Bank Loan Supply and Corporate Capital Structure: Recent Evidence from China

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Abstract:

This paper provides new evidence on the supply side effects on corporate capital structure in China. We find that bank-dependent firms, which are mainly large and state-owned companies in China, increase (decrease) their leverage ratios if loan supplies increase (decrease) relative to the case for small and private firms due to the inability of small and private firms to access bank loans. With their ability to substitute between different forms of capital, large and state-owned firms are relatively less (more) likely to use internal funds and equity financing when bank loans are (not) available than are small and private firms. During the credit boom in 2009 and 2010, the large and state-owned firms increase leverage ratios by 2.26% and 2.76% more than matched firms; and small and private firms are shown to decrease leverage in this period. These findings lend support to the importance of supply side effects and bank loan segmentation on capital structure decisions.

JEL Classifications: G21; G32;

Keywords:

Bank loan supply; access to bank loans; corporate leverage; financing choice; loan financing

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1. Introduction

The finance literature argues that market frictions and the types of available capital influence a firm's capital structure. Faulkender and Petersen (2006) show that firms with access to the public bond market have significantly higher leverage than the firms without such access. Sufi (2007) finds that the introduction of bank loan ratings allows the firms with lower credit quality to access the public debt market and increase the use of debt. Higher leverages are also found in the firms with traded Credit Default Swap (CDS) contracts that reduce the market friction in the debt market (Saretto and Tookes, 2013). The supply of external capital also helps determine corporate leverage. Some studies show that exogenous shocks on the supply of capital have varying impacts on capital structure, which depend on firms' abilities to raise capital, e.g., investment-grade vs. noninvestment-grade firms, large vs. small firms, and firms with more matured debts vs. firms with less matured debts (Leary, 2009; Almeida, Campello, Laranjeira and Weisbenner, 2011; Erel, Julio, Kim and Weisbach, 2012). The ability to use different forms of external financing and substitution among them are found to affect bank borrowings and corporate investment in credit contractions (Kashyap, Stein, and Wilcox, 1993; Becker and Ivashina, 2014). These studies are related to a new strand of corporate finance literature that demonstrates that the supply of capital, debt, or loans, as well as the factors from the demand side, determines corporate capital structure, alongside market segmentation or frictions in substituting multiple sources of capital (see the review in Graham and Leary (2011)).

Kahle and Stulz (2013) explore the impacts of supply (lending or credit) shock and demand shock on corporate policies during the 2007 credit crisis in the U.S. The supply

shock channels theory suggests that the firms that rely on bank loans or credit would have to reduce debt issuance and capital expenditure during the 2007 credit crisis because the crisis resulted in a credit contraction. In contrast with the prior literature, they show that bank-dependent firms do not have more decreases in net debt issuance or capital expenditure, a result that questions the role of bank lending supply in corporate policies. Possible reasons for the results could be that the bank loans have become less important funding source and firms may have multiple methods to obtain financing other than bank loans.

Whether the lending/credit supply determines capital structure is still debatable. In our study, we examine this question using data from the emerging capital market of China. China is a particularly interesting setting for our research for several reasons. First, the banking system in China is often the sole and most important external financing source for companies, as non-bank financings are relatively rare due to the immature capital market. Equity issues (as well as bond issues) are subject to strict quotas set by the regulator, the China Securities Regulatory Commission (the CSRC), and in some years the quota is zero thus closing down the IPO market and even the market for secondary offerings. Second, the banking system is controlled by the government and is used as a policy tool for addressing national and social priorities. Furthermore, access to credit may be determined by political considerations and connections rather than determined on a commercial basis. Many studies show that large and state-owned firms have priority access to bank loans (Martin, 2012), while small and private firms have restricted access to bank loans. The market segmentations in China provide opportunities to observe how the shock in bank loan supply, as a supply side factor, affects corporate capital structure of different firms depending on their access to bank financing. Third, monetary policy and bank loan supply are frequently used to stimulate economic growth in emerging countries. A recent phenomenon is the significant credit growth since 2008 in large emerging markets like India, China, Turkey, and Brazil (Onaran,

2013). In China, the supply of bank loans substantially increased in 2009 and 2010 following an expansionary monetary policy. The consequences of bank loan supply shock on corporate financial policies across different groups of firms are unknown. For these reasons, we believe that a study on China can make a very valuable contribution to the extant corporate finance literature on the impact of bank lending shocks.

In this paper, we explore the role of bank lending shocks as a supply side effect on the capital structures of different types of firms in China. Our study has several objectives. First, we investigate the impacts of loan supply shocks on the leverage ratios of listed Chinese firms that have the ability to access bank loans and those firms with restricted access to loans. Second, since a bank loan is the most important type of external financing, we study the substitution from firms' internal funds/equity financing to bank financing due to changes in the bank loan supply. Third, and similar to the previous studies in the U.S. (for example, Leary, 2009; Kahle and Stulz, 2013), we use two special event periods, the credit boom in China from the last quarter of 2008 to 2010 and the credit contraction period from the third quarter of 2007 to the second quarter of 2008, to examine the importance of access to bank loans and lending supply shocks.

Based on the prior literature, the intuitions behind the supply side effect can be summarized as follows. First, there are some firms that are restricted from using the public debt market due to information asymmetry or other reasons, and instead they have to rely more on bank lending/credit. Second, these companies are normally small or unrated firms (Leary, 2009; Kahle and Stulz, 2013), and are unable to substitute bank lending with other external financing sources. Thus, if bank loan supply increases (decreases), they will obtain more (less) loans and increase (decrease) leverage. In contrast, large firms and firms with higher credit quality or credit ratings are not sensitive to bank loan supply because they can use other external funds if the bank loan supply is not available. Unlike the studies in the U.S.,

our groups of bank-dependent firms do not have impaired access to the capital market nor are they necessarily small firms. In this paper, the "bank-dependent" firms are large firms and state-owned firms, as they receive preferential treatment from the banks (the major banks are state-owned). These firms have the advantage of easier access to bank loans. Small and private (not owned by state) firms have a reduced or impaired access to bank loans. Similar to the logic used in previous studies in the U.S., we expect that bank lending shocks will generate more impacts on bank-dependent firms (large and state-owned firms in this study) than firms with impaired access to loans (small and private firms), especially when the loan supplies increase.

The findings in this paper can be summarized as follows. First, large and state-owned firms have a larger (smaller) increase in corporate leverage when bank loans are expanded (contracted) than small and private firms. The reason is that these firms have easier access to bank loans and therefore place more reliance on them. Small and private firms are restricted to the loan market and thus are less sensitive to bank supply shocks. Our findings are opposite to the findings of Leary (2009) who finds that large U.S. firms are less bank-dependent because of the availability of a large public debt market whereas in our study, large firms in China are more bank-dependent and bank loans are the most important external source of financing. The differences in findings are due to the different market and institutional arrangements across the two countries. For example, a large U.S. (small) firm is able (unable) to substitute bank loans with public debt, while in China, a large (small) firm is able (unable) to substitute internal funds/equity financing with bank loans. Second, we test the financing choice and the substitution among internal funds, bank loans, and equity financing. We find that large and state-owned firms tend to use less (more) internal funds and equity financing when the bank loan supply increases (decreases) than is the case for small and private firms. This is due to the preferential treatment given to large and state-owned

firms in China's banking system, which allows these firms to rely less on internal funds and equity financing. Small and private firms, however, cannot substitute other financings with bank loans. Third, using the event of the credit boom between 2008Q4 and 2010Q4 in China, we find that large and state-owned firms increase leverage ratios by 2.26% and 2.76% (on a quarterly basis) more than matching firms. The leverage ratios decrease more in small and private firms than matching firms. State-owned firms are found to receive more bank loans (by approximately 1.94% on a quarterly basis) than matching firms. We also test the implications of supply side effect by the event of tightening monetary policy in China between 2007Q3 and 2008Q2. The results show that state-owned firms decrease leverage ratios by 3.39% (on a quarterly basis) more than matching firms. Large firms are shown to have more decrease by 1.6% (on a quarterly basis) in loan financings than matching firms.

Our paper makes several contributions to the current literature. First, it supports the predictions of supply side impacts on capital structure in a developing country. Unlike U.S. corporations that have the flexibility to switch among different forms of external financing, China's listed companies with access to bank loans significantly increase corporate leverage when loan supply increases. Second, our paper is the first paper to explore the impacts of bank loan supply and access to bank loans on financing choices between internal funds and external financing in China. We find that an increase in bank loan supply reduces the probability of using internal funds in large and state-owned companies, which supports the supply side effects of bank financing. Finally, our empirical findings support the claims in the recent report on China's banking system from the U.S. Congressional Research Service that China's banks give preferential treatment in lending to selected companies, usually large, state-owned and historically served firms (Martin, 2012). China's stimulus program from late 2008 to the end of 2010 lends more support to these companies than to small- and medium-size firms, despite the government's avowed intent to help small and medium sized

firms.

The paper is structured as follows. The next section presents a brief review of the relevant literature and provides a background on corporate financing and loan supply in China. The third section presents the hypotheses development, methodology and sample data. Empirical results and associated discussions are presented in section 4. The final section concludes the paper.

2. Background on Corporate Financing in China and Literature Review

2.1 Monetary Policy and Bank Loan Supply

The banking system in China has experienced significant reforms since 1978. A recent reform introduced in 2003[1] was to transform previously state-owned banks into listed, joint-stock and competitive commercial entities. As a result of this reform, five major commercial banks in China have been listed in Hong Kong and the mainland China exchanges starting from 2005[2]. There are several important characteristics of China's banks: first, state ownership is still large in these five major banks; second, the CEOs and directors in these banks are still assigned by the central government; and third, the central bank in China can regulate the operations, loans supply and services of these banks through multiple channels of influence and determine the quotas and interest rates of lending. There is an ongoing debate on whether the banks should continue to be used to implement policies set by central government or whether they should operate based purely on commercial principles (Martin, 2012).

The central bank in China, the People's Bank of China (PBC), can employ many

[1] In 2003, the China Banking Regulatory Commission (CBRC) was established to oversee China's banks and promote the reform of the banking system.

[2] These banks are Agricultural Bank of China, Bank of China, China Construction Bank, Industrial and Commercial Bank of China, and the Bank of Communications. They listed on the exchanges in 2010, 2006, 2005, 2006, and 2005, respectively.

instruments to impact banks' practices and loan supply. The PBC sets the direction of monetary policy and adopts instruments to increase or decrease bank loans. The directions can be "neutral", "tight", or "loose". We identify two periods with tight and loose monetary policy, respectively, after 2000 as credit contraction and credit boom events. The tight or moderately tightening policy started from the third quarter of 2007 and lasted to the second quarter of 2008, and was instituted with the intention of controlling inflation and preventing the overheating of the economy[3]. We note, however, that the net increase in loans in 2007 was 3.64 trillion Yuan, which was more than the 3.32 trillion Yuan in 2006[4]. We use the stimulus program starting from 2008 Quarter Four to represent the credit boom period in China. The central government shifted its monetary policy to a *moderately loose* level, followed by several instruments to boost bank loan supply[5] between the end of 2008 and 2010. Unlike the tight monetary policy, the loose monetary policy effectively increases money and credit supply. The growth of bank loans and money supply can be easily observed from macroeconomic data. Figure 1 shows that the money supply (M2) and bank credit increases suddenly in 2008Q4. The net increases in loans in 2009 and 2010 are 9.63 trillion and 7.95 trillion, respectively. The quarterly increase in loans reaches its historical peak in the first quarter of 2009, with a figure of 4.62 trillion Yuan.

[Insert Figure 1 Here]

In addition to deciding bank loan supply, the central bank also gives some guidance on lending practices. In 2008 Q4, the PBC stated its monetary policy as being "to guide financial institutions to increase credit lending to agriculture, rural areas and farmers, small- and medium-sized enterprises, and post-disaster reconstruction on a preferential basis" (PBC,

[3] See the descriptions in China Monetary Report Quarter Three/Four, 2007.

[4] The data are from the People's Bank of China.

[5] The details of instruments can be found in China Monetary Report Quarter Four, 2008.

2008). Thus, the China Banking Regulatory Commission ostensibly put pressure on banks to allocate loans to small- and medium-sized enterprises. However, according to the interviews by the Congressional Research Service of the U.S. government, "the banks perceive their past creditors more favorably than new creditors, and the banks have a tendency to provide loans to the larger, well-established state-owned and private corporations" (Martin, 2012, p.21).

The credit boom may have an affect on the capital structure of firms in China; however, the specific impacts are not immediately obvious. Some reports have shown that only 10 percent of the massive increased bank lending flowed to smaller firms (Leow, 2009; Ramzy, 2009). Yet Lardy (2012) argued that at the aggregate bank lending level, household businesses, small size, and medium size firms obtained more loans than large firms in 2009 and 2010; and the growths of loans to small and medium firms are much higher than the growth in lending to large firms (See Figure 1 in Lardy, 2012). This debate is related to the firm's ability to gain access to bank loans during the credit boom period. That is, if the large and state-owned firms are still bank-dependent and retain a priority in borrowing, then the credit boom would lead to more loan financing and higher leverage in these firms. On the other hand, the small and private firms could have relatively more borrowings from banks during the credit boom if the boom leads to a reduction or removal of credit restrictions. To help resolve this debate we use the matching approach of Abadie and Imbens (2006) to investigate corporate financial policies in the credit boom period for groups of large firms, small firms, state-owned firms, and private firms. Our study of China's companies provides new evidence on the supply side impacts of lending policies and identifies which types of firm benefit in a credit boom.

2.2 Loans to Listed Firms in China

Beck, Demirguc-Kunt, and Maksimovic (2008) find that small firms use less bank finance because of information asymmetry across 48 countries. Many studies in China also

indicate that large and state-owned firms have priority in using bank credit (Song, 2005; Ferri and Liu, 2010). To examine whether loans are more likely to be given to large and state-owned firms, we obtain the loan data for listed firms in China from 2002 to 2013[6]. The listed firms (excluding firms in the finance industry) are divided into ten groups based on firm size (total book assets) and eight groups based on ownership by the state, respectively[7]. Table 1 shows the total number of loans and the average amount of loan for each group.

[Insert Table 1 Here]

The numbers of loans and the average amounts of loans increase with firm size. Small firms (those in the category of the bottom 10% according to total assets (group 1)) obtain only 2.67% of the loans made to all firms. Even worse, the average amount of each loan they receive is just 38.69 million Yuan. In contrast, the largest firms (those in the top 10% of total assets) receive 12.46% of loans and the average amount of each firm's borrowings is 615.45 million Yuan. A similar pattern is obtained for private firms and state-owned firms (see Panel B in Table 1). In general, private firms obtain fewer loans and smaller amounts of loan than do state-owned firms. One interesting pattern is that if firm ownership by the state increases, the average amount of the loan is also increased.

Overall, we confirm that the banks and financial institutions in China make lending decisions based on firm size and the state ownership of the firm. Although small and private firms can obtain some loans, the access to bank loans is impaired due to the fact that the banking system is dominated by state-owned banks. Our interest is to examine how bank loan supply conditions affect capital structure and financing decisions in different groups of firms.

[6] The loan data for listed firms are taken from the China Stock Market and Accounting Research Database (CSMAR).

[7] We use eight groups by state ownership. About 35% of listed firms in China are private firms with state ownership equal to zero.

2.3 Literature Review

Faulkender and Petersen (2006, p.46) examine the intuition that "the variables that measure the constraints on a firm's ability to increase its leverage (the supply side)" are also related to corporate capital structure. They use the presence of a credit rating to measure the access to the public debt market. Having a credit rating may help a firm obtain more capital or cheaper capital from the public market, while a firm with limited access to public capital markets (firms that are riskier, smaller, and less well known) has to rely on capital from financial intermediaries and to incur additional costs in borrowing due to the needs of increased monitoring. Our results indicate that the firms with a credit rating have a 35% larger leverage than the firms without a credit rating after controlling for the corporate variables that may determine capital structure. Those firms without a credit rating have to borrow from financial intermediaries. However, the higher information asymmetry and the increased cost of monitoring will increase the cost of debt capital and ration the credit quantity.

Sufi (2009) investigates the effects of the introduction of bank loan ratings, which reduces the monitoring and certification costs of raising debt financing. His empirical results show that the introduction of bank loan ratings increases the use of debt financing and leads to more asset growth and investment, especially for the firms without a prior high credit quality and rating. Similarly, Saretto and Tooke (2013) find a positive relationship between the existence of CDS trading on the firm and its leverage. The trading of CDS reduces the market friction of debt financing because a capital supplier may use CDS to reduce its regulatory capital requirement and mitigate portfolio risk and credit risk, which increases debt supply. Thus, the increase of debt supply allows firms to have larger leverage.

Other studies have explored the impacts of external shocks on capital supply in addition to a firm's ability to access external capital. Leary (2009) argues that large firms, which are

relatively transparent and less informationally opaque, are able to access private debt and equity, and are less sensitive to loan supply shocks. He uses two events, the 1961 emergence of the market for certificates of deposit and the 1966 Credit Crunch, to investigate the impacts of bank loan shocks on capital structure. The firm's characteristics (small or large; bank-dependent or non bank-dependent) that are related to informational asymmetry and transaction costs in financing, along with the supply of bank loans, determine the amounts of debt that a firm may use in a specific period. The increases (decreases) of leverage in small and bank-dependent firms are more significant for positive (negative) loan supply shocks than for large firms with access to public capital markets. The empirical results confirm the role of credit supply in capital structure. Macroeconomic conditions are found to affect a firm's capital raising decisions in Erel, Julio, Kim, and Weisbach (2011). They find that lower-rated, non-investment-grade firms have a lower probability to raise capital when the overall market turns worse, but the poor macroeconomic conditions do not affect the financing ability of higher-rated firms.

The availability of external financing can also influence corporate real outcomes including capital investment. Almeida, Campello, Laranjeira, and Weisbenner (2011) find that firms with large proportions of long term debt after the 2007 financial crisis have to reduce their investment. Lemmon and Roberts (2010) examine three events that cause a reduction in capital availability to non-investment grade firms, and test the impacts of capital availability on corporate financing patterns. The net security issuance and corporate investment are found to decrease in below investment grade firms after these events. Overall, they confirm that the exogenous shocks in the supply of capital have significant impacts on corporate behavior including financial and investment decisions. In contrast, Kahle and Stulz (2013) find that bank-dependent firms do not have more reductions in corporate investment and net debt issuance than matched firms during the 2007 financial crisis. They question the view that

bank lending supply determines corporate investment and financial policies.

3. Hypotheses Development, Methodology and Sample Data

3.1 Hypotheses Development

In contrast to the U.S. studies of Faulkender and Peterson (2005), Leary (2009), and Kahle and Stulz (2013), large (and state-owned) firms in China are bank dependent due to the lack of an active public debt market and preferential lower interest rates charged by state-owned banks at least before the recent banking reforms (Song, 2005; Ferri and Liu, 2010). Small and private firms are still limited in their access to bank lending because of information asymmetry (Firth, Lin, Liu, and Wong, 2009). The state-owned banks choose what they perceive to be more reliable and better supported companies as clients, i.e., those that are large and state-owned. Hence, these companies are more sensitive to the exogenous shocks of bank loan supply. The prediction can be expressed in the following hypothesis.

H1. Given other conditions equal, large and state-owned firms have relatively larger increases in debt (decreases) when the bank loan supplies are increased (decreased).

We also examine financing patterns and capital substitutions between internal financing and external financing that are affected by bank loan supply; previous U.S. studies show that firms with impaired access to capital may not be able to substitute bank loans with other sources of financing and are impacted more by a bank loan shock. As mentioned previously, a bank loan is the most important external financing source for many Chinese companies. With limited access to bank loans, internal funds/equity financing should be more important for small and private firms (Guariglia, Liu and Song, 2011; Ding, Guariglia and Knight, 2013). Large and state-owned firms will turn to bank loan financing and use less internal funds or external equity financing if the bank loans are cheaper and easier to obtain in credit

expansion periods. The increase (decrease) of bank loan supply will make these firms less (more) likely to use internal funds or equity funds than small and private firms, while small and private firms have to rely on internal funds or equity funds both in credit expansion and contraction periods because they are rationed in the bank loan market. We expect that small and private firms will have to choose internal or equity funds as their preferred financing choice, while large and state-owned firms will use bank loans as their preferred choice of raising additional capital. These financing patterns should be exaggerated when the supply of bank loans increases. We develop the following hypothesis.

H2. Given other conditions equal, large and state-owned firms are less (more) likely to use internal funds or equity funds than small and private firms when bank loan supplies increase (decrease).

Similar to previous studies of credit booms and contractions, and the 2007 credit crisis in the U.S., we use the events of credit contraction in 2007 and credit expansion of 2008-2010 in China to explore firms' different financing patterns. We examine the relative changes in the debt ratios and loan financing ratios for different groups of firms across the credit events. Unlike the findings of Leary (2009), we expect that large firms and state-owned firms will obtain more loans during a credit boom than small and private firms. And in credit contraction periods, the leverage ratios and loan financing would decrease more in large firms and state-owned firms than small and private firms.

3.2 Key Variables, Methods and Models

We use two approaches to test our hypotheses. The first approach is to use regression models similar to those used in previous studies (Faulkender and Peterson, 2006; Leary, 2009; Duchin, Ozbas and Sensoy, 2010), where the key variables are the dummy variable of access to bank loans and the interaction terms of access to bank loans and bank loan supply. The other is the matching approach of Abadie and Imbens (2006), which is used to estimate the

impacts of a credit crisis on corporate policies using treatment and control groups (Almeida, Campello, Laranjeira, and Weisbenner, 2011; Kahle and Stulz, 2013). The first approach is used to test Hypotheses 1 and 2 (H1 and H2) and the second approach is used to investigate the impacts of the two credit events on financing decisions.

In the first approach, we use two dummy variables to measure whether a firm has access to bank loans based on firm size and state ownership. Following the approach of Leary (2009) and Kahle and Stulz (2013), access (limited access) to bank loans by firm size is defined by the upper (lower) two deciles of quarterly average total book assets. Access (limited access) to bank loans by state ownership is defined by the upper four deciles (lower four deciles, state ownership equals to 0) of quarterly average state ownership[8]. Appendix 1 shows the details on how the variables of access to bank loan are created in our data sample.

[Insert Appendix 1 Here]

We use three variables to measure the exogenous supply of bank loans, LOANGDP and LNLOAN, which are the bank loans over GDP ratio and the log value of quarterly bank loans taken directly from the macroeconomic data provided by the People's Bank of China. These two variables are constructed to measure the credit cycle in the studies of Schularick and Taylor (2012) and Aikman, Haldane, and Nelson (2014). We also create a variable to measure the shocks of bank loan supply similar to Kashyap and Stein (2000), Campello (2003), and Almeida, Campello, and Weisbach (2004). The variable RESLOAN is calculated from the residual of an autoregressive–moving-average model of log quarterly bank loans on three lags of the same quarter's bank loans.

The variables of interest in the first approach are the interaction terms of access variables and macroeconomic bank loan variables. Similar to the studies of Faulkender and

[8] We use the upper four deciles because the private firms represent about 35% of the firms in our sample. The results do not change significantly if we define the access to bank loans as state ownership > 0.

Peterson (2006) and Leary (2009), our paper includes the variable of access to bank loans and the above interaction variables to test H1 and H2. Variables from the demand side are also incorporated in the tests. The base regression function for leverage is,

$$LEVERAGE_{i,t} = \alpha_0 + \beta_1 ACCESS_i + \beta_2 LOAN_t * ACCESS_i + \delta X_{i,t-1} + v_i + Q_t + \varepsilon_{i,t} \quad (1)$$

The interaction term is expected to have positive coefficients according to H1. The main coefficient of interest is the dummy variable ACCESS multiplied by the bank loan supply. Control variables X are corporate variables from the demand side including market to book value (MTBV; a negative sign is expected), firm size (LNTA; positive), tangibility (TANG; positive), and profitability (PROFIT; negative)(see the discussions in Frank and Goyal, 2009). We also include state ownership (STATESHARE) as a control variable as many studies have shown that state ownership is an important factor in the capital structure decisions of Chinese companies (Qian, Tian, and Wirjanto, 2009; Li, Yue, and Zhao, 2009). The variable ν is the fixed effect for industry[9]. The variable Q is the industry-quarter fixed effect.

The second hypothesis involves financing patterns in different groups of companies in China. We expect that the companies with limited access to bank loans will rely on internal funds (or equity financing) more heavily. We also predict that an exogenous shock in bank loans will have different impacts on the companies with full and with limited access to bank loans. A multinomial logistic model similar to Denis and Mihov (2003), Korajczyk and Levy (2003), and Leary (2009) is employed to explore this financing pattern. The dependent variable FINCHOICE has a value of zero for internal funds, one for net borrowing, and two for net equity financing[10]. The internal funds are the sum of net income and depreciation in

[9] We also run the regressions using firm fixed effects. The results still hold.

[10] The cash flow statements of Chinese listed companies report cash received from and paid for borrowings, investment (including equity and bond issuance), and other proceeds from financing activities. Thus, we can precisely identify the amount of capital from each source. The dependent variable is measured as the financing choice in a firm that has been used most in the quarter.

the company. Net borrowing is the proceeds from borrowing net of cash repayment of amounts borrowed. Net equity financing is cash received from investment including the proceeds from equity minus cash paid for dividends. The multinomial logit models for H2 have similar forms to Equations (1).

$$mlogit(FINCHOICE_{i,t}) = \alpha_0 + \beta_1 ACCESS_i + \beta_2 LOAN_t * ACCESS_i + \delta X_{i,t-1} + v_i + Q_t + \varepsilon_{i,t} \quad (2)$$

We use the events of credit contraction and credit boom, and employ a matching approach to test the shocks of loan supply, similar to Almeida, Campello, Laranjeira, and Weisbenner (2011) and Kahle and Stulz (2013). According to the central bank's monetary policy reports, the tight monetary policy starts from Quarter Three 2007 and lasts for four quarters until Quarter Two 2008; the loose monetary policy lasts from Quarter Four 2008 to Quarter Four 2010, nine quarters in total. We determine the groups of treatment firms by firm size and state ownership based on data from the second quarter of 2007 and the third quarter of 2008, respectively, before the credit events. The groups of large firms and small firms are the firms in top and bottom quintile of total assets in our data sample at 2007Q2 and 2008Q3. Similarly, we choose the firms in the top quintile of state ownership and the firms with zero state ownership at the end of the two quarters as the state-owned group and the private group. Using the approach in Abadie, Drukker, Herr, and Imbens (2004), we match the firms in these four treatment groups with control firms in our data sample before the credit events. Following the studies of Almeida, Campello, Laranjeira, and Weisbenner (2011) and Kahle and Stulz (2013), the variables used for matching are the market-to-book ratio, cash flow, cash holdings, size, leverage ratio, state ownership, and industrial classification code. The changes in leverage ratio and loan borrowing in the treatment groups due to credit contraction/boom are estimated and compared with the changes in the control groups.

3.3 Sample and Data Source

The firm-level data are obtained from the China Stock Market and Accounting Research Database (CSMAR). The loan data for listed firms are also from CSMAR. The macroeconomic data are from National Bureau of Statistics of China and the People's Bank of China. The full sample consists of all listed companies on the Chinese exchanges with quarterly data. The time periods are from 2002Q1 to 2013Q2[11]. The firms in the finance industry are excluded and 2601 firms remain in the sample. We also drop observations with negative values in total assets, sales, and cash holdings. Observations are also deleted if total liabilities are larger than total assets or market value of total assets. Following Almeida, Campello, Laranjera, and Weisbenner (2011), we also disregard the observations with asset growth and sale growth larger than 100% in a quarter. Firm variables are further winsorized at the 95% level (top and bottom 2.5%) to reduce the outlier effects. The definitions and data sources of variables are given in Appendix 2.

[Insert Appendix 2 Here]

4. Discussion of Results

4.1 Summary Statistics

Table 2 reports the descriptive statistics of variables for regression functions in the full sample. It also shows the financing patterns of Chinese listed companies. There are three major capital sources in China: internal funds, bank borrowing, and external investment (including equity and bond issuances). The most significant fund source is the borrowings (BORW) from banks or other financial institutions, which averages 14.2% of total assets. In contrast, the net borrowings (NETBORW), which are the borrowings net of cash repayments of the amount borrowed, are only 1.4% of total assets. This indicates most new borrowings

[11] The starting quarter is 2002Q1 because CSMAR started to report quarterly financial statements from 2002.

are used to replace (i.e., repay) old borrowings. Internal fund (CF) is 3.7% of total assets. Another important source of finance is external investment, mainly equity issuance (we find that bond issuance is negligible). The funds raised from equity issuance (EQUITY) is 3.2% of total assets, slightly lower than internally generated funds. Net equity issuance (NETEQUITY) represents the funds from equity issuance net of dividend payment (approximately 3.2%). The holding of cash and cash equivalents (CASH) is high (18.1% of total assets) in China's firms.

[Insert Table 2 Here]

4.2 Bank Loan Supply and Capital Structure

Table 3 reports the results of regression equation (1). We use all listed companies (excluding firms in the finance industry) in China's stock markets from 2002Q1 to 2013Q2. The key variable is the interaction terms of bank loan supply and access to bank loans.

[Insert Table 3 Here]

The control variables have the expected coefficient signs in accordance with capital structure theory. The variables of market-to-book value (MTBV), profitability ratio (PROFIT), and internal funds (CF) have negative and very significant coefficients (in almost all regressions in the tables), indicating that firms with high growth opportunities, large profits, and high internal funds choose lower leverages. Intuitively, large state ownership may indicate that the firm has political connections to state-owned banks, which may result in high leverage. However, the existing empirical results are mixed. Huang and Song (2006) argue that state ownership does not significantly influence capital structure in China's listed companies. In contrast, Qian, Tian, and Wirjanto (2009) find that the state shareholding is positively associated with the leverage ratio in listed companies. Li, Yue, and Zhao (2009) also find that state ownership is positively related to leverage and the access to long term debt when using the data from unlisted companies. The results in Panel A show that the

relationship between state ownership and leverage is not significant. Panel B shows that firm size (LNTA) is positively related to corporate leverage, which is similar to the previous findings of capital structure decisions in the U.S. market.

The key variables in this paper are the interaction terms between the access to bank loan and macroeconomic variables of bank loan supply. H1 predicts that corporate leverage increases more for firms that already have access to bank loans when the supply of the bank loans increase. We use two variables to measure the accessibility (size and state ownership) and report the results in Panels A and B, respectively. In Panel A, the coefficients on the interaction terms are all positive and very significant (at the 1% level). This indicates that when the central government decided to release more bank loans, the larger companies have priority in obtaining such bank loans and hence increase leverage more. The results for the measures of accessibility by state ownership are similar, except that in model 3 of Panel B, the coefficient on the interaction term is not significant. Overall, large and state-owned firms have priority in accessing bank loans, especially when the supply of bank loans increases. We support the view that bank lending shock is first-order determinant factor of corporate capital structure in China.

4.3 Bank Loan Supply and Financing Choice

The most important type of external financing in China is the borrowings from banks and other financial institutions. The other external funds include the equity issuance, bond issuance, and financing from other activities. The funds from bond issuance and other activities are very small, approximately 0% and 0.5% of total assets. So we focus on the three main sources of funds: internal funds, borrowings, and equity issuance. Similar to the studies of Leary (2009) and Korajczyk and Levy (2003), we study the impact of bank lending supply on financing choices using multinomial logistic regressions. We sort firm financings into three categories: internal funds, net funds from borrowings (borrowings net of principal

repayments), and net funds from equity (proceedings from equity issuance net of payment of dividends). The dependent variable FINCHOICE is equal to 0 if internal funds dominate the other two forms, 1 if borrowings dominate, and 2 if funds from equity issuance dominate. The choice of borrowings (group 1) is taken as the omitted group in the regressions. The negative coefficients on the interaction terms of access to bank loans and the supply of bank loans are consistent with H2.

[Insert Table 4 Here]

Table 4 reports the regression results for financing choices. The primary variable in Table 4 is the interaction variable between the access dummy (by size and state ownership) and the variables of bank loan supply. We report the results in Panel A and B for regressions by size and state ownership, respectively. In Panel A, the coefficients on the interaction variables in the regressions of internal funds and net equity are negative and significant at the 1% level; and the results in Panel B by state ownership are similar to Panel B except for some insignificant coefficients. The results support the predictions of H2 that large and state-owned firms with access to bank loans are less likely to use internal funds and equity financing when the supply of bank loans increase. They are able to switch financing sources among internal funds, equity financing, and bank loans. In contrast, small and private firms have to use internal funds or equity financing because of the restrictions on who obtains bank loans. Overall, these results confirm that firms with access to bank loans are more likely to use bank loans and are less likely to use internal funds or equity financing when the supply of bank loans increase. The results also support the view that bank lending shocks influence corporate financing choices as bank lending can be used to substitute for internal funds and funds from equity financing in some firms with access to bank lending.

There are some differences between our findings and those from previous studies in the U.S. Leary (2009) finds that small firms (without access to public debt market; more

bank-dependent) use less internal funds and equity financing during credit expansion periods because they can use more bank loans. The logic is that bank-dependent firms would employ more bank loans and fewer sources other than bank loans when the bank loan supply increases. Our findings are the large and state-owned firms in China are more bank-dependent and thus use bank lending as a substitute for other sources of finance in credit booms.

4.4 Credit Contraction, Credit Boom and Corporate Financing Decisions

In this section, we test the impacts of loan supply from the events of credit contraction from 2007Q3 to 2008Q2 and the credit boom from 2008Q4 to 2010Q4 in China. The bank-dependent firms will have more increases (decreases) in leverage ratios and loan financings during the lending boom (loan contraction) periods according to the supply side argument. We use a matching approach to explore the impacts of the credit events (Almeida, Campello, Laranjeira, and Weisbenner, 2011; Kahle and Stulz, 2013).

To employ the matching approach (Abadie and Imbens, 2006), we need to construct treatment groups and identify suitable matching firms in non-treatment groups. The methods of determining treatment groups and identifying control groups are introduced above, and are similar to those used in Almeida, Campello, Laranjeira, and Weisbenner (2011), and Kahle and Stulz (2013). We calculate the changes of leverage ratio and borrowings in the treatment groups before and during the credit contraction/credit boom; and then we compare the differences with the differences in the control groups. The Abadie-Imbens' average effect of the treatment on the treated (ATT) is based on the difference-in-difference estimations as well as by the estimators from the traditional difference-in-difference (DID) method.

[Insert Table 5 Here]

The results from the matching method are reported in Table 5. Panel A shows the quarterly leverage ratio before and during credit contraction periods (both of them last for 4

quarters). The average leverage ratio decreases by 1.42% due to tightening monetary policy. State-owned firms decrease their leverage ratios by 4.61%. The leverage ratios of small firms and private firms are also reduced by 5.52% and 0.79%. The results show that large firms have a slight decrease in their leverage ratios.

The key variables are DID and ATT in Panel B. The state-owned firms have a 3.39% (4.56%) more decrease in leverage ratio than the matched firms according to the ATT (DID) estimator. Both DID and ATT estimators are significant at the 5% level or better. The tight monetary policy may cause the state-owned firms to make fewer and smaller loans. Large firms are found to have a slightly greater decrease in leverage ratio than the matched firms, but the coefficients are not significant. The small firms have 2.1% and 4.66% more decrease in leverage than the matched firms based on the ATT and DID approaches. This finding is not consistent with the supply side predictions. Private firms do not show a significant change in leverage ratio.

[Insert Table 6 Here]

We directly investigate the changes in loan financing through the quarterly borrowings ratio, which is cash flow from borrowings divided by total assets. The results are given in Table 6. Panel A reports the change in loan financing for different groups of firms and Panel B gives the DID and ATT estimators. Surprisingly, the loan financing increases by 0.39% in the credit contraction period for all the firms in the subsample. Large firms have a slight decrease in their borrowings ratio. However, the state-owned firms have a 0.62% increase in their borrowings ratio in credit contraction periods compared to the period before. One possible explanation is that the aggregate loan supply actually increases during credit contraction, even though a tight monetary policy is adopted. The changes in borrowings ratio for small firms and state-owned firms are not significant. In Panel B, large firms are shown to have 1.2% and 1.6% more decrease in borrowings ratio by the DID and ATT estimators than

the matched firms. The findings are consistent with supply side predictions. The results for state-owned firms, small firms, and private firms are not significant in ATT estimators. It is normal that the loan financing of small and private firms are not sensitive to tight monetary policy.

In sum, the results from credit contraction periods only weakly support our predictions that large and state-owned firms are more bank-dependent and thus more sensitive to the shock of loan supply than small and private firms. However, it should be noticed that in the credit contraction period, the aggregate loan supply in the whole banking system does not decrease. Thus, the impacts may not be significant.

We next turn to the credit boom period from 2008Q4 to explore the effects of substantial loan supply increase on corporate leverage and borrowings. Table 7 reports the estimators for quarterly leverage ratios before and during the credit boom (2008Q4 – 2010Q4). Unlike the credit contraction event, we examine the changes in leverage ratios and borrowings in the treatment groups before and during credit boom (2006Q3-2008Q3 vs. 2008Q4-2010Q4), one year before the boom, and the first year of the credit boom (2007Q4-2008Q3 vs. 2008Q4-2010Q4), and the first quarter of 2007 and the first quarter of 2008 (2007Q1 vs. 2008Q1).

[Insert Table 7 Here]

In Panel A of Table 7, column 1 shows that the average quarterly leverage ratios for the full sample significantly increase during the credit boom, the first year of the credit boom, and the first quarter of 2009. When it comes to the treatment group, we find that large firms and state-owned firms increase leverage by 2.88% and 2.36% in the credit boom period in comparison with the leverages in the pre-boom period. The leverage ratios in these two groups also increase significantly in the first year of the credit boom and the first quarter of 2009. However, the leverage ratios in small and private firms are significantly decreased in

the whole credit boom period. The decreases of leverage ratios in the last two treatment groups are not significant in the first year of credit boom and 2009Q1.

The key variables are DID and ATT in the credit boom, its first year, and 2009Q1, which are reported in Panel B. We find that the increases in leverage ratios in the control groups are significantly less than the increases in treatment groups of large and state-owned firms in the whole credit boom period. DID and ATT estimators are significant at the 5% level or better. According to the ATT estimators, during the credit boom the large and state-owned firms have 2.26% and 2.76% more increases in leverage than their matched firms. However, small and private firms decrease leverage ratios in comparison with matched firms during the credit boom. In particular, private firms significantly lower their leverage by 1.63% and 1.24% according to the DID and ATT estimations. Similar patterns can be seen in the first year of the credit boom and 2009Q1. We conclude that the credit boom plays a significant role in capital structure in the firms that are more bank-dependent or are able to access bank loans, but it has no significant impact on the firms without access to bank loans.

[Insert Table 8 Here]

We conduct the same tests for the borrowings ratio before and during the credit boom periods. Panel A of Table 8 shows that during the credit boom periods, the borrowings ratios increase by 0.79%, 1.55%, and 1.67% for the firms in full sample, large firm group, and state-owned firm group. The borrowing ratios also increase slightly in small firms and private firms (0.73% and 0.06%, respectively) during the credit boom. Panel B shows DID and ATT estimators for the treatment groups. State-owned firms have significant increases in loan financing using both the DID and ATT estimations in the whole credit boom period, first year of credit period, and 2009Q1. Within the whole credit boom period, bank lending given to state-owned firms over total assets is 1.94% higher than the ratio of the matched firms. Large firms have a greater increase in borrowings than the matched firms in the whole credit boom

period. However, the matching results indicate that large firms actually decrease borrowings more than matching firms in the first year of the credit boom and 2009Q1. The DID and ATT estimators for small firms and private firms are negative or not significant, indicating that the impacts of the credit boom are trivial or negative.

Overall, we find that the positive shock in credit supply plays a significant and positive role in the financial policies of large and state-owned firms. This is because these firms are able to obtain access to bank loans in China's banking system. The small and private firms, however, are not affected or negatively affected by the credit boom. Our results support the view that credit supply shock is a determining factor in the financial decisions in China, the world's largest emerging capital market.

5. Conclusions

In this paper, we explore the question of whether a bank lending shock affects capital structure and financing choices in China's listed companies. We find that bank loan shocks significantly affect corporate leverage if the firms are large or state-owned, which have priority of access to the banking system. Firms with the ability to obtain bank loans have larger increases in leverage ratios than firms with limited access to banking facilities if the bank loan supplies increases. These results are similar to previous studies in supporting the view that credit supply impacts on corporate financial and investment policies. A significant difference in our study is that bank-dependent firms are large and state-owned firms.

We also show that the credit supply cycle and access to bank loans influences the financing choices of listed companies in China. Firms with access to bank loans are less likely to use internal funds/equity financing and are more sensitive to the changes in bank loans. In contrast, firms that have restricted access to the loan markets have to rely more on internal funds and are not able to switch to loan financing even in credit expansion periods.

We also find that large and state-owned firms increase leverage and loan financing more than matching firms during a credit boom. The small and private firms have opposite results in these financing policies.

Overall, these results suggest that bank lending plays a significant role in determining corporate capital structure in China and they lend support to the idea that bank loan supply has a significant influence on corporate leverage. These findings also have important policy implications for the reforms of the banking system in China. The monetary policy in China may have little impact on helping small and private firms as long as access to banking facilities is restricted and in the absence of a liquid corporate bond market.

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Table 1: Loans by Firm Size and State Ownership

Note: the table reports the loans obtained by listed firms in China (excluding the firms in the finance industry) from 2002 to 2013. The firms are divided into groups based on their total assets and state ownership. In Panel A, the firms are sorted by the quarter-beginning total assets from the smallest to the largest. Group 1 reports the number of loans received by the bottom 10% firms (smallest) in terms of total assets, the proportion of these loans to all loans and the average amount of these loans. Group 10 reports the data for top 10% firms (largest). Panel B reports the loan data by state ownership. The firms are sorted by average quarterly state ownership. Group 1 contains all private firms, which amounts to around 35% of the firms in our sample. There are eight groups of firms based on the state ownership. The table also shows the ranges of ownership ratio by state for each group. The number of loans, and the proportion and average amount of loan for each group are given.

Panel A: The number and average amount of loans by firm size

Group	*Percentile of Size*	*No. of Loan*	*Proportion*	*Average Amount of Loan (million Yuan)*
1	0 - 10%	579	2.67%	38.69
2	10% - 20%	1148	5.29%	53.80
3	20% - 30%	1379	6.35%	59.14
4	30% - 40%	1607	7.40%	77.91
5	40% - 50%	1856	8.55%	100.21
6	50% - 60%	2086	9.60%	96.80
7	60% - 70%	2873	13.23%	102.52
8	70% - 80%	3809	17.54%	143.10
9	80% - 90%	3675	16.92%	207.88
10	90% - 100%	2706	12.46%	615.46

Panel B: The number and average amount of loans by state ownership

Group	*Percentile of State Ownership*	*Shares Held by State*	*No. of Loan*	*Proportion*	*Average Amount of Loan (million Yuan)*
1	0 - 35%	0	4972	21.20%	121.67
2	35% - 40%	(0, 1.1%)	1715	7.31%	118.23
3	40% - 50%	(1.1%, 8%)	2724	11.62%	123.60
4	50% - 60%	(8%, 18%)	3049	13.00%	156.15
5	60% - 70%	(18%, 26%)	3543	15.11%	165.27
6	70% - 80%	(26%, 33%)	2994	12.77%	213.06
7	80% - 90%	(33%, 41%)	2528	10.78%	278.22
8	90% - 100%	(41%, 67%)	1923	8.20%	436.90

Table 2: Descriptive Statistics

Note: LEVERAGE is the book value of leverage. BORW and NETBORW are funds from borrowings to total assets and net borrowings to total assets. FINCHOICE is the financing choice in choosing internal funds, bank loans, or equity financing. ACCESS is the variable of access to bank loans by firm size and state ownership. LOANGDP is the ratio of loans over GDP. LNLOAN is the log value of quarterly bank loans. RSDLOAN is the residual from an autoregressive model of quarterly bank loans. The detailed definitions of other control variables can be found in Appendix2.

Panel A: Descriptive statistics of full sample

Variable	*Obs*	*Mean*	*Median*	*Std. Dev.*	*Min*	*Max*
Dependent variables and key variables						
LEVERAGE	59061	0.463	0.476	0.197	0.105	0.789
BORW	53063	0.142	0.100	0.138	0	0.465
NETBROW	53063	0.014	0.002	0.051	-0.083	0.130
FINCHOICE	59077	0.554	0	0.727	0	2
ACCESS(SIZE)	22767	0.603	1	0.489	0	1
ACCESS(STATE)	42851	0.707	1	0.455	0	1
LOANGDP	59077	4.341	4.385	0.663	3.053	5.533
LNLOAN	59077	9.264	9.470	0.738	6.576	10.740
RSDLOAN	59077	0.006	0.026	0.494	-1.602	1.394
Control variables and others						
MTBV	56329	2.165	1.805	1.129	0.964	5.114
PROFIT	58946	0.080	0.063	0.122	-0.180	0.358
TANG	59061	0.259	0.229	0.168	0.022	0.607
STATESHARE	57312	0.200	0.024	0.242	0	0.665
LNTA	59070	21.444	21.324	1.039	19.796	23.640
AGE	59077	11.330	11	4.934	0	31.25
GDPGROWTH	59077	0.101	0.1	0.019	0.066	0.145
CF	56264	0.037	0.028	0.034	-0.011	0.118
EQUITY	42927	0.032	0	0.092	0	0.363
NETEQUITY	42927	0.032	0	0.092	-0.002	0.362
BOND	33551	0	0	0	0	0
OTHER	43708	0.005	0	0.012	0	0.047
CASH	59059	0.181	0.141	0.136	0.023	0.515

Table 3: Bank loan supply, access to bank loans, and capital structure

$$LEVERAGE_{i,t} = \alpha_0 + \beta_1 ACCESS_i + \beta_2 LOAN_t * ACCESS_i + \delta X_{i,t-1} + v_i + Q_t + \varepsilon_{i,t}$$

The dependent variable is the book value of leverage. Two variables are created to measure the ability to obtain bank loans by firm size and state ownership. Panel A and B report results for these two measures, respectively. The key variable is the interaction term of bank loan supply and access to bank loan. The results with industry-fixed effects are given in each panel. Clustered standard errors at the firm level are presented in the brackets for coefficients. ***, **, and * are 1%, 5%, and 10% significance levels, respectively.

Panel A: By firm size	*Model 1*	*Model 2*	*Model 3*
ACCESS	0.089***	-0.157**	0.144***
	(0.026)	(0.074)	(0.014)
*ACCESS*LOANGDP*	0.013***		
	(0.005)		
*ACCESS*LNLOAN*		0.033***	
		(0.008)	
*ACCESS*RSDLOAN*			0.014***
			(0.005)
MTBV	-0.018***	-0.017***	-0.019***
	(0.005)	(0.005)	(0.005)
PROFIT	-0.340***	-0.337***	-0.339***
	(0.048)	(0.048)	(0.048)
TANG	0.084**	0.085**	0.083**
	(0.035)	(0.035)	(0.035)
CF	-1.234***	-1.228***	-1.238***
	(0.157)	(0.157)	(0.156)
STATESHARE	-0.015	-0.014	-0.015
	(0.019)	(0.019)	(0.019)
AGE	0.006***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)
Constant	0.423***	0.421***	0.424***
	(0.021)	(0.021)	(0.022)
N	14370	14370	14370
N of Groups	1020	1020	1020
Industry/ Year-Quarter Fixed Effect	Yes	Yes	Yes
Adjusted R-Squared	0.4985	0.5008	0.4984
F-statistic	100.29***	100.94***	94.20***

Table 3- cont'd

Panel B: By state ownership	*Model 1*	*Model 2*	*Model 3*
ACCESS	-0.022	-0.374***	0.041***
	(0.018)	(0.064)	(0.010)
*ACCESS*LOANGDP*	0.014***		
	(0.003)		
*ACCESS*LNLOAN*		0.044***	
		(0.006)	
*ACCESS*RSDLOAN*			0.003
			(0.003)
MTBV	-0.009**	-0.009**	-0.009**
	(0.004)	(0.004)	(0.004)
PROFIT	-0.469***	-0.465***	-0.469***
	(0.036)	(0.035)	(0.036)
TANG	0.061**	0.059**	0.061**
	(0.024)	(0.024)	(0.024)
CF	-0.980***	-0.975***	-0.982***
	(0.117)	(0.117)	(0.118)
LNTA	0.067***	0.066***	0.067***
	(0.004)	(0.004)	(0.004)
AGE	0.005***	0.004***	0.005***
	(0.001)	(0.001)	(0.001)
Constant	-0.974***	-0.950***	-0.979***
	(0.087)	(0.087)	(0.087)
N	27699	27699	27699
N of Groups	1931	1931	1931
Industry/ Year-Quarter Fixed Effect	Yes	Yes	Yes
Adjusted R-Squared	0.4730	0.4762	0.4725
F-statistic	242.47***	253.83***	232.26***

Table 4: Bank loan supply, access to bank loans and financing choices

$$mlogit = \alpha_0 + \beta_1 ACCESS_i + \beta_2 LOAN_t * ACCESS_i + \delta X_{i,t-1} + Q_t + \varepsilon_{i,t}$$

The dependent variable is financing choice, which is set equal to 1 if the internal funds dominate other funds, 2 if borrowings dominate, and 3 if equity financings dominate. In the result tables, borrowings are the omitted group. The key variable is the interaction term of bank loan supply and access to bank loan. Clustered standard errors at the firm level are presented in the brackets for coefficients. ***, **, and * are 1%, 5%, and 10% significance levels, respectively.

	Model 1		*Model 2*		*Model 3*	
Panel A: By firm size	*Internal Fund*	*Net Equity*	*Internal Fund*	*Net Equity*	*Internal Fund*	*Net Equity*
ACCESS	0.631***	2.554***	1.372***	3.189***	-0.036	-0.288
	(0.228)	(0.366)	(0.438)	(0.658)	(0.174)	(0.225)
*ACCESS*LOANGDP*	-0.157***	-0.669***				
	(0.039)	(0.068)				
*ACCESS*LNLOAN*			-0.164***	-0.400***		
			(0.047)	(0.070)		
*ACCESS*RSDLOAN*					-0.105***	-0.461***
					(0.040)	(0.077)
LEVERAGE	-2.633***	-1.552***	-2.617***	-1.528***	-2.627***	-1.535***
	(0.231)	(0.327)	(0.230)	(0.326)	(0.230)	(0.324)
MTBV	0.116***	0.276***	0.125***	0.294***	0.114***	0.269***
	(0.032)	(0.042)	(0.032)	(0.042)	(0.033)	(0.042)
PROFIT	0.569*	-3.336***	0.564*	-3.308***	0.593*	-3.225***
	(0.316)	(0.447)	(0.316)	(0.444)	(0.315)	(0.443)
TANG	0.250	-0.344	0.240	-0.363	0.250	-0.353
	(0.207)	(0.340)	(0.206)	(0.339)	(0.207)	(0.338)
OPCF	8.027***	2.588***	7.985***	2.382***	7.974***	2.429***
	(0.470)	(0.672)	(0.470)	(0.671)	(0.470)	(0.670)
CASH	2.131***	3.902***	2.144***	3.914***	2.124***	3.863***
	(0.328)	(0.454)	(0.328)	(0.451)	(0.327)	(0.449)
STATESHARE	0.190	-0.225	0.153	-0.281	0.228	-0.111
	(0.141)	(0.203)	(0.142)	(0.205)	(0.141)	(0.201)
LNTA	-0.096	-0.019	-0.049	0.090	-0.104*	-0.038
	(0.060)	(0.081)	(0.062)	(0.080)	(0.060)	(0.079)
AGE	0.025***	0.014	0.027***	0.017*	0.025***	0.014
	(0.008)	(0.010)	(0.008)	(0.010)	(0.008)	(0.010)
GDPGROWTH	-0.185	-8.063***	-0.431	-6.945***	0.900	-4.886**
	(1.459)	(2.439)	(1.456)	(2.420)	(1.457)	(2.386)
Constant	3.013**	0.007	2.036	-2.385	3.066**	0.106
	(1.232)	(1.693)	(1.277)	(1.676)	(1.238)	(1.657)
N	13878		13878		13878	
N of Firms	1018		1018		1018	
Wald chi2	1158.77***		1125.99***		1124.53***	
Pseudo R2	0.1116		0.1089		0.1085	

Panel B: By state ownership	*Model 1*		*Model 2*		*Model 3*	
	Internal Fund	*Net Equity*	*Internal Fund*	*Net Equity*	*Internal Fund*	*Net Equity*
ACCESS	1.017***	2.104***	2.118***	0.083	0.163**	-0.066
	(0.135)	(0.209)	(0.306)	(0.537)	(0.072)	(0.099)
*ACCESS*LOANGDP*	-0.191***	-0.488***				
	(0.026)	(0.044)				
*ACCESS*LNLOAN*			-0.203***	-0.016		
			(0.031)	(0.055)		
*ACCESS*RSDLOAN*					-0.032	-0.133***
					(0.029)	(0.049)
LEVERAGE	-2.818***	-1.499***	-2.800***	-1.499***	-2.816***	-1.502***
	(0.177)	(0.246)	(0.178)	(0.243)	(0.177)	(0.244)
MTBV	0.113***	0.285***	0.126***	0.280***	0.109***	0.271***
	(0.025)	(0.033)	(0.025)	(0.032)	(0.025)	(0.033)
PROFIT	0.558**	-3.622***	0.558**	-3.435***	0.598**	-3.465***
	(0.253)	(0.384)	(0.253)	(0.378)	(0.253)	(0.380)
TANG	0.220	0.593**	0.205	0.546*	0.206	0.548**
	(0.165)	(0.282)	(0.165)	(0.279)	(0.165)	(0.279)
OPCF	7.701***	1.542***	7.714***	1.222**	7.552***	1.249***
	(0.354)	(0.486)	(0.354)	(0.483)	(0.353)	(0.481)
CASH	2.199***	4.746***	2.203***	4.612***	2.146***	4.606***
	(0.244)	(0.345)	(0.245)	(0.343)	(0.243)	(0.342)
STATESHARE	0.214*	-0.352*	0.096	-0.217	0.279**	-0.184
	(0.118)	(0.187)	(0.119)	(0.188)	(0.118)	(0.185)
LNTA	-0.085***	-0.043	-0.067**	-0.044	-0.088***	-0.052
	(0.030)	(0.038)	(0.030)	(0.039)	(0.030)	(0.038)
AGE	0.035***	0.021***	0.038***	0.021***	0.034***	0.020***
	(0.006)	(0.008)	(0.006)	(0.008)	(0.006)	(0.008)
GDPGROWTH	-0.593	-6.602***	-1.175	-2.587	1.032	-2.848
	(1.087)	(1.790)	(1.118)	(1.746)	(1.079)	(1.739)
Constant	2.539***	-0.371	2.151***	-0.668	2.473***	-0.466
	(0.639)	(0.849)	(0.641)	(0.855)	(0.638)	(0.845)
N	26767		26767		26767	
N of Firms	1930		1930		1930	
Wald chi2	2030.88***		2004.15***		1993.17***	
Pseudo R2	0.1023		0.1007		0.0994	

Table 5: Quarterly leverage ratio in credit contraction period

Panel A gives the quarterly leverage ratio for the whole sample and four treatment groups in the pre-contraction period and the credit contraction period (2006Q3 – 2007Q2 and 2007Q3 – 2008Q2). The groups of large firms and small firms are the firms in top and bottom quintile of total assets in our data sample on 2007Q2. State-owned group and private group are the firms in the top quintile of state ownership and the firms with zero state ownership at the end of quarter 2 of 2007. We compare the differences of leverage ratios before and during the credit boom in the whole sample and subsamples using a t-test.

Panel B reports difference-in-difference results for the treatment groups and their control groups. The approach of Abadie, Drukker, Herr, and Imbens (2004) is employed to match the firms in these four treatment groups with non-treatment firms in the data sample on 2007Q2. The variables used in the matching process are the market-to-book ratio, cash flow, cash holdings, size, state ownership, and industrial classification code, following the methods used in Almeida, Campello, Laranjera, and Weisbenner (2012) and Kahle and Stulz (2013). DID represents the traditional difference-in-difference estimator. ATT is the Abadie-Imbens bias-corrected average effect on the treatment group. ***, **, and * are 1%, 5%, and 10% significance levels using heteroskedasticity-consistent standard errors, respectively.

Panel A: Quarterly leverage ratio before and during the credit contraction

	Whole	Large	State-owned	Small	Private
Period averages	(1)	(2)	(3)	(4)	(5)
Pre-Contraction (2006Q3-2007Q2)	0.5088	0.5611	0.5039	0.4350	0.4788
Contraction (2007Q3-2008Q2)	0.4946	0.5604	0.4578	0.3798	0.4709
Difference	-0.0142***	-0.0007	-0.0461***	-0.0552***	-0.0079*
Number of firms	1344	243	356	246	242

Panel B: The average changes of quarterly leverage ratio before and during credit contraction

	Large	State-owned	Small	Private
	(1)	(2)	(3)	(4)
Pre-contraction (2006Q3-2007Q2) versus contraction (2007Q3-2008Q2)				
Treatment: contraction - pre-contraction	-0.0007	-0.0461	-0.0552	-0.0079
Control: contraction - pre-contraction	-0.0016	-0.0005	-0.0086	-0.0154
DID	-0.0008	-0.0456***	-0.0466***	0.0075
ATT	-0.0040	-0.0339**	-0.0210**	0.0092
Number of treatment firms	243	356	246	242
Number of observations in matching	1344	1344	1344	1344

Table 6: Quarterly borrowings ratio in credit contraction

Panel A gives the quarterly borrowings ratio (bank loan ratio) for the whole sample and four treatment groups. It reports the average borrowings ratio in these samples in the pre-contraction period and the credit contraction period (2006Q3 – 2007Q2 and 2007Q3 – 2008Q2). The groups of large firms and small firms are the firms in the top and bottom quintile of total assets in our data sample on 2006Q4. State-owned group and private group are the firms in the top quintile of state ownership and the firms with zero state ownership at the end of the fourth quarter of 2006. We compare the differences in borrowings ratios before and during credit boom in the whole sample and subsamples using a t-test.

Panel B reports difference-in-difference results for the treatment groups and their control groups. The approach of Abadie, Drukker, Herr, and Imbens (2004) is employed to match the firms in these four treatment groups with non-treatment firms in the data sample on 2007Q2. The variables used in the matching process are market-to-book ratio, cash flow, cash holdings, size, leverage ratio, state ownership, and industrial classification code, following the methods used in Almeida, Campello, Laranjera, and Weisbenner (2012) and Kahle and Stulz (2013). DID is the traditional difference-in-difference estimator. ATT is the Abadie-Imbens bias-corrected average effect on the treatment group. ***, **, and * are 1%, 5%, and 10% significance levels using heteroskedasticity-consistent standard errors, respectively.

Panel A: Quarterly borrowings ratio before and during the credit contraction

	Whole	Large	State-owned	Small	Private
Period averages	(1)	(2)	(3)	(4)	(5)
Pre-Contraction (2006Q3-2007Q2)	0.1491	0.1747	0.1385	0.1059	0.1597
Contraction (2007Q3-2008Q2)	0.1530	0.1712	0.1448	0.1089	0.1571
Difference	0.0039**	-0.0035	0.0062*	0.0029	-0.0026
Number of firms	1252	233	266	183	241

Panel B: The average changes of quarterly borrowings ratio before and during the credit contraction

	Large	State-owned	Small	Private
	(1)	(2)	(3)	(4)
Pre-contraction (2006Q3-2007Q2) versus contraction (2007Q3-2008Q2)				
Treatment: contraction - pre-contraction	-0.0035	0.0062	0.0029	-0.0026
Control: contraction - pre-contraction	0.0085	0.0056	0.0086	0.0086
DID	-0.0120**	0.0006	-0.0056	-0.0113**
ATT	-0.0160**	0.0029	-0.0051	-0.0098
Number of treatment firms	233	266	183	241

Table 7: Quarterly leverage ratio in the credit boom period

Panel A gives the quarterly leverage ratio for the whole sample and four treatment groups. It reports the average leverage ratio in these samples in six periods/quarters. The groups of large firms and small firms are the firms in the top and bottom quintile of total assets in our data sample on 2008Q3. State-owned group and private group are the firms in the top quintile of state ownership and the firms with zero state ownership at the end of the third quarter of 2008. We compare the differences of leverage ratios before and during the credit boom in the whole sample and subsamples using a t-test.

Panel B reports difference-in-difference results for the treatment groups and their control groups. The approach of Abadie, Drukker, Herr, and Imbens (2004) is employed to match the firms in these four treatment groups with non-treatment firms in the data sample on 2008Q3. The variables used in the matching process are the market-to-book ratio, cash flow, cash holdings, size, state ownership, and industrial classification code, following the methods used in Almeida, Campello, Laranjera, and Weisbenner (2012) and Kahle and Stulz (2013). DID is the traditional difference-in-difference estimator. ATT is the Abadie-Imbens bias-corrected average treated effect on the treatment group. ***, **, and * are 1%, 5%, and 10% significance levels using heteroskedasticity-consistent standard errors, respectively.

Panel A: Quarterly leverage ratio before and during the credit boom

	Whole	Large	State-owned	Small	Private
Period averages	(1)	(2)	(3)	(4)	(5)
1. Pre-boom (2006Q3-2008Q3)	0.4946	0.5661	0.4933	0.4068	0.4672
2. Whole boom period (2008Q4-2010Q4)	0.4982	0.5948	0.5169	0.3973	0.4558
3. 1 year before boom (2007Q4-2008Q3)	0.4917	0.5738	0.4981	0.3966	0.4590
4. First year in boom (2008Q4-2009Q3)	0.4974	0.5937	0.5157	0.3960	0.4548
5. 2008Q1	0.4901	0.5727	0.4926	0.3973	0.4568
6. 2009Q1	0.4964	0.5852	0.5135	0.3990	0.4544
Difference (2-1)	0.0036*	0.0288***	0.0236***	-0.0095*	-0.0114**
Difference (4-3)	0.0057***	0.0199***	0.0177***	-0.0006	-0.0042
Difference (6-5)	0.0063***	0.0125**	0.0209***	0.0017	-0.0024
Number of firms	1470	294	296	294	504

Panel B: The average changes of quarterly leverage ratio before and during the credit boom				
	Large	State-owned	Small	Private
	(1)	(2)	(3)	(4)
Pre-boom (2006Q3-2008Q3) versus the whole boom period (2008Q4-2010Q4)				
Treatment: whole boom - pre-boom	0.0288	0.0236	-0.0095	-0.0114
Control: whole boom - pre-boom	0.0007	0.0038	0.0021	0.0049
DID	0.0281***	0.0198**	-0.0117	-0.0163***
ATT	0.0226**	0.0276***	-0.0022	-0.0124*
Number of treatment firms	288	276	280	490
Number of observations in matching	1432	1432	1432	1432
1 year before boom (2007Q4-2008Q3) versus the first year in boom (2008Q4-2009Q3)				
Treatment: first year - 1 year before	0.0199	0.0177	-0.0006	-0.0042
Control: first year - 1 year before	0.0047	0.0043	0.0064	0.0074
DID	0.0152**	0.0134**	-0.0071	-0.0116**
ATT	0.0111	0.0201**	0.0043	-0.0091
Number of treatment firms	288	276	280	490
Number of observations in matching	1431	1431	1431	1431
2008Q1 versus 2009Q1				
Treatment: 2009Q1 - 2008Q1	0.0125	0.0209	0.0017	-0.0024
Control: 2009Q1 - 2008Q1	-0.0035	-0.0009	0.0087	0.0069
DID	0.0160**	0.0218***	-0.0070	-0.0093*
ATT	0.0085	0.0274***	0.0015	-0.0090
Number of treatment firms	262	257	250	445
Number of observations in matching	1321	1321	1321	1321

Table 8: Quarterly borrowings ratio

Panel A gives the quarterly borrowings ratio (bank loan ratio) for the whole sample and four treatment groups. It reports the average borrowings ratio in these samples in six periods/quarters. The groups of large firms and small firms are the firms in the top and bottom quintile of total assets in our data sample on 2008Q3. State-owned group and private group are the firms in the top quintile of state ownership and the firms with zero state ownership at the end of the third quarter of 2008. We compare the differences of borrowings ratios before and during the credit boom in the whole sample and subsamples using a t-test.

Panel B reports difference-in-difference results for the treatment groups and their control groups. The approach of Abadie, Drukker, Herr, and Imbens (2004) is employed to match the firms in these four treatment groups with non-treatment firms in data sample on 2008Q3. The variables used in the matching process are the market-to-book ratio, cash flow, cash holdings, size, leverage ratio, state ownership, and industrial classification code, following the methods used in Almeida, Campello, Laranjera, and Weisbenner (2012) and Kahle and Stulz (2013). DID is the traditional difference-in-difference estimator. ATT is the Abadie-Imbens bias-corrected average treated effect on the treatment group. ***, **, and * are 1%, 5%, and 10% significance levels using heteroskedasticity-consistent standard errors, respectively.

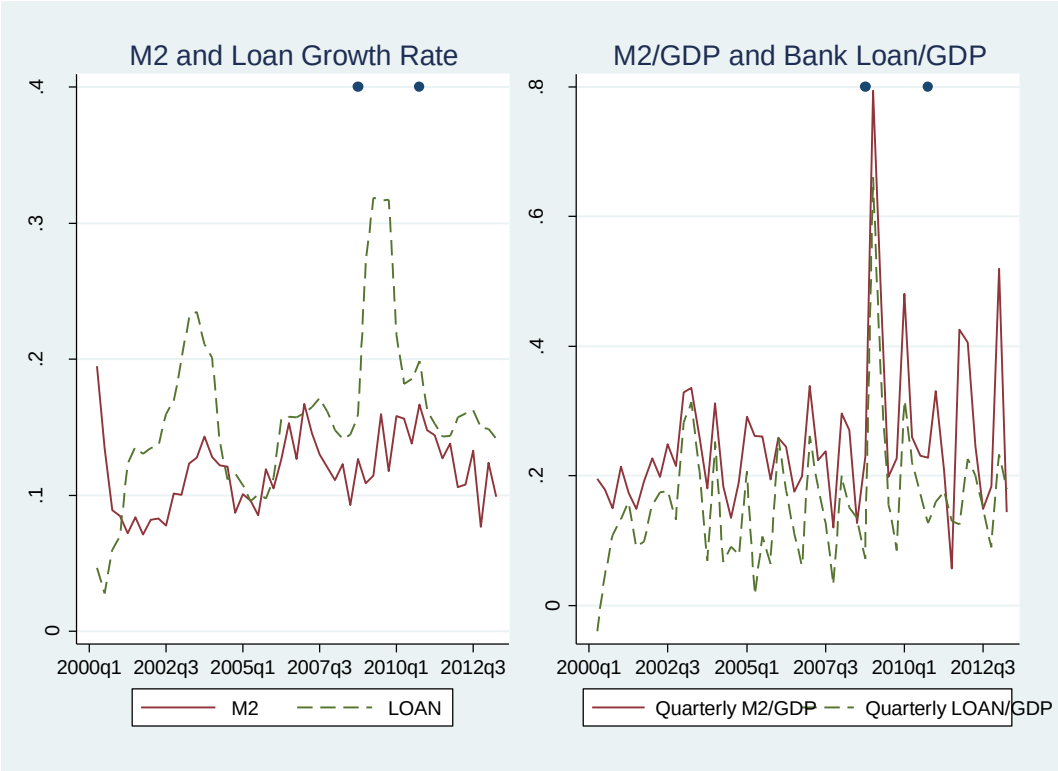
Panel A: Quarterly borrowings ratio before and during the credit boom

	Whole	Large	State-owned	Small	Private
Period averages	(1)	(2)	(3)	(4)	(5)
1. Pre-boom (2006Q3-2008Q3)	0.1512	0.1721	0.1305	0.1060	0.1538
2. Whole boom period (2008Q4-2010Q4)	0.1591	0.1876	0.1473	0.1133	0.1545
3. 1 year before boom (2007Q4-2008Q3)	0.1477	0.1721	0.1306	0.1040	0.1478
4. First year in boom (2008Q4-2009Q3)	0.1502	0.1641	0.1315	0.1170	0.1521
5. 2008Q1	0.0604	0.0771	0.0559	0.0437	0.0620
6. 2009Q1	0.0684	0.0814	0.0663	0.0448	0.0655
Difference (2-1)	0.0079***	0.0155***	0.0167***	0.0073*	0.0006
Difference (4-3)	0.0024	-0.0081**	0.0009	0.0130***	0.0042
Difference (6-5)	0.0080***	0.0042	0.0104**	0.0012	0.0036
Number of firms	1476	295	296	295	506

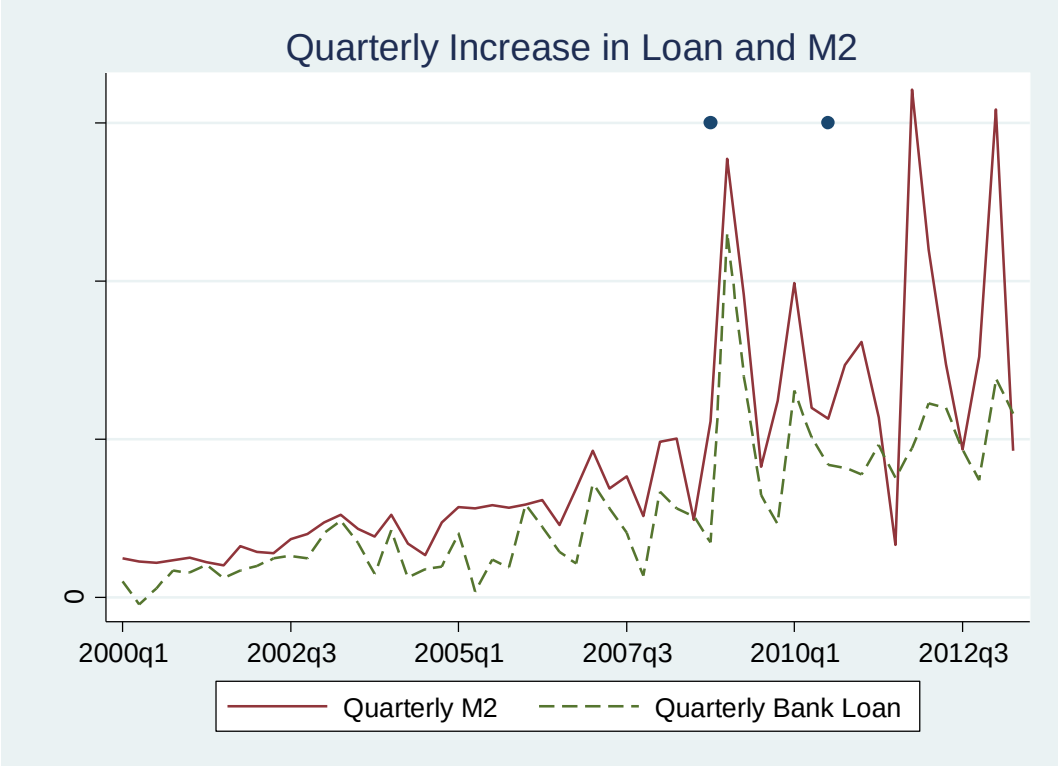
Panel B: The average changes of quarterly borrowings ratio before and during the credit boom

	Large	State-owned	Small	Private
	(1)	(2)	(3)	(4)
Pre-boom (2006Q3-2008Q3) versus the whole boom period (2008Q4-2010Q4)				
Treatment: whole boom - pre-boom	0.0155	0.0167	0.0073	0.0006
Control: whole boom - pre-boom	0.0086	0.0021	0.0103	0.0081
DID	0.0070	0.0147***	-0.0030	-0.0074*
ATT	0.0079	0.0194***	0.0052	-0.0068
Number of treatment firms	288	276	280	491
Number of observations in matching	1432	1432	1432	1432
1 year before boom (2007Q4-2008Q3) versus the first year in boom (2008Q4-2009Q3)				
Treatment: first year - 1 year before	-0.0081	0.0009	0.0130	0.0043
Control: first year - 1 year before	-0.0058	-0.0072	0.0065	0.0047
DID	-0.0023	0.0081*	0.0065	-0.0004
ATT	-0.0108**	0.0092*	0.0053	0.0000
Number of treatment firms	289	277	281	493
Number of observations in matching	1438	1438	1438	1438
2008Q1 versus 2009Q1				
Treatment: 2009Q1 - 2008Q1	0.0042	0.0104	0.0012	0.0036
Control: 2009Q1 - 2008Q1	0.0093	0.0009	0.0253	0.0107
DID	-0.0050	0.0095**	-0.0242***	-0.0072*
ATT	-0.0095*	0.0120**	-0.0264***	-0.0053
Number of treatment firms	260	255	249	444
Number of observations in matching	1316	1316	1316	1316

Figure 1: M2 and bank loan in China



Quarterly increase in M2 and bank loan



Appendix 1: Firm size, state ownership and variables of access to bank loan

Note: The sample data come from CSMAR. We firstly use quarterly data from 2002Q1 to 2013Q2 to identify the average firm size and state ownership for each company for the entire study period. Panel A shows the values of Firm Size and State Ownership at the mean, min, 20th percentile, 40th percentile, 60th percentile, 80th percentile and max. Panel B indicates the conditions, firm observations, and three firm characteristics for variables relating to access to bank loan. The values of the two loan access variables indicate the firm's ability to access bank loans and are coded 1 if they have access, and coded 0 if they have no access to bank loans. ACCESS(SIZE) is created from the firm size, following Leary (2009). It is equal to 1 if the firm size is in the upper two deciles of book asset value of all listed companies; and it is 0 if the firm size is in the lower two deciles. ACCESS(STATE) equal to 1 if the state ownership of a firm is in the upper two deciles of all listed companies; and it is equal to 0 if state ownership is 0. The average firm size (natural log of total assets) and proportion of state ownership for the groups with and without access to bank loans are also given in Panel B.

Panel A: Firm Variable	Mean	Min	20th Percentile	40th Percentile	60th Percentile	80th Percentile	Max
Firm Size (log value)	21.32	19.79	20.51	20.95	21.42	22.08	23.64
State Ownership (%)	0.16	0	0	0.01	0.19	0.34	0.66

Panel B: Access Variable	Condition	N	Firm Size (Mean)	State Ownership (Mean)
ACCESS(SIZE)=1	22.08<Firm Size<23.64	520	22.77	0.27
ACCESS(SIZE)=0	19.79<Firm Size<20.51	520	20.21	0.08
ACCESS(STATE)=1	0.19<State Ownership<0.66	1041	21.71	0.35
ACCESS(STATE)=0	State Ownership=0	927	20.98	0

Appendix 2: Definitions of variables

Variable	Variable Name and Brief Explanation
ACCESS(SIZE)	Indicator for access to bank loan by firm size. It is equal to 1 if the firm size is in upper two deciles of all firm observations and 0 if in the lower two deciles.
ACCESS(STATE)	Indicator for access to bank loan by state ownership. It is equal to 1 if state ownership is in the upper four deciles and 0 if state ownership is 0.
Net Loan	The increase in quarterly bank loans. It is the difference between outstanding bank loans this quarter and outstanding bank loans last quarter.
LOANGDP	Quarterly net loans to GDP
LNLOAN	Log value of quarterly net loans
RSDLOAN	Residual of an autoregressive–moving-average model of log quarterly bank loans on three lags of the same quarter's bank loans
FINCHOICE	Indicator for financing choices among internal funds, borrowings, and equity funds. It is equal to 0 if the company mostly uses internal funds, 1 if borrowings, and 2 if equity financing.
LEVERAGE	Book leverage=total liability/total assets
MTBV	Market to book value
LNTA	Firm size: natural log value of total assets
PROFIT	Profitability ratio=operating income/sale
TANG	Tangibility ratio=net fixed asset/total assets
AGE	Firm age from establishment quarter
CF	Cash flow ratio (internal funds)=(net income + depreciation)/ total assets
OPCF	Operating cash flow ratio=net cash flow from operating activities/lagged total assets

Variable	Variable Name and Brief Explanation
BORW	Borrowings ratio=proceeds from borrowings/total assets
NETBORW	Net borrowings ratio=(proceeds from borrowings - cash paid for repayment of principal)/total assets
EQUITY	Equity fund=proceeds from equity funds /total assets
NETEQUITY	Net equity fund=(proceeds from equity funds - dividend payments) / total assets
BOND	Bond fund=proceeds from bond issuance /total assets
OTHER	Other fund=other proceeds related to financing activities /total assets
CASH	Cash ratio=(cash and cash equivalents) / lagged total assets
GDPGROWTH	Quarterly GDP growth ratio