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Ownership control and debt maturity structure:

Evidence from China

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Abstract

We examine the debt maturity structure of Chinese listed companies during a period when the bond market was under-developed and the majority of commercial banks were owned by the state. We find that the type of ownership control affects the debt maturity structure. Compared to privately controlled enterprises, state-controlled companies had greater access to long-term debt and used less short-term debt during the sample period 2001–2008. The empirical results also show that company profitability was an important concern when Chinese banks allocated loans to listed companies, which meant that they became de facto monitors of listed companies during China's transition process. However, although the financial reform process has increased the motivation of banks to consider company profitability in their lending decisions, the effect of profitability on the debt maturity structure is confounded because of state ownership being a big weight in bank lending decision.

Keywords: ownership control, privately controlled enterprise, profitability, debt maturity structure, China

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1. Introduction

In contrast to most developed countries, China has not yet established sophisticated and mature capital markets to support the funding requirements of companies and entrepreneurs. According to data from the National Bureau of Statistics of China, the total value of bank loans is 100 times greater than the value of stocks and corporate bonds (Cai et al., 2008), such that bank loans are the main source of corporate financing in China. The four largest state-owned banks: Bank of China (BOC), Industrial and Commercial Bank of China (ICBC), China Construction Bank (CCB) and Agricultural Bank of China (ABC) dominate the Chinese banking sector, and during the period of our study, controlled around three quarters of all banking assets (Allen et al., 2005; Berger et al., 2009). The China Banking Regulatory Commission (CBRC) controls lending by assigning quotas to each of the major banks and uses the Reserve Requirement Ratio (RRR) to further limit the funds a bank is able to lend.

Until the late 1990s, the Chinese banking sector had little latitude, and could only serve as a conduit for channelling low-cost capital to state owned enterprises (SOEs). This was because SOEs were expected to assume the task of employment and social welfare provision. Privately controlled firms were virtually excluded from the formal credit market. In 1997, due to the increasing importance of the private sector in employment creation and economic growth, the government formally allowed banks to extend loans to private firms for the first time (Firth et al., 2009). Nonetheless, a close relationship between SOEs and the state owned banks remains, and, with loans priced below market clearing rates, SOEs obtain preferential access to credit. This discrimination problem is documented by Brant and Li (2003), Allen et al. (2005), and Firth et al. (2009), and discussed widely in the popular press e.g. South China Morning Post (2013), China Economic Review (2013) and The Wall Street Journal (2013). The state is able to influence bank lending for the benefit of SOEs through the regulatory

system, the power to appoint senior managers in the banks, and by exercising their right as controlling equity shareholder.

Cai et al. (2008) investigate the determinants of debt maturity structure and find that high-quality Chinese firms employ a higher proportion of long-term debt. They note that this contradicts the signalling theory proposed by Flannery (1986) and much of the empirical literature, and conclude that short term debt may not signal a firm's good quality in China. Cai et al. (2008) also consider a proxy for a firm's growth prospects and obtain ambiguous results regarding its impact on debt maturity structure. Accordingly, they find inconclusive support for agency theories of debt maturity structure relating to the control of managerial incentives to over- and under-invest in the firm's activities. However, in a material omission from their study, Cai et al. (2008) do not distinguish firms that are privately owned from firms that are state owned.

The debt maturity structure of Chinese listed firms depends on both supply-side and demand-side factors. The supply-side factors include the willingness of state owned banks to lend, while the firm's preference for using short- or long-term debt constitutes a demand-side factor. Privately owned and state owned firms differ in both respects. SOEs have greater access to bank loans. The firm's preference for employing short- or long-term debt is predicted by existing agency and signalling theories, however the differing ownership structures may influence their application. This follows because agency theory is predicated on the assumption that maximisation of shareholder wealth is the primary objective of decisions by a firm's management. For SOEs, a social or policy objective may be paramount. Similarly, signalling theory presumes that banks play a monitoring role and the decision to lend to a firm provides the market with a credible signal as to the firm's quality. However, the market is unlikely to regard the decision to lend to SOEs as a credible signal of quality given that the decision may not be entirely based on creditworthiness.

We examine the relationship between ownership control types and debt maturity structure for Chinese A share firms listed on Shanghai and Shenzhen securities exchanges over the period 2001 – 2008. We extend the existing literature in three respects. First, we find that SOEs employ more long term debt than their privately owned counterparts. This is consistent with the problem of state banks discriminating against private firms in providing credit, that Brant and Li (2003) document, extending to discrimination in the maturity of the loans the banks offer. Second, we show that during our sample period, profitability has greater importance in determining the access of privately owned firms to long-term debt than is the case with SOEs. Third, we find that SOEs located in less-developed regions tend to employ more long-term debt, in contrast to their private counterparts that use short-term debt. Cognizant of the Li et al. (2009) demonstration that the ability of unlisted firms to access to bank finance varies by region, these findings favour the dominance of supply-side constraints in explaining the differing debt maturity structures of SOEs and privately owned listed firms in China.

The remainder of this study is organised as follows: Section 2 reviews relevant literature and develops hypotheses. Section 3 describes sample selection and variable construction; Section 4 presents the method and empirical results; Section 5 reports the results of the robustness tests from different dimensions; and Section 6 concludes the research.

2. Literature and hypotheses development

In developed economies, banks conduct credit analysis to screen applicants and structure their lending according to their assessment of the applicant's risk. In China, such lending practices are likely to apply more to privately owned firms. State-owned banks may perceive private firms to be more risky, as the banks are less likely to be compensated through recapitalisation by the state¹ if the quality of these loans deteriorates (Lu, Zhu and Zhang,

2012). In line with this perception of risk, state-owned banks lending to private firms will prefer to provide short-term funds that have lower default risk than longer-term loans to the same firms.

The lending quota assigned to Chinese banks by the CBRC is negotiable, and may be adjusted as the result of ‘window guidance’ meetings (Cousin, 2011). We speculate that the case for an increased quota will be strongest if the purpose is to facilitate long-term lending to SOEs to permit investment in projects consistent with government policy. Moreover, since the quota applies to new lending, banks seeking to maximise the size of their loan book have the incentive to make this lending long-term. A similar incentive is absent for lending to private firms, since the RRR limits lending as a proportion of existing loans, and any negative increase imposed as a penalty is more likely to follow ‘inappropriate’ lending to private firms than to SOEs.

State ownership domination and central control allow state owned banks to discriminate against private firms not just in offering loans (Brandt and Li, 2003), but also in offering long-term debt. If the above supply-side considerations dominate, there will be a tendency for SOEs to employ a larger proportion of long-term debt in their debt maturity structure, while privately controlled firms will tend towards employing short-term debt. Accordingly, we propose:

H1: Compared with privately controlled firms, SOEs obtain greater access to long-term debt and use less short-term debt.

The revision and amendment of the *Law of the People’s Republic of China on Commercial Banks* in 2003, requires banks to evaluate a customer’s credit risk and collateral in their lending decisions. Li et al. (2009) find that China’s banks have responded to these reforms and begun to apply economic criteria in their lending decisions. The links between bank finance and subsequent productivity suggest that Chinese banks are somehow able to

identify and lend to relatively productive enterprises (Cull and Xu, 2000). Chinese banks extend loans to financially healthier and better-governed firms, which implies that the banks use commercial judgments in this segment of the market (Firth et al., 2009).

Irrespective of whether a firm is privately owned or state owned, rational lenders will prefer to lend to more creditworthy firms. Such firms tend to be more profitable. To control credit risk, banks will avoid long-term lending, which has inherently higher credit risk, to less profitable firms. Therefore, if supply-side considerations dominate, we propose:

H2a: Profitability is an important determinant of the debt maturity structure in Chinese firms; firms with higher profitability obtain greater access to long-term debt, while firms with lower profitability tend to raise more short-term debt.

In addition to the above supply-side considerations, agency and signalling theories make compatible predictions about a firm's demand for long-or short-term debt. Barclay and Smith (1995) argue that short-term debt can be used to control the interest conflict between the lender (principal) and borrower (agent) caused by the borrower rejecting risky, but positive, NPV projects that require investment before the firm's debt matures. This underinvestment hypothesis, which predicts that high-growth firms will use a greater proportion of short-term debt, is applicable for privately owned firms. However, SOEs are less motivated by the objective of maximising shareholder wealth and are likely to invest in projects, consistent with social and policy objectives, which have negative NPVs.

The overinvestment hypothesis predicts that firms with profitable new investments will use a smaller proportion of long-term debt. Hart and Moore (1995) argue that short-term debt can control the shareholder (principal) – manager (agent) conflict, where managers have the incentive to invest in negative NPV projects. We propose that this prediction remains valid for privately owned firms. However, managers of SOEs are less concerned about shareholder wealth as an objective, and overinvestment would be common whenever the primary

motivation of an investment was social or policy objectives. Managers of underperforming SOEs will have a greater incentive to avoid monitoring. Moreover, to ensure that overinvestment is not curtailed by the lenders, managers of SOEs with poorer investment opportunities would seek a longer-term commitment of funds.

Barclay and Smith (1995) outline a theory where managers use short-term debt to signal their firm's quality to equity markets. High quality firms will pay the higher transaction costs, submit to more frequent monitoring, and accept the risk that short-term debt may not be rolled over. We argue that because loans to SOEs may not reflect creditworthiness, the monitoring role of state banks is compromised. Accordingly, more profitable private firms will tend to use more short-term debt; however, this theory offers no prediction with respect to SOEs. Thus, from the demand-side consideration, we proposed:

H2b: Being an SOE decreases the positive effect of firm profitability on long-term debt financing; being an SOE intensifies the negative effect of profitability on short-term debt financing.

In a study of unlisted SOEs and foreign firms, Li et al. (2009) find regional differences in capital structures. Firms in less-developed regions are more likely to use long term debt. The differences are attributed to political connections, where local officials are able to influence the lending of the state owned banks (Firth et al., 2009). This may follow where the purpose of the loan is to support a project that the officials deem to have a priority. Indeed, as Sapienza (2004) suggests, socially maximising governments aim to channel funds to depressed areas of the country. China has massive differences in economic development across regions.

Unlike the unlisted firms examined by Li et al. (2009), our focus on listed firms avoids the possibility that regional differences in capital structure could be attributed to the increased demand for debt caused by a poorer legal environment reducing protections for equity

investors. Moreover, other demand-side differences that may be caused by the agency relationship between management and shareholders should be independent of the region in which the firm operates, because the shares are listed on exchanges in developed regions. Therefore, we can attribute any regional differences in the debt maturity structures of SOE and privately owned listed to supply-side factors.

We expect that differences in the institutional environment will differentially affect the supply-side determinants of a firm's debt maturity structure. In lesser-developed regions, the influence of political connections in securing long-term funding from the state owned banks should be greater. Moreover, the influence of these connections will be more apparent where it concerns the operations of SOEs. In an environment where the overall supply of credit is constrained by lending quotas we expect a corresponding decrease in the supply of long-term debt to privately owned firms. Accordingly, we propose:

H3: Regional development is an important determinant of the debt maturity structure in Chinese firms; banks are more likely to support SOEs in low-developed areas with long-term debt and privately controlled firms in low-developed areas with short-term debt.

3. Sample selection and variable construction

3.1. Sample selection

The sample pool consists of all publicly traded Chinese firms that only issue A shares on the Shanghai Security Exchange (SHSE) and Shenzhen Security Exchange (SZSE). The firms issuing both A shares and B shares or both A shares and H shares are required to apply international financial reporting standards, rather than Chinese financial reporting standards. We exclude firms with foreign ownership to avoid the difference in financing policy and accounting issues, as is common practice in sample selection. Our sample period commences

in 2001, when Chinese companies implemented the New Accounting Standards and Policies. Although the new accounting standards have been revised in 2006, the variables involved in this study remain consistent before and after the revision. Our study concludes in 2008, when the global financial crisis occurred and the Chinese stock market fell sharply. We choose 2001–2008 as our sample period to mitigate the influences of changing accounting policies and the financial crisis.

We exclude firms with ST and PT² status, firms in the financial and insurance industries, and firms with incomplete datasets, from our analysis. We define the ownership control type in terms of the nature of the ultimate controller. If the ultimate controller of a firm is the state for all of the observation period (2001–2008), this firm is defined as an SOE; if the ultimate controller is a civilian (a natural or legal person, with the firm belonging to individuals) for all of the observation period, it is defined as a privately owned enterprise. To have a clean sample, we omit companies that transferred from state control (SOE) to private control or from private control to SOE in this period. Other types of controlling ownership, such as collective ownership, social group ownership and employee ownership, are somewhat ambiguous, lying somewhere between state and private ownership, where the controlling ownership could be either private entities or the government (Allen et al., 2005; Li et al., 2009). We eliminate several firms with such ambiguous types of controlling ownership from the study.

All of the raw data related to corporate finance and governance are extracted from the China Center for Economic Research (CCER) database, which is developed by the Beijing Sinofin Information Service Limited Company. We supplement the data from annual reports available from the Shanghai and Shenzhen Stock Exchange websites. We exclude observations with missing terms or suspected errors. We also exclude outliers, such as when Tobin's Q is greater than 10.³ The final sample consists of 5,924 firm-year observations of

publicly listed firms during 2001–2008, in which 4,646 firm-years are SOEs and 1,278 are privately controlled firms.

3.2. Variable construction

3.2.1. Dependant and analytical variables

We use two variables to measure the debt maturity structure: long-term debt dummy (LTD dummy), which is set to 1 if the firm has long-term debt in a specific year and 0 otherwise; short-term debt ratio (STD), which is short-term borrowings from banks or other financial institutions divided by the total debt. As general practice, the long-term debt that matures within 12-months is counted as short-term debt rather than long-term debt. The total debt is calculated as long-term debt plus short-term debt.⁴

The variable STATE is used to denote the type of ownership control for listed companies. It is set to 1 if the company's controlling shareholder is the state and 0 if it is a legal or natural person without government involvement. Following Chen et al. (2009), we use three variables to measure firm profitability: return on assets (ROA), which is the operating earnings divided by the average book value of total assets; return on sales (ROS), which is the operating earnings divided by the net sales; and cash flow return on assets (CFOA), which is the operating cash flow divided by the average book value of total assets. These three measures of profitability consider both accounting income and cash flow income. We use the marketisation index (MARKET), developed by Fan et al. (2010), as the measurement of the regional economic development and institutional efficiency. Higher scores on the index indicate a relatively high level of economic development and institutional efficiency.

3.2.2. Control variables

After reviewing the relevant literature, we include the following control variables in our analysis. Managerial ownership (MO) is the ratio of all board members' ownership stake to total ownership of the firm (Cho, 1998; Davies et al., 2005). Empirical evidence shows that

managers with higher stock ownership use a larger proportion of short-maturity debt, thus committing to more frequent monitoring. Conversely, more entrenched managers who have lower stock ownership may choose longer-maturity debt. Growth opportunity (Q) is measured by using Tobin's Q (Barclay and Smith, 1995; Cai et al., 2008). A firm's growth opportunities affect its choice of debt maturity structure because managers may have an incentive to overinvest and the agency cost is likely to be higher for firms in high-growth industries (Titman and Wessels, 1988).

Banks secure their lending, particularly long-term debt, against a firm's collateral assets. We use the ratio of property, plant and equipment to total assets (PPE) as the measure of collateral assets (Pittman and Fortin, 2004). The decision to choose long- or short-term debt might also be affected by a firm's tax position, since the debt maturity structure may affect the amount and timing of tax payments (Wu and Yue, 2009). We use depreciation scaled by total assets as a non-debt tax shield (DEPR). In addition, we also include the logarithm of total assets (SIZE) to capture the effect of firm size, leverage in previous year (PreLEV) to mitigate endogenous problems relating to capital structure, year dummy (YEAR) to control for policy effects and industry dummy (INDUSTRY) to allow for differences across industries.

3.3. Summary of statistics

Table 1 reports the summary statistics for the main variables in the 5,924 observations in our sample. It shows that the probability of holding long-term debt (the mean value of the LTD dummy) for Chinese listed companies is 80.9 percent, while the mean proportion of short-term debt in total liabilities is 33.7 percent. On average, the government ultimately controls 78.4 percent (STATE) of the firms in our sample. Firms in our sample have an average leverage ratio of 44.9 percent, which remains stable over time (Wu and Yue, 2009). The distribution of managerial ownership is highly skewed, with a mean of 2.5 percent and

the maximum of 77.9 percent which reflect a predominance of small managerial shareholders. Marketisation is lowest for Tibet in 2001, with an index score of 0.33 and at 11.71, highest for Shanghai in 2007.

[Insert Table 1 here]

4. Empirical results

4.1. Univariate analysis

First, we compare the mean and median of debt maturity structure variables to test whether there are significant differences between SOEs and private enterprises. Table 2 shows the number of listed privately controlled firms increased faster than the number of SOEs. From 2001 to 2008, the number of SOEs increased by approximately 25 percent (from 484 to 604), while privately controlled firms increased by approximately three times (from 73 in 2001 to 289 in 2008). Of particular note is that from 2006 to 2007, the numbers of SOEs and privately controlled firms increased by 12 percent (from 622 to 694 firms) and 48 percent (from 182 to 270 firms), respectively.

[Insert Table 2 here]

Panel A (Panel B) of Table 2 compares the means (medians) of the state-owned firms with the privately owned firms for each year. The statistical significant of these differences is assessed using the *t*-test (Mann–Whitney *U*-test). The results show that between the two groups, both the long-term debt dummy and short-term debt ratio differ significantly. For the full sample, the means of the LTD dummies are significantly larger for SOEs than for privately controlled firms. For example, the mean LTD dummy in SOEs in 2001 is 81.2 percent, which is significantly higher than 65.8 percent of private firms in the same year. The probability of holding long-term debt over the eight-year period was 84.0 percent for SOEs, which is significantly larger than the 69.4 percent for privately controlled firms.

Relative to privately controlled firms, both the means and medians of the STD variable show that SOEs use significantly less short-term debt. For example, the mean (median) STD for SOEs in 2001 is 35.5 percent (37.7 percent), which is significantly less than for privately controlled firms at 43.8 percent (47.7 percent). Considering the weak interest alignment between shareholders and managers in SOEs (Ruan et al., 2011), the difference of debt maturity variables between SOEs and privately controlled firms supports the notion that managers in Chinese listed SOEs prefer long-term debt to reduce the frequency of external monitoring, such as that from banks.

In Table 3, Panels A and B show the mean/median comparison of the LTD dummy and STD variable grouped by each of the profitability measures in turn. We partition our sample into quartiles and compare the lowest and highest quartile for each profitability measure. There are approximately 1,481 observations in each pair of extreme quartile sub-samples. The differences in the mean (median) STD for the high and low profitability groups are significant in both panels, with firms in the lowest profitability quartile using more short-term debt. This echoes Cai et al. (2008) who find that the ability to access long-term debt may signal a Chinese firm's good quality because banks prefer to lend long-term debt to profitable firms. Firms with poorer performance receive more short-term debt. Better-performing firms use less short-term debt. The results lend further support to the supply-side explanation for Hypothesis 2a—that listed companies with lower profitability raise more short-term debt.

[Insert Table 3 here]

We also categorise firms according to their locations, and show the comparative results in Table 4. If the marketisation index of a firm located region is smaller (larger) than the mean of 7.749, the firm located in this region is assigned to the low- (high-) institution group. We then compare the LTD dummy and STD between two different institutional groups for SOEs and private firms respectively. In Panel A, there are 2,607 SOEs located in low-institution

areas and 2,039 SOEs located in high-institution areas. The mean and median of the LTD dummy for SOEs between these two institutional groups are significantly different. Banks are more likely to support the SOEs located in low-developed areas with long-term debt. In Panel B, there are 407 privately controlled firms located in low-institution areas and 871 firms in high-institution areas. There is no significant difference for the LTD dummy between these two groups. That is, for private firms, access to the LTD is unaffected by the marketisation of the region. However, the differences for the STD are significant. Banks are more likely to support privately controlled firms located in low-developed areas with short-term debt. These comparison results provide evidence supporting Hypothesis 3 that banks are more disposed to support SOEs in low-developed areas with long-term debt, and privately controlled firms in low-developed areas with short-term debt.

[Insert Table 4 here]

4.2. Regression analysis

To further examine the determinants of Chinese firms' choice of debt maturity structure, we use regression analysis⁵. Equation (1) expresses the proposed determinants of the debt maturity structure in Chinese listed companies:

$$\begin{aligned}
 Debtmaturity_{it} = & \alpha + \beta_1 STATE_i + \beta_2 Profitability_{it} + \beta_3 STATE_i * Profitability_{it} \\
 & + \beta_4 MARK_{it} + \beta_5 PreLEV_{it} + \beta_6 MO_{it} + \beta_7 Q_{it} + \beta_8 DEPR_{it} + \beta_9 PPE_{it} + \beta_{10} SIZE_{it} \quad (1) \\
 & + \theta' (Yeardummies_t) + \gamma' (Industrydummies_i) + \varepsilon_{it}
 \end{aligned}$$

For firm i in year t , the dependant variable *Debtmaturity* refers to the short-term debt ratio (STD) when OLS is employed, or to the likelihood of having long-term debt (LTD dummy) when the Logit model is used. The results of Equation (1) are shown in Table 5. In Panels A and B, the dependant variables are the LTD dummy and STD respectively.

[Insert Table 5 here]

In both panels of Table 5, the STATE dummy is significantly associated with the debt maturity measures in all specifications. In Panel A, the coefficient is positive, consistent with our earlier discussion regarding the role of government in firms' borrowing and banks' lending decisions. In Panel B, the negative relationship between the STD and STATE provides evidence that short-term debt is not the main tool for monitoring management in SOEs. That is, consistent with Hypothesis 1, SOEs have greater access to long-term debt and use less short-term debt than privately controlled firms.

In Panel A, both the ROA and ROS are positively related to access to long-term debt. Therefore, firms with better profitability have greater access to long-term debt, which is consistent with Firth et al. (2009). In Panel B, the profitability variables ROA and CFOA are negatively related to the short-term debt ratio. This relation provides evidence in support of Hypothesis 2a: banks prefer to provide long-term loans to firms with better profitability, and firms with lower profitability raise more short-term debt.

In some specifications, the statistically negative coefficient on the interaction of the STATE and profitability variables in Panel A of Table 5, offers some support for Hypothesis 2b: that being an SOE decreases the effect of firms' profitability on firms' access to long-term debt. However, in specifications including the control variables, the significance of the interaction is reduced. Stronger support for Hypothesis 2b is obtained from Panel B. The statistically negative coefficients on the interaction term shows that relative to privately owned firms, the proportion of short-term debt decreases more strongly as the firms' profitability increases when the firm is state-owned. Moreover, the coefficient on the CFOA interactive term is robust to the addition of the control variables. Accordingly, we conclude that being an SOE intensifies the negative effect of profitability on the proportion of short-term debt financing. For China's listed companies, although bank reform has promoted the

banks' incentive and ability to lend according to the borrower's profitability, government involvement in the financial markets can still induce a misallocation of financial resources.

Both the negative coefficients of MARKET in Panel A and positive coefficients in Panel B are significant at one percent. This shows that institutional efficiency associated with the relative development of the regional economy affects long-term debt financing negatively, and short-term debt financing positively, which is consistent with Firth et al. (2009) and Li et al. (2009). We consider the effect of marketisation on the debt maturity of SOEs and privately controlled firms in more detail in the following subsection.

It is apparent from the similarity of the coefficients on many of the control variables to those found in studies in developed markets that some determinants of the debt maturity structure for Chinese firms common to both markets. For example, the leverage ratio is a common measurement of financial risk. The leverage ratio in the previous year (PreLEV) significantly affects both the LTD dummy and the STD. Managerial ownership (MO) plays an important role in a firm's short-term debt decisions, which is consistent with Datta et al. (2005). The significant negative effect of MO on the STD supports the notion that short-term debt is a tool for reducing the agency cost between shareholders and managers in Chinese privately controlled enterprises. Firms with larger-scale operations tend to use a higher proportion of long-term debt and a lower proportion of short-term debt, which is consistent with Titman and Wessels (1988), Cai et al. (2008) and Berger et al. (2009).

4.3. Split-sample analysis according to control ownership

To further investigate of the effects of marketisation on the debt maturity structure, we split the sample into two groups and conduct separate regression analyses for SOEs and privately controlled firms. We control for industry effects using industry-adjusted profitability (IAProfitability) (industry-adjusted return on assets (IAROA), industry-adjusted return on sales (IAROS), or industry-adjusted cash flow on assets (IACFOA)), where the

industry medians are deducted from the raw numbers, giving relative performance measures.

The regression equation is shown as:

$$\begin{aligned} Debtmaturity_{it} = & \alpha + \beta_1 IAProfitability_{it} + \beta_2 MARK_{it} + \beta_3 PreLEV_{it} + \beta_4 MO_{it} + \beta_5 Q_{it} \\ & + \beta_6 DEPR_{it} + \beta_7 PPE_{it} + \beta_8 SIZE_{it} + \theta' (Yeardummies_t) + \varepsilon_{it} \end{aligned} \quad (2)$$

Panel A of Table 6 shows that the effect of industry-adjusted profitability on firms' access to long-term debt in private firms is greater than in SOEs in most specifications. For example, the difference between the coefficients for IAROA in private firms and SOEs is significant at the 10 percent level. As a complement to the conclusions of Firth et al. (2009) regarding the importance of commercial judgment in banks' lending decisions, we present evidence that the banking sector uses profitability as a major determinant of loan allocations to privately controlled corporations. Banks tend to lend more long-term debt to better-performing private firms. However, this allocation criterion does not appear to be as effective in SOEs. Therefore, we provide further support for Hypothesis 2b: that state control ownership decreases the effects of firm profitability on long-term debt financing.

[Insert Table 6 here]

The institutional development variable (MARKET) is significantly related to the debt characteristic variables in nearly all specifications in both panels. In Panel A, listed SOEs located in less-developed regions have significantly greater access to long-term debt; moreover, the negative relationship between institutional development and access to long-term debt is stronger for SOEs than for privately controlled enterprises. However, as Panel B shows, for SOEs, the proportion of short term debt (STD) employed is unrelated to institutional development. In contrast, the significantly negative coefficient (Market) shows that private firms operating in less-developed regions employ more STD relative to those in more-developed regions. Therefore, we find support for Hypothesis 3: that banks tend to provide long-term debt to SOEs located in low-developed areas and are more likely to

support privately controlled firms located in low-developed areas with short-term debt. This is another example of ‘bank discrimination’ in China.

5. Robustness test

5.1 Impact of state ownership

State ownership has dominated the Chinese economy for decades and private ownership has significantly increased its role in Chinese economy. Although the ideological discrimination against private ownership in China is waning, it remains prevalent. Cognizant of our finding that SOEs have greater access to long-term loans, we conjecture that high state ownership is an advantage for access long-term loans regardless of whether the firm is actually controlled by the state. To examine this conjecture, we use the state ownership ratio as an independent variable to investigate its effect on the debt maturity. The results support our conjecture that firms with higher levels of state ownership tend to use a larger proportion long-term debt and less short-term debt⁶.

5.2 Impact of new bank law

In early 2003, the China State Council announced the establishment of the China Banking Regulatory Commission (CBRC). By the end of year, the Tenth National Peoples’ Congress approved the revision of the Law of the People's Republic of China on Commercial Banks. We conjecture that these regulations would significantly affect banks’ lending behavior. Therefore, we run separate models for the years 2001-2003 and 2004-2008. The results show no significant difference in the effect of profitability on debt maturity structures between the two periods. This suggests that the response to the new policies aimed at improving the lending practices of Chinese banks is subdued. Therefore, we do not address this regulation issue in context.

5.3 Alternative variables

In the tests in Section 4, we use after-tax return to calculate the profitability variables. As operating earnings are calculated before interest payments, the effect of leverage on earnings numbers may be reduced. To address this issue, we use operating earnings (before tax) on equity (hereafter ROE) as an alternative variable for profitability. We also use earnings price ratio, which is the profitability variable most affected by the market aspects of listed companies. These tests do not materially alter the results we obtain from ROA, ROS and CFOA. For brevity, these results are not reported. We also use equity ownership of firms' controlling interests following Li et al. (2009), but again these results do not alter this study's conclusions.

In addition, using the standard from "China's Western Development Policy" promulgated by the Chinese Government, we separate companies into two groups by coding a firm as "1" if it is located in relatively poorly developed western China, and "0" if the firm is situated in relatively highly developed eastern China. The analysis results are similar to those obtained using the marketisation index. We also re-estimate the equation (2) with raw profitability variables that are not adjusted by industry: ROA, ROS and CFOA. The results have no substantial differences.

6. Conclusion

In developing countries, many banks are state-owned, and a large proportion of their credit goes to SOEs, but the effect of SOEs on credit allocation in China is even more pronounced (Cull and Xu, 2000). Cai et al. (2008) investigate the potential determinants of the debt maturity of Chinese listed firms by considering corporate ownership and governance, but do not refer the impact of ownership control types. This study extends Cai et al. (2008) to examine the impact of ownership control types on firms' debt maturity choices.

We find that the type of ownership control is an important factor affecting listed firms'

debt maturity structures. Firms controlled by the state have greater access to long-term debt and employ proportionately less short-term debt. In contrast, firms controlled by individuals have restricted access to long-term debt, while short-term debt remains an economically important financing source for them. When we examine whether the banks screen borrowers based on the firm's profitability, we find that firms with better profitability use a significantly lower proportion of short-term debt. This is the reverse of that predicted by signalling theory that is applicable in developed markets, and more consistent with supply-side constraints on long-term debt. The use of long-term debt increases with profitability; however, we find some evidence that state ownership control reduces the magnitude of the positive relation between profitability and the firms' access to long-term debt. This finding supports the contention that although China's state-owned banks are screening borrowers on a commercial basis, government involvement in financial markets can still produce a misallocation of financial resources.

Finally, this study supplements the literature pointing to a 'bank discrimination' problem in China. The empirical results suggest that banks are more likely to support SOEs with long-term debt and privately controlled companies with short-term debt in low-developed areas. Beyond Brandt and Li (2003), we find that China's state-owned banks have also discriminated against privately controlled firms in the form of long-term loans.

¹ The high level of bad debts on the balance sheets of state owned banks were reduced by their transfer to asset management companies that were established for this purpose (Shan and Xu, 2012).

² The financial distressed firms have been classified by the China Securities Regulatory Commission (CSRC) as 'special treatment' (ST) or 'particular transfer' (PT) firms. If a listed firm records a loss in two consecutive years, it will be designated as a ST firm. If it continues to produce losses for a third year, it will be designated a PT firm. A PT firm will be delisted if it does not become profitable in the following year.

³ To deal with the outlier of Tobin's Q, we borrow the idea from Baker and Wurgler (2002), who eliminate observations with market to book ratio larger than 10. Both Tobin's Q and market to book ratio represent growth

opportunity and their values are similar in some extent.

⁴ In our definition and calculation, long-term debt ratio + short-term debt ratio = 1 (i.e., LTD +STD = 1). Thus, the coefficients and t-values of the independent variables in the regression on dependent variable of STD are equal to those of correspondent independent variables in the regression on dependent variable of LTD in absolute value, but opposite in sign. From the regression on STD, we can deduce the results of the regression with LTD as the dependent variable. Also, due to the underdeveloped debt markets in China, banks are the main sources of debt financing for firms (Cai et al. 2008). Among our sample companies, only a few received a small proportion of their loans from non-bank financial intermediaries. We believe the loans from non-bank financial intermediaries do not bias our results.

⁵ All the correlation coefficients are small, although four of them are between 0.314 and 0.543. The largest VIF value is 1.61, substantially smaller than the critical level of 10. Therefore, multicollinearity is not a concern in this study. The tabulated correlation coefficient matrix and VIF diagnostic results are available upon request.

⁶ The tabulated results are available upon request.

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Table 1 Summary of statistics

	Minimum	25th percentile	Mean	75th percentile	Maximum	Std dev.
LTD dummy	0	1	0.809	1	1	0.393
STD	0	0.162	0.337	0.497	0.969	0.217
STATE	0	1	0.784	1	1	0.411
LEV	0.015	0.310	0.449	0.566	0.966	0.173
ROA	0	0.011	0.038	0.053	0.340	0.039
ROS	0	0	0.063	0.086	2.712	0.107
CFOA	-0.597	0.022	0.065	0.110	0.724	0.087
MO	0	0	0.025	0	0.779	0.100
DEPR	0	0.032	0.108	0.183	1.370	0.133
PPE	0.022	0.342	0.472	0.591	0.960	0.171
Q	0	0.807	1.201	1.305	9.873	0.698
SIZE	8.158	9.014	9.337	9.595	12.077	0.469
MARKET	0.330	6.060	7.749	9.450	11.710	2.181

The sample consists of 5,924 firm-year observations for the firms listed on Shanghai and Shenzhen stock exchanges from 2001 to 2008. LTD dummy is long-term debt dummy, STD is short-term debt ratio, STATE is state ownership control dummy, LEV is leverage ratio, ROA is return on assets, ROS is return on sale, CFOA is cash flow return on assets, MO is managerial ownership ratio, DERP is non-debt tax shield, PPE is property and plant and equipment to total assets, Q is Tobin's Q, SIZE is the logarithm of the total asset, MARKET is marketization index.

Table 2 Comparison of debt maturity structure between SOEs and privately controlled firms

	Obs		LTD dummy			STD		
	SOEs	Private	SOEs	Private	t/Z	SOEs	Private	t/Z
<i>Panel A: Value of means and test in difference (t-test in means, 2-tailed)</i>								
2001	484	73	0.812	0.658	3.05***	0.355	0.438	-3.09***
2002	521	77	0.823	0.675	3.10***	0.332	0.413	-3.07***
2003	549	100	0.851	0.780	1.77*	0.341	0.420	-3.23***
2004	599	145	0.851	0.752	2.89***	0.336	0.401	-3.27***
2005	573	142	0.871	0.725	4.30***	0.323	0.411	-4.38***
2006	622	182	0.888	0.808	2.82***	0.303	0.376	-4.12***
2007	694	270	0.821	0.652	5.74***	0.313	0.374	-4.05***
2008	604	289	0.801	0.602	6.47***	0.294	0.361	-4.36***
Total	4646	1278	0.840	0.694	11.91***	0.323	0.388	-9.55***
<i>Panel B: Value of medians and test in difference (Mann-Whitney U-test in medians, 2-tailed)</i>								
2001	484	73	1	1	3.03***	0.377	.477	-2.83***
2002	521	77	1	1	3.06***	0.330	.425	-2.89***
2003	549	100	1	1	1.77*	0.342	.419	-3.16***
2004	599	145	1	1	2.88***	0.331	.351	-3.20***
2005	573	142	1	1	4.25***	0.313	.437	-4.16***
2006	622	182	1	1	2.81***	0.295	.391	-4.00***
2007	694	270	1	1	5.65***	0.311	.371	-3.81***
2008	604	289	1	1	6.32***	0.276	.388	-4.08***
Total	4646	1278	1	1	11.77***	0.319	.401	-9.07***

The sample consists of 5,924 firm-year observations for the firms listed on Shanghai and Shenzhen stock exchanges from 2001 to 2008. LTD dummy is long-term debt dummy, STD is short-term debt ratio, 'Private' represents privately controlled firms. SOEs represents state controlled firms, *** and * are significant at the 1 and 10 percent levels, respectively (two-tailed).

Table 3 Comparison of debt maturity structure between firms grouped by profitability

	LTD dummy			STD		
	25% lowest	25% highest	t/Z	25% lowest	25% highest	t/Z
<i>Panel A: Mean comparison</i>						
ROA	0.803	0.803	0.00	0.377	0.272	13.16***
ROS	0.747	0.800	-3.47***	0.326	0.307	2.34**
CFOA	0.801	0.809	-0.56	0.388	0.270	15.10***
<i>Panel B: Median comparison</i>						
ROA	1	1	0.00	0.386	0.245	13.273***
ROS	1	1	-3.47***	0.327	0.291	2.993***
CFOA	1	1	-0.56	0.400	0.245	14.716***

The sample consists of 5,924 firm-year observations for the firms listed on Shanghai and Shenzhen stock exchanges from 2001 to 2008. LTD dummy is long-term debt dummy, STD is short-term debt ratio, ROA is return on assets, ROS is return on sale, CFOA is cash flow return on assets, '25% lowest' refers to the sub-samples consisting of firms with the value of profitability lower than the value of the 25th percentile of all observations, '25% highest' refers to the sub-samples consisting of firms with the value of profitability higher than the value of the 75th percentile of all observations, t values for mean comparison. Z values for median comparison. ***, ** and * are significant at the 1, 5 and 10 percent levels respectively.

Table 4 Comparison of debt maturity structure for SOEs and privately controlled firms grouped by institutional development

	Obs.		LTD dummy			STD		
	Low	High	Low	High	t/Z	Low	High	t/Z
<i>Panel A: SOEs</i>								
Mean			0.857	0.819	3.58***	0.329	0.317	1.82*
Median	2607	2039	1	1	3.58***	0.331	0.305	2.33**
<i>Panel B: Private</i>								
Mean			0.703	0.690	0.46	0.428	0.370	4.26***
Median	407	871	1	1	0.65	0.436	0.386	4.19***

The sample consists of 5,924 firm-year observations for the firms listed on Shanghai and Shenzhen stock exchanges from 2001 to 2008. LTD dummy is long-term debt dummy, STD is short-term debt ratio, 'Private' represents privately controlled firms, SOEs represents state controlled firms, 'Low' refers to the firms' locations where the marketisation index is lower than the mean value, 'High' refers to the firms' locations where the marketisation index is higher than the mean value. ***, ** and * are significant at the 1, 5 and 10 percent levels, respectively (two-tailed).

Table 5 Results of regressions on debt maturity with firm ownership, profitability and marketisation

Panel A: Logit regression, LTD dummy as dependent variable (z-test)

Constant	0.698*** (8.44)	-12.398*** (-11.83)	0.720*** (9.41)	-12.257*** (-11.70)	0.850*** (11.98)	-12.614*** (-12.08)
STATE	0.972*** (9.67)	0.318*** (2.65)	0.951*** (10.66)	0.265** (2.31)	0.813*** (9.28)	0.227** (2.08)
ROA	3.050** (2.09)	4.433*** (2.65)				
STATE*ROA	-3.313* (-1.83)	-2.756 (-1.42)				
ROS			1.905** (2.05)	1.851* (1.72)		
STATE*ROS			-2.063** (-2.09)	-1.078 (-1.00)		
CFOA					-0.586 (-0.86)	-0.255 (-0.33)
STATE*CFOA					0.548 (0.67)	-0.518 (-0.55)
MARKET		-0.106*** (-5.17)		-0.103*** (-5.01)		-0.104*** (-5.07)
PreLEV		3.579*** (14.27)		3.614*** (14.12)		3.417*** (14.07)
MO		0.039 (0.12)		0.135 (0.42)		0.148 (0.46)
Q		-0.107* (-1.83)		-0.091 (-1.59)		-0.075 (-1.12)
DEPR		0.754* (1.72)		0.772* (1.77)		0.789* (1.79)
PPE		0.384* (1.66)		0.348 (1.50)		0.353 (1.52)
SIZE		1.378*** (12.48)		1.361*** (12.29)		1.417*** (12.87)
YEAR		Yes		Yes		Yes
INDUSTRY		Yes		Yes		Yes
Obs	5924	5924	5924	5924	5924	5924
Pseudo R ²	0.023	0.163	0.023	0.163	0.022	0.162

Panel B: Ordinary least squares regression, STD as dependent variable (t-test)

Constant	0.426*** (53.12)	1.095*** (17.16)	0.389*** (51.68)	1.227*** (18.88)	0.405*** (59.24)	1.142*** (17.93)
STATE	-0.054*** (-5.91)	-0.081*** (-8.68)	-0.060*** (-7.15)	-0.083*** (-9.25)	-0.043*** (-5.48)	-0.070*** (-8.20)
ROA	-0.931*** (-6.98)	-1.204*** (-8.93)				
STATE*ROA	-0.369** (-2.35)	-0.176 (-1.17)				
ROS			-0.043 (-0.51)	-0.081 (-0.93)		
STATE*ROS			-0.070 (-0.78)	0.086 (0.98)		
CFOA					-0.315* (-4.81)	-0.313*** (-5.01)

STATE*CFOA				-0.242***	-0.209***
				(-3.23)	(-2.93)
MARKET	0.005***	0.005***	0.005***	0.005***	0.005***
	(3.32)	(3.06)	(3.06)	(3.21)	(3.21)
PreLEV	0.231***	0.312***	0.312***	0.292***	0.292***
	(13.40)	(17.55)	(17.55)	(17.56)	(17.56)
MO	-0.162***	-0.212***	-0.212***	-0.212***	-0.212***
	(-5.91)	(-7.62)	(-7.62)	(-7.77)	(-7.77)
Q	-0.001	-0.015***	-0.015***	-0.004	-0.004
	(-0.29)	(-3.01)	(-3.01)	(-0.80)	(-0.80)
DEPR	-0.016	-0.023	-0.023	0.056**	0.056**
	(-0.62)	(-0.86)	(-0.86)	(2.08)	(2.08)
PPE	0.104***	0.109***	0.109***	0.102***	0.102***
	(6.24)	(6.38)	(6.38)	(6.09)	(6.09)
SIZE	-0.095***	-0.112***	-0.112***	-0.101***	-0.101***
	(-14.37)	(-16.55)	(-16.55)	(-15.28)	(-15.28)
YEAR	Yes	Yes	Yes	Yes	Yes
INDUSTRY	Yes	Yes	Yes	Yes	Yes
Obs	5924	5924	5924	5924	5924
Adj. R ²	0.062	0.141	0.020	0.125	0.158

The sample consists of 5,924 firm-year observations for the firms listed on Shanghai and Shenzhen stock exchanges from 2001 to 2008. LTD dummy is long-term debt dummy, STD is short-term debt ratio, STATE is state ownership control dummy, ROA is return on assets, ROS is return on sale, CFOA is cash flow return on assets, MARKET is marketization index, PreLEV is leverage ratio in prior year, MO is managerial ownership ratio, Q is Tobin's Q, DERP is non-debt tax shield, PPE is property and plant and equipment to total assets, SIZE is the logarithm of the total asset, YEAR is yearly dummy, INDUSTRY is industry dummy. ***, ** and * are significant at the 1, 5 and 10 percent levels, respectively.

Table 6 Results of regressions on debt maturity with firm ownership, profitability and marketisation for firms grouped by ownership control types

	SOEs	Private firms	Diff.	SOEs	Private firms	Diff.	SOEs	Private firms	Diff.
<i>Panel A: Logit regression, LTD dummy as dependent variable (z-test)</i>									
IAROA	2.480*	6.538***	-4.058*						
	(1.95)	(3.76)	(0.060)						
IAROS				0.811*	3.235***	-2.424*			
				(1.77)	(2.68)	(0.060)			
IACFOA							-0.948*	-0.328	-0.620
							(-1.73)	(-0.43)	(0.507)
MARKET	-0.134***	-0.058*	-0.076*	-0.136***	-0.036	-0.100**	-0.139***	-0.060*	-0.079**
	(-6.38)	(-1.73)	(0.052)	(-6.47)	(-1.03)	(0.013)	(-6.67)	(-1.80)	(0.042)
PreLEV	3.715***	3.534***	0.181	3.750***	3.470***	0.280	3.558***	3.225***	0.333
	(12.86)	(7.43)	(0.745)	(12.70)	(7.27)	(0.618)	(12.64)	(6.91)	(0.541)
MO	5.381**	-2.280	5.661**	5.691**	-0.140	5.831**	5.952**	-0.122	6.074**
	(2.08)	(-0.83)	(0.030)	(2.21)	(-0.42)	(0.025)	(2.32)	(-0.37)	(0.019)
Q	-0.084	-0.183**	0.099	-0.067	-0.171**	0.104	-0.059	-0.197**	0.138
	(-1.39)	(-2.28)	(0.328)	(-1.11)	(-2.11)	(0.306)	(-0.95)	(-2.43)	(0.175)
DEPR	1.622***	0.589	1.033	1.722***	1.034	0.688	1.973***	2.662**	-0.689
	(3.90)	(0.46)	(0.446)	(4.21)	(0.79)	(0.617)	(4.68)	(2.17)	(0.595)
TANG	0.580**	0.282	0.298	0.538**	0.240	0.298	0.532**	0.075	0.457
	(2.12)	(0.67)	(0.551)	(1.98)	(0.57)	(0.552)	(1.96)	(0.18)	(0.357)
SIZE	1.457***	.990***	0.467*	1.447***	0.965***	0.482*	1.503***	0.957***	0.546**
	(11.91)	(4.42)	(0.067)	(11.82)	(4.34)	(0.058)	(12.18)	(4.31)	(0.032)
Obs.	4646	1278	5924	4646	1278	5924	4646	1278	5924
Pseudo R ²	0.137	0.112	0.149	0.137	0.108	0.148	0.137	0.103	0.146
<i>Panel B: Ordinary least squares regression, STD as dependent variable (t-test)</i>									
IAROA	-1.081***	-1.120***	0.039						
	(-12.66)	(-7.29)	(0.819)						
IAROS				0.010	-0.278***	0.288***			
				(0.38)	(-2.66)	(0.005)			
IACFOA							-0.489***	-0.310***	-0.179**
							(-13.92)	(-4.46)	(0.015)
MARKET	-0.001	-0.015***	0.014***	0.002	-0.016***	0.018***	0.002	-0.013***	0.015***
	(0.10)	(-5.02)	(0.005)	(1.42)	(-5.06)	(0.000)	(1.17)	(-4.31)	(0.000)
PreLEV	0.232***	0.245***	-0.013	0.296***	0.272***	0.024	0.276***	0.282***	-0.006
	(12.38)	(5.76)	(0.774)	(15.38)	(6.29)	(0.594)	(15.23)	(6.60)	(0.892)
MO	-0.550***	-0.101***	-0.449**	-0.729***	-0.132***	-0.597***	-0.674***	-0.137***	-0.537**
	(-2.62)	(-3.14)	(0.038)	(-3.42)	(-4.07)	(0.007)	(-3.23)	(-4.25)	(0.013)
Q	-0.010**	-0.006	-0.004	-0.012**	-0.005	-0.007	-0.001	0.002	-0.003
	(-2.02)	(-0.76)	(0.663)	(-2.37)	(-0.64)	(0.462)	(-0.11)	(0.26)	(0.768)
DEPR	0.077***	0.504***	-0.427***	0.006	0.324***	-0.318***	0.086***	0.287***	-0.201*
	(3.22)	(4.42)	(0.000)	(0.25)	(2.76)	(0.005)	(3.63)	(2.63)	(0.053)
TANG	0.096***	0.111***	-0.015	0.105***	0.125***	-0.02	0.104***	0.123***	-0.019
	(5.18)	(2.90)	(0.782)	(5.59)	(3.21)	(0.626)	(5.63)	(3.18)	(0.633)
SIZE	-0.114***	-0.068***	-0.046**	-0.122***	-0.064***	-0.058***	-0.108***	-0.058***	-0.05***
	(-17.10)	(-3.50)	(0.015)	(-17.97)	(-3.25)	(0.003)	(-16.12)	(-2.96)	(0.009)
Obs.	4646	1278	5924	4646	1278	5924	4646	1278	5924
Adj. R ²	0.130	0.130	0.749	0.100	0.100	0.740	0.136	0.108	0.748

The sample consists of 5,924 firm-year observations for the firms listed on Shanghai and Shenzhen stock exchanges from 2001 to 2008. LTD dummy is long-term debt dummy, STD is short-term debt ratio, IAROA is industry adjusted return on assets, IAROS is industry adjusted return on sale, IACFOA is industry adjusted cash flow return on assets, MARKET is marketization index, PreLEV is leverage ratio in prior year, MO is managerial ownership ratio, Q is Tobin's Q, DERP is non-debt tax shield, PPE is property and plant and equipment to total assets, SIZE is the logarithm of the total asset. ***, ** and * are significant at the 1, 5 and 10 percent levels, respectively. For Panel A, z values are in parentheses for the columns of SOEs and 'Private firms'; p values are in parentheses for columns of 'Diff'. For Panel B, t values are in parentheses for the columns of SOEs and 'Private firms'; p values are in parentheses for columns of 'Diff'. ***, ** and *

are significant at the 1, 5 and 10 percent levels, respectively. Differences of coefficient are tested for significance using the chow-test. All of the constants and year dummies in the regressions and are omitted in the table for the sake of brevity.