

Yu, Mei

### Article

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

Mei Yu\*

Birmingham City University, UK

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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.

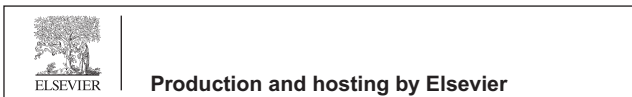
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## 1. Introduction

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

\* Tel.: +44 1212024620; fax: +44 1213316366.

E-mail address: [mei.yu@bcu.ac.uk](mailto:mei.yu@bcu.ac.uk)



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 <sup>a</sup> , MBS <sup>b</sup> , 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 <sup>c</sup>	The government-owned share proportion is found to have exerted a linear and positive impact on firm performance

<sup>a</sup> The market value of equity plus the book value of debt divided by the book value of equity.

<sup>b</sup> The market value of equity plus total debt divided by sales.

<sup>c</sup> 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,  $\text{Perf}_{it}$  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.  $\beta$  represents the coefficients to be estimated, and  $\varepsilon_{it}$  is the error term.  $\alpha_i$  is the firm fixed effect, and  $\gamma_t$  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) database<sup>1</sup> 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.<sup>2</sup> 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,

<sup>1</sup> 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.

<sup>2</sup> 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 $Q$
<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 $Q$	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 $Q$	State ownership	Board ownership	Log of board salary	Log of assets	Debt ratio
ROA	1							
ROE	0.882	1						
Tobin's $Q$	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.<sup>3</sup> 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

<sup>3</sup> 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 ownership2	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> <sup>2</sup>	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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