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Bank Concentration and Firms' Debt Structure: Evidence from China*

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The argument on the puzzling relationship between bank concentration and firms' debt structure in China remains inconclusive as the effects of firm ownership competition and firm size competition are intertwined in the existing research. This article utilizes the market shares of Big Four state-owned banks to investigate whether bank concentration affects debt structure in China. The results show that bank concentration has a stronger positive effect on debt maturity for state-owned enterprises and large-sized enterprises. The effect of bank concentration on debt maturity strengthens with firm state ownership and firm size. Moreover, state-owned enterprises and large-sized enterprises are associated with a longer debt maturity compared to non-state-owned enterprises and small and medium-sized enterprises, respectively. These results reveal that privatizing state-owned banks and state-owned enterprises would be an effective way to reduce credit discrimination and relieve the capital constraints of non-state-owned enterprises and small and medium-sized enterprises.

Key Words: Bank concentration; State ownership; Firm size; Debt structure.
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1. INTRODUCTION

Well-functioning financial markets play a vital role in evaluating investment projects, allocating capital resources, and supervising managers (Hsu et al., 2014). The progress of banking system over the last two decades

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has attracted the attention of financial researchers. Some people argue that bank concentration promotes economic growth by boosting access to credit and promoting investment allocation (Ratti et al., 2008). Others emphasize that bank concentration is associated with higher cost of funding and non-performing loan ratio (Bonini et al., 2016; Kasman and Kasman, 2015).

China's experience provides a puzzling counter example to these general conclusions. Although China has been experiencing a successive economic boom for nearly four decades, its banking system is dominated by the Big Four state-owned banks[1] that are inefficient. Lin et al. (2015) find that the progress of banking system has not effectively alleviated the financial constraints of non-state-owned enterprises and small and medium-sized enterprises (SMEs) that are consistent with comparative advantages in China. "Small and Medium-sized Enterprises Promotion Law" was lunched to improve the operating environment of small and medium-sized enterprises in 2002. However, there is no sign that the government's policy has eased the financial constraints of non-state-owned enterprises and SMEs significantly (Chong et al., 2013). This makes them an example for verifying the effects of bank concentration on firms' debt structure. Thus, verifying the role of bank concentration in firms' debt structure is important for relieving the capital constraints of non-state-owned enterprises and SMEs and promoting capital allocation efficiency. As the Big Four state-owned banks are both state-owned and the largest banks simultaneously in China financial market, measuring the Big Four state-owned banks would simultaneously capture the effects of both state ownership and firm size. Therefore, the argument about the puzzling relationship between bank concentration and firms' debt structure in China remains inconclusive, and the effects of ownership competition and firm size competition are noticeably intertwined in the existing research.

We focus on how bank concentration modifies debt structure and how firm state ownership and firm size shape the effect of bank concentration. This paper uses data sets which includes banking sector and 54529 firms across China's 30 provinces during 1999 — 2009 to improve our understanding about the relationship between bank concentration and debt structure by investigating (1) how bank concentration affects debt maturity, (2) whether state-owned enterprises have longer debt maturity in provinces with the Big Four state-owned banks occupy more market compared to non-state-owned enterprises, and (3) whether large-sized enterprises have longer debt maturity in provinces with the Big Four state-owned banks occupy more market compared to small and medium-sized enterprises. We

[1]The four largest banks are the Industrial and Commercial Bank of China (ICBC), the Bank of China (BOC), the Construction Bank of China (CBC), and the Agriculture Bank of China (ABC).

find that, for the transition economy of China, bank concentration is associated with a longer debt maturity and the effect is stronger for state-owned enterprises and large-sized enterprises. Further analysis reveals that firm state ownership and firm size help to increase the positive effect of bank concentration on debt maturity.

International institutions, such as the Bank for International Settlements, the International Monetary Fund, and the World Bank, are encouraging China to support the development of non-state-owned enterprises and SMEs by efficient financial market. These suggestions are frequently mentioned in the context of increasing financial stability. However, there are few studies analyzing the effects of the interaction between bank concentration and firm characteristics on debt structure. This paper contributes to the broader literature on the relationship between bank concentration and firm financing in China by separating state ownership competition effect and size competition effect. We also performed a sensitivity analysis with different measures of the dependent variable and main independent variables to examine the robustness of our results. Moreover, the study objective is China that is the biggest emerging market, while previous studies pay more attention to cross countries and few on specific country. This study provides new insights into the impacts of bank concentration on debt financing, which offer policy implications for China in transition economy. A continued concentrate on reforming the banking sector and state-owned enterprises can facilitate improved promoting credit allocation efficiency.

In summary, supportive evidence shows that bank concentration has significant effect on firms' debt structure. The rest of this paper is organized as follows. Section 2 discusses how this study relates to existing literature to develop our testable hypotheses. Section 3 presents the empirical methodology and data. Section 4 presents the test results and discussion. The last section concludes.

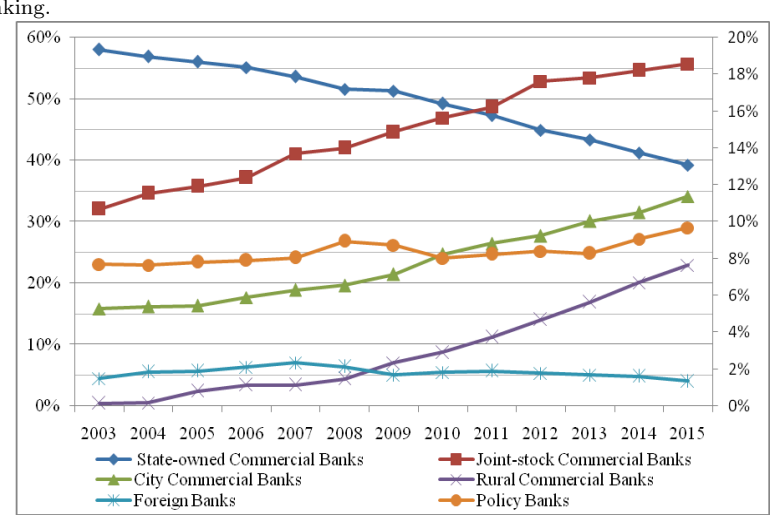
2. THEORETICAL BACKGROUND AND HYPOTHESES

2.1. Bank Concentration and Debt Maturity

Banks hold most of the free capital in China' financial market, while equity market is relatively small compared to other emerging markets (Jiang and Zeng, 2014). Berger et al. (2009) find that the key problem for China's banking system is the non-performing loans of the Big Four state-owned commercial banks. China's banking system has been impressive reform over the past two decades, but it remains dominated by the Big Four state-owned commercial banks which account for half of all the loans. As shown in Fig. 1, about half of total banking assets were owned by the Big Four state-owned commercial banks before 2010 that are also the least efficient

banks in China' financial market (Berger et al., 2009). In addition to state-owned commercial banks, there are other financial institutions, such as joint-stock commercial banks, city commercial banks, rural commercial banks, foreign banks, and policy banks, which play minor roles in China's banking sector.

FIG. 1. Market shares of banks by total assets in China's banking sector. The left Y-axis shows the shares for state-owned banks, and the right Y-axis shows the shares of the other types of banking institutions. Data source: Almanac of China's Finance and Banking.



Due to the booming of joint-stock commercial banks, city commercial banks, and rural commercial banks, bank concentration has decreased substantially in China's financial market over the past two decades. The development of city commercial banks and joint-stock banks pose a positive influence on alleviating small and medium-sized enterprises' financial constraints than the Big Four state-owned banks that dominate China's financial market (Chong et al., 2013). The potential effect of banking liberalization is traditionally associated with bank concentration changes. As a consequence, the boost of bank competition promotes the accessibility of financing and reduces the cost of debt. Besides, if there is no asymmetric information in the financial market, higher competition would increase debt availability (González and González, 2014). Due to long-term debt's greater information asymmetries, higher competition reduces banks' benefits and restricts interest rates when they hold lending relationship with firms, thus reducing the probability of banks facilitate borrowers' access to credit and contract debt with longer maturity. Our first hypothesis is formally stated as follows:

Hypothesis1. Bank concentration has a positive effect on debt maturity.

2.2. Ownership-competition View

Banks may make a lending decision based on political, ideological or bank managers' personal objectives rather than the banks' profits, or the perceived higher fail risk of non-state-owned enterprises, and leading them to prefer state-owned enterprises. Lending by the Big Four state-owned banks is biased against non-state-owned enterprises and in favor of state-owned enterprises that are low efficiency (Lin et al., 2015). Banks, especially state-owned banks, tend to prefer state-controlled firms, since these banks strive to build up political connections with governments and politicians by providing favorable credit terms to state-owned enterprises rather than non-state-owned enterprises (Butler et al., 2009).

Moreover, government guarantee is likely to reduce the perceived risk of default, which reduces the risk premiums required by banks (Borisova and Megginson, 2011; Faccio et al., 2006; Iannotta et al., 2013). Due to bank discrimination, non-state-owned enterprises have to look for more expensive alternatives, such as trade credit and long-term trade credit, than state-owned enterprises (Borisova and Megginson, 2011; Brandt and Li, 2003). On the other hand, the domination of the Big Four state-owned banks provides opportunities for state-owned enterprises with central and local governments' help to access long credit through their political connection. Consequently, we expect a positive relation between state ownership and debt maturity, particularly for state-owned enterprises, since the government guarantee enables banks to lend on a longer-term basis. Following the above arguments, our second hypothesis is:

Hypothesis2. State-owned enterprises experience a higher increase in debt maturity compared to non-state-owned enterprises, and the effect of bank concentration on debt maturity is stronger for state-owned enterprises and strengthens with firm state ownership.

2.3. Size-competition View

Bank preferences have a great influence on smaller firm, since these firms face more financial constraints (González, 2015). Small and medium-sized enterprises are less likely to obtain loans from and maintain relationship with big financial institutions than large-sized enterprises, as the lending required for processing soft information is less well developed in larger banks (Berger and Black, 2011; Berger and Udell, 2002). Besides, under the current paradigm in firms lending research, large banks tend to specialize in lending to transparent firms, since these firms have more hard information which is easy to quantify and transmit through the communication channels and layers of management of large organizations (Berger and Udell, 2002).

On the other hand, large enterprises are generally considered to be less risky, due to more assets in place and greater opportunities for economies of scale, and they are negatively associated with the cost of debt (Carey et al., 1993). Large enterprises have greater asset diversification and more opportunities for economies of scale than small and medium-sized enterprises and therefore these enterprises are generally considered to be safer (Borisova et al., 2015). Moreover, Beck et al. (2004) find that bank concentration results in higher financing obstacles for firms of all sizes and the effect of concentration decreases with firm size. Therefore, large enterprises have more approach access to domestic and international financial markets than small and medium-sized enterprises (González and González, 2014). Following the above arguments, our third hypothesis is:

Hypothesis3. Large-sized enterprises experience a higher increase in debt maturity compared to small and medium-sized enterprises, and the effect of bank concentration on debt maturity is stronger for Large-sized enterprises and strengthens with firm size.

3. METHODOLOGY AND DATA

3.1. Empirical Methodology

While verifying these hypotheses is important, it is difficult and few empirical studies have tried to address these issues. In order to fill this gap and distinguish the roles of state ownership and firm size in bank concentration influencing firms' debt structure, we construct two interaction terms: the interaction between bank concentration and firm state ownership, and the interaction between bank concentration and firm size. The first interaction captures the firm ownership competition effect, and the second interaction captures the firm size competition effect.

We investigate the aggregate effect of bank concentration on firms' debt structure with different level of firm state ownership and firm size by estimating the following benchmark model:

$$\begin{aligned} \text{Debt\_Mat}_{j,i,t+1} &= \beta_0 + \beta_1 CR4_{i,t} + \beta_2 State_{j,i,t} + \beta_3 CR4_{i,t} State_{j,i,t} \\ &+ \beta_4 Size_{j,i,t} + \beta_5 CR4_{i,t} Size_{j,i,t} \\ &+ \beta_6 P_{i,t} + \beta_7 F_{j,i,t} + \eta_{i,t+1} + \mu_k + \varepsilon_{j,i,t+1} \end{aligned} \tag{1}$$

where j indexes firms, i indexes provinces, and t indexes years. The dependent variable, $\text{Debt\_Mat}_{j,i,t}$, is debt structure for firm j in province i in year t, which is measured as the ratio of long-term debt to total debt. Similar to prior studies (Beck et al., 2004; Bikker and Haaf, 2001; Leon, 2015; Petersen and Rajan, 1995), we construct an index of provincial bank concentration, $CR4_{i,t}$, which uses the credit market shares of the Big Four state-owned banks to measure banking sector concentration in province i

in year t, with lower values indicating more intense the degree of bank competition in the local financial market. $State_{j,i,t}$ is firm state ownership for firm j in province i in year t and $Size_{j,i,t}$ is firm size for firm j in province i in year t. $CR4 \times State$ and $CR4 \times Size$ are interaction terms, which distinguish the two competition effects through which bank concentration impacts firms' debt maturity. Specifically, firms' state ownership has two measured variables: $State1$ takes a value of one if state is the ultimate controlling shareholder and zero otherwise, and $State2$ is the percentage of firms' shares held by state shareholders. Firms' size has two measured variables: $Size1$ takes a value of one if the firm has more than 250 employees and zero otherwise, and $Size2$ is number of employees and takes the logarithm of employees in the regression procedure.

Following existing literature (Chong et al., 2013; Sun and Jiang, 2015), we control for province characteristics and firm characteristics that may influence debt structure. The control variable $P_{i,t}$ includes province characteristics, such as local credit market development Loan and price index CPI. The control variable $F_{j,i,t}$ includes firm characteristics, such as Age, Current, Leverage, Profit, Subsidy, and Tangible. Following methodology of Petersen (2009) and Hsu et al. (2014), we use a standard error estimation methodology adjusted for double clustering on our panel data to account for time series dependence and control heteroskedasticity. $\eta_{i,t}$ is the province-year fixed effect which absorbs timing-varying province characteristics. μ_k captures industry fixed effect which absorbs the effects of industry characteristics. $\varepsilon_{j,i,t}$ is the error term. We also cluster standard errors by province and industry. In order to control potential problems of endogeneity, independent variables are lagged by one year in regressions.

3.2. Data Sources

We use both firm-level individual and provincial aggregate data set of China. The source of firm data is Annual Report of Industrial Enterprise by National Statistic Bureau of China (NSBC). Our sample comprises 54529 firms and 261900 firm-year observations for China's 30 provinces over the period 1999-2009. We obtain province characteristics information from the China Statistical Yearbook and Almanac of China's Finance and Banking. Table 1 reports the definitions and summary statistics of all variables used in this article.

4. RESULTS AND DISCUSSION

Table 2 presents the main estimation results for Eq. (1). In columns (1) to (7), the estimated coefficients of Loan are negative and significant at 1% or 5% the level, which suggests that banking development reduces firms' debt maturity. The significantly positive coefficients of $CR4$ reveal

TABLE 1.

Definitions and summary statistics of variables

Variables	Definition	Mean	Std
Dependent variable			
Debt_Mat (%)	The ratio of long-term debt to total debt.	7.175	16.357
Test variables			
CR4 (Credit)	The credit market shares of the Big Four state-owned banks.	0.553	0.105
State1	Dummy variable. Taking a value of one if state is the ultimate controlling shareholder and zero otherwise (Shailer and Wang, 2015).	0.051	0.219
State2	The percentage of firms' shares held by the state shareholders.	0.052	0.202
Size1	Dummy variable. Taking a value of one if the firm has more than 250 employees and zero otherwise (Mudd, 2012; O'Toole et al., 2016).	0.324	0.468
Size2	Number of employees. Taking the logarithm of employees in the regression procedure.	274.06	697.91
Control variables			
Loan	Ratio of local loans provided by banking sector to GDP.	1.024	0.310
CPI	Annual rate of consumer price index.	0.017	0.025
Age	Number of years that a firm has existed since the founding of year.	12.824	10.172
Current	Current assets divided by total assets.	0.589	0.214
Leverage	Debt divided by total assets measured at the end of fiscal year.	0.551	0.231
Profit	Ratio of profit to sales. Profit represents income before extraordinary items.	0.096	0.184
Subsidy	Taking a value of one if firms obtain subsidy from government and zero otherwise.	0.158	0.382
Tangible	Ratio of tangible assets to total assets. Tangible assets represent the difference between non-current assets and intangible assets.	0.327	0.190
Alternative variables			
Longdebt (%)	The ratio of long-term debt to total assets.	4.230	10.250
CR4 (Deposit)	The deposit market shares of the Big Four state-owned banks.	0.612	0.096
HHI (Credit)	The Herfindahl-Hirschman index (HHI) of the Big Four state-owned banks credit (Berger et al., 2008).	0.092	0.039
HHI (Deposit)	The HHI of the Big Four state-owned banks deposit.	0.109	0.041

that bank concentration is associated with longer debt maturity (Columns 1 to 7). In fact, debt maturity increases a 7.248 basis points (bps) on average when bank concentration increases one standard deviation (Column 1). The effect is lower after considering firm state ownership and firm size in columns (2) to (7). These results imply that higher bank concentration

increases lender incentives to build relationships with firms over time and enables firms to suffer less stringent restriction on debt maturity, supporting hypothesis H1.

In column (2), the significantly positive coefficient of $State1$ implies that state-owned enterprises are associated with longer debt maturity compared to non-state-owned enterprises. The positive coefficient on $CR4 \times State1$ is significant at 1% the level, which suggests that the positive effect of bank concentration on debt maturity strengthens 8.884 bps for state-owned enterprises compared to non-state-owned enterprises. Specifically, bank concentration is associated with a 14.598 bps increase in debt maturity for state-owned enterprises and a 5.714 bps increase for non-state-owned enterprises. These results suggest that bank concentration increases debt maturity for all firms, and the effect is stronger for state-owned enterprises compared to non-state-owned enterprises. In column (3), the main explanatory variable of $State2$, is a continuous variable measured as the proportion of state ownership. The estimated coefficient of $CR4$ shows that each extra proportion of bank concentration increases debt maturity by 6.167 bps when state ownership of a firm is equal to the mean of $State2$. The significantly positive coefficient on $CR4 \times State2$ suggests that each extra proportion of state ownership increases the effect of bank concentration on debt maturity by 10.529 bps. These results show that the positive effect of bank concentration strengthens with state ownership and the benefits of implicit government guarantees where with higher bank concentration accrue more to state ownership. These results support hypothesis H2. Revealing the value of state ownership as a way of to promote the financing conditions of firms where banking sector is dominated by the Big Four state-owned banks in China. In line with the study by Chen et al. (2013), lending relationship is more valuable for long-term debt where bank market is less competitive.

In column (4), the significantly positive coefficient of $Size1$ indicates that large-sized enterprises are associated with longer debt maturity compared to small and medium-sized enterprises. The significantly positive coefficient on $CR4 \times Size1$ reveals that the positive effect of bank concentration on debt maturity strengthens 3.409 bps for large-sized enterprises compared to small and medium-sized enterprises. The intercept term for $CR4$ depends on the firm size. Specifically, bank concentration is associated with a 9.762 bps increase in debt maturity for large-sized enterprises and a 6.353 bps increase for small and medium-sized enterprises. This suggests that the positive influence of bank concentration is stronger for large-sized enterprises compared to small and medium-sized enterprises. In column (5), the estimated coefficient of $CR4$ suggests that each extra proportion of bank concentration increases debt maturity by 6.691 bps when firm size is equal to the mean of $Size2$. Thus, firm size has a positive effect on

debt maturity, and revealing that larger firms have a longer debt maturity. The significantly positive coefficient on $CR4 \times Size2$ implies that larger scales of firms can be seen to result in an increase in the positive effect of bank concentration on debt maturity. These results support hypothesis H3. These above results are maintained in columns (6) and (7).

TABLE 2.

Regression results

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$CR4$	7.248^{***}	5.714^{**}	6.167^{***}	6.353^{***}	6.691^{***}	5.276^{**}	5.907^{***}
	(2.251)	(2.381)	(2.330)	(2.280)	(2.190)	(2.405)	(2.284)
$CR4 \times State1$		8.884^{***}				8.149^{***}	
		(2.684)				(2.624)	
$CR4 \times State2$			10.529^{***}				9.318^{***}
			(3.032)				(2.959)
$CR4 \times Size1$				3.409^{**}		2.256^{*}	
				(1.355)		(1.290)	
$CR4 \times Size2$					2.213^{***}		1.604^{***}
					(0.570)		(0.541)
$State1$		1.594^{***}				1.442^{***}	
		(0.269)				(0.269)	
$State2$			1.998^{***}				1.777^{***}
			(0.311)				(0.312)
$Size1$				1.080^{***}		0.996^{***}	
				(0.169)		(0.168)	
$Size2$					0.536^{***}		0.489^{***}
					(0.074)		(0.073)
Loan	-1.572^{**}	-1.709^{***}	-1.738^{***}	-1.640^{**}	-1.594^{**}	-1.728^{***}	-1.706^{***}
	(0.646)	(0.650)	(0.650)	(0.646)	(0.638)	(0.652)	(0.644)
CPI	-29.27^{***}	-27.95^{***}	-27.60^{***}	-29.15^{***}	-28.54^{***}	-28.06^{***}	-27.35^{***}
	(4.799)	(4.794)	(4.803)	(4.747)	(4.709)	(4.768)	(4.741)
Age	0.109^{***}	0.099^{***}	0.097^{***}	0.100^{***}	0.097^{***}	0.092^{***}	0.087^{***}
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)
Current	-6.457^{***}	-6.440^{***}	-6.434^{***}	-6.292^{***}	-6.211^{***}	-6.263^{***}	-6.183^{***}
	(0.351)	(0.352)	(0.352)	(0.342)	(0.340)	(0.341)	(0.340)
Leverage	4.711^{***}	4.683^{***}	4.678^{***}	4.640^{***}	4.590^{***}	4.633^{***}	4.586^{***}
	(0.290)	(0.289)	(0.288)	(0.291)	(0.292)	(0.290)	(0.291)
Profit	3.641^{***}	3.862^{***}	3.898^{***}	3.630^{***}	3.596^{***}	3.773^{***}	3.771^{***}
	(0.591)	(0.587)	(0.586)	(0.597)	(0.598)	(0.595)	(0.595)
Subsidy	0.692^{***}	0.665^{***}	0.658^{***}	0.550^{***}	0.495^{***}	0.531^{***}	0.475^{***}
	(0.092)	(0.091)	(0.091)	(0.096)	(0.098)	(0.095)	(0.096)

TABLE 2—*Continued*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tangible	9.806***	9.747***	9.733***	9.775***	9.729***	9.799***	9.746***
	(0.445)	(0.442)	(0.442)	(0.441)	(0.440)	(0.441)	(0.440)
Province-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	261900	261900	261900	261900	261900	261900	261900
Adj. R^2	0.089	0.090	0.090	0.090	0.090	0.090	0.090

Notes: In columns (1) to (7), the dependent variables are Debt_Mat. In columns (2), (4), and (6), $State1$ and $Size1$ are dummy variables and $CR4$ is mean centered when we construct $CR4 \times State1$ and $CR4 \times Size1$ interaction terms. In columns (3), (5), and (7), $State2$ and $Size2$ are continuous variable and $CR4$, $State2$, and $Size2$ are mean centered when we construct $CR4 \times State2$ and $CR4 \times Size2$ interaction terms. The statistical inferences are based on robust standard errors (reported in brackets) clustered by province and industry. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Finally, we performed as sensitivity analysis to check the robustness of our main findings. First, we examine whether our results are robust to alternative proxies for firms' debt structure and bank concentration. We use the ratio of long-term debt to total assets, Longdebt, as an alternative proxy for Debt_Mat (Columns 1 and 2). We use the deposit market shares of the Big Four state-owned banks, $CR4$ (Deposit), as an alternative proxy for $CR4$ (Credit) (Columns 3 and 4). We use the HHI of the Big Four state-owned banks credit, HHI (Credit), as an alternative proxy for $CR4$ (Credit) (Columns 5 and 6). We use the HHI of the Big Four state-owned banks deposit, HHI (Deposit), as an alternative proxy for $CR4$ (Credit) (Columns 7 and 8). Next, we study whether the documented impacts of bank concentration on firms' debt structure are robust to alternative specification of the baseline model. Specifically, in columns (9) and (10), we study whether the main results are robust to controlling for province-industry and year fixed effect (Hsu et al., 2014). In columns (11) and (12), we study whether the main results are robust to estimating robust standard errors with cluster firm.

Table 3 reports the results of robustness estimations. Compared with the results in Table 2, the magnitudes of the main independent variables in Table 3 changed to some extent, but their signs and significance remain unchanged. All previous conclusions remain the same with these measurements in columns (1) to (8): the debt maturity increases when bank concentration rises. The coefficients of $CR4 \times State1$ and $CR4 \times Size1$ suggest the positive effect of bank concentration on debt maturity is stronger for state-owned enterprises and for large-sized enterprises (Columns 1, 3, 5, 7, 9, and 11). Similarly, the coefficients of $CR4 \times State2$ and $CR4 \times Size2$ indicating such an effect strengthens with state ownership and firm size (Columns 2, 4, 6, 8, 10, and 12).

TABLE 3: The results of robustness examination

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$CR4$	2.400*	2.885**	9.681***	10.05***	11.65*	13.70**	17.54***	18.84***	13.62***	14.42***	5.276***	5.907***
	(1.383)	(1.326)	(2.504)	(2.290)	(6.591)	(6.148)	(5.658)	(5.118)	(1.299)	(1.143)	(1.251)	(1.229)
$CR4 \times State1$	6.445***		5.315**		17.26***		7.828*		8.139***		8.149***	
	(1.540)		(2.643)		(6.586)		(4.465)		(2.577)		(1.916)	
$CR4 \times State2$		7.263***		4.967*		19.34***		6.700*		8.524***		9.318***
		(1.732)		(2.951)		(7.374)		(3.864)		(2.856)		(2.127)
$CR4 \times Size1$	1.634**		1.814*		10.22***		8.878**		3.686***		2.256**	
	(0.786)		(1.023)		(3.572)		(3.445)		(1.285)		(0.933)	
$CR4 \times Size2$		1.184***		1.628***		6.666***		5.965***		2.149***		1.604***
		(0.348)		(0.591)		(1.505)		(1.334)		(0.533)		(0.393)
$State1$	1.485***		1.555***		1.471***		1.529***		1.458***		1.442***	
	(0.167)		(0.267)		(0.267)		(0.265)		(0.262)		(0.196)	
$State2$		1.775***		1.893***		1.790***		1.855***		1.769***		1.777***
		(0.192)		(0.310)		(0.309)		(0.307)		(0.304)		(0.220)
$Size1$	0.675***		1.046***		1.063***		1.131***		1.163***		0.996***	
	(0.097)		(0.183)		(0.170)		(0.178)		(0.161)		(0.079)	
$Size2$		0.333***		0.537***		0.534***		0.578***		0.604***		0.489***
		(0.043)		(0.082)		(0.074)		(0.077)		(0.069)		(0.035)
Loan	−0.437	−0.427	−1.490**	−1.513**	−1.790***	−1.776***	−1.638**	−1.646**	−1.964***	−1.921***	−1.728***	−1.706***
	(0.428)	(0.423)	(0.633)	(0.630)	(0.656)	(0.649)	(0.648)	(0.646)	(0.693)	(0.679)	(0.272)	(0.272)
CPI	−19.08***	−18.55***	−21.97***	−21.82***	−27.56***	−26.69***	−26.82***	−26.34***	12.92***	13.14***	−28.06***	−27.35***
	(2.926)	(2.894)	(4.529)	(4.500)	(4.762)	(4.742)	(4.595)	(4.577)	(4.025)	(3.996)	(3.310)	(3.311)
Age	0.068***	0.064***	0.092***	0.087***	0.092***	0.085***	0.092***	0.086***	0.092***	0.086***	0.092***	0.087***
	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)
Current	−3.771***	−3.716***	−6.276***	−6.197***	−6.267***	−6.181***	−6.270***	−6.185***	−6.097***	−5.993***	−6.263***	−6.183***
	(0.213)	(0.211)	(0.341)	(0.340)	(0.341)	(0.340)	(0.341)	(0.339)	(0.333)	(0.331)	(0.192)	(0.192)
Leverage	7.662***	7.630***	4.635***	4.590***	4.632***	4.566***	4.639***	4.575***	4.600***	4.535***	4.633***	4.586***
	(0.294)	(0.293)	(0.290)	(0.291)	(0.290)	(0.291)	(0.290)	(0.291)	(0.286)	(0.287)	(0.144)	(0.144)
Profit	0.734**	0.737**	3.743***	3.752***	3.798***	3.765***	3.761***	3.741***	3.783***	3.770***	3.773***	3.771***
	(0.312)	(0.313)	(0.597)	(0.597)	(0.595)	(0.595)	(0.596)	(0.596)	(0.604)	(0.604)	(0.416)	(0.415)
Subsidy	0.358***	0.319***	0.549***	0.499***	0.535***	0.484***	0.552***	0.506***	0.398***	0.320***	0.531***	0.475***
	(0.059)	(0.059)	(0.094)	(0.095)	(0.095)	(0.097)	(0.095)	(0.096)	(0.091)	(0.092)	(0.075)	(0.075)
Tangible	5.584***	5.547***	9.786***	9.730***	9.796***	9.772***	9.789***	9.759***	9.302***	9.223***	9.799***	9.746***
	(0.263)	(0.262)	(0.441)	(0.441)	(0.441)	(0.440)	(0.441)	(0.440)	(0.406)	(0.405)	(0.240)	(0.240)
Province-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes
Province-Industry FE									Yes	Yes		
Year FE									Yes	Yes		
Obs.	261900	261900	261900	261900	261900	261900	261900	261900	261900	261900	261900	261900
Adj. R^2	0.104	0.105	0.090	0.090	0.090	0.090	0.090	0.090	0.091	0.091	0.090	0.090

Notes: In columns (1) and (2), the dependent variables are Longdebt. In columns (3) to (12), the dependent variables are Debt_Mat. In columns (1), (3), (5), (7), (9), and (11), $State1$ and $Size1$ are dummy variables and $CR4$ is mean centered when we construct $CR4 \times State1$ and $CR4 \times Size1$ interaction terms. In columns (2), (4), (6), (8), (10), and (12), $State2$ and $Size2$ are continuous variable and $CR4$, $State2$, and $Size2$ are mean centered when we construct $CR4 \times State2$ and $CR4 \times Size2$ interaction terms. The statistical inferences are based on robust standard errors (reported in brackets) clustered by province and industry in columns (1) - (10) and clustered by firm in columns (11) and (12). ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

5. CONCLUSION

For the transition economy of China, this article provides evidence that bank concentration is associated with longer debt maturity. The positive effect of bank concentration also varies across firm state ownership and firm size. State ownership provides an implicit guarantee for firm debt and contributes to longer debt maturity, which would be more valuable where bank concentration is domination. Moreover, the positive influence of bank concentration on debt maturity is stronger for large-sized enterprises compared to small and medium-sized enterprises and strengthens with firm size. This reveals that bank preferences influence smaller firms in a greater extent since these firms more depending on domestic bank loans than larger firms.

This paper provides new insights into the effects of bank concentration on firms' debt structure. These results suggest caution when bank concentration process is adopted since, although bank concentration increases debt maturity and the effect is stronger for state-owned enterprises and large-sized enterprises, non-state-owned enterprises and SMEs benefit least from the increase of bank sector concentration. This paper provides a case for China's financial system reforms to promote small and medium-sized banking institutions and privatize the Big Four state-owned banks. In addition, reducing bank concentration may be an effective way to promote state-owned enterprises reform and alleviate credit discrimination between state-owned enterprises and non-state-owned enterprises.

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