Optimal capital structure: case of SOE versus private listed corporation

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Abstract

Purpose – The purpose of this paper is to examine whether corporate ownership affects corporate capital structure. This study also seeks to find out whether there is difference in dynamics of the capital structure between these two groups of firms.

Design/methodology/approach – Based on panel data of China's listed firms from 1998 to 2007, this paper employs a static empirical model to validate the difference in capital structure between these two groups of firms, and then, a dynamic empirical model is used to explore the dynamic adjustment of the capital structure.

Findings – The empirical results show that there is structural difference in static capital structure between state-owned and private listed firms. Further study results tell us that the adjustment to an optimal capital structure is to be faster for the private firm than for the state-owned firm.

Practical implications – The findings suggest that compared with state-owned firms, private firms face higher financial friction in financing activities, but have more incentive to adjust toward optimal capital structure to maximize the shareholders' benefit. This study offers insights to corporate managers interested in privatization, when a state-owned firm is privatized, that firm becomes subject to the disciplining forces of the market and more active to pursue maximum market value of the firm, thus the adjustment to an optimal capital structure to be faster for private firm than for state-owned firm.

Originality/value – This paper for the first time looks at the influence of ownership on capital structure, from both static and dynamic perspective. And this study is helpful for regulators, and corporate managers to understand the corporate financial management behavior.

Keywords Capital structure, Corporate ownership, Management incentive, Private enterprise, State-owned enterprise

Paper type Research paper

1. Introduction

Over last few decades, the non-state-owned economy has experienced a dramatic development. In 2005, the non-state-owned economy has contributed 65 percent of GDP in China. The non-state-owned economy increasingly contributes to the governments' tax income, exports, and employment creation. In the past 30 years, the non-state-owned economy has rapidly grown as measured by the number of enterprises, and by the amount of assets. In addition, a variety of ownership structures have emerged. In the context of the Chinese transition economy, it is of great importance to figure out the role of corporate ownership structures in motivating the efficiency of corporate governance. This paper aims at investigating the impact of corporate ownership structure on

Chinese Management Studies
Vol. 7 No. 4, 2013
pp. 604-616

1750-614X
DOI 10.1108/CMS-09-2013-0169

The author appreciates the generous financial support from the National Science Foundation of China for Projects No. 71002074 and the helpful comments from the Editor, Check-Teck Foo.

corporate capital structure in listed companies in Chinese stock markets. However, the impact is ambiguous for two reasons. On the one hand, market forces, outside monitoring, and compensation plans all incentivise the management of private firms to operate under and migrate toward an optimal capital structure. In contrast, the incentives of the management of state-owned firms are not as clear. On the other hand, it is commonly recognized that private firms encounter higher financial frictions than state-owned firms. As a result, state-owned firms have an advantage over private firms in adjusting their capital structure to their target capital structure. Our objective in this paper is to examine whether there is a systematic difference in capital structure between state-owned firms and private firms. We also examine whether private firms differ from state-owned firms in the dynamic process in the adjustment toward optimal capital structure. Our finding that state-owned firms have lower debt-to-assets ratios provides support to the hypothesis that the managers of private firms build capital structures that are conducive to shareholders' benefits. Further study results that the adjustment to an optimal capital structure is faster for private firms than for state-owned firms support the hypothesis that private firms have more incentive than state-owned firms to adjust capital structure towards the optimal capital structure to maximize firms' market value.

The paper is organized as follows. Section 2 introduces briefly the corporate ownership problem that private firms have to face in financing in the context of the Chinese transition economy. Section 3 reviews previous studies. Section 4 is variable description and data description. Section 5 provides empirical results. Finally, Section 6 is conclusion and policy implication.

2. Corporate ownership reform in the Chinese transition economy

The reform in China inevitably pushed enterprises to transfer their financing resource from governmental financial support to commercial loans from commercial banks in the early 1980s. After 1990, the development of Chinese security markets provided new financing channels to enterprises. However, in order to guarantee the leadership of the state-owned economy, the sustainability of production and the stability of economic reform, the Chinese Government still insisted on leading capital allocation. As a result, private enterprises may suffer different treatment in the financing process.

China migrated through several phases in the development of its non-state-owned economy. During the experimental phase, which took place from 1978 to 1986, the Chinese Government relaxed socialist ideological constraints, revised the constitution and provided legal status and legitimacy for private commercial enterprises. However, during the experimental phase the Chinese Government was not very enthusiastic in developing the non-state-owned economy. It was hard for private enterprises to receive

principles of risk and return. However, private enterprises were still excluded from equity financing in the stock market. During the endorsement phase, which occurs after 1992, the Chinese Government aimed at full-scale economic liberalization. One significant political event was Mr Deng's speech in October 1992. Deng reconfirmed China's determination to establish a "socialist-market economy" as a response to Chinese people's common doubt about the opening policy. The deep reform in state-owned financial institutions and the expansion of the policies facilitating private enterprises' access to financing created a wide financing channel for private enterprises, including equity financing in the stock market. As of 2007, there are 410 privately owned listed companies in China, accounting for over 30 percent of the total listed companies.

While the financing channel has widened for private enterprises, has financing friction by banks against private enterprises been eliminated? According to the "trade-off" theory in corporate finance, a company determines its optimal capital structure by trading off the benefits of tax shield from debt against the costs of bankruptcy. A deviation from the optimal capital structure causes the loss in the company's market value. Thus, companies will take positive steps to offset deviations from their optimal capital structure. The speed at which a company adjusts its capital structure depends on the financing friction it faces. The higher financing friction a company faces, the more slowly the company adjusts its leverage towards the target leverage. Therefore, if private publicly traded companies face higher financial friction in financing than state-owned publicly traded companies, private companies will adjust towards the target leverage more slowly than state-owned companies, *ceteris paribus*.

3. Literature review

The existence of the optimal capital structure

The investigation on whether or not a corporate pursues an optimal capital structure has been one of the most active inquiries in finance since Modigliani and Miller's irrelevance proposition in 1958. There are two academic camps on the subject of optimal capital structure. To the extent that we identify differences between state-owned company capital structure adjustment and private company adjustment, we can provide insight into the correctness of these camps.

The advocates of optimal capital structure state that firms have a target debt-equity ratio that minimizes the costs of prevailing market imperfections, such as taxes, bankruptcy costs and agency costs. The Modigliani and Miller (1963) theorem tells us that the value of the levered firm, *ceteris paribus*, equals that of the unlevered firm plus the value of the debt tax shield. Later studies take the associated penalties with bankruptcy into account and show that the market value of a levered firm equals the unlevered market value, plus the corporate tax rate times the market value of the firm's debt, less the complement of the corporate tax rate times the present value of bankruptcy costs. When firms are subject to stochastic bankruptcy cost and corporate income taxes, optimal capital structures involve less debt financing than the maximum amount of borrowing allowed by the capital market, and, hence, shareholder-wealth-maximizing firms will search for optimal capital structures rather than simply maximize their borrowing. Managers act as agents on behalf of the owners of the company. Jensen (1986) points out that the debt can motivate organizational efficiency for two reasons:

(1) debt reduces the cash flow available for managers to spend in discretionary private benefits so that the agency costs of free cash flow are reduced; and

(2) shareholder and managers are motivated by the threat of failure to pay back debt.

The leverage should be increased until the marginal cost of debt besides bankruptcy costs equals the marginal benefit of debt. Jensen emphasizes that the role of debt in motivating organizational efficiency is particularly important to growing organizations with generate large cash flows. On a conceptual level, Jensen's reasoning can be applied to state-owned companies. Managers of state-owned companies are likely entrenched and may more easily pursue private benefits under a capital structure that is low in debt.

The opponents of the existence of an optimal capital structure largely base their theories on the assumption of information asymmetry between managers and investors. A corporation's capital structure largely depends on the management discretion which is influenced by stock prices fluctuation. The famous pecking order theory is among these theories. This theory tells us that the information asymmetry exists between managers and investors (the owners). Managers act to maximize the value of the existing shareholders and will raise equity only if the existing stock is overvalued. Investors recognize this objective of management. The result is that

in bank-dominated systems. Loof (2004) finds large cross-country differences in determinants to optimal capital structure by comparing the arm's-length systems in the USA and the UK with the bank-dominated systems in Sweden, Finland, France, Germany and Italy. The economic transition that China is experiencing is characterised, to some extent, by the transformation of the financial system from a relation-based bank-dominated system, aiming at an arm's-length security market dominated system. Despite the progress made, state-owned firms still have advantages over private firms in securing financing. First, since state-owned firms have political objectives such as employment goals, it is likely that if they are in financial distress, the government will support them through direct investment, loans, and/or reduced taxes. The government can also write off prior loans or change the terms of prior loans. These "soft budget constraints" are commonly seen in transition and socialist economies (Frydman *et al.*, 1999). For state-owned firms, their close relationship with the government creates a critical financial source for bank loans. In contrast, when private firms search for bank loans, they

Corporate ownership. In the last ten years, although a lot of Chinese firms were privatized when they became listed companies on the stock market, the Chinese Government still controls corporate governance of these firms by different means. The firms that the government firmly controls are not different from those in which the government is a large shareholder. In order to more exactly measure the effect of corporate relationship with the government on corporate capital structure in Chinese firms, we substitute ultimate corporate control to corporate ownership. I use $CTRL_{i,\,t}$ to denote ultimate corporate control, where $CTRL_{i,\,t}$ is a time-variant dummy variable that takes on the value of 1 if a firm is ultimately controlled by the state or state agency; and 0, otherwise.

In addition, we select the explanatory variables for observed leverage and target leverage that are used in previous studies. These variables are:

MB	market to book ratio of assets. The market value of asset is defined as the sum of the market value of circulated stock (float), non-tradable shares time book value of asset per share and book debt.
EBITDA_A	the ratio of earnings before interest, depreciation and taxes as a proportion of total assets to total assets.
SIZE	natural log of total assets.
FA_A	the ratio of fixed assets to total assets.
DEP_A	the ratio of depreciation to total assets.
Indm	median debt ratio of firm *i*'s industry, which is the first level of industry classification in the industry classification system defined by China Securities Regulatory Commission, at time *t*. This variable can be used to control for unobserved industrial factors.

Prior studies view R&D expenses as an important factor in capital structure and corporate ownership structure (Fama and French, 2002; Barry *et al.*

5. Empirical findings

The static capital structure

We first analyze the impact of corporate ownership on the static corporate capital structure. Table II shows the test for difference between leverage means. The average book debt ratio is 33.8 percent for state-owned firms and 40.3 percent for private firms. The difference between means is significant at the 1 percent level. These results tell us that there is systematic difference between state-owned firms and private firms in book debt ratio.

In our second step, we model equation (A1) in the Appendix by regressing leverage on the explanatory variables identified from the literature as well as the corporate control variable. The regression results are shown in Table III.

The selection of firm fixed effects in Column 3 is based on the Hausman test we apply to compare the fixed-effects model and the random-effects model. The test rejects the null hypothesis that there is no systematic difference between the fixed-effects model and the random-effects model at the 1 percent level.

Column 1 shows the estimation result for the pooled cross-sectional model. The estimated coefficient of $CTRL_{i,t}$ is -0.06 and statistically significant at the 1 percent level. Column 2 shows the estimation result for a year fixed effects model. The adjusted R^2 of the pooled model is 0.1888 and the adjusted R^2 year fixed effects model is 0.1935. The coefficient estimates in both models are qualitatively similar in magnitude and both are statistically significant at the 1 percent level. Column 3 shows the estimation result for the model including both firm fixed effects and year fixed effects. Comparing the adjusted R^2 in Columns 1 and 2, the adjusted R^2 of 0.7316 in Column 3 is much higher, which

State-owned firms		Private firms
$n = 5{,}936$		$n = 1{,}786$
Leverage mean = 0.338		Leverage mean = 0.403
SD = 0.206		SD = 0.216
	t-value = 11.27 *	

Note: Significant at: *1 percent

Table II.
Testing difference between leverage means

	(1)	t-statistics	(2)	t-statistics	(3)	t-statistics
$MB_{i,t}$	−0.024	−7.68***	−0.037	−10.00***	−0.017	−5.97***
$EBITDA\_A_{i,t}$	−0.648	−29.06***	−0.653	−29.12***	−0.473	−30.37***
$SIZE_{i,t}$	0.028	11.15***	0.024	9.03***	0.108	26.79***
$FA\_A_{i,t}$	0.159	11.14***	0.159	11.15***	0.169	11.18***
$DEP\_A_{i,t}$	−1.784	−10.70***	−1.641	−9.57***	−0.548	−3.49***
$Indm_{i,t}$	0.513	13.66***	0.621	13.30***	0.393	8.13***
$CTRL_{i,t}$	−0.060	−11.29***	−0.062	−11.58***	−0.029	−4.88***
Constant	0.127	6.44***	0.163	5.97***	−0.180	−3.30***
Firm fixed effects?	/		/		Yes	
Year fixed effects?	No		Yes		Yes	
n	7,722		7,722		7,722	
Adj. R^2	0.1888		0.1935		0.7316	

Note: Significant at: *10, **5 and ***1 percent

Table III.
Estimation results for static capital structure

indicates that the firm dummies are important in controlling for unobserved firm heterogeneity. The estimated coefficient of $CTRL_{i,t}$ is -0.029 and statistically significant at the 1 percent level. It means that the average debt ratio of the state-owned firms is, *ceteris paribus*, 0.029 lower than that of the private firms in China. The regression results in Table III provide us with a conclusion consistent with that in Table II, and convince us that after controlling for important corporate financial characteristics, there is systematic difference between state-owned firms and private firms in capital structures.

Our results can be interpreted in three ways. First, we provide evidence of management entrenchment in state-owned firms. As debt can have a disciplining effect on management, it appears that the management of state-owned firms prefers equity to debt. The second interpretation is that state-owned firms lack an incentive to use debt due to the lack of a debt tax shield. When the state is the large shareholder of a firm, the benefit to private shareholders, besides the possible debt tax shield, is very likely to be ignored. Third, since most state-owned firms are large firms in terms of both assets and the number of employees and have sufficient internal financial funds, they do not, or might not have to, utilize the leverage. As a result, the leverage ratios for state-owned firms are low, although these firms are adjusting regularly management policies during the era of transition economies. Although our empirical results do not disentangle these three possible interpretations, the contrasting debt ratios between state-owned and private firms lend support to the stream of literature where capital structure matters; otherwise there would not be a systematic difference between the state-owned and private firms.

Let us turn to other independent variables in Table III. The negative sign of *EBITDA_A* implies that a firm with higher earnings could prefer lower leverage. The negative sign of *MB* means that since higher market to book ratio of assets is a signal of higher expected future growth, a firm with high market to book ratio of assets would protect the expected future growth by limiting leverage. The positive sign of *SIZE* indicates larger firms tend to operate with higher leverage. The positive sign of *FA_A* implies that a firm with greater tangible assets tends to operate with higher leverage. The negative sign of *DEP_A* implies that a firm with more depreciation needs less tax shield from debt financing.

The dynamic adjustment of capital structure

As we mentioned before, compared with state-owned firms, private firms encounter greater financing friction, but might be more active to adjust their capital structure to maximize shareholders' benefit. In the Appendix, this paper develops a model to distinguish this affect, I investigate the ambiguous impact of corporate ownership on the dynamics of corporate capital structure by estimating equation (A6), the model specification implies that the leverage-adjustment parameter for private firms is given by 1 minus the coefficient estimate of $L_{i,t-1}$; the leverage-adjustment parameter for state-owned firms is given by 1 minus the sum of the coefficient estimate of $L_{i,t-1}$ and the coefficient estimate of $L_{i,t-1}CTRL_{i,t}$. The regression results are shown in Table IV.

The selection of firm fixed effects in Column 3 is based on the Hausman test we apply to compare the fixed-effects model and the random-effects model. The test rejects the null hypothesis that there is no systematic difference between the fixed-effects model and the random-effects model at the 1 percent level.

We show results for a pooled cross-sectional mode in Column 1, results for a year fixed effects model in Column 2, and results for a firm and year fixed effects model

Table IV.
Estimation results for dynamic adjustment of capital structure

	(1)	*t*-statistics	(2)	*t*-statistics	(3)	*t*-statistics
$MB_{i,\ t-1}$	0.007	1.76*	0.002	0.57	0.001	0.19
$EBITDA\_A_{i,\ t-1}$	0.048	1.97**	0.044	1.79*	−0.038	−1.48
$SIZE_{i,\ t-1}$	0.011	3.35***	0.010	3.13***	0.041	7.08***
$FA\_A_{i,\ t-1}$	0.016	0.81	0.014	0.75	0.029	1.14
$DEP\_A_{i,\ t-1}$	−0.606	−2.47**	−0.449	−1.82*	−0.662	−2.09**
$Indm_{i,\ t-1}$	−0.034	−0.78	0.038	0.81	0.296	4.06
$CTRL_{i,\ t-1}$	−0.004	−0.42	−0.009	−1.07	0.00029	−0.03
$L_{i,\ t-1}$	0.812	56.63***	0.812	56.89***	0.465	24.03***
$MB_{i,\ t-1}$*$CTRL_{i,\ t}$	−0.007	−1.45	−0.008	−1.80*	−0.002	−0.41
$EBITDA\_A_{i,\ t-1}$*$CTRL_{i,\ t}$	−0.072	−2.09**	−0.059	−1.73*	−0.093	−2.56**
$SIZE_{i,\ t-1}$*$CTRL_{i,\ t}$	−0.010	−2.96***	−0.010	−2.93***	0.00035	0.07
$FA\_A_{i,\ t-1}$*$CTRL_{i,\ t}$	0.020	0.92	0.021	0.97	0.002	0.08
$DEP\_A_{i,\ t-1}$*$CTRL_{i,\ t}$	−0.004	−0.01	−0.078	−0.29	0.069	0.20
$Indm_{i,\ t-1}$*$CTRL_{i,\ t}$	0.001	0.03	0.005	0.10	−0.145	−2.17**
$CTRL_{i,\ t-1}$*$CTRL_{i,\ t}$	0.025	1.58	0.030	1.92*	0.036	2.23**
$L_{i,\ t-1}$*$CTRL_{i,\ t}$	0.061	3.61***	0.059	3.53***	0.059	2.69***
Constant	0.045	2.54**	−0.003	−0.16	0.031	0.54
Firm fixed effects?	/		/		Yes	
Year fixed effects?	No		Yes		Yes	
n	6,902		6,902		6,902	
Adj. R^2	0.7057		0.7090		0.7773	

Note: Significant at: *10, **5 and ***1 percent

in Column 3. We find that the model strongly explains the dynamic of capital structure (the adjusted R^2 is 0.7057). The inclusion of the lagged dependent variable is a critical variable in obtaining the high adjusted R^2.

Recall from the model that the leverage-adjustment parameter for private firms is given by 1 minus the coefficient estimate of $L_{i,\ t-1}$ and the leverage-adjustment parameter for state-owned firms is given by 1 minus the sum of the coefficient estimate of $L_{i,\,t-1}$ and the coefficient estimate of $L_{i,\,t-1}CTRL_{i,\,t}$. Both $L_{i,\,t-1}$ and $L_{i,\,t-1}CTRL_{i,\,t}$ are statistically significant at the 1 percent level in all three models. Using the firm year fixed effects model, we find that private listed firms adjust, on average, towards optimal capital structures by 53.5 percent (1

ownership is a significant factor affecting the company's optimal capital structure, which should be considered by the CFO in decision making.

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Appendix. Model specification

First of all, we specify the following model to test whether there is a systematic difference in capital structure between state-owned firms and private firms:

$$L_{i,t} = \beta X_{i,t} + \varepsilon_{i,t} \tag{A1}$$

where $L_{i,t}$ is firm i's observed leverage at time t; β is a coefficient vector; $X_{i,t}$ is a vector of firm i's financial characteristics at time t. Particularly, according to previous studies (Barry *et al.*, 1991; Thomsen and Pedersen, 2000; Goldeng *et al.*, 2008), corporate ultimate control, $CTRL_{i,t}$, is included in $X_{i,t}$ as a explanatory variable. $CTRL_{i,t}$ is a time-variant dummy variable that takes on the value of 1 if a firm is ultimately controlled by the state or state agency; and 0, otherwise.

As we mentioned before, corporate ownership may not only influence capital structure, but may also influence the leverage adjustment speed. Due to financial frictions that prevent firms from adjusting immediately to their target capital structure, we assume the adjustment towards to target leverage to be partial, i.e. the adjustment cannot be completed within one period (Loof, 2004). A standard partial adjustment equation is given by:

$$L_{i,t} - L_{i,t-1} = \delta\left(L^*_{i,t} - L_{i,t-1}\right) \tag{A2}$$

where $L^*_{i,t}$ is the target leverage; δ is the adjustment parameter reflecting the gap between a firm's desired leverage adjustment and its actual leverage adjustment and $|\delta| < 1$. Here, we do not allow the adjustment parameter to vary across firms and over time. However, taking a firm's ownership into account, we specify two adjustment parameters: one is the average adjustment parameter for state-owned firms, the other is for private firms. Thus, we have:

$$\begin{cases} L_{i,t} - L_{i,t-1} = \delta_1\left(L^*_{i,t} - L_{i,t-1}\right) \\ L_{i,t} - L_{i,t-1} = \delta_0\left(L^*_{i,t} - L_{i,t-1}\right) \end{cases} \tag{A3}$$

Where δ_1 is the adjustment parameter for state-owned firms and δ_0 is the adjustment parameter for private firms. Equation (A3) equals:

$$L_{i,t} - L_{i,t-1} = \delta_0\left(L^*_{i,t} - L_{i,t-1}\right) + (\delta_1 - \delta_0)\left(L^*_{i,t} - L_{i,t-1}\right)CTRL_{i,t} \quad \text{(A4)}$$

However, $L^*_{i,t}$ is unobserved. According to the previous studies (Loof, 2004), the target leverage can be expressed as:

$$L^*_{i,t} = \beta \mathrm{X}_{i,t-1} \quad \text{(A5)}$$

Substituting equation (A5) into equation (A4) and rearranging gives us an estimable model:

$$L_{i,t} = \delta_0\beta \mathrm{X}_{i,t-1} + (\delta_1 - \delta_0)\beta \mathrm{X}_{i,t-1}CTRL_{i,t} + (1 - \delta_0)L_{i,t-1} + (\delta_0 - \delta_1)L_{i,t-1}CTRL_{i,t} + \mu_{i,t} \quad \text{(A6)}$$

where $\mu_{i,\ t}$ is error terms. The model specification implies that the leverage-adjustment parameter for private firms is given by 1 minus the coefficient estimate of $L_{i,\ t-1}$; the leverage-adjustment parameter for state-owned firms is given by 1 minus the sum of the coefficient estimate of $L_{i,\ t-1}$ and the coefficient estimate of $L_{i,\ t-1}CTRL_{i,\ t}$.

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