0.518)	−0.047 (0.693)	−0.054 (0.518)	−0.061 (0.518)
GEARING	?	−0.533 (0.226)	−0.701 (0.113)	−0.373 (0.226)	−0.427 (0.226)
lnTA	−	−0.580*** (0.000)	−0.523*** (0.000)	−0.406*** (0.000)	−0.464*** (0.000)
ROA	+	12.616*** (0.000)	13.298*** (0.000)	8.831*** (0.000)	10.093*** (0.000)
FIXED_EFFECTS		Yes	Yes	Yes	Yes
Constant	?	14.597*** (0.000)	13.137*** (0.000)	10.218*** (0.000)	11.678*** (0.000)
Adj- <i>R</i> ²		0.499	0.487	0.499	0.499
<i>F</i> -stat.		17.172	18.439	17.172	17.172
OBS		423	423	423	423

Note: *P*-values are in parentheses.

* Indicate significance at the 10% level.

** Indicate significance at the 5% level.

*** Indicate significance at the 1% level.

4.4. Multiple regression analysis

This section reports the results of the multiple regression analysis with respect to the two hypotheses. The results are shown in Tables 9–11.

According to Berman (2007), the variance inflation factor (VIF) values of variables that do not exhibit multicollinearity are usually between 1.0 and 2.0.¹⁵ The collinearity test results show that none of the independent variables in this paper have a VIF of over 2 (not tabulated). According to these results and the correlation analysis of these variables shown in Table 7, multicollinearity is not considered to be a problem for either model.

4.4.1. Central SCLFs

Table 9 reports the regression results for central SCLFs. TOPSHARE is negatively related to TQ, but the association is not significant. However, TOPSHARE² is positively related to TQ at the 1% significance level,

¹⁵ Only TOPSHARE and TOPSHARE² exhibit high correlations with one another in all regressions.

Table 10
Regression results: corporate governance mechanisms and firm value in local SCLFs.

	Expected sign	Sensitivity Tests			
		TQ	TQ	TQ70	TQ80
TOPSHARE	?	−15.308*** (0.001)		−10.716*** (0.001)	−12.246*** (0.001)
TOPSHARE ²	?	18.910*** (0.000)		13.237*** (0.001)	15.128*** (0.001)
SHARE2_5	?	−2.214 (0.000)		−1.550 (0.140)	−1.771 (0.140)
TOPEXE_SHARE	+	−2.463 (0.571)	−3.886 (0.364)	−1.724 (0.571)	−1.970 (0.571)
TOPEXE_REMUN	+	7.218*** (0.001)	7.874*** (0.000)	5.053*** (0.001)	5.775*** (0.001)
lnBOD	+	1.099 (0.151)	0.973 (0.201)	0.770 (0.151)	0.880 (0.151)
SEP_CAP	+	−0.470 (0.886)	−0.002 (0.994)	−0.033 (0.886)	−0.038 (0.886)
BIG12	+	0.326 (0.295)	0.299 (0.337)	0.228 (0.295)	0.261 (0.295)
DUAL_LIST	+	1.243** (0.038)	1.098* (0.064)	0.870** (0.038)	0.994** (0.038)
MI	+	0.009 (0.978)	−0.088 (0.782)	0.006 (0.978)	0.007 (0.978)
GEARING	?	0.927 (0.396)	0.940 (0.388)	0.649 (0.396)	0.742 (0.396)
lnTA	−	1.341*** (0.000)	−1.246*** (0.000)	−0.939*** (0.000)	−1.073*** (0.000)
ROA	+	32.129*** (0.000)	33.252*** (0.000)	22.490*** (0.000)	25.703*** (0.000)
FIXED_EFFECTS		Yes	Yes	Yes	Yes
Constant	?	29.840*** (0.000)	25.039*** (0.000)	20.888*** (0.000)	23.872*** (0.000)
Adj-R ²		0.266	0.260	0.266	0.266
F-stat.		23.002	25.201	23.002	23.002
OBS		1583	1583	1583	1583

Note: P-values are in parentheses.

* Indicate significance at the 10% level.

** Indicate significance at the 5% level.

*** Indicate significance at the 1% level.

implying that the effect of ownership of the largest shareholder is non-linear and that there may be a U-shaped relationship between firm value and ownership, as expected. SHARE2_5 is positively related to TQ at the 1% significance level, indicating that the higher the degree of ownership concentration among other large shareholders, the higher the firm value. These two associations are consistent with Bai et al. (2004). DUAL_LIST is also positively related to TQ at the 1% significance level, implying that investors prefer dual-listed firms, possibly because these firms are required to provide detailed information to foreign investors and/or foreign stock exchanges. This positive association is also consistent with the findings of Bai et al. (2004). lnTA is negatively related to TQ, indicating that the value of larger central SCLFs decreases as firm size increases, and this negative association is consistent with the findings of Bai et al. (2004) and Wang and Xiao (2009). ROA is positively related to TQ at the 1% significance level, indicating that firm value increases in line with profitability. Overall, the effect of other CGMs on firm value is not significant.

Sensitivity tests were performed using Eq. (1). The regression equation was rerun by (1) eliminating TOPSHARE and TOPSHARE² and (2) replacing TQ with TQ70 and TQ80, respectively. The results show that the directions and significance of the associations between other tested variables remain the same.

Table 11

Comparison of regression results: corporate governance mechanisms and firm value in four types of Chinese listed firms.

	Expected sign	TQ			
		Central SCLFs (Panel A)	Local SCLFs (Panel B)	Non-SCLFs (Panel C)	Whole sample (Panel D)
TOPSHARE	?	−2.390 (0.120)	−15.308*** (0.001)	−1.896** (0.018)	−8.702*** (0.000)
TOPSHARE ²	?	3.911** (0.041)	18.910*** (0.000)	2.900*** (0.003)	10.840*** (0.000)
SHARE2_5	?	1.613*** (0.003)	−2.214 (0.140)	0.610* (0.025)	−0.880 (0.215)
TOPEXE_SHARE	+	−0.517 (0.879)	−2.463 (0.571)	0.306 (0.553)	−1.077 (0.529)
TOPEXE_REMUN	+	0.885 (0.306)	7.218*** (0.001)	1.010*** (0.005)	5.244*** (0.000)
lnBOD	+	−0.359 (0.203)	1.099 (0.151)	−0.049 (0.724)	0.388 (0.286)
SEP_CAP	+	0.111 (0.369)	−0.470 (0.886)	−0.055 (0.384)	−0.490 (0.760)
BIG12	+	0.060 (0.609)	0.326 (0.295)	0.086 (0.243)	0.193 (0.196)
DUAL_LIST	+	0.853*** (0.000)	1.243** (0.038)	0.391*** (0.000)	0.974*** (0.000)
MI	+	−0.076 (0.518)	0.009 (0.978)	−0.028 (0.630)	0.022 (0.882)
GEARING	?	−0.533 (0.226)	0.927 (0.396)	−1.244*** (0.000)	0.794 (0.131)
lnTA	−	−0.580*** (0.000)	1.341*** (0.000)	−0.508*** (0.000)	−0.918*** (0.000)
ROA	+	12.616*** (0.000)	32.129*** (0.000)	15.131*** (0.000)	30.331*** (0.000)
FIXED_EFFECTS		Yes	Yes	Yes	Yes
Constant	?	14.597*** (0.000)	29.840*** (0.000)	12.971*** (0.000)	21.024*** (0.000)
Adj- <i>R</i> ²		0.499	0.266	0.510	0.259
<i>F</i> -stat.		17.172	23.002	57.654	46.901
OBS		423	1583	1417	3423

Note: *P*-values are in parentheses.

* Indicate significance at the 10% level.

** Indicate significance at the 5% level.

*** Indicate significance at the 1% level.

4.4.2. Local SCLFs

Table 10 reports the regression results for local SCLFs. TOPSHARE is negatively related to TQ, whereas TOPSHARE² is positively related to TQ, at the 1% significance level, consistent with Bai et al. (2004), Chen et al. (2004a) and Li et al. (2004) and also consistent with the results for central SCLFs. SHARE2_5 is positively related to TQ, but not significantly, indicating that unlike in central SCLFs, the aggregate of other large shareholders cannot countercheck the acts of the largest shareholder, possibly because there is a potential threat that the second or even the third largest shareholder can collude with the largest shareholder for their own benefit, at the expense of other shareholders (see the Hunan Dongting Aquaculture case study in Section 1.2.4). TOPEXE_REMUN is positively related to TQ at the 1% significance level, indicating that the remuneration of top executives increases in line with firm value, consistent with Buck et al. (2008) and Yang et al. (2009). DUAL_LIST is positively related to TQ at the 5% significance level, consistent with the results for central SCLFs. lnTA and ROA, respectively, are negatively and positively related to TQ at the 1% significance level, consistent with the results for central SCLFs. The effect of other CGMs on firm value is not significant.

Sensitivity tests were also performed using Eq. (1). The regression equation was rerun by (1) eliminating TOPSHARE and TOPSHARE² and (2) replacing TQ with TQ70 and TQ80. The results show that the directions and significance of the associations between other tested variables remain the same.

4.5. Additional tests

4.5.1. Comparison with non-SCLFs and full sample

Eq. (1) was also rerun for (1) non-SCLFs (Panel C) and (2) the full sample (Panel D). Table 11 summarises the regression results of these four panels. TOPSHARE is negatively related to TQ in all panels, but is significant only in Panels B, C and D. In contrast, TOPSHARE² is positively related to TQ in all panels at the 1–5% significance levels, implying that there is a non-linear relationship between TOPSHARE and TQ in the full sample and in particular panels, consistent with the findings of Bai et al. (2004), Chen et al. (2004a,b) and Li et al. (2004). SHARE2_5 is positively related to TQ in central and non-SCLFs at the 1–5% significance levels, but not in local SCLFs. TOPEXE_REMUN is positively related to TQ in all panels, and at the 1% significance level in Panels B, C and D, consistent with the findings of Buck et al. (2008) and Yang et al. (2009), possibly because the remuneration of top executives of local and non-SCLFs is linked to corporate performance, whereas the top executives of central SCLFs are politically appointed and thus their remuneration is not linked to corporate performance. DUAL_LIST is positively related to TQ in all panels at the 1–5% significance levels, consistent with the findings of Bai et al. (2004). In general, TQ is not significantly related to any CGMM except DUAL_LIST, in all panels, possibly because Chinese listed firms are strongly affected by their largest shareholders and top executives and these insiders are rarely challenged by auditors (BIG10) or money lenders (GEARING). The directions and significance of the associations between TQ and lnTA and ROA remain unchanged in all panels.

4.5.2. Sensitivity tests: Elimination of company data in 2008, dual-listed firms and separation of manufacturing and non-manufacturing firms

Two sensitivity tests were performed. First, because of the unusual drop in the share prices of Chinese listed firms in 2008 caused by the financial tsunami,¹⁶ the Tobin-Q value might include the effect of market volatility. The authors considered this non-corporate governance effect on firm value by including year dummies and lnTA and ROA as control variables in the regression equations (Eqs. (1) and (2)). Eq. (1) was also rerun after excluding the 2008 company data.

Second, because the CGMs of dual-listed firms (especially those listed in Hong Kong) are better than those of non-dual-listed firms (e.g., Bai et al., 2004), the inclusion of dual-listed firms in the sample may provide a biased association between CGMs and firm value. Furthermore, as shown in Table 5, manufacturing firms (Sector C) amounted to over 50% of the full sample. Most of these firms were spun off from their largest shareholders before their IPOs and their businesses are still closely connected to their largest shareholders (or controlling party), as mentioned in the Wuliangye case, and their CGMs are likely to differ from those of non-manufacturing firms. Accordingly, additional tests were conducted on (1) the sample without dual-listed firms, (2) the sample without manufacturing firms and (3) the sample with manufacturing firms only.

The results of these two sensitivity tests (not tabulated) further support that SHARE2_5 and TOPEXE_REMUN exhibit different effects in central and local SCLFs. The directions and significance of other associations with CGMs remain unchanged.

4.6. Endogenous effect of firm value on ownership of the largest shareholder

Chen et al. (2004b) suggest that ownership structure is determined by the trade-off of many factors, including firm value, and firm value is likely to affect ownership structure. To examine the potential endogenous

¹⁶ The market index, HuShen 300, on 30 April 2007, 2008, 2009 and 2010 was 3478.93, 3793.87, 2604.45 and 3014.07, respectively.

effects between TQ and TOPSHARE, Eq. (1) was modified so that TOPSHARE and TOPSHARE² are the dependent variables and TQ the independent variable. Eq. (2) is formulated as follows:

$$\begin{aligned} \text{TOPSHARE(or TOPSHARE}^2\text{)}_{i,t} = & \beta_0 + \beta_1 \text{TQ}_{i,t} + \beta_2 \text{TOPEXE_SHARE}_{i,t} \\ & + \beta_3 \text{TOPEXE_REMUN}_{i,t} + \beta_4 \ln \text{BOD}_{i,t} + \beta_5 \text{SEP_CAP}_{i,t} \\ & + \beta_6 \text{BIG12}_{i,t} + \beta_7 \text{DUAL_LIST}_{i,t} + \beta_8 \text{MI}_{i,t} + \beta_9 \text{GEARING}_{i,t} \\ & + \beta_{10} \ln \text{TA}_{i,t} + \beta_{11} \text{ROA}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (2)$$

The results of this regression for both central and local SCLFs (not tabulated) confirm that there is no significant endogenous effect of firm performance on ownership of the largest shareholder, as both TQ and ROA are insignificantly associated with TOPSHARE in all panels. This result is consistent with Hess et al. (2010), who find no endogenous effect of firm value on the aggregate of ownership of the largest five shareholders. Eq. (2) was rerun by using TOPSHARE² as the dependent variable, and the regression results again show that there is no endogenous effect of firm value on ownership of the largest shareholder in central and local SCLFs.

4.7. Summary of regression results

Overall, SHARE2_5 and TOPEXE_REMUN are different CGMs in central and local SCLFs. SHARE2_5 is significantly and positively related to TQ in central SCLFs, but not in local SCLFs. This result may help to explain the inconsistent findings of Bai et al. (2004) and Gao et al. (2006) mentioned in Section 2.1, possibly because in central SCLFs other large shareholders can effectively monitor the largest shareholders, whereas in local SCLFs the largest shareholder is likely to collude with the second largest shareholder to extract funds from Chinese listed firms, as proposed by Chen and Zhu (2007). TOPEXE_REMUN is significantly and positively related to TQ in local SCLFs, but not in central SCLFs, implying that local SCLFs employ professional managers to operate their businesses, and their compensation and tenure is strongly linked to firm performance (value), in contrast to the politically employed managers in central SCLFs. Another indicator of management incentive, TOPEXE_SHARE is insignificantly related to TQ, possibly because it is very low in both central and local SCLFs, as mentioned in Section 4.2. Accordingly, both H1 and H2 are supported.

5. Conclusion

Some scholars describe the current government policy as *zhuada fangxiao*, in which central SOEs are subject to a ‘grasp the large’ (*zhuada*) scheme and local SOEs to a ‘release the small’ (*fangxiao*) scheme, whereby the state owner retains control. Based on company data from 2007 to 2009, this paper provides empirical evidence that the different characteristics of ultimate shareholders may lead to heterogeneous effects of CGMs on firm value. The results suggest that the aggregate ownership of other large shareholders and the remuneration of top executives exhibit different effects on the value of central and local SCLFs. The findings also suggest a possible non-linear relationship between the ownership of the largest shareholder and firm value in all SCLFs, perhaps because the ultimate shareholder has a strong incentive to support and tunnel the listed firm for its own political benefits, and the largest shareholder seeks benefits at the expense of other shareholders. Furthermore, in many cases the local government may even collude with other large shareholders. This paper also provides evidence that there is no endogenous effect between the ownership of the largest shareholder and firm value in central and local SCLFs.

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Appendix A

A.1. Case studies on state-controlled listed firms

In China, there are statutory regulations and recommendations to regulate and restrict related-party transactions between the largest shareholders and their listed firms (e.g., Article 21 of Company Law (2005), Paragraphs 12–21 of the Code of Best Practice and Certain Opinions on Regulating the Behaviour of State-owned Shareholders of Listed Firms (2009)). However, in some state-controlled listed firms, the largest shareholders tunnel and use the funds to pay for the pensions and welfare of past employees (e.g., Northeast Electrical from 1999 to 2001, H-share Stock code: 0042, A-share Stock code: 000585), to support the expenditure of local governments (e.g., Jiugui Liquor from 1998 to 2005, Stock code: 000799) and to support their own business expansion (e.g., Sanjiu).

Cases One and Two illustrate the common practice in China of the largest shareholders propping up the listed firms before the IPO, and then tunnelling them after the IPO. Case Three presents another common example of the integration of the controlling party and the listed firm into a single economic entity.

A.1.1. Case One – Agricultural Bank of China (central SCLF): a case of propping up before the IPO

The Agricultural Bank of China Limited (hereafter ‘ABC’) is one of the big four commercial banks in China. Its shares have been listed on the Shanghai Stock Exchange (A-share Stock code 601288) and the Hong Kong Stock Exchange (H-share Stock code 1288) since 2010. The percentage of state-owned shares has changed from 100% ownership by the Ministry of Finance and Central Huijin Investment Co Ltd, both under the State Council, to 96.3% (before the IPO) and to 82.7% at the end of 2010 (after the IPO). Its prospectus (H shares) shows that in 2008, before its corporate restructuring, ABC disposed of certain non-performing assets worth RMB815695 million, including non-performing loans of RMB766768 million and other impaired assets of RMB48927 million. From the total of RMB815695 million, the People’s Bank of China and the Ministry of Finance carried RMB150602 million and RMB665093 million, respectively. If those transactions had not been undertaken in 2008, the total equity of ABC as at 31 December 2009 would have been reduced to RMB760665 by the reporting accountants and auditors, and its financial position over the period, including the corporate restructuring, would have been as follows.

	2007	2008	2009	2010	Total
	RMB	RMB	RMB	RMB	RMB
	Million	Million	Million	Million	Million
Reported comprehensive income (after non-controlling interest) (‘CI’)*	35,146	76,400	52,374	87,762	251,682
<i>Pro-forma CI without corporate restructure</i>	<i>35,146</i>	<i>(684,265)</i>	<i>52,374</i>	<i>87,762</i>	<i>(508,983)</i>
Reported total equity (after non-controlling interest) (‘TE’)	(727,605)	290,445	342,819	542,071	
<i>Pro-forma TE without corporate restructure*</i>	<i>(727,605)</i>	<i>(470,220)</i>	<i>(417,846)</i>	<i>(218,594)</i>	

Source: H-share prospectus and 2010 annual report of ABC.

* It is assumed that in 2008 the reversal of impairment loss on the loan receivables of RMB 43.1 billion would have not been made and the additional balance of doubtful loan receivables of RMB 717.6 billion would have been made, resulting in the decrease of profit for that year and a reduction in the accumulated equity by a total of RMB 760.7 billion.

With the above pro-forma adjustments, ABC would not have met the listing qualifications in Hong Kong and China, as it had incurred a loss in recent years and had negative equity. The above corporate restructuring was, in fact, propping from the central government (the ultimate shareholder) to ABC to enable it to meet the listing qualifications.

The issue of non-performing loans is an extremely important problem in the Chinese financial system. Previously, due to political pressure, the state-owned banks always granted loans and advances to other inefficient state-owned enterprises (SOEs), even when they were unprofitable and insolvent, resulting in an accumulation of non-performing loans. Although the central government got rid of a material part of the non-performing loans from ABC's books in 2008, it is uncertain whether political influence would make ABC support other SOEs in future economic slowdowns.

A.1.2. Case Two – Sanjiu (central SCLF): a case of tunnelling

The China Resources Sanjiu Medical and Pharmaceutical Co Ltd (formerly known as Sanjiu Medical and Pharmaceutical Co Ltd (Sanjiu)) has been listed on the Shenzhen Stock Exchange (Stock code: 000999) since 2000 and is engaged in the production and sale of pharmaceutical products in China. On 31 December 2007, Sanjiu Enterprise Group Co Ltd was the controlling shareholder of Sanjiu with a total of 71.4% of the shares.

After the IPO in 2000, the controlling shareholder embezzled funds from Sanjiu, and this was reported in the mass media as an attempt by the controlling shareholder to raise funds for the repayment of existing loans.¹⁷ As a result, in October 2005 the Ministry of Finance issued a notice concerning the quality of listed firms, the '**Notice of the State Council on Approving and Forwarding the Opinions of China Securities Regulatory Commission on Improving the Quality of Listed Companies**'. This notice required that all advances made by listed firms to their related parties had to be settled in full before 31 December 2006. The controlling shareholder did not comply with this notice, and on 31 December 2007 it owed RMB 3.7 billion to Sanjiu, representing 48.2% of the net assets of the firm. The mass media reported that the controlling shareholder extracted funds from Sanjiu to acquire new businesses that were unrelated to Sanjiu.¹⁸ In 2008, the controlling shareholder transferred the shares of Sanjiu to New Sanjiu Holdings Co Ltd (wholly owned by China Resources (Group) Co Ltd, which is supervised by the State Council) and fully repaid the amount due to Sanjiu.¹⁹

A.1.3. Case Three – Wuliangye (local SCLF): a case of the integration of business operations with its controlling party

Wuliangye Yibin Company Limited is listed on the Shenzhen Stock Exchange (Stock code: 000858). Wuliangye and its subsidiaries are engaged in the sale and manufacture of wine under the name of 'Wuliangye', in Yibin, Sichuan, China. Although it is held under the name of the local government agency, Yibin State-owned Assets Management Co Ltd (the controlling shareholder), the firm is actually under the control of another state-owned enterprise, the Wuliangye Group Co Ltd (the controlling party) as evidenced by

1. the official website, www.wuliangye.com.cn, where the firm appears to be part of the controlling party; and
2. the firm's financial statements, which disclose a series of related party transactions (RPTs) between the firm and the controlling party.

Although a series of regular and irregular RPTs were conducted between the firm and the Wuliangye Group, Wuliangye is a profitable business, unlike other firms that were bankrupted, delisted or taken over after being tunnelled by their controlling shareholders. Liu et al. (2004) estimate that the Wuliangye Group yielded private benefits of RMB9.7 billion between 1998 and 2003. Nevertheless, its financial statements and official website show that

1. the firm has rarely paid a cash dividend, even though it has been profitable since the IPO in 1998 and it possesses a huge amount of cash and cash equivalents; and
2. the firm and the Wuliangye Group are integral parts of the same supply chain, as evidenced by the RPTs; both Wuliangye and the Wuliangye Group sell products with the same brand name.

¹⁷ For example, see the news from Sina Finance, <http://finance.sina.com.cn/roll/20040811/0607939595.shtml>, accessed on 20 October 2011.

¹⁸ See '999 Group', <http://wiki.mbalib.com/>, accessed on 29 September 2011.

¹⁹ It is thought that the controlling shareholder sold the Sanjiu shares for cash and used the same funds to repay the debt due to Sanjiu.

Most new mainland Chinese listed firms reorganised their corporate structure before their IPOs to reduce the magnitude of the RPTs (i.e., the possibility of tunnelling and earnings management) and to ensure the independence of their management hierarchy and business models from their related parties. Following this professional practice, in 2009 Wuliangye announced its proposal for corporate reorganization to separate the core business from the Wuliangye Group and dispose of the non-business related investments to its controlling shareholder to improve investors' perceptions of corporate governance.

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Ownership balance, supervisory efficiency of independent directors and the quality of management earnings forecasts

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ABSTRACT

In the Chinese securities market, with its characteristics of influence through personal relationships (*Guanxi*) and underdeveloped standards of law and enforcement, can independent directors play the supervisory role expected by securities regulators? In this study we use the degree of precision and accuracy in corporate earnings forecasts as proxies for the quality of information disclosure by listed companies and examine the supervisory efficiency of independent directors with respect to information disclosure. Using data from 2007 to 2009, we find that in the absence of ownership balance, independent directors have a significant positive effect on the accuracy of management forecasts. In addition, the personal backgrounds of independent directors have specific effects on management earnings forecasts. Directors with certified public accountant (CPA) expertise significantly improve the precision of management forecasts. However, directors with industrial expertise significantly reduce the precision of management forecasts. In other words, having directors with CPA expertise improves the independence of boards, but having independent directors with industrial expertise has the opposite effect.

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1. Introduction

The absence of ownership balance and the popularity of a single large shareholder are the most commonly mentioned causes of malpractice in Chinese share markets. Therefore, investors have for many years been calling for boards of directors with greater independence. In 2002, the Chinese Securities Regulatory Commission (CSRC) moved to improve the corporate governance structures of Chinese listed companies by issuing *The Guiding Opinions on the Establishment of Systems of Independent Directors* (hereafter referred to as the *Guiding Opinions*). Thereafter, the efficiency of independent directors became one of the most widely studied fields in the Chinese capital market. There are many extant studies on the relationship between independent directors and firm performance, which generally agree that supervision is the most important responsibility of independent directors (Ye et al., 2007; Wang, 2007a; Zhao et al., 2008). Recently, Wang et al. (2008) argue that the improvement in listed companies' levels of disclosure and transparency serves both to curb the dominance of large shareholders and to provide a basis for the appraisal of independent directors' supervisory efficiency.

In testing this theory, the main question that previous studies confront is how to measure the level of information disclosure in listed companies. The easiest and most accepted way is to use the rating scores given by independent institutions.¹ In China, however, only companies listed on the Shenzhen Securities Exchange (hereafter referred to as the SZE) are rated annually and those on the Shanghai Securities Exchange are not. The sample of rated companies is therefore limited, which raises difficulties for using rating scores as a proxy for the level of information disclosure. Because of this difficulty, previous studies have usually used variables such as earnings quality to proxy for the level of information disclosure. The measurement of earnings quality requires the use of statistical models and the derived variables may not be significantly related to the quality of information disclosure. For example, among the three variables used by Hu and Tang (2008), only the degree of earnings aggressiveness is significantly related to the rating scores given by the SZE and the degree of earnings management or earnings smoothness are not.

Another way to measure the level of information disclosure is to study the quality of one specific aspect of corporate reporting. The assumption here is that a measure of disclosure quality produced by examining any one aspect of corporate reporting could proxy for the general level of disclosure provided by a firm (Botosan, 1997). This assumption was tested and confirmed by Lang and Lundholm (1996), who document a significant rank-order correlation between annual report and other publication disclosure rankings, compared with the correlation between annual report and investor relations disclosure rankings. Building on this approach, Botosan (1997) used the degree of voluntary information disclosure found in a firm's annual report alone to serve as a proxy for the degree of disclosure provided by a firm across all avenues and created a transparency scoring system called the *DSCORE*. Li (2008) scored companies based on the readability of annual reports. Other studies (Graham et al., 2005; Wang, 2007b) have used the attributes of management earnings forecasts to proxy for the general level of disclosure. For Chinese listed companies, Bai (2009) find that the precision and the accuracy of management forecasts are significantly related to the transparency rating scores given by the SZE. In line with this approach, we choose the precision and accuracy of management forecasts to proxy for the general level of disclosure and use this measure to study the supervisory efficiency of independent directors.

We choose the quality of management forecasts to proxy for the general level of corporate disclosure for three reasons. First, management forecasting is an important aspect of corporate disclosure that has a significant influence on investors and financial analysts (Bai, 2009; Healy and Palepu, 2001). Numerous studies have used the quality of management forecasts to proxy for the level of information disclosure, such as Graham et al. (2005) and Wang (2007b).² Second, there is considerable scope for manipulation in management forecasting. Studies on voluntary management forecasts have found that management can manipulate the timing, precision and accuracy of management forecasts (Karamanou and Vafeas, 2005; Rogers and Stocken, 2005).

¹ For example, studies on American firms (Sengupta, 1998; Lang and Lundholm, 1996, etc.) usually use the rating scores provided by FAF (the Report of the Financial Analysts Federation Corporate Information Committee) and its successor AIMR (The Association for Investment Management and Research, which changed its name to The CFA Institute in 2004).

² Beyer et al. (2010) find that for the average firm, 28.37% of the variance in quarterly stock returns occurred on days when accounting disclosures (including earnings announcements, earnings pre-announcements, management forecasts, analyst forecasts or other SEC-form filings) are made. Surprisingly, management forecasts provided, on average, approximately 55% of accounting-based information (pp. 299–300).

In Chinese share markets, most management forecasts are mandatory and securities regulators specify the timing of disclosures. However, there are no specifications concerning the precision and accuracy of management forecasts and this deficiency provides management with many opportunities to manipulate forecasts.³ This variability in forecasting standards provides us with a good opportunity to examine the supervisory efficiency of independent directors.⁴ Third, it is very easy to measure the quality of management forecasts in hindsight, without the use of sophisticated statistical models.

Our study makes two main contributions. First, we use an easily measureable proxy for the general level of corporate disclosure to examine the supervisory efficiency of independent directors in companies with varied ownership structures. The results are complementary to those found by previous studies, such as Wang et al. (2008), and also provide insights into the influence that independent directors have on improving transparency. Second, we examine the factors influencing mandatory management forecasts and compare them with factors influencing voluntary management forecasts. This comparison provides relatively solid support for the improvement of regulations on management forecasts in China.

The remainder of this paper is organized as follows. Section 2 discusses the institutional background and reviews the related literature. Section 3 develops our research hypothesis and provides variable definitions. Section 4 reports the empirical results and Section 5 concludes the study.

2. Institutional background and literature review

2.1. Institutional background

Requirements for management forecasts by companies listed on the Chinese stock markets began in 1998. Song and Ji (2012) provide a detailed description of the related institutional background, explaining that listed companies have to make management forecasts if their annual earnings are expected to exceed a certain threshold (henceforth, “the threshold”). This requirement makes management forecasts mandatory rather than voluntary when the expected earnings exceed the threshold—a unique characteristic not found in more developed capital markets. Bai (2009) finds that the information disclosure ratings given by the Shenzhen Securities Exchange have a significant positive relationship with the precision and accuracy of contemporary annual management forecasts.⁵ Therefore, Bai concludes that the quality of management forecasting is a good proxy for the overall quality of information disclosure by listed firms.

Management forecasts provide significant corporate information content. For example, Luo and Song (2012) find that there are significant market reactions to management forecasts. Bai (2007) and Xue (2001) arrive at similar conclusions. In summary, there are significant positive (or negative) abnormal market returns from management forecasts announcing good (or bad) news.

Listed companies who have made wrong or misleading management forecasts are likely to be publicly criticized by securities regulators. However, Song and Ji (2012) find that the application of penalties is selective in that most punishments for fraudulent forecasts go to firms with poor economic performance. Luo and Song (2012) find that, other things being equal, firms that have made inaccurate management forecasts in prior years receive a lower market reaction to their current forecasts. These researchers conclude that wrong or mis-

³ According to the listing rules, “Listed companies should ensure that there is no material difference between the financial data reported in earnings pre-announcements and the actual data reported in periodic reports. If the difference is more than 20 percent, the listing firm should apologize in the form of a board note when disclosing the corresponding periodic report. In the meantime, the board must explain the reason for the difference and the responsibilities of internal personnel”. However, earnings pre-announcements are different from management forecasts.

⁴ In some cases owner managers might fail to communicate their forecasts to independent directors before disclosing them to the public. However, independent directors can still affect the quality of management forecasts in two ways. First, about 50% of annual management forecasts are announced in third-quarter reports, which must be confirmed by independent directors. Second, as Ajinkya et al. (2005) argue, independent directors might not directly influence management forecasts disclosed apart from periodic reports, but these directors can still indirectly influence management forecasts by fostering an environment that encourages greater transparency.

⁵ We conduct a similar correlation analysis for the 2002–2009 period. The results indicate that the Pearson (Spearman) correlation coefficient between the information disclosure ratings and the precision of management forecasts is 0.1508 (0.1251) and the corresponding correlation between the information disclosure ratings and management forecast error is -0.1788 (-0.1484), all significant at the level of 1%.

leading management forecasts do harm to the reputation of listed companies and thereby reduce the credibility of subsequent forecasts, as also concluded by Williams (1996).

2.2. Literature review

2.2.1. Precision and accuracy of management forecasts

Management forecasts take four forms: general impressions, open-interval estimates, closed-interval estimates and point estimates. General impression forecasts are the least precise and point estimate forecasts the most precise. Theoretical analysis (Kim and Verrecchia, 1991, for example) and psychological studies (Rapoport et al., 1990, for example) both indicate that the precision of information directly influences the receiver's acceptance of the signal's information content. Usually, higher precision information indicates that the sender has greater certainty concerning the signal and the receiver responds by giving greater weight to the signal. Concerning the precision of management forecasts, Baginski et al. (1993) find that price reactions to management forecasts are influenced by the precision of management forecasts. Specifically, the price reactions to point estimates are larger than reactions to range estimates. Although Pownall et al. (1993) find no relationship between price reactions and management forecast precision, the experimental results of Hirst et al. (1999) provide one explanation for this exception to the rule. These researchers find that only when the accuracy of prior management forecasts has been high can investors seriously consider the precision of current management forecasts. If prior management forecasts have been inaccurate, the current management forecast (however accurate it is) has no effect on investors' judgments.

Inaccurate management forecasts can not only mislead market participants (Bai, 2009; Hassell and Jennings, 1986), but also harm the forecaster's reputation for accurate disclosure (Luo and Song, 2012). In extreme situations, inaccurate management forecasts might incur litigation (Skinner, 1994) or enforcement actions (Song and Ji, 2012). Hirst et al. (1999), Hutton and Stocken (2007) and Luo and Song (2012) all find that the accuracy of prior management forecasts directly affects investors' belief in the credibility of current forecasts. Bai (2009) finds that analyst forecasts are directly affected by the precision and accuracy of contemporary management forecasts. Williams (1996) and Song (2012) both find that analyst forecast revisions are affected not only by the deviation between management forecasts and analyst forecasts, but also by the accuracy of prior management forecasts.

2.2.2. Independence of boards and the quality of information disclosure

The quality of information disclosure is an attribute that is hard to measure. Therefore, studies on Chinese capital markets use various other proxies to examine the supervisory efficiency of independent directors and these studies have mixed results. Hu and Tang (2008) use the quality of earnings to proxy for the quality of information disclosure.⁶ They find that independent directors significantly improve the quality of information disclosure, with the measure of earnings management an exception to this pattern. Yang and Yang (2006) use the frequency of restatements as a proxy for the quality of disclosure. They find that a board's percentage of independent directors has no significant influence on the likelihood of restatements. Wang (2007a) also finds no significant relationship between the quality of disclosure (measured by the extent of earnings management) and the percentage of independent directors on the board. Zhi and Tong (2005) find that the frequency and percentage of changes in independent directors is positively related to the extent of earnings management. These authors argue that independent directors have expertise, but are not sufficiently independent, and this is the key reason why independent directors have not played effective roles in corporate governance. This argument was confirmed by the results of Zhao et al. (2008), who employ the degree of accounting conservatism to proxy for the quality of disclosure. These researchers find that independent directors have a significant positive influence on accounting conservatism and that this influence is stronger for firms with better corporate governance. However, Wang et al. (2008) find that even in companies with lower ownership balance (and therefore worse corporate governance), the supervisory efficiency of independent directors was significant, which is

⁶ Hu and Tang (2008) employ four variables to measure the quality of earnings. These variables are the extent of earnings management, the information disclosure ratings given by the Shenzhen Securities Exchange, the degree of earnings aggressiveness and the degree of earnings smoothness.

in contrast with the results of Zhao et al. (2008). These inconsistencies may arise from the variable measurements and designs of these studies.⁷ However, the models used in both the Wang et al. (2008) and Zhao et al. (2008) studies are derived from the famous Basu model and their sample periods are both from 2002 to 2004.

Studies on developed markets have also used the degree of earnings management (for example, Klein, 2002; Davidson et al., 2005; Peasnell et al., 2005) or the degree of accounting conservatism (for example, Beekes et al., 2004; Ahmed and Duellman, 2007) to examine independent directors' influence on the quality of information disclosure. These studies have arrived at relatively consistent conclusions that independent directors significantly increase the degree of accounting conservatism and decrease the degree of earnings management. At the same time, studies on developed markets have directly examined the relationship between the independence of boards and the quality of management forecasts. The results of these studies have been mixed. For example, Karamanou and Vafeas (2005) find that the precision of management forecasts is higher for firms with a higher percentage of independent directors, but Ajinkya et al. (2005) find no significant influence.⁸ Ajinkya et al. (2005) find that the optimistic bias is smaller for firms with a higher percentage of independent directors, but Karamanou and Vafeas (2005) find no significant influence. Of course there are also some consistent results. For example, both Karamanou and Vafeas (2005) and Ajinkya et al. (2005) find that the accuracy of management forecasts is positively related to the percentage of independent directors.

2.2.3. Independent directors' expertise and the quality of information disclosure

Xie et al. (2003) use current abnormal accruals to measure the quality of information disclosure and examine the relationship between independent directors' expertise and the quality of disclosure. These authors find that independent directors with financial expertise or legal expertise have no significant effect on current abnormal accruals, but directors with corporate governance expertise can significantly decrease the level of current abnormal accruals. This finding is consistent with the results of Bedard et al. (2004). However, Abbott et al. (2004) find that having at least one financial expert on the audit committee significantly decreases the probability of financial restatements. Wang et al. (2008) also argue that independent directors with financial backgrounds can help to detect fraudulent reports and improve the credibility of financial reports. These authors also point out that independent directors with legal backgrounds can help control management irregularities and decrease litigation risks with regard to information disclosure. Wang et al. (2008) also suggest that independent directors may exert greater supervisory effort to ensure the firm maintains a good reputation.

2.2.4. Other factors influencing the precision and accuracy of management forecasts

Studies on factors influencing the precision of management forecasts are less numerous than those on the accuracy of management forecasts. Baginski and Hassell (1997) find that the precision of management forecasts is positively related to analyst following and negatively related to both firm size and earnings volatility. Baginski et al. (2002) find that the precision of management forecasts issued by Canadian firms is higher than that of their counterparts in the USA because the litigation risks in Canada are lower than in the USA. Baginski and Hassell (1997) and Karamanou and Vafeas (2005) both find that the precision in reporting bad news is significantly lower than in reporting good news, because managers wish to avoid dampening the market. Hribar and Yang (2006) find that over-confident managers are more likely to make management forecasts of higher precision.

There is a wealth of studies on the accuracy of management forecasts. The factors examined in these studies include corporate governance structures, firm size, earnings volatility, timing of disclosure, and other factors. Karamanou and Vafeas (2005) find that the size of boards has no significant influence on the accuracy of management forecasts, but larger board size does decrease the likelihood of optimistically biased forecasts. Johnson et al. (2001) find a significant negative relationship between firm size and the accuracy of management forecasts, but Ajinkya et al. (2005) and Hribar and Yang (2006) find no such significant relationship. Waymire

⁷ Wang et al. (2008) use a pooled sample with 3046 firm-year observations and employ the ratio of the shares held by the single largest shareholder to the sum of shares held by the second to fifth largest shareholders as a proxy for the degree of ownership balance. Zhao et al. (2008) use a panel sample with 2979 firm-year observations to obtain an index of corporate governance through factor analysis.

⁸ Ajinkya et al. (2005) attribute this result to the directors' fear of greater litigation exposure that might result from more specific forecasts.

(1986) reports no significant relationship between earnings volatility and the accuracy of management forecasts, but Ajinkya et al. (2005) find a significant negative relationship. Johnson et al. (2001), Ajinkya et al. (2005) and Karamanou and Vafeas (2005) all find that the time gap between the forecast day and the fiscal year end is negatively related to the accuracy of management forecasts.⁹

3. Research hypothesis and variable definitions

3.1. Research hypothesis

Studies on voluntary management forecasts usually assume that if managers seek to maximize company value for shareholders, they should make management forecasts more frequently, more precisely and more accurately (Skinner, 1994; Kasznik and Lev, 1995; Williams, 1996). However, managers can also manipulate management forecasts for their own interests. Independent directors from outside the company can mitigate managerial self-interest and influence the issuance and content quality of earnings forecasts by directly reviewing the disclosure policies and earnings releases, as well as by fostering an environment that encourages greater transparency. However, outside directors may also be ineffective, either because they are appointed by, or have allegiance to company managers, or because their board culture discourages conflict. The effectiveness of outside directors and the extent to which they represent shareholder interests could also be influenced by the fear of litigation and reputation costs (Ajinkya et al., 2005, pp. 348–349).

Although the results of studies on independent directors' supervisory roles are mixed, securities regulators expect that independent directors play important supervisory roles and improve the general level of corporate disclosure. Thus our research hypothesis is as follows.

H1: The percentage of independent directors is positively related to the quality of management forecasts.

The corporate governance environment should influence the supervisory roles of independent directors. On one hand, a good corporate governance environment will probably strengthen the supervisory efficiency of independent directors (Zhao et al., 2008). On the other hand, a bad corporate governance environment will probably induce a lower quality of corporate disclosure (Wang et al., 2008), thereby causing a higher risk of fraudulent behavior. In a poor governance environment, independent directors might also try to reduce their own personal risk. Therefore, our two sub-hypotheses are as follows.

H1a: In the case of lower company ownership balance, the percentage of independent directors is positively related to the quality of management forecasts.

H1b: In the case of higher company ownership balance, the percentage of independent directors is positively related to the quality of management forecasts.

For this analysis we categorize ownership balance by using a z-score, which is equal to the shares held by the largest shareholder divided by the sum of shares held by the second- to fifth-largest shareholders. If the z-score is no higher than the industry median of the same year, we allocate it to the higher ownership balance group. Otherwise, we allocate it to the lower ownership balance group.

3.2. Variable definitions

Table 1 provides the definitions of variables used in our analysis. The dependent variables include *PRECISION*, *BIAS* and *FE*.

⁹ In most of the world, voluntary management forecasts usually occur before the end of the fiscal year, but this is not necessarily true in China. Chinese listed companies' management forecasts can occur either in October, which is before the end of fiscal year, or in January, which is within one month after the end of the fiscal year. If we choose only observations occurring before the end of fiscal year, the sample size would be dramatically smaller.

For *PRECISION*, we classify the types of management forecasts into four categories according to their degree of precision. These are forecasts based on (i) general impression estimates, (ii) open-interval estimates, (iii) closed-interval estimates and (iv) point estimates. As the first type of estimate is the least precise and the last type the most precise, we assign general impression estimates a value of 0, open-interval estimates a value of 1, closed-interval estimates a value of 2 and point estimates a value of 3, so that the variable *PRECISION* has a value between 0 and 3. *BIAS* is used to examine whether independent directors can systematically decrease optimistic bias in management forecasts and *FE* measures the accuracy of management forecasts. The calculations of accuracy of forecasts of net income are based on the type of forecast used in each observation, with the number of points used in point estimates, the mean in closed-interval estimates and the lower end in open-interval estimates.

The independent variables include the independence of the board (*OUT*) and proxies for independent directors' characteristics, such as their financial expertise (*CPA*), legal expertise (*LAW*), industrial expertise (*HY_EXP*), expertise in corporate governance (*GOV_EXP*), their reputation as reflected in membership of other boards (*REPUT*) and their compensation (*COMPEN*).

The *Guiding Opinions* specify that "at least one of the independent directors should be a professional accountant (the term 'professional accountant' meaning a person with a senior title or qualifications as a certified public accountant)". According to this specification, every listed company should have at least one professional accountant as an independent director. Therefore, having at least one professional accountant is an almost homogeneous condition across all listed companies. However, having a certified public accountant (*CPA*) on the board is more exceptional and we have tried to detect if such accounting expertise has a measurable effect on the accuracy of management forecasts (Wang et al., 2008).

Concerning other types of director expertise, the *Guiding Opinions* allow listed companies greater choice in selecting independent directors with relevant professional backgrounds. Therefore, the number of independent directors with legal backgrounds, industrial expertise or expertise in corporate governance vary across companies. This variation provides us with opportunities to examine the effects of independent directors with these different kinds of expertise on their companies' management styles.

Concerning professional reputation, we could expect that independent directors who stand on a greater number of company boards should have higher supervisory efficiency. However, in terms of efficient working time, the more boards that an independent director serves on, the less time that director can allocate to each

Table 1
Variable definitions.

Variable	Definition
<i>BIAS</i>	Forecast net income – actual net income/total assets, winsorized at 1st and 99th percentiles by year
<i>COMPEN</i>	Equals one if the mean compensation of independent directors is higher than the median of the industry and zero otherwise
<i>CPA</i>	Equals one if the company has at least one independent director with a CPA background and zero otherwise
<i>EV</i>	Equals the standard deviation of net income in the past 3 years divided by their absolute mean, winsorized at 95th percentile by year
<i>FE</i>	Equals <i>BIAS</i>
<i>GOV_EXP</i>	Equals one if the company has at least one independent director who is also a manager of other companies and zero otherwise
<i>HY_EXP</i>	Equals one if the company has at least one independent director with an industrial background and zero otherwise
<i>IND</i>	Industry dummies
<i>LAW</i>	Equals one if the company has at least one independent director with a legal background and zero otherwise
<i>MONTH</i>	Equals one if the company's forecasts are made before the end of fiscal year, two if the forecasts are made within one month after the end of fiscal year and three if the forecasts are made between February and April
<i>OUT</i>	The percentage of independent directors on the board
<i>PRECISION</i>	Rated on a scale of zero to three, with zero for general impression estimates, one for open-interval estimates, two for closed-interval estimates and three for point estimates
<i>REPUT</i>	The mean number of companies in which the independent directors serve as board members
<i>ROA</i>	Equals net income of current year/total assets, winsorized at 1st and 99th percentiles by year
<i>SIZE</i>	Natural log of total assets
<i>ST</i>	Equals one if the company is in the state of special treatment and zero otherwise
<i>UE</i>	Net income of current year – net income of last year/total assets, winsorized at 1st and 99th percentile by year
<i>YEAR</i>	Dummy variables to control for the years 2008 and 2009

company, and the fiduciary effect of their expertise could be weakened. Therefore, we have no expected effect from the variable *REPUT*.

The influence of compensation on independent directors is double-edged. Higher compensation could impel independent directors to play more active roles. However, higher compensation might also induce lower fiduciary effort, in that directors may be so dependent on their compensation that they are reluctant to challenge the company's primary owners.

The control variables for our study are defined according to extant literature on voluntary management forecasts. The variable *EV* measures the volatility of earnings. Studies on voluntary management forecasts have found that the precision of management forecasts are negatively related to the volatility of earnings. The variable *UE* measures unexpected earnings, or income not anticipated by management. Johnson et al. (2001) and Ajinkya et al. (2005) find that the accuracy of management forecasts is negatively related to the magnitude of unexpected earnings. Eames and Glover (2003) argue that it is necessary to control for the level of earnings in analyzing forecasting errors, so we include *ROA* to control for this effect.¹⁰ Koch (2002) finds that companies in financial distress are more likely to issue wrong or misleading management forecasts. To account for this we use the variable *ST* instead of the Ohlson score to proxy for financial distress in the Chinese business environment. The variable *MONTH* controls for the timing of management forecasts. When management forecasts are disclosed later in the financial year, management has more information for earnings forecasts and therefore produces management forecasts with higher precision and accuracy. The variable *SIZE* is used to control for the influence of firm size. In addition, the quality of management forecasts might vary across years and between industries. We include *YEAR* and *IND* dummies to control for these effects.

3.3. Regression models

Because *PRECISION* is an ordinal variable, we run ordered logit regressions of Model (1). As *BIAS* and *FE* are continuous variables, we run OLS (ordinary least squares) regressions of Models (2) and (3), respectively.

$$\begin{aligned} \text{PRECISION} = & \alpha_0 + \alpha_1 \text{OUT} + \alpha_2 \text{CPA} + \alpha_3 \text{LAW} + \alpha_4 \text{HY_EXP} + \alpha_5 \text{GOV_EPX} + \alpha_6 \text{REPUT} \\ & + \alpha_7 \text{COMPEN} + \alpha_8 \text{EV} + \alpha_9 \text{ROA} + \alpha_{10} \text{ST} + \alpha_{11} \text{MONTH} + \alpha_{12} \text{SIZE} + \text{YEAR} + \text{IND} + \varepsilon \end{aligned} \quad (1)$$

$$\begin{aligned} \text{BIAS} = & \beta_0 + \beta_1 \text{OUT} + \beta_2 \text{CPA} + \beta_3 \text{LAW} + \beta_4 \text{HY_EXP} + \beta_5 \text{GOV_EPX} + \beta_6 \text{REPUT} + \beta_7 \text{COMPEN} \\ & + \beta_8 \text{UE} + \beta_9 \text{ROA} + \beta_{10} \text{ST} + \beta_{11} \text{MONTH} + \beta_{12} \text{SIZE} + \text{YEAR} + \text{IND} + \eta \end{aligned} \quad (2)$$

$$\begin{aligned} \text{FE} = & \gamma_0 + \gamma_1 \text{OUT} + \gamma_2 \text{CPA} + \gamma_3 \text{LAW} + \gamma_4 \text{HY_EXP} + \gamma_5 \text{GOV_EPX} + \gamma_6 \text{REPUT} + \gamma_7 \text{COMPEN} \\ & + \gamma_8 \text{UE} + \gamma_9 \text{ROA} + \gamma_{10} \text{ST} + \gamma_{11} \text{MONTH} + \gamma_{12} \text{SIZE} + \text{YEAR} + \text{IND} + \mu \end{aligned} \quad (3)$$

4. Empirical results

4.1. Sample description

Our sample includes annual management forecasts issued by China's A-share companies during the 2007–2009 period. To obtain our final sample, we first remove observations from financial industries. Second, we omit observations in which the types of forecasts issued are “uncertain” or “continuous profit”. Third, we remove observations without sufficient data for analysis. Finally, we have 2621 (2225) suitable observations with which to examine the precision (accuracy) of management forecasts.

¹⁰ Results concerning voluntary management forecasts indicate that the precision and accuracy of good news forecasts are higher when the reports are voluntary. We also define the variable *NEWS* with a value of one for good news and zero for bad news. The results of our study indicate that *NEWS* is positively related to *ROA*. However, when we add *NEWS* and *ROA* simultaneously in the regressions, the estimated coefficients of *NEWS* are not significantly different from zero and those of *ROA* are still significantly different from zero. Thus, we use only *ROA* in our regressions to control for the level of earnings and the nature of news.

Table 2
Summary of sample.

	All	Quantitative estimates ^a		Optimistically biased ^b	
<i>A: Year distribution</i>					
2007	792	666	(84.1%)	85	(12.8%)
2008	871	751	(86.2%)	285	(37.9%)
2009	958	808	(84.3%)	197	(24.4%)
	2621	2225	(84.9%)	567	(25.5%)
<i>B: Timing of management forecasts</i>					
Before the end of fiscal year	1050	858	(81.7%)	201	(23.4%)
January, next year	1379	1195	(86.7%)	326	(27.3%)
February	52	48	(92.3%)	6	(12.5%)
March	52	45	(86.5%)	14	(31.1%)
April	88	79	(89.8%)	20	(25.3%)
	2621	2225	(84.9%)	567	(25.5%)

^a Quantitative estimates include open-interval, closed-interval and point estimates. Open-interval estimates only forecast a lower end of the performance, closed-interval estimates forecast the minimum and maximum of the performance, and point estimates forecast a precise number. There is no number with regard to performance in general impression estimates.

^b Refers to overestimated observations among the quantitative estimates. First, we define *MFD* as (forecast net income – actual net income)/absolute value of actual net income. If *MFD* > 10%, then the observation is overestimated (or optimistically biased) and if *MFD* < -10% then the observation is under-estimated (or pessimistically biased).

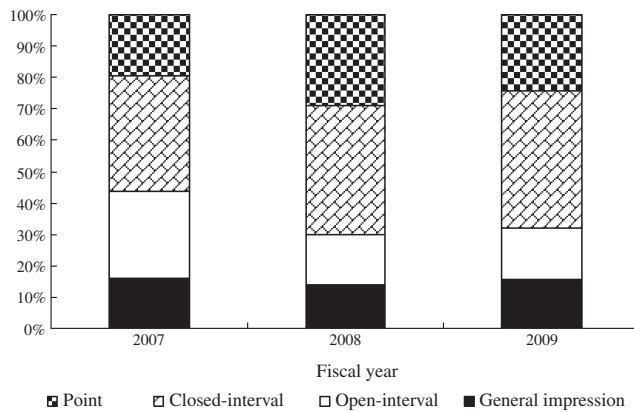


Fig. 1a. Forecast precision by year.

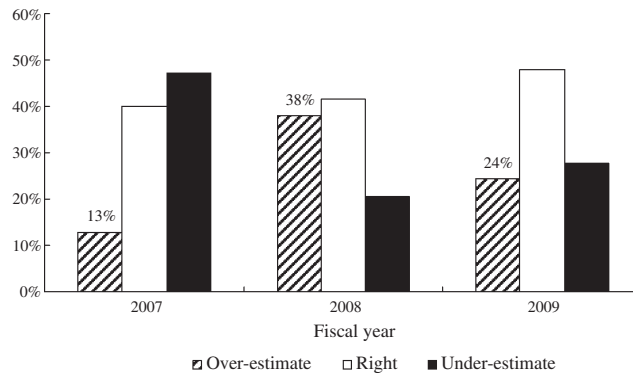


Fig. 1b. Forecast accuracy by year.

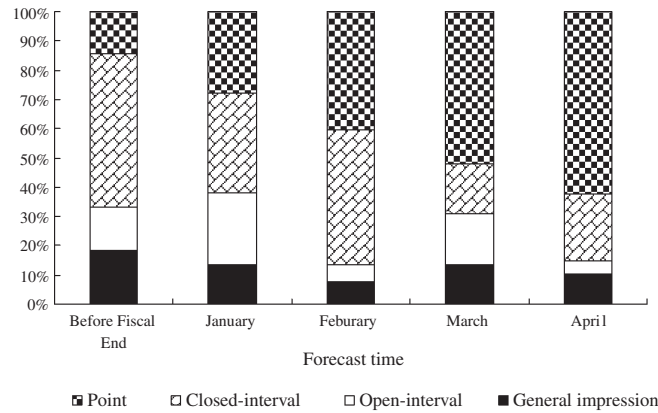


Fig. 2a. Forecast precision and forecast time.

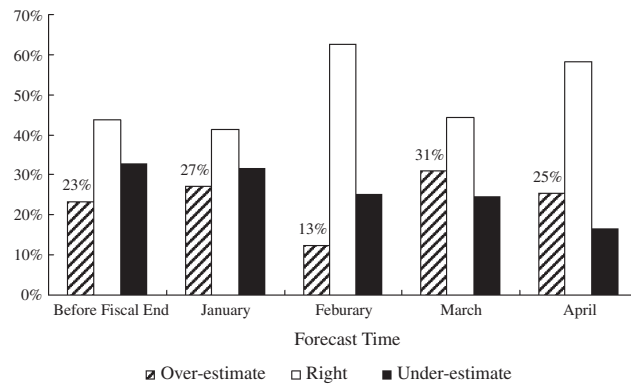


Fig. 2b. Forecast accuracy and forecast time.

Table 2 reports the distribution of our sample and Figs. 1a, 1b, 2a and 2b depict the percentage differences between factors. Qualitative observations make up less than 15% of our total sample. Concerning the accuracy of management forecasts, nearly 50% of the observations in 2007 are under-estimated, which might relate to the application of new accounting standards and the volatility of financial markets. In 2008, the percentage of overestimated forecasts is about 38%, which is considerably greater than in 2007 or 2009. This change may be a result of the 2008 global financial crisis. In 2009, the percentage of accurate forecasts (or forecasts that were less than 10% different from actual results) rose to 48%, which is a higher level of accuracy than in the previous 2 years. Also, management forecasts made in January show slightly higher precision than forecasts made before the end of fiscal year. However, management forecasts made between February and April have higher forecast accuracy than those made near the end of the fiscal year.

4.2. Descriptive analysis

The details concerning independent directors are summarized in Table 3. The results are consistent with extant literature in showing that the percentage of independent directors required by most listed companies is generally around 33% of board members. Where the percentage of independent directors is slightly above 33%, it is usually just because board size is not a multiple of three.¹¹ Fig. 3a indicates that boards whose percentage of independent directors is more than 40% are more likely to make forecasts using range or point

¹¹ When the size of the board is less than nine and the number of independent directors has to be no less than three as regulated, the percentage of independent directors must be more than one third. To test the influence of board size, we re-run the regressions with an additional dummy *BDUM* (equals one if the size of the board is nine and zero otherwise). The unreported results were unaffected.

Table 3
Summary of independent directors.

	Precision of management forecasts equals				Accuracy of management forecasts ^a		
	0	1	2	3	Over	Accurate	Under
<i>A: Percentage of independent directors on the board</i>							
<1/3	13	15	25	26	26	25	15
=1/3	215	295	581	333	284	518	407
(1/3%, 40%]	99	128	272	161	149	235	177
(40%, 50%]	65	70	179	113	101	172	89
>50%	4	9	10	8	7	15	5
Ratio test	$\chi^2 = 10.78$				$\chi^2 = 21.54^{***}$		
<i>B: Number of independent directors who are CPAs</i>							
0	307	401	580	413	357	579	458
1	82	106	457	213	197	359	220
2	6	10	29	15	13	27	14
≥ 3	1		1				1
Ratio test	$\chi^2 = 119.91^{***}$				$\chi^2 = 9.12$		
<i>C: Number of independent directors with legal backgrounds</i>							
0	209	287	566	340	314	518	361
1	152	199	454	260	216	393	304
2	32	25	43	41	33	49	27
≥ 3	3	6	4		4	5	1
Ratio test	$\chi^2 = 21.68^{***}$				$\chi^2 = 8.03$		
<i>D: Number of independent directors with industrial backgrounds</i>							
0	244	267	548	448	312	535	416
1	125	196	390	150	201	327	208
2	25	43	118	39	47	93	60
≥ 3	2	11	11	4	7	10	9
Ratio test	$\chi^2 = 76.97^{***}$				$\chi^2 = 6.13$		
<i>E: Number of independent directors with corporate governance backgrounds</i>							
0	219	302	726	385	356	623	434
1	135	178	277	199	169	277	208
2	28	28	57	49	37	57	40
≥ 3	14	9	7	8	5	8	11
Ratio test	$\chi^2 = 43.54^{***}$				$\chi^2 = 3.33$		
<i>F: Mean number of corporate boards on which independent directors stand</i>							
1	110	118	276	181	157	242	176
(1, 2]	215	267	563	333	289	510	364
(2, 3]	66	118	207	122	114	198	135
>3	5	14	21	5	7	15	18
Ratio test	$\chi^2 = 15.76^*$				$\chi^2 = 5.27$		
<i>G: Mean compensation of independent directors</i>							
<30,000	151	144	331	224	183	308	208
30,000–50,000	163	218	470	243	241	399	291
50,000–100,000	66	134	242	153	126	236	167
>100,000	16	21	24	21	17	22	27
Ratio test	$\chi^2 = 27.15^{***}$				$\chi^2 = 5.11$		

** Represent significance levels of 5% respectively.

* Represent significance levels of 10% respectively.

*** Represent significance levels of 1% respectively.

estimates. Also, as the percentage of independent directors increases, the percentage of accurate forecasts increases (accurate forecasts meaning those within 10% of the actual results) and the percentage of overestimated forecasts decreases.

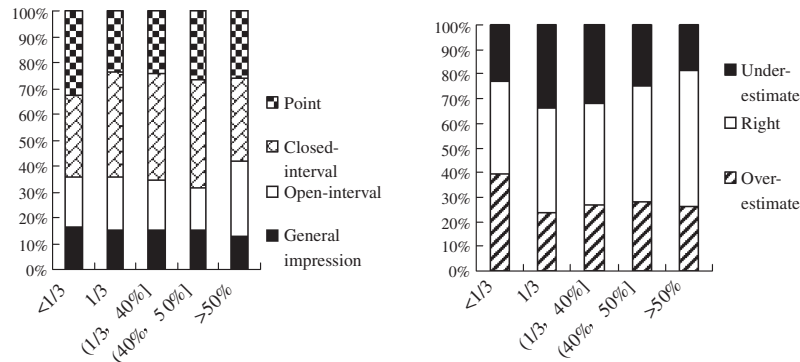


Fig. 3a. Precision and accuracy of management forecasts and independent directors.

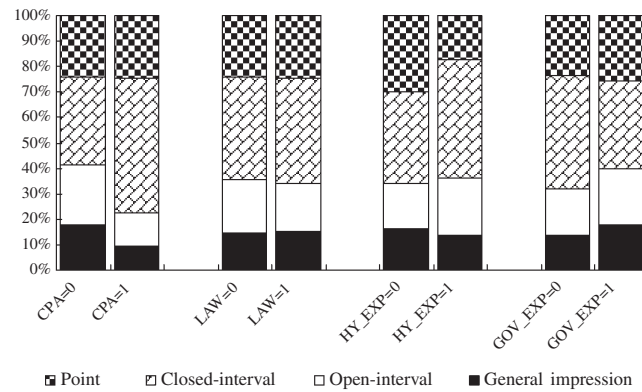


Fig. 3b(1). Independent directors' backgrounds and the precision of management forecasts.

In Fig. 3b(1), the observations concerning boards whose $CPA = 1$ and those whose $CPA = 0$ are not significantly different in their percentage of point estimates. However, the $CPA = 1$ boards make a higher percentage of range estimates than the $CPA = 0$ boards, resulting in higher forecast precision. The observations from boards whose $LAW = 0$ and those whose $LAW = 1$ are not significantly different in their distributions of forecast precision. The observations from boards whose $HY_EXP = 0$ and those whose $HY_EXP = 1$ are not significantly different in their percentages of qualitative estimates, but the $HY_EXP = 1$ boards have a higher percentage of point estimates. Similarly, the observations from boards whose $GOV_EXP = 0$ and those whose $GOV_EXP = 1$ are not significantly different in the percentage of point estimates, but the $GOV_EXP = 1$ boards have a higher percentage of range estimates. In other words,

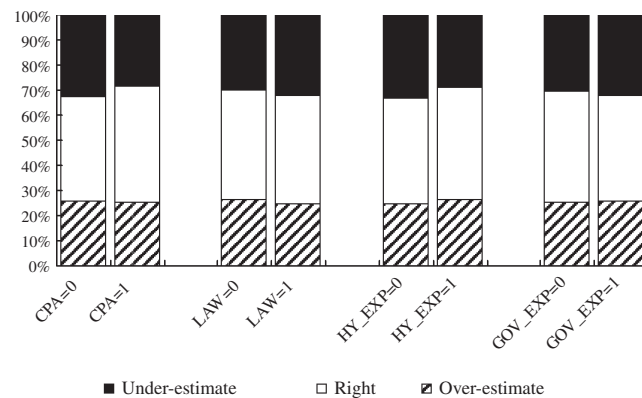


Fig. 3b(2). Independent directors' backgrounds and the accuracy of management forecasts.

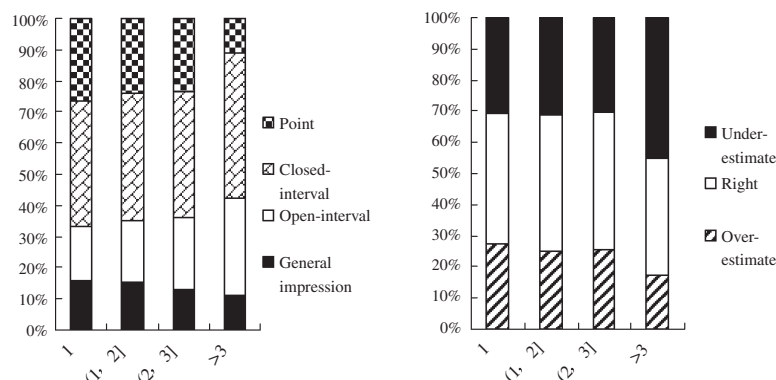


Fig. 3c. Precision and accuracy of management forecasts and the mean number of boards on which independent directors stand.

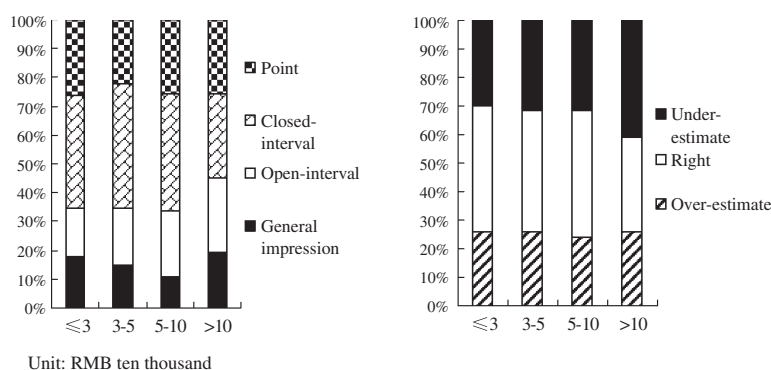


Fig. 3d. Precision and accuracy of management forecasts and independent directors' mean compensation.

independent directors with industrial expertise or corporate governance expertise seem to have negative effects on the precision of management forecasts. The results shown in Fig. 3b(2) indicate that the personal attributes of independent directors have almost no effect on the accuracy of management forecasts.

Fig. 3c shows that as the number of boards that the independent directors serve on increases, their boards' percentage of quantitative estimates also increases. However, their percentage of point estimates also decreases, which makes it difficult to judge the effects of director reputation on forecast precision. As for the accuracy of their management forecasts, boards with independent directors serving on a larger numbers

Table 4
Descriptive statistics of continuous variables.

Variable	Q1	Mean	Median	Q3	Std.
<i>A: Forecast precision</i>					
EV	0.4748	2.0549***	0.9087	1.8943	4.5052
ROA	0.0034	0.0228***	0.0278	0.0647	0.1752
SIZE	6.6922	7.5160***	7.3983	8.2903	1.3840
<i>B: Forecast bias and error</i>					
BIAS	-0.0064	0.0007	-0.0005	0.0044	0.0306
FE	0.0019	0.0131***	0.0053	0.0130	0.0277
ROA	0.0076	0.0357***	0.0346	0.0709	0.1450
UE	-0.0226	0.0114***	0.0145	0.0422	0.1997
UE	0.0170	0.0819***	0.0349	0.0731	0.1825
SIZE	6.7335	7.5597***	7.4568	8.3421	1.3657

* Represent significance levels of 10% respectively.

** Represent significance levels of 5% respectively.

*** Represent significance levels of 1% respectively.

of other boards show a decrease in their percentage of overestimated forecasts, but they show no improvement overall in their percentage of accurate estimates. Fig. 3d indicates that independent directors' compensation has no significant effect on the precision or accuracy of management forecasts.

Table 4 reports the descriptive summary of continuous variables. The result for *BIAS* indicates that there is no significantly optimistic or pessimistic bias in management forecasts. In other words, management forecasts are mainly unbiased. However, the mean value of *FE* is significantly positive, indicating that there are significant errors in management forecasts.

Table 5 reports the correlation coefficients between the main variables. In the full sample and the sample of companies with higher ownership balance, the percentage of independent directors has no significant correla-

Table 5
Correlations between main variables.

Variable	Full sample		Higher balance		Lower balance	
	Pearson	Spearman	Pearson	Spearman	Pearson	Spearman
<i>A: Forecast precision (PRECISION)</i>						
OUT	0.0172	0.0233	-0.0073	0.0033	0.0440*	0.0450*
CPA	0.1360***	0.1296***	0.1386***	0.1282***	0.1332***	0.1309***
GOV_EXP	-0.0484**	-0.0417*	-0.0062	0.0094	-0.0925***	-0.0924***
LAW	0.0059	0.0077	-0.0246	-0.0217	0.0376	0.0378
HY_EXP	-0.0601***	-0.0765***	-0.0706***	-0.0980***	-0.0492**	-0.0570***
REPUT	-0.0239	-0.0335	-0.0287	-0.0359*	-0.0190	-0.0316
COMPEN	-0.0051	-0.0119	-0.0075	-0.0177	-0.0027	-0.0076
[UE]	-0.0486**	-0.0680***	-0.0683***	-0.0601***	-0.0195	-0.0741***
ROA	0.0562***	0.0685***	0.0696***	0.0869***	0.0384	0.0475**
EV	-0.0727***	-0.0680***	-0.0398**	-0.0560***	-0.1062***	-0.0765***
MONTH	0.1542***	0.1354***	0.1565***	0.1356***	0.1519***	0.1369***
ST	-0.0652***	-0.0218	-0.0823***	-0.0266	-0.0463**	-0.0138
SIZE	-0.0662***	-0.0808***	-0.0778***	-0.0937***	-0.0542***	-0.0635***
<i>B: Forecast bias (BIAS)</i>						
OUT	0.0412*	0.0481**	0.0808***	0.0566*	0.0122	0.0403
CPA	0.0104	0.0493**	0.0072	0.0318	-0.0394	0.0667**
GOV_EXP	0.0013	-0.0162	0.0331	-0.0167	0.0124	-0.0183
LAW	-0.0180	-0.0169	-0.0445	-0.0470	-0.0210	0.0167
HY_EXP	-0.0168	0.0250	-0.0135	0.0305	-0.0146	0.0181
REPUT	-0.0090	-0.0177	-0.0019	-0.0346	-0.0294	0.0022
COMPEN	-0.0349	-0.0320	-0.0399	-0.0244	-0.3614***	-0.0399
UE	-0.2488***	-0.4228***	-0.1957***	-0.3875***	0.3711***	-0.4599***
ROA	-0.1096***	-0.3589***	-0.0678**	-0.2900***	0.0849***	-0.4395***
MONTH	0.0835***	0.0544***	0.0829***	0.0263	0.1354***	0.0859***
ST	0.1617***	0.0509**	0.1804***	0.0697**	-0.1564***	0.0298
SIZE	-0.1888***	-0.1374***	-0.2093***	-0.1521***	0.0000	-0.1091***
<i>C: Forecast error (FE)</i>						
OUT	0.0636***	-0.0208	0.1228***	0.0231	-0.0069	-0.0668**
CPA	-0.0345	-0.0221	-0.0405	-0.0009	-0.0289	-0.0441
GOV_EXP	0.0144	-0.0087	0.0463	-0.0077	-0.0257	-0.0102
LAW	-0.0029	-0.0121	0.0351	0.0573*	-0.0483	-0.0844***
HY_EXP	-0.0568***	-0.0094	-0.0769***	-0.0160	-0.0336	-0.0027
REPUT	-0.0159	-0.0088	-0.0233	0.0152	-0.0057	-0.0334
COMPEN	-0.0402*	0.0138	-0.0554*	0.0064	-0.0225	0.0213
[UE]	0.5123***	0.3668***	0.5064***	0.3746***	0.5464***	0.3587***
ROA	0.0284	0.1678***	0.0958***	0.1830***	-0.1012***	0.1521***
MONTH	0.0294	-0.0928***	0.0444	-0.0728**	0.0112	-0.1128***
ST	0.3056***	0.1683***	0.3865***	0.2450***	0.2005***	0.0823***
SIZE	-0.2572***	-0.0589***	-0.2962***	-0.0898***	-0.2073***	-0.0304

* Represent significance levels of 10% respectively.

** Represent significance levels of 5% respectively.

*** Represent significance levels of 1% respectively.

Table 6
Ordered-logit results of independent directors' effects on the precision of management forecasts.

	Exp.	Full sample ($N = 2621$)			Higher balance ($N = 1327$)			Lower balance ($N = 1294$)		
		Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
OUT	+		0.6652 (0.84)	0.6553 (0.81)		-0.4146 (0.17)	-0.2696 (0.07)		2.2918** (4.59)	2.0850** (3.77)
CPA				0.5335*** (47.76)			0.5700*** (27.04)			0.4997*** (20.24)
GOV_EXP				-0.2525*** (10.41)			-0.0789 (0.49)			-0.4229*** (14.31)
LAW				-0.0587 (0.62)			-0.1687 (2.53)			0.0260 (0.06)
HY_EXP				-0.3150*** (16.00)			-0.4113*** (13.27)			-0.1890* (2.85)
REPUT				-0.0838 (1.95)			-0.0831 (0.94)			-0.1045 (1.47)
COMPEN				0.0776 (1.04)			0.0078 (0.01)			0.1506 (1.94)
Intercept 3		-0.1555 (0.30)	-0.3965 (1.04)	-0.4021 (0.99)	-0.4000 (0.99)	-0.2460 (0.20)	-0.2050 (0.12)	-0.0072 (0.00)	-0.8214 (2.11)	-0.8588 (2.19)
Intercept 2		1.7028*** (35.21)	1.4622*** (14.07)	1.4986*** (13.76)	1.6353*** (16.34)	1.7895*** (10.31)	1.8837*** (10.39)	1.7234*** (16.45)	0.9133 (2.61)	0.9185 (2.51)
Intercept 1		2.8658*** (97.20)	2.6256*** (44.79)	2.6884*** (43.73)	2.6338*** (41.52)	2.7879*** (24.75)	2.9060*** (24.46)	3.0967*** (51.55)	2.2907*** (16.19)	2.3320*** (15.94)
EV		-0.0348*** (15.53)	-0.0351*** (15.75)	-0.0349*** (15.72)	-0.0142 (1.47)	-0.0141 (1.44)	-0.0174 (2.18)	-0.0554*** (15.21)	-0.0555*** (15.26)	-0.0548*** (14.39)
ROA		0.7721*** (12.36)	0.7704*** (12.28)	0.7406*** (11.37)	0.8603*** (10.41)	0.8641*** (10.50)	0.8713*** (10.49)	0.8419** (4.35)	0.8625** (4.56)	0.7728* (3.63)
ST		-0.5106*** (22.53)	-0.5143*** (22.81)	-0.5201*** (22.78)	-0.5638*** (14.29)	-0.5631*** (14.25)	-0.6326*** (17.38)	-0.4355 (7.49)	-0.4523 (8.05)	-0.3993 (6.15)
MONTH		0.4498*** (102.36)	0.4488*** (101.83)	0.4682*** (108.46)	0.5024*** (61.62)	0.5034*** (61.76)	0.5202*** (64.35)	0.4151 (42.82)	0.4145 (42.64)	0.4402 (47.01)
SIZE		-0.1968*** (41.83)	-0.1965*** (41.68)	-0.1815*** (32.99)	-0.1528*** (12.65)	-0.1531*** (12.68)	-0.1433*** (10.09)	-0.2312 (25.63)	-0.2314 (25.64)	-0.2069 (19.16)
Industry and year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rescaled R^2 (%)		8.77	8.80	11.50	11.64	11.65	14.75	9.96	10.31	13.18
-2LogL		6676.03***	6675.22***	6602.74***	3489.45***	3287.95***	3244.54***	3511.44***	3306.26***	3267.44***

Wald chi-square statistics in parentheses.

For variables with expected signs, the significance level is one-tailed and for other variables the significance level is two-tailed.

* Represent significance levels of 10% respectively.

** Represent significance levels 5% respectively.

*** Represent significance levels of 1% respectively.

tions with precision. However in the case of companies with lower ownership balance, the correlation coefficients between *OUT* and *PRECISION* are positive and significant at the level of 10%. There is a large gap between the actual effect of independent directors on the accuracy of management forecasts and the effect expected by securities regulators. Specifically, in the full sample and the sample of higher ownership balanced companies, *OUT* and *BIAS* are positively related, indicating that the higher the percentage of independent directors, the higher the likelihood of overestimated forecasts. Similarly, in the full sample and the sample of higher ownership balanced companies, the Pearson coefficient between *OUT* and *FE* is significantly positive, indicating that the higher the percentage of independent directors, the higher the percentage of forecast errors. Obviously, these results are in contrast to those expected by security market regulators. However, in the sample of lower ownership balance companies, the Spearman coefficient between *OUT* and *FE* is significantly negative, indicating that independent directors might play a positive supervisory role in such companies.

The results indicate that the effects of independent directors' personal characteristics on the quality of management forecasts vary from case to case. The precision of management forecasts has a significantly positive

Table 7
OLS results of independent directors' effects on the bias of management forecasts.

	Full sample ($N = 2225$)			Higher balance ($N = 1131$)			Lower balance ($N = 1094$)			
	Exp.	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
OUT	–		0.0225** (1.85)	0.0226** (1.85)		0.0541*** (2.95)	0.0526*** (2.85)		–0.0153 (0.95)	–0.0156 (0.97)
CPA				0.0011 (0.85)			0.0012 (0.65)			0.0009 (0.51)
GOV_EXP				0.0003 (0.23)			0.0012 (0.61)			–0.0012 (0.68)
LAW				–0.0016 (1.26)			–0.0040** (2.11)			0.0005 (0.33)
HY_EXP				0.0006 (0.44)			0.0013 (0.67)			0.0001 (0.05)
REPUT				0.0006 (0.62)			0.0009 (0.62)			0.0001 (0.05)
COMPEN				0.0009 (0.71)			0.0010 (0.52)			0.0005 (0.28)
UE	–0.0539*** (12.24)	–0.0541*** (12.29)	–0.0541*** (12.24)	–0.0404*** (6.95)	–0.0414*** (7.13)	–0.0416*** (7.13)	–0.0832*** (11.74)	–0.0832*** (11.75)	–0.0831*** (11.67)	–0.0831*** (11.67)
ROA	0.0345*** (5.68)	0.0346*** (5.70)	0.0344*** (5.64)	0.0264*** (3.24)	0.0269*** (3.31)	0.0271*** (3.32)	0.0404*** (4.03)	0.0403*** (4.02)	0.0400*** (3.96)	0.0400*** (3.96)
MONTH	0.0017** (2.44)	0.0017** (2.39)	0.0018** (2.46)	0.0014 (1.28)	0.0013 (1.21)	0.0013 (1.24)	0.0019** (2.03)	0.0019** (2.04)	0.0020** (2.09)	0.0020** (2.09)
ST	0.0119*** (5.76)	0.0117*** (5.66)	0.0118*** (5.67)	0.0118*** (3.85)	0.0116*** (3.79)	0.0117*** (3.78)	0.0138*** (4.88)	0.0139*** (4.93)	0.0141*** (4.95)	0.0141*** (4.95)
SIZE	–0.0035*** (6.85)	–0.0035*** (6.80)	–0.0036*** (6.85)	–0.0043*** (5.47)	–0.0042*** (5.36)	–0.0045*** (5.49)	–0.0024*** (3.50)	–0.0024*** (3.50)	–0.0024*** (3.33)	–0.0024*** (3.33)
Intercept	0.0158*** (3.27)	0.0075 (1.13)	0.0073 (1.07)	0.0252*** (3.42)	0.0044 (0.43)	0.0059 (0.55)	0.0044 (0.68)	0.0099 (1.15)	0.0095 (1.08)	0.0095 (1.08)
Industry and year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2 (%)	14.02	14.12	14.03	12.20	12.81	12.89	18.39	18.39	18.00	18.00

The dependent variable is *BIAS*.

Student t values in parentheses.

For variables with expected signs, the significance level is one-tailed and for other variables, the significance level is two-tailed.

* Represent significance levels of 10% respectively.

** Represent significance levels 5% respectively.

*** Represent significance levels of 1% respectively.

relation with *CPA* and this correlation is not influenced by the level of ownership balance. However, inconsistent with Wang et al. (2008), the level of forecast precision is negatively correlated with *HY_EXP*.¹² Legal experts have no significant effect on the precision of management forecasts and the independent directors who are experts in corporate governance have negative effects on the precision of management forecasts. Also, the negative effects are most pronounced in the observations of companies with lower ownership balance.¹³

¹² Wang et al. (2008) use a comprehensive index ($INDEX = CPA + HY_EXP + LAW$). If the positive effect of one factor is much larger than the negative effect of another factor, the overall effect of the comprehensive index is still positive. In our results, the positive result of *CPA* is much larger than the negative result of *HY_EXP*, so the overall effect of *INDEX* is of course positive. We argue that the reasons that industrial experts do not play their expected roles might be (1) that industrial experts are familiar with their industries and might play a positive role in operational strategy, but they are not financial experts and might know little about financial analysis; (2) that many industrial experts are retired and their energy in playing the director's role may be limited; (3) industrial experts might have closer relationships with managers and thereby lose their independence.

¹³ The negative effects of corporate governance experts might be due to their dependence "in substance". Independent directors who are managers of other companies might be controlled by managers of our sample companies and lose their independence. In extreme cases there may be collusion.

Table 8
OLS results of independent directors' effects on the accuracy of management forecasts.

	Full sample ($N = 2225$)			Higher balance ($N = 1131$)			Lower balance ($N = 1094$)			
	Exp.	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
OUT	–		0.0108 (1.07)	0.0105 (1.04)		0.0365*** (2.44)	0.0344** (2.28)		–0.0133 (1.00)	–0.0123 (0.92)
CPA				–0.0013 (1.28)			–0.0012 (0.77)			–0.0012 (0.83)
GOV_EXP				0.0006 (0.52)			0.0009 (0.58)			0.0001 (0.05)
LAW				0.0009 (0.89)			0.0015 (0.96)			–0.0036*** (2.62)
HY_EXP				0.0011 (0.97)			0.0015 (0.90)			0.0003 (0.19)
REPUT				0.0009 (1.13)			0.0004 (0.32)			0.0020* (1.82)
COMPEN				0.0013 (1.21)			0.0016 (1.01)			0.0001 (0.05)
UE	0.0802*** (22.89)	0.0801*** (22.82)	0.0802*** (22.83)	0.0645*** (13.55)	0.0639*** (13.43)	0.0641*** (13.44)	0.1075*** (19.28)	0.1077*** (19.30)	0.1082*** (19.37)	
ROA	–0.0287*** (7.50)	–0.0287*** (7.50)	–0.0291*** (7.58)	–0.0242*** (4.75)	–0.0242*** (4.76)	–0.0245*** (4.80)	–0.0244*** (3.78)	–0.0245*** (3.80)	–0.0252*** (3.90)	
MONTH	–0.0017*** (2.94)	–0.0018*** (2.96)	–0.0018*** (2.97)	–0.0019** (2.16)	–0.0019** (2.21)	–0.0019** (2.18)	–0.0018** (2.21)	–0.0018** (2.20)	–0.0018** (2.31)	
ST	0.0028 (1.54)	0.0028 (1.51)	0.0029 (1.57)	0.0091*** (3.26)	0.0091*** (3.27)	0.0094*** (3.33)	–0.0027 (1.14)	–0.0026 (1.08)	–0.0027 (1.13)	
SIZE	0.0006 (1.31)	0.0006 (1.30)	0.0008* (1.81)	–0.0013** (2.01)	–0.0013* (1.95)	–0.0015** (2.13)	0.0002 (0.36)	0.0002 (0.36)	0.0000 (0.04)	
Intercept	0.0190*** (4.65)	0.0150*** (2.74)	0.0154*** (2.72)	0.0256*** (4.18)	0.0117 (1.41)	0.0113 (1.28)	0.0108** (1.97)	0.0155** (2.14)	0.0158** (2.14)	
Industry and year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2 (%)	28.83	28.83	28.87	29.22	29.54	29.38	30.80	30.80	31.13	

The dependent variable is *FE*.

Student *t* values in parentheses.

For variables with expected signs, the significance level is one-tailed and for other variables, the significance level is two-tailed.

* Represent significance levels of 10% respectively.

** Represent significance levels 5% respectively.

*** Represent significance levels of 1% respectively.

When analyzing forecast bias, the positive correlation between *CPA* and *BIAS* appears in the full sample and in the sample of companies with lower ownership balance. The negative correlation between *COMPEN* and *BIAS* occurs only in the sample of lower ownership balance companies. The other personal characteristics have no significant effect on *BIAS*.

For forecast error, the correlations between *FE* and *CPA* are in contrasting directions for the two subsamples. Among the observations of lower ownership balance companies, legal experts do increase the accuracy of management forecasts, but among observations of higher ownership balance companies the presence of legal experts decreases forecast accuracy.¹⁴ Industrial experts have positive effects on forecast accuracy, but these effects are mainly evident in higher ownership balance companies. The results of *COMPEN* are similar to those of *HY_EXP*.

¹⁴ This result may be related to legal experts' judgment of litigation risks. In the case of lower ownership balance, the likelihood of irregularities in information disclosure might be higher (Wang et al., 2008) and this could increase litigation risk. Legal experts might try to decrease their litigation risk through efforts to improve the quality of information disclosure. In the cases of higher ownership balance, litigation risks are lower. Legal experts might then do nothing or even take advantage of gaps in the laws and regulations, thus reducing the quality of information disclosure.

4.3. Regression results

The results of regressions on forecast precision are reported in Table 6. Only in the lower ownership balance sample are the estimated coefficients on *OUT* significantly positive, which is consistent with the descriptive statistics. The estimated coefficients on *CPA* are significantly positive in all regressions, but those on *HY_EXP* are all significantly negative. In other words, after controlling for other factors that might determine the precision of management forecasts, the effects of *CPA* and *HY_EXP* are still significant.

Table 7 reports the OLS results of forecast bias. For the full sample and the subsample of higher ownership balance, the coefficients on *OUT* are both significantly positive, indicating that the likelihood of overestimated forecasts increases as the percentage of independent directors increases. These results indicate that independent directors might play negative roles instead of the expected positive fiduciary roles.

The regressions on *FE* are reported in Table 8. The results indicate that inconsistent with the expectations of securities regulators, independent directors play negative roles in situations of higher ownership balance. In addition, the coefficients on *CPA* are all negative, although they are insignificantly different from zero.

4.4. Robustness tests

In the above analysis, *CPA*, *LAW*, *HY_EXP* and *GOV_EXP* are all dummy variables. In a robustness test, we define them as the number of corresponding independent directors. The results from using these continuous variables are consistent with the reported results.

The observations of management forecasts were classified into four types, each with a different numerical level of precision. In a robustness test, we classify them into two types, either as qualitative estimates or quantitative estimates. The unreported results are consistent with previous findings.

The index of ownership balance that we use has no consideration of shareholders other than the largest five shareholders. In a robustness test, we consider the second to tenth largest shareholders. The unreported results are consistent with previous findings.

When analyzing the accuracy of management forecasts, the sample includes open-interval estimates. In a robustness test, we exclude open-interval estimates and use only range estimates and point estimates. The final sample consists of 1708 observations, with 839 of these observations concerning companies with lower ownership balance. We re-run the regressions and the unreported results are qualitatively the same.

5. Conclusions

Management forecasts are an important part of listed firm's information disclosure (Bai, 2009) and independent directors should play key supervisory roles in improving the quality of such forecasts (Wang et al., 2008). Therefore, we might expect that the increased presence of independent directors should improve the quality of management forecasts. Our results indicate that in the case of companies with lower ownership balance, independent directors do improve the precision of management forecasts, but they have no significant effect on the bias or error of management forecasts. In the case of companies with higher ownership balance, independent directors tend to have negative effects on the quality of management forecasts.

The results suggest that the effects of independent directors' expertise are varied. Independent directors who are also CPAs can significantly improve the precision of management forecasts, but they have no significant influence on the accuracy of the forecasts. Independent directors with industrial or corporate governance backgrounds commonly have a negative effect on the precision of management forecasts. Independent directors with legal backgrounds have no significant effect on the precision of management forecasts, but they improve forecast accuracy in the case of companies with lower balance ownership.

Overall, the supervisory efficiency of independent directors is relatively low. The expertise and skills of independent directors make little difference to the quality of management forecasts.

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Propping by controlling shareholders, wealth transfer and firm performance: Evidence from Chinese listed companies[☆]

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ABSTRACT

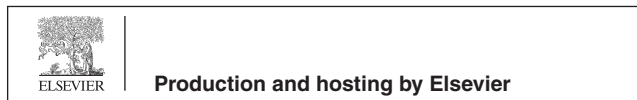
Propping acts by controlling shareholders are common in Chinese listed firms. In this paper, we use data on related-party transactions of all listed Chinese firms from 2002 to 2008 to investigate the motivation behind controlling shareholders' propping acts and subsequent wealth-transfer behavior and how both affect firm performance. We find that such institutional motivators as the maintenance of shell resources and qualification for refinancing have a significant effect on the propping behavior of controlling shareholders of Chinese listed firms and that such behavior is often followed by more serious tunneling when shareholders are driven by these motivators. Compared with non-state-owned firms, state-owned firms with the motivation to qualify for refinancing exhibit more severe tunneling after engaging in propping behavior. We also find that while propping by controlling shareholders improves a firm's current operating performance, in firms whose controlling shareholders' are motivated by the desire to maintain shell resources or obtain a refinancing qualification their performance declines in the following year because of subsequent tunneling. The results presented in this paper provide us with a better understanding of the relationship between propping and tunneling, controlling shareholders' engagement in both and the consequences of that behavior.

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1. Introduction

Controlling shareholders' expropriation of minority shareholders in listed firms has caused widespread concern in academic circles. Numerous studies show that controlling shareholders often profit from minority shareholders through related-party transactions, particularly in emerging economies with poor protection of minority shareholders. For example, La Porta et al. (1997, 1998, 1999, 2000), Johnson et al. (2000), Glaeser et al. (2001) and Chang (2003) all find that major shareholders are able to profit from minority shareholders through tunneling. Cheung et al. (2006) investigates related-party transactions between companies listed in Hong Kong and their controlling shareholders. They discover that firms that announce these transactions earn significantly lower excess returns than those that do not. They also find that firms listed in Hong Kong with ultimate shareholders in mainland China are more likely to expropriate from minority shareholders through related-party transactions. Controlling shareholders can engage in such expropriation by occupying or shifting funds, by obtaining related-party loans and by selling assets or products below market price to companies with which they enjoy a close relationship. Jiang et al. (2010) finds that controlling shareholders of listed firms tunnel from these firms by means of inter-corporate loans. Zhou et al. (2003) reveal that asset transactions between listed firms and their controlling shareholders are accompanied by transfers of wealth, with the asset revaluation rate of these transactions often higher than that between the firms and their minority shareholders. Li et al. (2005) report that tunneling operations also exist in mergers and acquisitions (M&A) in China. Chen et al. (2003) investigate controlling shareholders' actions against minority shareholders and find that a high-dividend policy serves as a tool allowing these shareholders to shift resources from listed firms rather than increase firm value.

In reality, however, controlling shareholders do not always carry out related-party transactions to expropriate wealth from minority shareholders. Propping is also common in listed firms in China. Controlling shareholders sometimes "prop up" the firms they control for some specific purpose. For instance, Air China, China Southern Airlines and China Eastern Airlines collectively lost RMB27.8 billion in 2008 after engaging in unsuccessful hedging exercises. To ease the financial distress of these firms, their controlling shareholder, the State-owned Assets Supervision and Administration Co. (SASAC), provided them with an instant capital injection.¹ In the same year, Central Huijin Investment Ltd. injected funds into three major state-owned banks to satisfy their need for capital to better support listed companies. In 2009, after ST Zhangjiajie (000430) had a financial deficit for two consecutive years and investors had been warned of its delisting risk, the firm's controlling shareholder issued a written announcement promising to provide funding in the following year. By means of M&As, related-party transactions and equity selling, the controlling shareholder of ST Zhujiang (000505) successfully helped the firm to escape delisting, putting on a show of uncapping, capping and uncapping again.²

Controlling shareholders most commonly prop up their listed firms when the firms are facing financial distress or are in need of funding.³ The means by which they engage in such propping actions are capital injections, loan guarantees, related-party transactions and other types of profit transfers that are in the opposite direction to tunneling operations. Intuitively, the entire process is not only harmless to minority shareholders but may even promote their well-being.

Tunneling and propping are the two major behavioral patterns exhibited by controlling shareholders in conducting related-party transactions. The two opposing patterns may be found in the same company at dif-

¹ The majority shareholders of listed firms tend to support these firms in the face of financial distress. A case in point is China Eastern Airlines, which suffered tremendous losses in 2008 because of the failure of its aviation fuel hedging. The company's losses were so huge that its total debt exceeded its total assets. On April 17, 2009, the firm was tagged for special treatment (ST). Its controlling shareholder, the SASAC, injected 3 billion RMB and 4 billion RMB in capital in November 2008 and December 2009, respectively, thus saving the company from a severe crisis. The cases of China Southern Airlines and Air China are similar.

² The capping-uncapping-capping phenomenon is not uncommon among Chinese listed firms. *ST Zhujiang was saved from being delisted three times and was at risk of delisting in 2001, earning it the nickname "the firm best at fooling."

³ Friedman et al. (2003) find that in 1997 when the Asian financial crisis hit, controlling shareholders of listed firms in many emerging Asian markets provided funding, loan guarantees, capital injections and other forms of support to the firms they controlled if those firms were faced with financial distress.

ferent times. The question is when and to what extent shareholders choose to tunnel or prop. Friedman et al. (2003) develops a model suggesting that when a firm is facing a medium-level adverse impact, the optimal decision for its controlling shareholders is to prop up the firm. In cases with little or no adverse impact, in contrast, the optimal policy is to tunnel. In extreme cases, the optimal choice is complete tunneling. The model proposed by Friedman et al. (2003) helps us to better understand the essence of tunneling operations and the transfer of profits. However, as they themselves point out, there is insufficient evidence to support the theory of the transfer of profits. Friedman et al. (2003) also fail to provide evidence of tunneling. The stock market and its regulation in China provide us with an excellent opportunity to classify the extent and timing of tunneling and propping. Firms listed in China face two special risks: the risk of being delisted and the risk of losing their ability to issue new stocks. According to China Securities Regulatory Commission (CSRC) regulations, if a firm has a negative return on equity (ROE) for two consecutive years, it will be tagged for special treatment (ST) and face multiple transaction restrictions. If it continues to lose money in the third year, it will be delisted. Firms also face the risk of being deprived of the ability to issue new stocks because a firm that issues new stocks must have an average ROE no lower than 6% to be in compliance with existing regulations.

There is a very strict threshold for firms to gain listing status or issue new stocks in China. When firms are delisted or deprived of the right to issue new stocks, their controlling shareholders suffer. Accordingly, when a firm is at risk of either, its controlling shareholders have strong incentives to prop it up. Once they have succeeded in doing so, these shareholders may then engage in tunneling through related-party transactions. In this study, we examine the transaction data of listed firms from 2002 to 2008 to investigate the propping and tunneling operations of their controlling shareholders. Propping includes the sale of goods, provision of credit guarantees and capital injections. We discover that institutional factors, the maintenance of “shells” and the attainment of refinancing qualifications to be the most common reasons for controlling shareholders to prop up their firms. After successfully doing so, these listed firms are found to suffer from tunneling. Wealth transfers from controlling shareholders can significantly improve firm performance. However, when firms are supported for shell maintenance and refinancing reasons, a significant decline in performance is seen in the following year owing to tunneling.

A number of studies are closely related to our discussion in this paper. Jiang and Wang (2008), for example, find that controlling shareholders prop up earnings by using abnormal related sales when the listed firms they control are at risk of being delisted or deprived of their ability to refinance. Once such risks have been removed, however, significant cash transfers take place through related lending from the listed firms back to their controlling shareholders. The overall operation is in essence a way of manipulating earnings in reaction to specific regulations in the Chinese context. Liu and Lu (2007) are also of the opinion that earnings manipulation by Chinese listed firms is to a great extent caused by the need for tunneling on the part of their controlling shareholders. Peng et al. (2011) find that when listed firms are financially healthy, the market reacts unfavorably to the announcement of related-party transactions, thus indirectly suggesting that these transactions take place to expropriate from minority shareholders. When firms are in financial distress, in contrast, the market reacts favorably to such transactions, thus indicating that in this case they are taken as evidence of controlling shareholders propping up earnings.

The work presented in this paper differs from the aforementioned studies in several respects. First, we provide evidence to support the model developed by Friedman et al. (2003). We also provide evidence on the timing and consequences of propping and tunneling operations. The difference between our study and that of Peng et al. (2011) is that rather than adopt direct measures as we do, they attempt to indirectly determine whether controlling shareholders had conducted propping or tunneling operations using the market's reaction to related-party transactions disclosed at different times, whereas we identify the nature of these operations by observing the direction of related-party transactions.⁴ In this paper, we also confirm that shell maintenance and the attainment of a refinancing qualification are the two vital motivations for propping and tunneling

⁴ As Peng et al. (2011) point out, there are shortcomings to identifying the nature of related-party transactions, i.e., whether they constitute propping or tunneling, by their direction because the nature of such transactions is also related to detailed prices. However, with a few exceptions, the cash recipient is the beneficiary of a related-party transaction. In this paper, we at least provide additional evidence of the propping and tunneling behavior of controlling shareholders and the connection between them.

operations. Second, we prove that controlling shareholders with these motivations tend to tunnel from their firms after propping them up. Previous studies, such as that of Jian and Wong (2010), test this relation, but they only take into account two specific forms of related-party transactions, that is, related-party sales and inter-corporate loans. However, as Peng et al. (2011) point out, propping and tunneling can be implemented through any type of related-party transaction. Therefore, in this paper, we define related-party transactions as the sale of goods, provision of guarantees, inter-corporate loans, equity transfers and asset transactions. We confirm that controlling shareholders with the motivation to maintain shell resources and/or obtain a refinancing qualification can carry out earnings manipulation using any form of related transaction to prop up and then tunnel from their firms. Third, this paper compares controlling shareholder behavior in three cases: the motivation for shell maintenance, the motivation to obtain a refinancing qualification and other motivations. The results show that subsequent wealth transfers (tunneling) after propping are significant only in the first two cases. Jian and Wong (2010) make no such distinction or comparison. Furthermore, they fail to consider the behavioral differences among the controlling shareholders of firms with different types of ownership. In this paper, in contrast, we compare the behavior of the controlling shareholders of state-owned and privately owned enterprises. We find that when the motivation is to obtain a refinancing qualification, controlling shareholders' tunneling subsequent to propping is more prominent in state-owned enterprises than in their privately owned counterparts. Finally, our investigation of the influence of related-party transactions on firm performance further corroborates our rationale for using the direction of these transactions to measure propping and tunneling operations.

The remainder of the paper is arranged as follows. Section 2 provides the background to our research and presents our research hypotheses. Section 3 describes the data, variables and sample. Section 4 presents analysis of our empirical results and Section 5 concludes the paper.

2. Research background and hypotheses

2.1. Analysis of the intention to prop up operations

In the Friedman et al. (2003) model, the optimal policy for a firm facing a medium-level adverse impact is to prop up operations. In circumstances with little or no adverse impact, the optimal choice is to tunnel. In extreme cases, the optimal policy is to tunnel extensively. As previously noted, the CSRC regulations stipulating delisting and termination of the right to refinance in the face of poor firm performance affect the timing of controlling shareholders' tunneling and propping operations.

The Chinese stock issuance system is bureaucratic, with government approval needed for almost every step. The government controls the minimum requirements for and the scale and even pace of stock issuance, which results in difficulties in going public and, consequently, current listed firms become important shell resources. These shell resources are important because they are both scarce and provide a valuable platform for stockholders to obtain extremely high benefits, such as the qualification to refinance, firm popularity and fame, and the enjoyment of preferential policies. However, their value is finite. The risks of being delisted or having refinancing restrictions imposed constitute direct threats to firms' ability to profit from the capital market on an ongoing basis.

According to a CSRC provision that came into force in 1998, a firm that loses money for two consecutive years is tagged as a ST company. In 1999, the CSRC introduced the particular transfer (PT) rule, according to which a ST company was tagged as a PT company if it suffered a third consecutive financial loss. ST firms face multiple restrictions. For example, their pricing limit is 5%, they have to provide audited interim reports and they are prohibited from raising new funds in the stock market. PT stocks can only be traded on Fridays, with an upper limit of 5%. If a PT firm gains no profits in the subsequent year, it is delisted. In 2002, the CSRC repealed the PT rule, but retained the provisions for ST firms. If a firm suffers a financial deficit in three consecutive years, it is delisted directly without being tagged for PT. The CSRC's aim in enforcing these regulations is investor protection. However, as Jian and Wong (2010) point out, the ST provision has had many unexpected and serious consequences. For example, numerous healthy firms risk being delisted because of a temporary loss and the controlling shareholders of unhealthy firms are able to engage in earnings manipulation. Bai et al. (2004) find that it is not uncommon for controlling shareholders to prop up ST firms for the

purpose of maintaining shell resources. Consequently, ST firms enjoy an excess market rate of return of 31.8%. Peng et al. (2011) point out that if a firm listed in China is faced with a delisting crisis, the market reacts favorably to its related-party transactions, possibly in anticipation of the firm's shareholders providing it with support through these transactions.

In addition to the ST provision, the CSRC also places rigorous restrictions on refinancing activities through the allotment of shares. A provision that came into force in 1996 requires that a firm looking to qualify for refinancing must have net asset yields of 10% for three consecutive years. In 1999, the criterion was amended to average ROE over 10% and in each year no lower than 6%. There is empirical evidence to indicate that many firms carry out wealth transfers and earnings manipulation to meet this requirement (Chen and Yuan, 2004; Haw et al., 2005). In 2001, the CSRC amended the restriction again, now requiring that the average net asset yield should reach 6% in the past 3 years. Following this amendment, controlling shareholders began to display greater concern over how to obtain an average ROE of more than 6%.

As it is difficult to gain listing status and issue new stocks in China, when a firm is delisted and deprived of stock issuance rights, its controlling shareholders suffer tremendous losses. In the face of such threats, these shareholders thus have particularly strong incentives to prop up their firms, which in essence is a form of earnings management. Earnings management activities undertaken to maintain shell resources and refinancing qualifications circumvent government regulation and can thus be seen as institution-driven. Until the CSRC changes its policies, the motivation to maintain shell resources and refinancing rights will continue to drive propping-up activities. Hence, the controlling shareholders of both state- and privately owned firms will continue to have strong incentives to temporarily prop up their firms. We thus posit the following hypothesis.

Hypothesis 1. Maintaining shell resources and refinancing qualifications are important motivators for controlling shareholders to provide their firms with support.

2.2. *Controlling shareholders' post-propping behavior*

Controlling shareholders may engage in different types of propping operations for a variety of reasons. In addition to maintaining shell resources and refinancing rights, some controlling shareholders may support their firms to improve long-term profitability. The actions that take place after propping are also likely to differ depending on the purpose of the propping operations. Claessens and Fan (2002) report that shareholders' ownership proportion and share structure directly determine the extent of the separation between the right to receive cash payments and control rights. The extent of this separation further influences the behavior of controlling shareholders. Reducing the degree of separation helps to reduce controlling shareholders' expropriation and strengthening the right to receive cash payments increases the number of propping operations they carry out. Denis and McConnell (2003) find that when the largest shareholder holds a very large or very small proportion of shares, we see the alignment effect and entrenchment effect, respectively. The alignment effect occurs when the largest shareholder holds a very high proportion of shares and it thus takes stronger action to support the firm. In most cases, such supportive operations have the purpose of improving the long-term performance of the firm.

By the same logic, when the controlling shareholder's holding ratio and the firm's ownership structure meet certain requirements, or when the firm has a good governance structure, the controlling and minority shareholders may have consistent interests. In such cases, the former's propping operations are beneficial to the long-term development of the firm. Their timing is determined by the firm's long-term development plan and they are carried out with the purpose of increasing the intrinsic value of the firm. Accordingly, they do not necessarily have a connection with maintaining shell resources or refinancing qualifications. However, if the controlling shareholders instead provide support for these institution-driven purposes, the propping tends to be temporary. It is possible that these shareholders are merely making preparations to tunnel from minority shareholders in the future, which may not be good news for the long-term development of the firm. Zhang and Zeng (2006) use TopSoft to illustrate the drivers of controlling shareholders' propping and tunneling operations. They point out that the propping up of listed firms is generally an intermediate rather than ultimate goal. The ultimate goals of these firms' controlling shareholders are to qualify for financing in the stock market and to better prepare themselves for future tunneling activities. Jian and Wong (2010) also note

that it is not uncommon for the controlling shareholders of listed firms in China to ask for higher returns after propping. It is clear that the controlling shareholders of listed firms in China rarely prop up their firms out of concern over their long-term profitability. Instead, they do so to improve firm performance temporarily, thus allowing them to keep the shell resources in hand and qualify for refinancing. On achieving this goal, they often carry out tunneling operations. Minority shareholders are the victims of this process. At the same time, the weaknesses in China's legal system make it difficult to distinguish the legality of related-party transactions between controlling shareholders and listed firms. Without internal or external supervision, it is relatively easy for controlling shareholders to manipulate earnings by means of connected transactions to maintain shell resources and refinancing rights.

Furthermore, under the CSRC's current approval system, state-owned firms can generally obtain refinancing approval more easily than non-state-owned firms even when both meet the basic requirements to qualify for refinancing. Therefore, once a refinancing qualification has been obtained, state-owned firms find it easier to realize that refinancing. Thus, the controlling shareholders of these firms are more likely to request a higher return and engage in tunneling in the year after their propping activities. Accordingly, we posit the following two hypotheses.

Hypothesis 2A. There is a significant transfer of wealth in listed firms that have been propped up for shell maintenance and refinancing qualification purposes, whereas no such transfer takes place in firms that have been supported for other purposes.

Hypothesis 2B. When motivated by the desire to qualify for refinancing, the controlling shareholders of state-owned firms are more likely to transfer wealth from the listed firms that they propped up the previous year compared to their non-state-owned counterparts.

2.3. Propping, wealth transfers and firm performance

The propping operations of controlling shareholders influence the performance of listed firms. In compliance with the CRSC's regulations, firms try to improve current-period earnings to qualify for refinancing and maintain shell resources. To achieve this objective, their controlling shareholders conduct wealth transfers by means of related-party transactions, capital injections and M&As because such operations can improve firm performance in the current period. Bai et al. (2004) discover a special phenomenon in the Chinese capital market: ST firms have a rate of return that is 31.8% higher than that of the market in the 2 years after being so tagged. The reason, they note, is that the controlling shareholders of these firms shift resources to them to maintain control and refinancing qualifications, thereby temporarily improving firm performance. Li et al. (2005) illustrate that M&As carried out when a firm is facing allotment or is trying to avoid a deficit are usually carried out for propping purposes. These M&As can improve firm performance in the accounting sense, whereas those carried out for other purposes have a less significant influence on performance. As previously noted, controlling shareholders sometimes prop up firms for reasons other than improving long-term profitability. If their rationale is to maintain shell resources or qualify for refinancing, they tend to subsequently engage in tunneling or even require payback, thereby expropriating from minority shareholders. Peng et al. (2011) find that when a listed firm is in financial distress, the market reacts positively to information disclosed about its related-party transactions, which suggests that the propping operations of controlling shareholders can improve firm performance. However, when a firm is performing well financially, the market displays an unfavorable reaction to related-party transaction disclosures because it anticipates that such tunneling activities will have a negative effect on firm performance. Therefore, if controlling shareholders support a listed firm merely for the temporary purpose of shell maintenance and refinancing qualification, the firm will experience a temporary improvement in performance, but that performance will soon deteriorate because of the subsequent tunneling operations. This discussion brings us to our third hypothesis.

Hypothesis 3. Propping operations can significantly improve a listed firm's performance in the current year, but subsequent tunneling operations will result in a significant performance decline.

3. Empirical design

3.1. Sample and data sources

Our data comprises all related-party transactions undertaken from 2002 to 2008 by companies listed on the Shanghai and Shenzhen Stock Exchanges. The data was carefully screened for transactions between listed companies and related parties. We manually remove projects unrelated to propping and wealth transfers, such as joint investments and labor/management agreements, to isolate the related-party transactions of interest. We then refine the original sample by excluding listed financial institutions and companies with incomplete data. Finally, to avoid the effect of outliers, we winsorize the sample. Our final sample thus contains 9348 related-party transaction observations, including 2913 observations of propping operations by controlling shareholders. Our related-party transaction data is from the RESSET financial research database and other financial data is from the CCER financial research database.

3.2. Variable measurements

3.2.1. Measure of the propping behavior of controlling shareholders

Propping can be represented by specific types of related-party transactions, albeit in the opposite direction to tunneling (Jian and Wong, 2010). Peng et al. (2011) point out that related-party transactions constitute the major means of both propping and tunneling among the large shareholders of listed companies in China. Large shareholders not only transfer wealth through a variety of related-party transactions, such as the purchase of goods, loan guarantees and asset injections, they also exploit listed companies through the sale of goods, a reverse form of guarantees and the illegal use of funds.

In the absence of effective legal and regulatory systems, the motivations for related-party transactions are difficult for regulators and minority shareholders to detect and thus these transactions are frequently used as earnings manipulation tools by controlling shareholders. As a result, they constitute the best proxy variable for measuring controlling shareholder behavior. Khanna and Yafeh (2005) point out that related-party transactions, particularly the sale of goods to related parties, can act as a proxy variable for such measurement. Jian and Wong (2010) deduct normal related-party transactions from total related-party transactions using an ordinary least squares (OLS) regression and use the residuals as abnormal related-party transactions to measure excess propping or tunneling behavior on the part of controlling shareholders. In this paper, we employ the same approach to test whether controlling shareholders prop up their companies. Our empirical model is

$$Prop_rate_{i,t} = r_0 + r_1 \cdot Size_{i,t} + r_2 \cdot Lev_{i,t} + r_3 \cdot Tobinq_{i,t} + \sum r_j \cdot Industry_{i,t} + \varepsilon_{i,t}. \quad (1)$$

In this model, $Prop_rate_{i,t}$ represents possible propping transactions as a proportion of total assets. We first classify funding, guarantees, mortgages and other related-party transactions by controlling shareholders that generate income for the company as possible propping transactions. We then use the residuals of Model (1) to represent excess propping operations. Related-party transactions may constitute normal business and thus to calculate the number of actual propping operations, we must remove those transactions that are a normal part of business. A company's size, debt ratio, business development opportunities and industry are the most important variables affecting normal related-party transactions, and we thus use them as control variables. We set $Size_{i,t}$ as the logarithm of asset size, $Lev_{i,t}$ as the debt ratio and $Tobinq_{i,t}$ as Tobin's Q to measure business development opportunities. We also control for industry dummies in Model (1). If the residual term in the model is greater than 0, then the dummy variable $Prop$ takes the value of 1, thus indicating that there is excess propping. Otherwise, it takes the value of 0. $Prop$ thus serves as an indicator to show whether there is excess propping. In robustness tests, $Prop_rate$, the ratio of possible propping activities to total assets, is used as an alternative proxy variable for controlling shareholders' propping behavior.

3.2.2. Measurement of tunneling after propping

Subsequent tunneling is measured similarly to propping, although in the opposite direction of related-party transactions. For listed companies, the possible sources of tunneling are the purchase of goods or assets, guar-

antees, mortgages and other projects that generate income for related parties. Subtracting normal related-party transactions that confer cash upon the related parties of the listed firm, the residual amount of related-party transactions then indicates controlling shareholders' tunneling behavior. If the residual amount is greater than 0, then the dummy variable *Tunnel* takes the value of 1, indicating the presence of excess tunneling, and otherwise is 0. Thus, the dummy variable *Tunnel* serves as an indicator to show whether there is excess tunneling. In robustness tests, *Tunnel_rate*, the ratio of the possible tunneling amount (measured as the amount of related-party transactions with the related parties of listed firms as the cash recipients) to total assets is used as an alternative proxy variable for controlling shareholders' tunneling behavior.

3.2.3. Measurement of controlling shareholders' incentives to engage in propping

According to a special provision published by the CSRC in 2001, Chinese listed companies that operate at a loss for three consecutive years face delisting. This provision has prompted the controlling shareholders of many listed companies to prop up and support these companies after two consecutive annual losses. Therefore, to measure propping activities that are driven by the motivation to maintain shell resources, we use the dummy variable *Baoqiao*, which takes the value of 1 if the firm's ROE in the two previous consecutive years has been less than 0, and the value of 0 otherwise.

Pursuant to the 2001 CSRC regulations concerning refinancing ability, listed companies must have an average ROE of at least 6% in the past 3 years to qualify for new stock issuance. The controlling shareholders of companies whose average return on assets (ROA) in the past 2 years was in the vicinity of 6% have strong motivation to prop up these companies in the third year to ensure that they meet the conditions for refinancing. For companies with a 2-year average ROE far less than 6%, propping alone will not help them to satisfy the threshold conditions. For those with a 2-year average ROE far more than 6%, these conditions can be satisfied without propping. Thus, in neither circumstance do controlling shareholders have an incentive to prop up their firms. To measure propping behavior motivated by the desire to meet the threshold for refinancing, we use the dummy variable *Peigu*. If a firm's average ROE in the past 2 years is between 4% and 8%, the value of this dummy variable is 1, and otherwise is 0. In addition to the incentives to maintain shell resources and qualify for refinancing, we also consider propping driven by other motivations, for example, propping undertaken to protect the long-term interests of the firm. Furthermore, taking into account that the propping and wealth-transfer behavior of controlling shareholders is likely to be affected by independent directors, external regulation, ownership structure and property rights, we include them as control variables. All of the variables used in this paper and their definitions are provided in Table 1.

3.3. Empirical models

In Hypothesis 1, we propose the attainment of refinancing rights and maintenance of shell resources as important controlling shareholder motivations. To test this hypothesis, we design the following econometric models.

$$\text{Probit}(\text{Prop}_{i,t}) = \alpha_0 + \alpha_1 \cdot \text{Peigu}_{i,t} + \alpha_2 \cdot \text{Baoqiao}_{i,t} + \alpha_3 \cdot \text{Control}_{i,t} + \varepsilon \quad (2)$$

$$\text{Prop_rate}_{i,t} = \alpha_0 + \alpha_1 \cdot \text{Peigu}_{i,t} + \alpha_2 \cdot \text{Baoqiao}_{i,t} + \alpha_3 \cdot \text{Control}_{i,t} + \varepsilon \quad (3)$$

Peigu and *Baoqiao* measure controlling shareholders' motivation to qualify for refinancing and maintain shell resources, respectively. The proportion of independent directors on the board, external auditor type and firm ownership structure are included as control variables, as they are expected to influence shareholder behavior. To increase the robustness of the results, we also used the ratio of shareholders' supporting funds to total assets, *Prop_rate*, as an alternative proxy variable for propping in empirical testing.

In Hypothesis 2, we propose that propping by controlling shareholders can be classified according to its underlying motivation. Driven by the motivation to qualify for refinancing and maintain shell resources, controlling shareholders of listed companies are posited to display significant tunneling behavior. However, propping without a regulatory arbitrage purpose may imply careful consideration of the long-term interests of the company. In this case, the listed firm would exhibit no significant tunneling behavior. To test this hypothesis, we design the following econometric model.

Table 1
Variable definitions.

Variable	Abbreviation	Definition
Excess propping measure (dummy variable)	<i>Prop</i>	<i>Dummy variable</i> : if excess propping exists, denoted as 1; otherwise 0
Propping measure (continuous variable)	<i>Prop_rate</i>	Amount of propping funds/total assets
Excess tunneling measure (dummy variable)	<i>Tunnel</i>	<i>Dummy variable</i> : if tunneling occurs next year, denoted as 1; otherwise 0
Tunneling measure (continuous variable)	<i>Tunnel_rate</i>	Next year's tunneling amount/total assets
Return on equity	<i>ROE</i>	Current year's return/net assets
Return on assets	<i>ROA</i>	Current year's return/total assets
Motivation to obtain refinancing qualification	<i>Peigu</i>	<i>Dummy variable</i> : if past 2 years' average ROE is 4–8%, denoted as 1; otherwise 0
Motivation to maintain shell resources	<i>Baoqiao</i>	<i>Dummy variable</i> : if past 2 years' average ROE is negative, denoted as 1; otherwise 0
Propping carried out to qualify for refinancing	<i>Propping1</i>	<i>Dummy variable</i> : if propping behavior matches the obtaining–refinancing–qualification motivation, denoted as 1; otherwise 0
Propping carried out to maintain shell resources	<i>Propping2</i>	<i>Dummy variable</i> : if propping behavior matches the maintaining–shell–resources motivation, denoted as 1; otherwise 0
Propping carried out for other purposes	<i>Propping3</i>	<i>Dummy variable</i> : if propping behavior matches no specific purpose, denoted as 1; otherwise 0
Proportion of independent directors	<i>Indep</i>	Number of independent directors/board size
Big-4 CPA firm	<i>Top4</i>	<i>Dummy variable</i> : if firm is audited by a Big-4 CPA firm, takes a value of 1; otherwise 0
Concentration of three largest shareholders	<i>Share3</i>	Stake of the top-three shareholders/stake of the top-10 shareholders
Ownership	<i>State</i>	<i>Dummy variable</i> : takes the value of 1 for state-owned enterprises; otherwise 0
Asset size	<i>Size</i>	Logarithm of total assets
Debt ratio	<i>Lev</i>	Total debt/total assets
Tobin's <i>Q</i>	<i>Tobinq</i>	Total market capitalization/total assets

$$Probit(Tunnel_{i,t+1}) = r_0 + r_1 \cdot Prop_{i,t} + Control_{i,t} + \varepsilon \quad (4)$$

In this model, $Tunnel_{i,t+1}$ indicates whether controlling shareholders engage in excess tunneling behavior in the next year, and $Prop_{i,t}$ indicates whether they prop up the company in the current year. We include independent directors, external regulation and ownership structure as control variables. On the basis of this model, we classify propping behavior according to its underlying motivation and perform the same empirical tests. Considering the endogeneity of the *Prop* variable because of the “generated regressor” problem (Pagan, 1984), we apply the classical two-step treatment effects model (Maddala, 1983) to control for this endogeneity problem. To further test and verify the influence of propping and tunneling on firm performance, we further add the following difference models to our tests.

$$\begin{aligned} \Delta Perf_{i,t} = & \alpha_0 + \alpha_1 \cdot \Delta Prop_{rate_{i,t}} + \alpha_2 \cdot \Delta Lev_{i,t} + \alpha_3 \cdot \Delta Tobinq_{i,t} + \alpha_4 \cdot \Delta Sales_{i,t} + \alpha_5 \cdot \Delta Assets_{i,t} \\ & + \alpha_6 \cdot \sum Ind + \alpha_7 \cdot \sum Year + \varepsilon \end{aligned} \quad (5)$$

$$\begin{aligned} \Delta Perf_{i,t} = & \alpha_0 + \alpha_1 \cdot \Delta Tunnel_{rate_{i,t}} + \alpha_2 \cdot \Delta Lev_{i,t} + \alpha_3 \cdot \Delta Tobinq_{i,t} + \alpha_4 \cdot \Delta Sales_{i,t} + \alpha_5 \cdot \Delta Assets_{i,t} \\ & + \alpha_6 \cdot \sum Ind + \alpha_7 \cdot \sum Year + \varepsilon \end{aligned} \quad (6)$$

In these models, $\Delta Perf_{i,t}$ is the change in firm performance from the previous year to the current year. We use ROE and ROA as proxy variables for change in firm performance. $\Delta Prop_{rate_{i,t}}$ is the difference in the amount of propping demonstrated by controlling shareholders between the current and previous years, and $\Delta Tunnel_{rate_{i,t}}$ is the difference in their amount of tunneling between these 2 years. The other control variables we include are the asset-liability ratio, Tobin's *Q*, operating income and asset size, all of them in difference

terms. In addition, we take into consideration the effects of industry and time dummy variables. We use the difference in each variable to remove unobservable individual firm effects that do not change over time. These individual effects may be simultaneously related to shareholders' propping or tunneling operations and to firm performance. Removing individual effects by differences controls for the endogeneity problem to a certain extent.

4. Empirical results and analysis

4.1. Descriptive statistics of controlling shareholders' propping and tunneling behavior

The descriptive statistics of the relevant variables of controlling shareholders' propping and tunneling behavior are presented in Table 2.

Table 2 shows that of the Shanghai and Shenzhen Stock Exchange-listed companies with related-party transactions, those whose controlling shareholders engaged in excessive propping account for 35.14% on average. The amount of propping-oriented related-party transactions is RMB12.19 billion on average, accounting for 41.77% of total assets. The companies whose controlling shareholders engage in tunneling immediately after propping account for 78.37% of all propped-up companies, with the amount of tunneling accounting for 20.71% of total assets. We can conclude that controlling shareholders do transfer wealth after propping. Table 2 also shows that the proportion of companies displaying excess propping and the ratio of the propping amount to total assets are both significantly higher in 2007 and 2008 than in the other years. The most likely explanation is that the global financial crisis of 2007 and 2008 created business difficulties for the listed companies in the sample, which thus experienced poorer financial performance. In these circumstances, the firms' controlling shareholders significantly increased their propping activities to stabilize financial performance.

Table 3 presents the distribution of the suspected motivations for controlling shareholders' propping behavior. Overall, maintaining shell resources and qualifying for refinancing are the most important propping motivations, accounting for 14.82% and 11.78%, respectively, of all propping observations on average and for a considerable proportion in every year. Table 4 further describes shareholders' propping and subsequent

Table 2
Sample distribution of controlling shareholders' propping and tunneling behavior.

	2002	2003	2004	2005	2006	2007	2008	Average
Number of listed companies involved in related-party transactions	1029	1133	1260	1220	1367	1372	904	1184
Number of listed companies displaying excess propping behavior	287	373	354	394	457	675	373	416
Proportion of listed companies displaying excess propping behavior (%)	27.89	32.92	28.10	32.30	33.43	49.20	41.26	35.14
Number of listed companies exhibiting excess tunneling behavior after propping	243	322	297	363	397	389	268	326
Proportion of listed companies exhibiting excess tunneling behavior after propping (%)	84.67	86.33	83.90	92.13	86.87	57.63	71.85	78.37
Amount of suspected propping transactions (in RMB billion)	7.90	9.40	11.00	12.00	12.00	19.00	14.00	12.19
Ratio of propping amount to total assets (%)	34.90	36.00	37.70	37.30	40.50	63.00	43.00	41.77
Amount of post-propping tunneling (in RMB billion)	6.20	5.70	6.30	7.80	12.00	8.00	8.40	7.77
Ratio of post-propping tunneling amount to total assets (%)	19.70	18.10	16.00	19.20	33.50	19.10	19.40	20.71

Table 3
Distribution of suspected motivations for controlling shareholders' propping behavior.

	2002	2003	2004	2005	2006	2007	2008	Average
Number of excessively propped companies	287	373	354	394	457	675	373	416
Number of observations with suspected refinancing motivation	49	58	52	60	59	100	55	62
Proportion of observations with suspected refinancing motivation (%)	17.19	15.46	14.60	15.23	12.98	14.77	14.75	14.82
Number of observations with suspected shell resource motivation	22	43	43	41	46	104	44	49
Proportion of observations with suspected shell resource motivation (%)	7.67	11.53	12.15	10.41	10.07	15.41	11.80	11.78
Number of observations with other motivations	216	272	259	293	352	471	274	305
Proportion of observations with other motivations (%)	75.14	73.01	73.25	74.36	76.95	69.82	73.45	73.40

Table 4
Descriptive statistics for propping behavior of controlling shareholders under different motivations.

		2002	2003	2004	2005	2006	2007	2008	Average
Suspected refinancing motivation	Amount of propping to total assets (%)	50.20	51.90	55.70	44.30	60.50	75.80	51.00	55.63
	Amount of next year's post-propping tunneling to total assets (%)	22.40	20.70	23.60	24.60	46.30	13.50	15.80	23.84
Suspected shell maintenance motivation	Amount of propping to total assets (%)	60.30	39.90	71.90	51.20	64.80	90.00	78.20	65.19
	Amount of next year's post-propping tunneling to total assets (%)	21.30	33.40	23.70	16.50	25.40	16.90	28.10	23.61
Other motivations	Amount of propping to total assets (%)	33.10	39.30	47.60	43.40	45.80	69.90	48.30	46.77
	Amount of next year's post-propping tunneling to total assets (%)	15.60	13.20	12.50	16.50	26.70	11.00	13.20	15.53

transfer behavior under different motivations. Table 4 comparison of the “ratio of propping amount to total assets” suggests that observations whose suspected motivations were the maintenance of shell resources and attainment of a refinancing qualification exhibited more prominent propping activities than those with other motivations in any given year. These results reflect institutional factors’ strengthening of controlling shareholders’ willingness to prop up their companies when they reach the critical values for these two institution-driven motivations. The comparison of the “ratio of post-propping tunneling amount to total assets” suggests that observations driven by these motivations experience more intense subsequent tunneling than those driven by other motivations.

4.2. Empirical results and discussion

In this section, we report the results of further tests of the hypotheses using regression models. These results give us a more reasonable and convincing explanation of the motivations for and consequences of controlling shareholders’ propping behavior and its relationship with tunneling behavior and firm performance.

4.3. Propping motivations of controlling shareholders

We first need to verify whether controlling shareholders with suspected shell resource and refinancing qualification motivations have a greater propensity to prop up listed companies and whether that propping is more intense than when other motivations are in play. The empirical results presented in Table 5 show that both *Peigu* and *Baoqiao* have a significant positive relationship with the propping variables (both the propping dummy variable and propping continuous variable), which suggests that when driven by these two institution-oriented motivations, controlling shareholders tend to prop up their listed companies. We further find them to be important motivations for the controlling shareholders of both state- and non-state-owned enterprises, with no significant difference between the two. Hypothesis 1 is thus supported by the empirical evidence.

The results for the other control variables show that the ratio of independent directors on the board does not affect the behavior of controlling shareholders. Listed companies audited by Big-4 accounting firms are less likely to be propped up, possibly because a high-quality audit reduces earnings manipulation. A higher ownership concentration implies that the controlling shareholder has a greater stake in the listed company, which leads to a greater probability and amount of propping. In addition, asset size and the asset-liability ratio also affect the propping behavior of controlling shareholders.

To further test whether there is significant post-propping tunneling among listed companies whose controlling shareholders are driven by the motivation to maintain shell resources or qualify for refinancing, we run regressions using empirical Model (4). In addition, we use the two-step treatment effects model (Maddala, 1983) to control for the endogenous selection bias of the propping variable. More specifically, in the first step,

Table 5
Empirical results of motivation analysis of controlling shareholders' propping behavior.

	Prop (dummy variable)			Prop_rate (continuous variable)		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>Peigu</i>	0.207*** (6.64)	0.187*** (3.59)	0.207*** (6.62)	0.043*** (7.29)	0.031*** (3.17)	0.043*** (7.27)
<i>Baoqiao</i>	0.198*** (4.82)	0.197*** (4.78)	0.172*** (2.65)	0.042*** (4.67)	0.041*** (4.58)	0.033** (2.45)
<i>Peigu</i> × <i>State</i>		0.030 (0.49)			0.018 (1.54)	
<i>Baoqiao</i> × <i>State</i>			0.042 (0.53)			0.013 (0.75)
<i>Indep</i>	-0.015 (-0.15)	-0.015 (-0.15)	-0.014 (-0.14)	-0.002 (-0.10)	-0.002 (-0.09)	-0.002 (-0.10)
<i>Top4</i>	-0.272*** (-4.66)	-0.272*** (-4.66)	-0.271*** (-4.65)	-0.049*** (-4.33)	-0.049*** (-4.35)	-0.049*** (-4.31)
<i>Share3</i>	1.970*** (12.41)	1.965*** (12.35)	1.971*** (12.41)	0.335*** (13.25)	0.332*** (13.07)	0.336*** (13.27)
<i>State</i>	-0.006 (-0.18)	-0.018 (-0.45)	-0.013 (-0.39)	0.009 (1.52)	0.002 (0.26)	0.007 (1.09)
<i>Size</i>				0.014*** (4.90)	0.014*** (4.82)	0.014*** (4.90)
<i>Lev</i>				0.071*** (6.20)	0.070*** (6.14)	0.071*** (6.29)
<i>Tobinq</i>				-0.012* (-1.85)	-0.012* (-1.91)	-0.011* (-1.82)
<i>Constant</i>	-2.688*** (-9.55)	-2.671*** (-9.42)	-2.686*** (-9.55)	-0.402*** (-5.46)	-0.386*** (-5.20)	-0.402*** (-5.46)
<i>Year</i>	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
<i>Industry</i>	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
<i>N</i>	9348	9348	9348	9348	9348	9348
<i>Pseudo R²/R²</i>	0.039	0.039	0.039	0.102	0.101	0.101

Notes: The figures in parentheses are *t*-values. We also set the critical values of the two previous years' average ROE for the *Peigu* variable to 5–7% and 4.5–7.5%, and our conclusions remain unchanged.

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

we run the *Probit* regression model in Eq. (2) to predict the probability of excess propping. The first-step regression yields the endogenous selection bias correction term *Hazard*, which is then included in the second-step regression using Model (4). The detailed regression results are presented in Table 6.⁵

The regression results indicate that controlling shareholders' subsequent tunneling behavior is significantly related to their motivation for propping. Those motivated by the desire to maintain shell resources or obtain a refinancing qualification are significantly more likely to engage in tunneling in the year after propping relative to those whose propping have some other motivation. The implication is that controlling shareholders with another motivation may be providing real support that is in the long-term interests of the listed companies they control. Hence, no significant tunneling behavior is observed in the year after propping in these firms. Hypothesis 2A is thus verified. Furthermore, the coefficient on the interaction term between the ultimate controller of the listed company and the propping variable shows that in the shareholder sample whose propping was motivated by the desire to qualify for refinancing, state-owned enterprises display significantly more post-propping tunneling behavior than their non-state-owned counterparts. This result supports Hypothesis 2B. However, tunneling does not necessarily occur in the year immediately following the propping activity, but

⁵ In this paper, the propping variable is lagged to the tunneling variable by one period. Thus, the endogeneity problem should not affect the regression results to a great extent. We also run the regression using Model (4) directly without controlling for the selection bias term, and the main results remain the same. The detailed regression results are omitted here, but they are available from the authors upon request.

Table 6
Empirical analysis of whether tunneling takes place after propping by controlling shareholders.

	Sample of propping with the refinancing motivation		Sample of propping with the shell resources motivation		Sample of propping for other motivations	
	1	2	3	4	5	6
<i>Propping1</i>	0.263*** (5.48)	0.087 (1.14)				
<i>Propping1</i> × <i>State</i>		0.257*** (3.01)				
<i>Propping2</i>			0.142** (2.24)	0.170* (1.68)		
<i>Propping2</i> × <i>State</i>				−0.043 (−0.35)		
<i>Propping3</i>					−0.034 (−0.77)	−0.012 (−0.15)
<i>Propping3</i> × <i>State</i>						−0.030 (−0.32)
<i>Indep</i>	0.015 (0.15)	0.012 (0.12)	0.005 (0.05)	0.005 (0.05)	0.002 (0.02)	0.001 (0.01)
<i>Top4</i>	0.056 (1.05)	0.055 (1.03)	0.060 (1.12)	0.060 (1.12)	0.042 (0.78)	0.041 (0.77)
<i>Share3</i>	0.926*** (6.05)	0.920*** (6.01)	0.939*** (6.15)	0.939*** (6.15)	1.089*** (7.06)	1.087*** (7.05)
<i>State</i>	0.163*** (5.16)	0.126*** (3.75)	0.160*** (5.08)	0.163*** (5.01)	0.165*** (5.22)	0.169*** (5.05)
<i>Hazard</i>	0.094*** (4.27)	0.095*** (4.29)	0.148*** (7.75)	0.148*** (7.74)	0.253*** (11.52)	0.253*** (11.52)
<i>Constant</i>	−1.970*** (−7.12)	−1.896*** (−6.78)	−1.279*** (−6.28)	−1.282*** (−6.29)	−1.342*** (−6.60)	−1.343*** (−6.61)
<i>Year</i>	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
<i>Industry</i>	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
<i>N</i>	9348	9348	9348	9348	9348	9348
<i>Pseudo R</i> ²	0.038	0.036	0.039	0.040	0.036	0.040

Notes: The figures in parentheses are *t*-values. We also set the critical values of the two previous years' average ROE for the *Peigu* variable at 5–7% and 4.5–7.5%, and our conclusions remain unchanged.

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

may take place later. As a robustness test, we replace the dependent variable with controlling shareholders' tunneling behavior within 2 years of propping, and the main results remain unchanged.⁶

4.4. Behavior of controlling shareholders and performance of listed firms

To further determine what influence controlling shareholders' propping and wealth-transfer behavior has on firm performance, we apply the empirical models in Eqs. (5) and (6) and run further regressions. The results are presented in Table 7. It can be seen that a change in the amount of propping by controlling shareholders has a significant and positive relationship with a change in company ROE (Δ ROE) and that a change in the amount of tunneling in the following year has a significant negative effect on company ROE in the next year. These results suggest that the propping behavior of controlling shareholders does affect firm performance, which is in line with Hypothesis 3. These results also further confirm the validity of using the direction of related-party transactions to identify propping and tunneling.

In addition, the regression results in Table 7 also show that the relationship between changes in ROA and controlling shareholders' propping and tunneling behavior is not significant. The most likely explanation is

⁶ To save space, we omit the detailed regression results from this paper, but they are available from the authors upon request.

Table 7

Empirical analysis of whether propping and tunneling in the next year result in a change in firm performance.

	Current year Δ ROE Model 1	Current year Δ ROA Model 2	Next year Δ ROE Model 3	Next year Δ ROA Model 4
Current year Δ Prop_rate	0.050** (2.47)	0.001 (0.39)		
Next year Δ Tunnel_rate			-0.044** (-2.37)	-0.003 (-0.81)
Current year Δ Lev	0.120 (0.90)	-0.294*** (-16.10)		
Current year Δ Tobinq	0.068*** (3.26)	-0.005 (-1.40)		
Current year Δ Sales	0.053*** (2.79)	0.023*** (7.67)		
Current year Δ Assets	-0.038** (-2.54)	0.000 (0.14)		
Next year Δ Lev			-0.234* (-1.80)	-0.297*** (-17.42)
Next year Δ Tobinq			0.044*** (2.77)	0.001 (0.21)
Next year Δ Sales			0.052*** (3.05)	0.027*** (9.51)
Next year Δ Assets			-0.017 (-1.28)	0.001 (0.32)
Constant	-0.002 (-0.02)	-0.022* (-1.72)	-0.239*** (-5.22)	0.047*** (4.08)
Year	Control	Control	Control	Control
Industry	Control	Control	Control	Control
N	7501	7501	9348	9348
R ²	0.014	0.227	0.012	0.17

Notes: The figures in parentheses are *t*-values. The critical values of the two previous years' average ROE for the *Peigu* variable were also set at 5–7% and 4.5–7.5%, and the conclusions remain unchanged.

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

that a large number of related-party transactions, e.g. inter-corporate loans, do not change the size of equity but do change asset size and profits. As a result, related-party transactions may have a greater effect on ROE than ROA. To a certain extent, this result also suggests that it is easier for controlling shareholders to manipulate the ROE of their companies than the ROA. However, current CSRC regulations impose restrictions primarily on ROE rather than ROA, which provides room for controlling shareholders to manipulate firm earnings to get around these regulations.

5. Conclusion

Propping is one of the most important types of behavior displayed by controlling shareholders. In this paper, we examine related-party transaction data for listed firms in China during the 2002–2008 period and investigate the intentions, consequences and mechanisms of controlling shareholders' propping operations and their connections with tunneling behavior. We find the institution-driven intentions of shell resource maintenance and refinancing qualification to be the two most important reasons for the controlling shareholders of listed firms to prop up their firms. We also find that firms propped up for these reasons suffer tunneling in the following year. Supportive activities motivated by other goals are more likely to be long-lasting and are found not to be accompanied by significant wealth-transfer activities in the following year. Controlling shareholder propping can significantly improve firm performance in the current year, but when its motivation is shell maintenance or refinancing qualification, that performance will experience a significant decline in the following year because of controlling shareholders' subsequent tunneling activities.

The results of this paper show that controlling shareholders take different actions after propping depending on their motivation for it. Propping activities motivated by the two aforementioned institution-driven goals are usually transitory, whereas those that occur for other purposes are more sustainable. Therefore, the Chinese regulatory authorities should look more closely at the related-party transactions of listed firms, particularly those driven by the desire to maintain shell resources and qualify for refinancing, to better regulate the short-term activities of these firms' controlling shareholders.

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