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Abstract

This study investigates how close bank-firm relationship affects Chinese listed firms' market performance from 1999 to 2004. We find that firms with stronger bank-firm relationship exhibit lower market value and there is a systematic lending bias towards firms with dominant state ownership. In addition, firms with worse market performance borrow more and firms within strategic industries borrow less due to the alternative financial support from the government. Overall, our results indicate that with the government being the ultimate owner of most banks and listed companies, the low firm value, poor lending practice and poor corporate governance are common in China.

Keywords: bank-firm relationship, firm performance, state-owned banks, China.

JEL Classification: G21, G30.

Introduction

This paper investigates a bank-firm relationship between Chinese banks and Chinese public listed firms and how this relationship affects listed firms' market performance. The question of whether a close bank-firm relationship improves firm performance has been studied in other economies. It is generally believed that establishing a good bank-firm relationship may help to reduce the conflicts between shareholders and creditors. Aoki, Patrick and Sheard (1994) point out that Japanese bank equity ownership provides a series of financial and non-financial services to their client-firms at substantially lower costs compared with their American counterparts over the past decades. There is a dozen of well documented literature to attribute the economic success of Germany to the close bank ties. Some authors argue that such close bank relationship can effectively monitor firms' management and their behavior on behalf of the other financial institution (Diamond, 1984; Fama, 1985; Horiuchi, Packer & Fukuda, 1988). In addition, such a relationship can mitigate the costs of financial instability and curb the information asymmetry. As a consequence, a firm with such a relationship can get debt easily and they should be associated with sound financial performance.

While the advantages of the close bank relationship are presented in the literature, a sizable number of empirical studies have shown the disadvantages in reality. Weinstein and Yafeh (1998) document that firms with a close bank relationship are always associated with lower profitability in a Japanese context. Kang and Stulz (2000) and Yao and Ouyang (2007) identify that there is a so-called 'dark side' of the bank-firm relationship. Actually, such relationship damages the firms' performance because

banks always act in the best interests of their own not the firms' interest even though sometimes they have equity holdings within those firms, since usually, the value of the debt banks lend to firms is greater than the equity holdings banks have on the firm.

The purpose of this study is to provide some empirical evidence on the impact of the strong bank-firm relationship on Chinese listed firms, since China provides a unique opportunity to investigate this topic. First, the existing literature on this topic in China is very limited. Second, Chinese corporate bond market is under-developed and extremely small. The major source of borrowing for Chinese industrial companies is banks. Third, China has its own characteristics of strong bank-firm relationship which are different from those in Japan or Germany. Although according to the China's banking law, Chinese commercial banks cannot hold equity of publically listed firms, all major Chinese banks and most listed firms are directly or indirectly owned by the Chinese government. The homogeneity of bank and firm ownership makes China an excellent context to test the link between this unique bank-firm relationship and the firm performance. As the state ownership of banks is common in countries other than the US (La Porta, López de Silanes and Shleifer, 2002) the results in this paper can be generalized. The fact that most Chinese banks and listed companies share the same owner could decrease the motivation of bank monitoring during lending. Some scholars argue that the poor lending practice and poor corporate governance in China lead to non-performance loans and poor financial performance of banks. In this paper, we focus on the impact of this bank-firm relationship on listed firms rather than bank performance.

In this paper, using both the ordinary least square (OLS) and the two stage least square (TSLS or 2SLS) to test the relationship among firm performance (measured by Tobin's Q), bank loan and investments, we find a significantly negative relationship between the close bank-firm relationship and the listed firms' performance. Moreover, this study

shows that there is a systematic lending bias in favour of firms with dominant state ownership. Finally, due to the government support, firms with worse market performance borrow more and firms in strategic industries borrow less.

The rest of this paper is organized as follows. Section 1 provides a literature review of the impact of the close bank-firm relationship on firm value and the background and structure of Chinese banking industry. Section 2 describes data, research methodology and develops hypotheses for this study. Section 3 presents and discusses empirical results, and the final Section concludes.

1. Literature review

Based on existing literature, most researchers and scholars agree that a close bank relationship has both advantages and disadvantages to companies. In different economies, banks control and affect firms not only through loans, but also through equity ownership and proxy voting.

1.1. Beneficial sides of the bank-firm relationship.

Diamond (1984) develops a model indicating that under a close bank-firm relationship, not only the bank monitoring costs would be mitigated at its lowest level, but does it suggest a solution to principal-agent problem. It can effectively prevent transfer of wealth from lenders to shareholders, and improve corporate governance (Prowse, 1990; Limpaphayom and Polwitoon, 2004). Theorists also suggest that this crucial relationship reduces the information asymmetries and incentive problems (Jensen and Meckling, 1976; Weinstein and Yafeh, 1998). It is broadly agreed that such problems (asymmetry and incentive) affect corporate investment to a large degree. Therefore, firms with such a relationship should improve their access to capital and invest more in the market. This argument is also well supported by Diamond's model (1991). Reputation effect is a key factor mentioned in his study. Firms acquiring loans from their banks could build a reputation and then disclose this information to the market. Diamond (1991) assumes that if moral hazard occurs in many places, this behavior indeed provides a certification of good credit; it is also viewed as a signal to outside investors. Ultimately, reputation effect helps firms to raise more funds on public markets either through equity or arm's length debt in the future.

Empirical finding indicates that investment for firms with close ties to a bank are less sensitive to liquidity than others financed with arm's length debt (Hoshi and Kashyap, 1991). Petersen and Rajan (1994) find a phenomenon of easy availability of funds to firms with close bank ties based on small U.S. business data. Best and Zhang (1993) illustrate that there is a positive and

statistically significant relationship between the bank loan announcements in the stock market and the firm value.

The strong bank-firm relationship maintains a significant role in the modern financial markets, especially during the financial distress. Many researchers agree that debt burdens make companies more unstable in economic turmoil. Hoshi, Kashyap and Scharfstein (1990) argue that a close bank relationship can reduce the costs of financial instability. Moreover, it is possible that a firm's main bank is also the main bank of its suppliers and even its customers. Therefore, this relationship can overcome the issues of credit expansion and trustworthiness among customers, suppliers, firms and banks. Empirical analysis in Hoshi et al. (1990) proves that this sort of relationship helps to reduce the costs of a financial crisis. They find a main bank would like to invest more in firms with such bank affiliations after business financial crisis than those without.

There is another reason why firms prefer a bilateral financing arrangement, i.e. to reduce the costs of information disclosure. Campbell (1979) points out that the small unknown companies with creative and promising ideas are viewed as major participators. They do not have a lot of internal funds or external opportunities raising money. More importantly, they do not need to disclose the proprietary technological information related to their 'leap-frog' product innovation to their competitors either in direct or indirect ways.

However, there is no free lunch in the world. A great amount of literature also demonstrates significant costs of this close bank relationship in the economy.

1.2. Side effects of the bank-firm relationship.

Theoretical analyses done by Sharpe (1990) and Rajan (1992) indicate that the relationship-building process between firms and banks is very costly to the borrowing side. Since the lending side flexes the borrowing agreement and gives the borrower financial aid at a favourable rate at the beginning, in return, the financial institution can accumulate a great amount of non-public material about the firm through this relation and finally have a bargaining power over the firm. Furthermore, by using this monopoly power, a bank could even threaten to cut off a firm's loan or simply charge it at a higher rate during the process of relationship building (Diamond, 1991). This is so, because there is an extra searching cost for the firm looking for an alternative bank to replace the current one. Also, if a firm discontinues the relationship with its current bank, others would view this as a negative sign due to information capture and adverse selection problems (Castelli, Dwyer Jr. & Hasan, 2006). These theories suggest another agency cost to borrowing firms.

If a close bank relationship makes firms' access to capital easier than those without such a relationship, better performance should be observed i.e. firms enjoy faster growth or high profitability among their peers. However, some empirical evidence shows opposite stories. Weinstein and Yafeh (1998) document a negative relationship between profitability and the degree of bank-firm relationship. Their sample period is prior to the Japanese financial market liberalization from 1977 to 1986. The evidence shows that although the strong bank ties did improve access to funds, this phenomenon has vanished since deregulation in early 1980s. Meanwhile, they conclude that banks conduct rent-seeking behavior which means banks use their monopoly power to siphon profits from their client-firms. Further, they find that banks tend to shy away from risky but profitable investment and put pressure on their client-firms. This could be one of the reasons that companies with close bank ties cannot beat non-relationship firms in the Japanese atmosphere. Moreover, Agarwal and Elston (2001) examine a hundred large listed German firms from 1970 to 1986 and they do not find any evidence showing the benefits of German universal banking relationship. Nevertheless, there is a negative relation between interest payment and bank-influenced firms although it is only significant at the 10% level. In addition, Agarwal and Elston (2001) conclude that existing easy access to capital benefit could be balanced by less risky projects taking or by rent-seeking effect.

Limpaphayom and Polwitoon (2004) support this argument by presenting similar Thai evidence. They test the relationship between firm performance and bank-firm relationship. Tobin's Q is used as a proxy of firm performance, and lending activities and bank ownership are used as explanatory variables. The lending variable illustrates a negative relationship with firm performance due to liquidity risk and information monopoly in Thailand. A negative concave function of bank ownership is found with firm performance. A close bank relationship may be beneficial to firms in the inception, but this effect declines after a certain point. This decline could be explained by the trade-off between effective monitor and entrenchment. This study also illustrates that a close bank firm relationship does improve capital investment. In addition, Limpaphayom and Polwitoon (2004) point out that an emerging market like Thailand suffers from poor corporate governance and this could further worsen firm performance through bank-firm relationship, since banks often act in the best interest for themselves rather than shareholders.

Finally, during early 1990s, the Japanese economy suffered a serious recession and the firms listed on the Tokyo Stock Exchange lost 57% of their market value on average (Kang and Stulz, 2000). This provided a unique opportunity to investigate how close bank relationship affects firms' performance in financial distress. Kang and Stulz (2000) document that firms without close bank relationship outperform those with such a relationship by 26% in terms of the value of their stocks. In this study, the authors control for the exposure to shocks, and conclude that economic shocks hit banks and therefore constrain the credit availability banks can provide to the firms. This implies an under-investment issue because banks feel too risky to finance more projects during financial distress. Ultimately, firms' performance is affected. However, Yao and Ouyang (2007) use similar data, but a bit different sample period from 1988 to 1992. They find over-investment rather than under-investment concern in Japan. They find evidence that banks use their monopoly power to control firms and fund them more; and thus get relative stable cash flows through interest payment. This also reduces the value of the firms.

1.3. Background of bank-firm relationship in China. The bank-firm relationship is a well researched area in developed countries like Germany, Japan, etc. On the contrast, limited studies have been done in emerging economies such as China.

Banking institutions, in China, include: the state-owned commercial banks (SOCB), policy lending banks (PLB), other commercial banks like joint-stock commercial banks (JSCBs) and city commercial banks, the credit cooperatives and foreign banks. The Chinese government has been very conservative in allowing foreign banks' entry, and therefore, foreign banks play a comparatively minor role in highly constrained Chinese financial market. Four SOCBs containing the Agricultural Bank of China, the Bank of China, the China Construction Bank, and the Industrial and Commercial Bank of China, take a dominant position in China's banking system, and control about three-fourths of the nation's banking assets. The government also has major ownership in other players in the banking sector.

Similar to banks in other transitional economies, Chinese banks play an important role in ensuring stable economic growth, in fulfilling companies' huge financing need, and in carrying out policy lending activities. Loans are major assets for all banking institutions in China. On average, loans accounted for over 60% of banking assets in 2003. Most of the loans (over 85%) are lent to the corporate sector and that makes 85% of banks' profits (Garcia-Herrero, Gavila and Santabarbara, 2006). In

state-owned enterprises (SOEs), which are major economic components in China, 95.6% of their working capital and 99.8% of its inventories are financed from SOCBs (Bonin, 1999).

Policy lending has been an issue of SOCBs. The government has ownership in both the SOEs and SOCBs. SOEs not only significantly contribute to the Chinese economy, but also provide much employment. However, the SOEs often perform badly due to their unclear ownerships, incentive issues, etc. Therefore, it is not uncommon to observe that the government directly or indirectly command banks to support SOEs in many ways, even by financing heavily to those loss-making ones. This is also called soft budget constraint, which refers that companies do not concern too much the financial risk and always wait for bailout (Lu, Thangavelu and Hu, 2005). Berger Hasan and Zhou (2009) document that since the four SOCBs made most of their loans to the state-owned enterprises, which had little incentive to repay, the asset quality of these banks deteriorated significantly during the 1990s. To improve this situation, the government established three policy banks (the Long-term Development and Credit Bank, the Agricultural Development Bank and the Import-Export Bank) in 1994, trying to take over the policy-lending from the state-owned banks. In addition, in 1999 the government founded four state-owned asset management companies, which brought 1.4 trillion RMB of non-performing loans (NPLs) of the Big Four (roughly 20% of their total loans) at its face value.

Lu, Thangavelu and Hu (2005) document that more bank loans are allocated to high risky SOEs than non-SOEs in China. Their empirical results are based on dataset from Genius Database, from 1994 to 1999. They find that lending bias exists in China. However, they have not documented anything about the firm performance and bank-firm relationship. Although in China the bank-firm relationship is very different from those in Japan or Germany, we treat SOEs as firms with strong bank relationship because the government owns both SOEs and major banks in China and the government has lending policy to support SOEs.

2. Data and methodology

2.1. Data. All market data obtained for this research was collected from the China Stock Market and Accounting Research Databases (CSMAR), commercially available at Shenzhen GTA Information Technology Company Ltd. The sample period is from 1999 to 2004 due to the availability of relevant databases. In addition, the sample is adjusted by deleting financial firms and firms

with less than six months of trading data. Finally, our sample includes 5102 firm years for the period of 1999-2004¹.

2.2. Methodology. In general, there are three common ways used in the previous literature to define the close bank relationship. First, we can use a proxy to define the business and/or personal relationship between a bank and a company, but such a proxy is very hard to observe. Second, there is a stream of research using equity ownership as the close bank-firm relationship proxy (Yao and Ouyan, 2007; Limpaphayom and Polwitoon, 2004). Third, loan share is an alternative according to Sheard (1994) and Gibson (1995). They document that the amount of loan from banks is a good proxy for the bank-firm relationship. Three proxies mentioned above have been showed as highly correlated.

In our study, we use two variables to measure the bank-firm relationship. One is the bank-loan² and the other is the proportion of the state-owned shares in listed companies. As Chiu and Lewis (2006) point out, since China's banking law does not allow banks to own shares of listed companies on the stock exchange, the amount of loan is the only available choice in this case. We believe that the higher the bank loans (debt to assets ratio), the stronger the bank-firm relationship is. In addition, most Chinese listed companies and banks are owned directly or indirectly by the State. It cannot be denied that government influence would continue, although those effects may phase out in the future. Thus, we believe the state ownership would have an impact on the bank-firm relationship. Under the same rationale, Wu and Yue (2009) use the percentage of non-tradable shares to measure the accessibility of bank loans and find that firms that have a higher percentage of non-tradable shares do have a higher level of access to bank loans. Among non-tradable shares, there are three major categories, including the state-owned shares, state-owned legal person shares and legal person shares. Since legal person shares are owned by common legal entities, here we use the percentage of the state-owned shares (the sum of state-owned shares and state-owned legal person shares) as the measure of companies' potential connection with the government and banks and the companies' accessibility of bank loans. Fan, Wong and Zhang (2007) argue that other things being equal, when the government shares are

¹ In particular, we have 663 companies in 1999, 554 in 2000, 814 in 2001, 937 in 2002, 1025 in 2003 and 1,109 in 2004.

² In the empirical test, we use the total debt as a substitute for the bank-loan, since there is no bank-loan information in the financial statements. In addition, according to Firth, Lin and Wong (2008), in China most borrowing comes from banks due to the extremely small size of the corporate bond markets.

getting larger, the firm tends to be better connected politically. This connection is very crucial because through this kind of connection, firms might easily get bank loans and subsidies from banks. In China, the better the political connection is, the stronger the bank-firm relationship would be.

Our model used in this study is based on the research by Limpaphayom and Polwitoon (2004), Tian and Estrin (2008) and Wei, Xie and Zhang (2005). The hypotheses of the three sets of tests are provided in the following sections.

2.2.1. Firm performance. First, we test how bank-firm relationship affects the firm market performance measured by Tobin's Q.

As we mentioned earlier, we do not have the data to directly measure the bank loans. However, most debt the firms have is bank loans because the corporate bond market in China is not an active one. Therefore, the ratio of debt to assets is used here. Gorton and Schmid (2000) state that a bank-firm relationship can improve firm performance due to the effective monitoring. James (1987) also finds evidence that there is a positive relationship between bank loans and firm value. On the other hand, Weinstein and Yafeh (1998) find evidence that firms with such bank-firm relationships are always associated with lower profitability. Morck and Nakamura (2000) also suggest that an under-investment problem occurs when a negative bank-firm relationship exists. In China, a negative relationship between debt ratio and firm value is expected due to the poor corporate governance. The ultimate owner of the majority of banks and listed firms is the Chinese government. The central and local governments always use SOEs to fulfil their political interests. For example, in China some key projects that the government assigns to SOEs are not always associated with potential future profitability or positive NPV, since a lot of the projects serve the political interests and the projects are related to some key officials' promotion. However, those firms carrying out government-related projects can usually borrow significant amount from banks with government support. The monitoring role of banks is compromised. Therefore, a negative relationship between debt to assets ratio and firm performance is hypothesized.

The second variable we use to measure bank-firm relationship is the state-ownership. Researchers have studied the relationship between the state-ownership and firm performance before. Anderson, Lee and Murrell (2000) and Gupta, Ham and Svejnar (2001) find that the state ownership can have a positive impact on efficiency in emerging markets. However, more recent evidences overwhelmingly

support a negative relationship (Dewenter and Malatesta, 2000; Megginson and Netter, 2001; Wei et al., 2005; Tian and Estrin, 2008). They point out that the state ownership is detrimental to firm value because the government is more interested in achieving their political interests rather than economics interests. In this paper, we follow other studies to test the non-linear relationship between the state ownership and firm value by adding a quadratic term of state-owned shares (SO^2). Wei et al. (2005) and Ng, Yuce and Chen (2009) both document a U-shape relationship that is up to a certain turning point, firm value decreases as the government shareholding goes up, but beyond this point the firm value increases. The reasoning here is that although the state-ownership is inefficient to profit maximization and company management, once the state becomes the dominant shareholder, the political connection and power can perhaps increase the firm value. Thus, a U-shape relation between the state ownership and firm value of listed companies, measured by Tobin's Q, is expected.

We also include the following control variables in our regressions. First, we are interested in how foreign ownership of listed companies affects the firm value. Wei et al. (2005) and Tian and Estrin (2008) document a positive relationship between firm performance and foreign shareholdings. They suggest that foreign investors can effectively monitor and influence management of the firm that they are holding. Thus, we expect a positive relationship between the firm value and the firm's foreign ownership. Second, natural logarithm of total assets is used in our model for controlling the firm size. Wei et al. (2005) argue that the bigger is the firm, the more severe is the agency problem. Thus, a negative relationship between the firm size (Log_TA) and Tobin's Q is expected. Third, we control for the firm's financial performance. Return on equity is an accounting measure of firm performance, so we expect a significantly positive coefficient for the variable return on equity. Finally, firm investments could have some impact on firm value. On one hand, more investments should bring more benefits to firms as a whole because firms grow through additional investments. On the other hand, firms' value might be reduced if most investments are politically-oriented rather than profit-oriented. The hypotheses and the model are shown as follows. Tables 1 and 2 (see Appendix) show the descriptions of variables in this study and the statistic summary of these variables, respectively.

H₁₋₁: There is a significantly negative relationship between debt to assets ratio and firm market performance.

H₁₋₂: There is a significantly U-shape relationship between the state-ownership and firm market performance.

H₁₋₃: There is a significantly positive relationship between the foreign shareholding dummy and firm market performance.

H₁₋₄: There is a significantly negative relationship between firm size and firm market performance.

H₁₋₅: There is a significantly positive relationship between return on equity and firm market performance.

H₁₋₆: There is a significantly positive/negative relationship between investments and firm market performance.

$$\text{Tobin's } Q_{it} = \alpha + \beta_1 \text{Foreign}_{it} + \beta_2 \text{SO}_{it} + \beta_3 \text{SO}_{it}^2 + \beta_4 \text{Log_TA}_{it} + \beta_5 \frac{\text{Debt}}{\text{Assets}_{it}} + \beta_6 \text{ROE}_{it} + \beta_7 \text{INV}_{it} + \varepsilon_{it} \quad (1)$$

2.2.2. Debt ratio. Next, we want to reversely test the relationship between firm performance and debt ratio and see whether our previous argument still exists. Due to the poor corporate governance and the fact that the government is the ultimate owner of most banks and listed companies, policy lending is popular in China. Although common economic sense tells us that banks should lend more to better performing companies, it might well not be the case in China. Researchers find that higher Tobin's Q is likely to be associated with higher debt ratio, since firms with better performance indeed have higher capacity to borrow more from banks. However, in China listed companies are valuable resources to the central and local governments, and the government has the incentive to support listed companies, especially poor-performing ones by allowing banks to lend more money to them. In this case, a negative relationship between Tobin's Q and companies' debt ratio is expected in our study.

The relationship between the state-ownership and the debt to assets ratio is also tested. As mentioned earlier, a strong and significant government connection might make a firm receive debt financing easier, since most banks are government owned. Therefore, a positive relationship between the two variables is expected. The quadratic term is also added to test whether there is a non-linear relationship between the state-ownership and the debt ratio.

In our model, we use a strategic industry dummy variable, which is also used in Wei et al. (2005) and Tian & Estrin (2008). They use the strategic industry dummy for the protected and supported industries, such as energy, iron, steel, oil refinery, petrochemicals, communications and heavy machinery. In China, the government always gives strong support to companies in those industries, by offering tax rebates and special subsidies. Therefore, the needs for companies in the strategic industry to bor-

row are not as strong as for other companies. We expect a negative relationship between the strategic dummy variable and the debt ratio.

We have other control variables in the regressions also. A positive relationship is expected between investments and debt ratio because more investments would require more debt on average, and under a weak bank monitoring system, this firm's need can be satisfied. Cash flows are predicted to be negatively correlated with debt ratio because a firm with high cash flows would be rich in cash and thus it has lower needs to borrow, *ceteris paribus* (Lu, Thangavelu and Hu, 2005). Finally, Smith and Watts (1992) document that high-growth firms tend to use more equity rather than debt to finance their growth, so we expect a negative relationship between sales growth and debt to assets ratio.

H₂₋₁: There is a significantly negative relationship between Tobin's Q and the debt to assets ratio.

H₂₋₂: There is a significantly positive relationship between the state-ownership and the debt to assets ratio.

H₂₋₃: There is a significantly negative relationship between the strategic industry dummy variable and the debt to assets ratio.

H₂₋₄: There is a significantly positive relationship between investments and the debt to assets ratio.

H₂₋₅: There is a significantly negative relationship between cash flows and the debt to assets ratio.

H₂₋₆: There is a significantly negative relationship between sales growth and the debt to assets ratio.

$$\frac{\text{Debt}}{\text{Assets}_{it}} = \alpha + \beta_1 \text{Log_TA}_{it} + \beta_2 \text{SO}_{it} + \beta_3 \text{SO}_{it}^2 + \beta_4 \text{Tobin's } Q_{it} + \beta_5 \text{SID}_{it} + \beta_6 \text{INV}_{it} + \beta_7 \text{CF}_{it} + \beta_8 \text{SalesG}_{it} + \varepsilon_{it} \quad (2)$$

2.2.3. Investments. Since the investments are related to the debt ratio, this relationship is also tested in this study. According to the perking order theory, managers would prefer internal financing rather than external financing due to the cost concerned. In this case, a company with higher cash flows would invest more, since the cost of internal funding is lower than that of external funding (Limpaphayom and Polwitoon, 2004). In addition, a positive relationship between debt ratio and investments is anticipated due to weak monitoring on bank lending. The same logic applies to the state ownership. Firms with more state-owned shares would invest more due to the strong connections with banks and the government. Finally, a firm with relatively high growth would invest more because firms with high growth want to invest more to ensure investors their future prospects. We also use logarithm of assets to control the size of firms.

H_{3.1}: There is a significantly positive relationship between cash flows and investments.

H_{3.2}: There is a significantly positive relationship between debt ratio and investments.

H_{3.3}: There is a significantly positive relationship between the state ownership and investments.

H_{3.4}: There is a significantly positive relationship between sales growth and investments.

$$INV_{it} = \alpha + \beta_1 CF_{it} + \beta_2 \frac{Debt}{Assets_{it}} + \beta_3 SO_{it} + \beta_4 SalesG_{it} + \beta_5 Log_TA_{it} + \varepsilon_{it} \quad (3)$$

2.2.4. OLS and 2SLS. Table 3 (see Appendix) shows the correlation matrix of independent variables used in our models. We can see that no correlation is high enough to cause the multicollinearity problem in our models. In this study, we first run all three regressions using the ordinary least square method. Since Tobin's Q and debt ratio appear in both equations (1) and (2) as dependent and independent variables, there is potential causality between them. Therefore, we use the two-stage least square¹ method to rerun regressions 1 and 2, and then compare the two results between using OLS and 2SLS.

In order to avoid the potential endogeneity problem, given our dataset and following Wei et al. (2005), we identify the strategic industry variable (SID) and foreign ownership as our instrument variables. When deciding the debt level, the banks and the government take into account whether the firm is in a strategic or important industry. Thus, we argue that SID affects debt ratio, but not Tobin's Q, and we also argue that foreign ownership affects Tobin's Q, but not the debt ratio. In addition, the independent variables in our regressions are the previous year-end data in comparison with the dependent variables.

3. Empirical results

Table 4 (see Appendix) shows the regression results using both OLS and 2SLS methods on equations (1) and (2). We can see that both methods give quite consistent results with regard to the signs and significance of coefficients of variables. All the regression results have been corrected for heteroskedasticity using White's (1980) method. As seen from Table 4, both debt to assets ratio and Tobin's Q are statistically significant in equations (1) and (2). This suggests a simultaneous effect in our models. Therefore, the interpretation using 2SLS method is more accurate than that using OLS method. However, the OLS results are still reported in our study for comparison purpose.

3.1. Firm performance. The results in Table 4 illustrate that the coefficient of debt ratio is significantly negative at the 1% level, as we expected.

Since we use debt ratio to measure the bank-firm relationship, this result indicates that more debt or stronger bank-firm relationship in China decreases value of listed companies. Banks do not play an important role in monitoring listed companies since most banks and listed companies ultimately both belong to the State. Previous studies on other markets find that the close bank-firm relationship either benefits both banks and firms or benefits the banks only. Our result shows that the bank-firm relationship in China certainly cannot benefit listed companies. How about the effect of this relationship on the bank side? We do not provide empirical answers to this question in our paper. However, as mentioned earlier, the Chinese government has established four state-owned assets management companies in 1999 to write off 1.4 trillion Yuan of non-performing loan from the four state-owned banks. Berger et al. (2009) analyse the efficiency of Chinese banks over 1994-2003 and find that Big Four SOCBs are by far the least efficient ones due to policy lending activities. Therefore, it is plausible to conclude that the close tie between firms and banks in China does not seem to benefit either borrowing firms or banks. This result is understandable considering the poor corporate governance in the Chinese financial markets due to the unclear ownership of banks and companies.

We find a U-shape relationship between the state ownership and firm performance. We interpret this result from a different angle. Originally, the Chinese government had 100% ownership of a firm. Since the government began to privatize a particular firm, the shareholding of the government starts to decrease from 100%. As the state ownership decreases, the firm performance decreases first, and then starts to improve after the turning point. As for the explanation, similar to Wei et al. (2005), as the state-owned shares decrease, the proportion of the non-state-owned shares gradually goes up at the same pace. However, the firm value is low because non-state shareholders lack the incentive to monitor or discipline the management of a firm before their share proportions reach the turning point. In addition, as the proportion of the state-ownership decreases, some benefits of being a wholly state-owned company have been weakened, such as easy access to bank loans or entitlements of government subsidies and tax cut. Both negative effects will reduce the firm value at the beginning of the privatization process. After the turning point, the high proportion of the non-state ownership will increase the efficiency of firms' management, and therefore increasing firms' value. In our study, the turning point is 41.76%. Our sample is a year-firm dataset with 5102 observations. Figure 1 shows the distribution of listed companies regarding the state-

¹ For the method of 2SLS, please refer to Brooks (2002), pp. 314-315 and pp. 324-327.

ownership. From Figure 1 (see Appendix), we can see that 3,690 observations are above the turning point and the rest of 1,412 observations are below the turning point.

We find most of the coefficients of control variables are significant with expected signs. First, there is a significantly positive relationship between foreign shareholding dummy and firm performance measured by Tobin's Q. This suggests that foreign holdings can monitor firm management and therefore improve firm performance which is consistent with some previous empirical studies (Wei et al., 2005; and Tian and Estrin, 2008). Second, it is the same as we anticipated that there is a negative relationship between the firm size and its performance, indicating that the bigger is the firm, the more severe is the agency problem. Finally, the signs of coefficients are consistent with our expectations for return on equity and investments, although the coefficient on ROE is statistically insignificant. Our result shows the evidence that more investment opportunities are associated with higher Tobin's Q.

3.2. Debt ratio. As expected, we find that Tobin's Q has a significantly negative relationship with the debt ratio, indicating that companies with lower Tobin's Q borrow more. Since the government plays an important role in bank lending decisions, and the government has strong connections with most of the listed companies, often banks lend money to the companies which "need" money, rather than to the companies which would offer high returns to banks. This phenomenon, somehow, explains the big amount of bad loans in Chinese banks.

Interestingly, we find that there is a U-shape relationship between the state-ownership and debt ratio of a company. After the turning point which is roughly at 60% of the state ownership, a positive relationship is observed and more debt would be obtained as more state-ownership a company has. This is simply because firms with a strong government connection have the priority to obtain more loans from banks, especially state-owned banks. Lu, Thangavelu and Hu (2005) identify that there is a systematic lending bias in favour of SOEs from Chinese banks. In our sample (5102 observations), there are 1,978 observations above the turning point (60%) and the rest of the sample is below the turning point. However, as for why this relationship is negative before the state-ownership reaches its turning point, we offer the following explanations. Below the turning point, when the state ownership is around 40-60%, the weightings of the state-ownership and other ownership are very similar. No dominant shareholder exists in the company, and therefore the State does not have strong motivation to help the company to get bank loans where there are "free riders" in the company. When the state owner-

ship keeps dropping further down, the company's performance would increase as found in this study and many others. These companies should be able to get more bank loans based on their good performance.

Our results also show that there is a significantly negative relationship between the strategic industry dummy variable and the debt ratio. In China, the central and local governments give firms in the strategic industry subsidies and tax rebates on a regular basis. For instance, Fu-Jian Express Way Limited belongs to the strategic industry and it mainly does highway infrastructure projects in Fu-Jian province. This firm was reported to receive direct subsidies of \$18 million yuan from the government in 1998, which accounted for 58% of its profits in that year (Tian and Estrin, 2008). Moreover, Sinopec Limited received 22.93 billion yuan in the second quarter in 2008 and PetroChina obtained rebates of 75% on the 17% tax levy on crude imports in the second quarter of 2008 as well (Wang, 2008). Those funds are given by the government and used to support refinery projects, investments and operations of firms in strategic industry. Thus, for those companies, the needs of borrowing from banks are not so strong.

We also find significant and expected results on other control variables (investments, cash flows and sales growth rate).

3.3. Investments. The results for equation 3 in Table 5 (see Appendix) are consistent with our hypotheses. The coefficient of cash flows is significantly and positively related to investments, indicating that firms with more cash flows invest more than others. Our results also suggest a significantly positive relationship between debt ratio, state ownership and investments, which supports our argument that firms with higher debt ratio and stronger government connection invest more in a poor corporate governance environment. Finally, firm growth and firm size impact investment level positively.

3.4. Robustness tests. For the robustness check, OLS and 2SLS are run separately by year to year from 1999 to 2004 for equations (1) and (2). In general, the regression results using both OLS and 2SLS run year by year give a consistent picture on the signs and significance of variable coefficients as pooled regressions. In addition, based on the CSMAR database, we add 12 industry dummies into our pooled OLS and 2SLS regressions and there is no change in our results also¹.

¹ The 12 industries are food fishing agriculture and forestry, mining, manufacturing, utilities, construction, transportation and warehousing, information technology, wholesale and retail trade, real estate, social services, communication and cultural industries, and conglomerates. We do not provide the tables of the results for the robustness checks due to the size limitation.

Conclusions

The purpose of this research is to empirically investigate how close bank-firm relationship affects listed firms' performance in a state-owned bank system like China¹. Previous studies suggest that the close bank-firm relationship can either benefit both banks and firms or give advantages to banks for most of the time. However, this scenario does not exist in China. First, this paper provides the evidence that firms with stronger bank-firm relationship exhibit lower market value. Second, there is a systematic lending bias towards firms with high and dominant state ownership. Third, firms with worse market performance (lower Tobin's Q) borrow more from banks, and firms within strategic industries borrow less due to other financial support they get from the government. Therefore, we conclude that with the government being the ultimate owner of most banks and listed companies, the close bank-firm relationship turns out not to be a win-win situation in China.

In summary, our study provides some insights for policy makers on how to improve the quality of listed companies in China. It is crucial that a country's financial system is established on sound corporate governance. Currently, under the strong ownership connections among the government, banks and listed companies, a close bank-firm relationship cannot show its benefits to either listed firms or banks. However, the Chinese government is partially privatising three of the Big Four SOCBs, by taking on minority foreign ownership and going public with some of the shares. At the same time, the Chinese government started the non-tradable share reform in April 2005, gradually reducing the non-tradable shares (including the state-owned shares) in listed companies. With the above changes of the ownership of state-owned commercial banks and state-owned listed companies, hopefully, there will be some positive effects of the bank-firm relationship in China in not too distant future.

Reference

1. Agarwal, R. & Elston, J.A. (2001). Bank-firm relationship, financing and firm performance in Germany, *Economic Letters*, 72(2), 225-232.
2. Anderson, J.H., Lee, Y. & Murrell, P. (2000). Competition and privatization amidst weak institutions: evidence from Mongolia, *Economic Inquiry*, 38, 527-549.
3. Aoki, M., Patrick, H. & Sheard, P. (1994). The Japanese main bank system: an introductory review, in Masahiko Aoki and Hugh Patrick, eds: *The Japanese Main Bank System*, Oxford, UK: Oxford University Press.
4. Berger, A.N., Hasan, I. & Zhou, M.M. (2009). Bank ownership and efficiency in China: what will happen in the world's largest nation? *Journal of Banking and Finance*, 33, 113-130.
5. Best, R. & Zhang, H. (1993). Alternative information sources and the information content of bank loans, *Journal of Finance*, 48(4), 1507-1522.
6. Bonin, J.P. (1999). Banking Reform in China: Gradually Strengthening Pillar or Fragile Reed? *Working paper (William Davidson Institute)*, University Of Michigan Business School, 1-30.
7. Brooks, C. (2002). *Introductory econometrics for finance*, Cambridge, UK: Cambridge University Press.
8. Campbell, T.S. (1979). Optimal investment financing decisions and the value of confidentiality, *Journal of Financial and Quantitative Analysis*, 14(5), 913-924.
9. Castelli, A., Dwyer Jr. G.P. & Hasan, I. (2006). Bank relationships and small firms' financial performance, *Working Paper Series (Federal Reserve Bank of Atlanta)*, 5, 1-26.
10. Chiu, B. & Lewis, M.K. (2006). *Reforming China's state-owned enterprise and banks*, Cheltenham, UK: Edward Elgar publishing Limited.
11. Dewenter, K. & Malatesta, P. (2000). State-owned and privately-owned firms: an empirical analysis of profitability, leverage, and labour intensity, *American Economic Review*, 91, 320-334.
12. Diamond, D.W. (1984). Financial intermediation and delegated monitoring, *Review of Economic Studies*, 51, 393-414.
13. Diamond, D.W. (1991). Monitoring and reputation: the choice between bank loans and directly placed debt, *Journal of Political Economy*, 99, 689-721.
14. Fama, E. (1985). What's different about banks, *Journal of Monetary Economics*, 15, 29-39.
15. Fan, J., Wong, T.J. & Zhang, T. (2007). Politically connected CEOs, corporate governance, and post-IPO performance of China's newly partially privatized firms, *Journal of Financial Economics*, 84, 330-357.
16. Firth, M., Lin, C. & Wong, S.M.L. (2008). Leverage and investment under a state-owned bank lending environment: evidence from China, *Journal of Corporate Finance*, 14, 642-653.
17. Garcia-Herrero, A., Gavila, S. & Santabarbara, D. (2006). China's banking reform: an assessment of its evolution and possible impact, *Economic Studies*, 52(2), 304-363.
18. Gibson, M. (1995). Can bank health affect investment? Evidence from Japan, *Journal of Business*, 68, 281-308.
19. Gorton, G. & Schmid, F.A. (2000). Universal banking and the performance of German firm, *Journal of Financial Economics*, 58, 29-80.

¹ A common method is to compare how this bank-firm relationship affects listed state-owned companies and listed private companies differently. However, due to the extreme small number of listed private enterprises in Chinese stock markets, it is not feasible to set up this matching group in our paper. Instead, we use the percentage of state-owned shares in our study to control the different levels of government connections of listed companies.

20. Gupta, N., Ham, J.C. & Svejnar, J. (2001). Priorities and sequencing in privatization: theory and evidence from the Czech Republic, *Working Papers (William Davidson Institute)*, University of Michigan Business School, 1-62.
21. Horiuchi, A., Packer, F. & Fukuda, S. (1988). What role has the "Main Bank" played in Japan, *Journal of the Japanese and International Economies*, 2, 159-180.
22. Hoshi, T. & Kashyap, A. (1991). Corporate structure, liquidity, and investment: evidence from Japanese industrial groups, *Quarterly Journal of Economics*, 106(1), 33-60.
23. Hoshi, T., Kashyap, A. & Scharfstein, D. (1990). The role of banks in reducing the costs of financial distress in Japan, *Journal of Financial Economics*, 27(1), 67-88.
24. James, C. (1987). Some evidence on the uniqueness of bank loans, *Journal of Financial Economics*, 19, 217-235.
25. Jensen, M.C. & Meckling, W. (1976). The theory of the firm: managerial behavior, agency costs, and ownership structure, *Journal of Financial Economics*, 3, 305-360.
26. Kang, J.K. & Stulz, R.M. (2000). Do banking shocks affect borrowing firm performance? An analysis of the Japanese experience, *Journal of Business*, 73, 1-23.
27. La Porta, R., López de Silanes, F. & Shleifer, A. (2002). Government ownership of banks, *Journal of Finance*, 57, 265-301.
28. Limpaphayom, P. & Polwitoon, S. (2004). Bank relationship and firm performance: evidence from Thailand before the Asian financial crisis, *Journal of Business Finance and Accounting*, 31, 1577-1600.
29. Lu, D., Thangavelu, S.M. & Hu, Q. (2005). Biased lending and non-performing loans in China's banking sector, *The Journal of Development Studies*, 41(6), 1071-1091.
30. Megginson, W.L. & Netter, J. (2001). From state to market: a survey of empirical studies on privatization, *Journal of Economic Literature*, 39, 321-389.
31. Morck, R. & Nakamura, M. (2000). Banks, ownership structure, and firm value in Japan, *Journal of Business*, 73, 539-567.
32. Ng, A. Yuce, A. & Chen, E. (2009). Determinants of state equity ownership, and its effect on value/performance: China's privatized firms, *Pacific-Basin Finance Journal*, 17, 413-443.
33. Petersen, M.A. & Rajan, R.G. (1994). The benefits of lending relationships: evidence from small business data, *Journal of Finance*, 49(1), 3-37.
34. Prowse, S.D. (1990). Institutional investment patterns and corporate financial behavior in the United States and Japan, *Journal of Financial Economics*, 27(1), 43-66.
35. Rajan, R. (1992). Insiders and outsiders: the choice between informed and arm's – length debt, *Journal of Finance*, 47, 1367-1400.
36. Sharpe, S.A. (1990). Asymmetric information, bank lending, and implicit contracts: a stylized model of customer relationships, *Journal of Finance*, 45(4), 1069-1087.
37. Sheard, P. (1994). Reciprocal delegated monitoring in the Japanese main bank system, *Journal of the Japanese and International Economies*, 8, 1-21.
38. Smith, C.W. & Watts, R. (1992). The investment opportunity set and corporate financing, dividend and compensation policies, *Journal of Financial Economics*, 32, 263-292.
39. Tian, L. & Estrin, S. (2008). Retained state shareholding in Chinese PLCs: does government ownership always reduce corporate value? *Journal of Comparative Economics*, 36, 74-89.
40. Wang, Y. (2008). *SINOPEC says 2008 is company's most 'difficult' year*. Retrieved August 26th, 2008 from the Bloomberg news at the following webstie: <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aVgh13ha7DCQ>.
41. Wei, Z., Xie, F. & Zhang, S. (2005). Ownership structure and firm value in China's privatized firms: 1991-2001. *Journal of Financial and Quantitative Analysis*, 40(1), 87-108.
42. Weinstein, D.E. & Yafeh, Y. (1998). On the costs of a bank-centered financial system: evidence from the changing main bank relations in Japan, *The Journal of Finance*, 53(2), 635-672.
43. Wu, L.S. & Yue, H. (2009). Corporate tax, capital structure, and the accessibility of bank loans: evidence from China, *Journal of Banking & Finance*, 33, 30-38.
44. Yao, J. & Ouyang, H. (2007). Dark-side evidence on bank-firm relationship in Japan, *Japan and the World Economy*, 19, 198-213.

Appendix

Table 1. Descriptions of variables used in this study

Variables	Descriptions
Cash flows (CF)	Net income plus depreciation then divided by total assets.
Debt to assets ratio	The ratio of short-term debt plus long-term debt and then divided by total assets.
Foreign	This is a dummy variable: 1 means that company has foreign shares (B-share or H-share) and 0 otherwise.
Investments (INV)	It is defined as the gross investment in capital assets (measured by fixed assets in current year minus fixed assets in previous year) divided by total assets.
Log assets (Log_TA)	Natural logarithm of total assets.
Return on equity (ROE)	The ratio of net income scaled by shareholders' equity.

Table 1(cont.). Descriptions of variables used in this study

Variables	Descriptions
Sales growth (SalesG)	It is calculated as sales in the current year minus sales in the previous year and then divided by sales in the previous year.
State-owned shares (SO)	The state-owned shares plus state-owned legal person shares divided by the total number of shares.
Strategic industries (SID)	It is a dummy variable: equal to 1 if a firm belongs to one of the strategic industries and 0 otherwise.
Tobin's Q	Tobin's Q proxy defined as the total market value of equity plus liabilities divided by the book value of the assets.

Table 2. Descriptive statistics of variables in the study

Variables	Mean	Median	Standard deviation	Min	Max
Cash flows (CF)	0.1593	0.1341	0.1441	-1.3752	1.2486
Debt to total assets	0.2444	0.2383	0.1365	0.0001	0.7783
Investments (INV)	0.0551	0.0222	0.0803	0.0000	0.7951
Log total assets (Log_TA)	21.1883	21.0884	0.8586	18.7715	26.8546
Return on equity (ROE)	0.0202	0.0628	0.4269	-6.2157	0.9662
Sales growth (SalesG)	0.2685	0.1525	0.9752	-4.4110	29.8578
State-owned shares (SO)	0.5109	0.5452	0.1842	0.0000	0.9131
Tobin's Q	1.8820	1.7129	0.8211	0.3437	3.9988

Table 3. Correlation matrix of variables in the study

	CF	DEBT RATIO	FOREIGN	INV	LOG_TA	ROE	SALESG	SID	SO	TOBIN'S Q
CF	1.0000									
DEBT RATIO	-0.2229	1.0000								
FOREIGN	0.0461	0.0058	1.0000							
INV	0.1060	0.0590	-0.0596	1.0000						
LOG_TA	0.2438	0.0203	0.2446	0.1159	1.0000					
ROE	0.3221	-0.1901	-0.0192	0.1138	0.1218	1.0000				
SALESG	0.0213	-0.0221	0.0048	0.1011	0.0515	0.1094	1.0000			
SID	0.1082	-0.0731	0.0358	-0.0288	0.1108	0.0164	-0.0018	1.0000		
SO	0.2793	-0.1631	-0.1388	0.0516	0.0997	0.0848	-0.0201	0.0874	1.0000	
TOBIN'S Q	0.0218	-0.1157	0.0213	-0.0424	-0.4522	0.0383	-0.0637	-0.0120	0.0296	1.0000

Note: This table shows the correlation matrix of variables in the study. We can see that no correlation is high enough to cause the multicollinearity problem in our models.

Table 4. OLS and 2SLS regression results

Tobin's Q as dependent variable				Debt ratio as dependent variable			
Variables	Expected sign	2SLS results	OLS results	Variables	Expected sign	2SLS results	OLS results
C		12.869***	12.578***	C		0.762***	0.262***
Foreign	+	0.376***	0.399***	Log_TA		-0.015**	0.005**
SO	-	-1.768***	-1.327***	SO	+	-0.277***	-0.239***
SO ²	+	2.116***	1.925***	SO ²	+	0.233***	0.181***
Log_TA	-	-0.477***	-0.497***	Tobin's Q	-	-0.058***	-0.016***
Debt ratio	-	-2.783***	-0.489***	SID	-	-0.013***	-0.015***
ROE	+	0.004	0.147***	INV	+	0.136***	0.135***
INV	+/-	0.488***	0.174	CF	-	-0.169***	-0.198***
				SalesG	-	-0.007***	-0.005***
Turing point		0.4176		Turing point		0.5949	
N (pooled)		5102	5102	N (pooled)		5102	5102
Adjusted R-squared		0.2537	0.2560	Adjusted R-squared		0.0824	0.0844

Note: * at the 10% significant level, ** at the 5% significant level, *** at the 1% significant level. This table shows the regression results using both OLS and 2SLS methods on the equations (1) and (2) as follows. Since Tobin's Q and debt ratio appear in both equations as dependent and independent variables, there is potential causality between them. Therefore, we use the 2SLS method as well as the OLS method.

$$Tobin's Q_{it} = \alpha + \beta_1 Foreign_{it} + \beta_2 SO_{it} + \beta_3 SO^2_{it} + \beta_4 Log_TA_{it} + \beta_5 \frac{Debt}{Assets}_{it} + \beta_6 ROE_{it} + \beta_7 INV_{it} + \varepsilon_{it},$$

$$\frac{Debt}{Assets}_{it} = \alpha + \beta_1 Log_TA_{it} + \beta_2 SO_{it} + \beta_3 SO^2_{it} + \beta_4 Tobin's Q_{it} + \beta_5 SID_{it} + \beta_6 INV_{it} + \beta_7 CF_{it} + \beta_8 SalesG_{it} + \varepsilon_{it}.$$

The variables in the regressions include: *Tobin's Q* (the total market value of equity plus liabilities divided by the book value of the assets); *debt ratio* (the ratio of short-term debt plus long-term debt and then divided by total assets); *foreign* (1 means that company has foreign shares, such as B-share or H-share, and otherwise 0); *SO* (the state-owned shares plus state-owned legal person shares divided by the total number of shares); *Log_TA* (natural logarithm of total assets); *ROE* (the ratio of net income scaled by shareholders' equity); *INV* (investments which is defined as the gross investment in capital assets divided by total assets); *SID* (a dummy variable, equal to 1 if a firm belongs to one of the strategic industries, and otherwise 0); *CF* (cash flows, measured by net income plus depreciation then divided by total assets); and *SalesG* (sales growth rate, calculated as sales in the current year minus sales in the previous year and then divided by sales in the previous year). All the regression results have been corrected for heteroskedasticity using the White's (1980) method.

Table 5: OLS regression results (investments as the dependent variable)

Variables	Expected Signs	Coefficients
C		-0.140***
CF	+	0.052***
Debt ratio	+	0.050***
SO	+	0.014**
SalesG	+	0.008***
Log_TA		0.008***
N		5102
Adjusted R-squared		0.0352

Notes: * at the 10% significant level, ** at the 5% significant level, *** at the 1% significant level. This table shows the regression results using the OLS method on the equation (3) as follows:

$$INV_{it} = \alpha + \beta_1 CF_{it} + \beta_2 \frac{Debt}{Assets}_{it} + \beta_3 SO_{it} + \beta_4 SalesG_{it} + \beta_5 Log_TA_{it} + \varepsilon_{it}.$$

The dependent variable is *INV* (investments which is defined as the gross investment in capital assets divided by total assets). The independent variables include *CF* (cash flows, measured by net income plus depreciation then divided by total assets); *debt ratio* (the ratio of short-term debt plus long-term debt and then divided by total assets); *SO* (the state-owned shares plus state-owned legal person shares divided by the total number of shares); *SalesG* (sales growth calculated as sales in the current year minus sales in the previous year and then divided by sales in the previous year); and *Log_TA* (natural logarithm of total assets). The regression results have been corrected for heteroskedasticity using the White's method (1980).

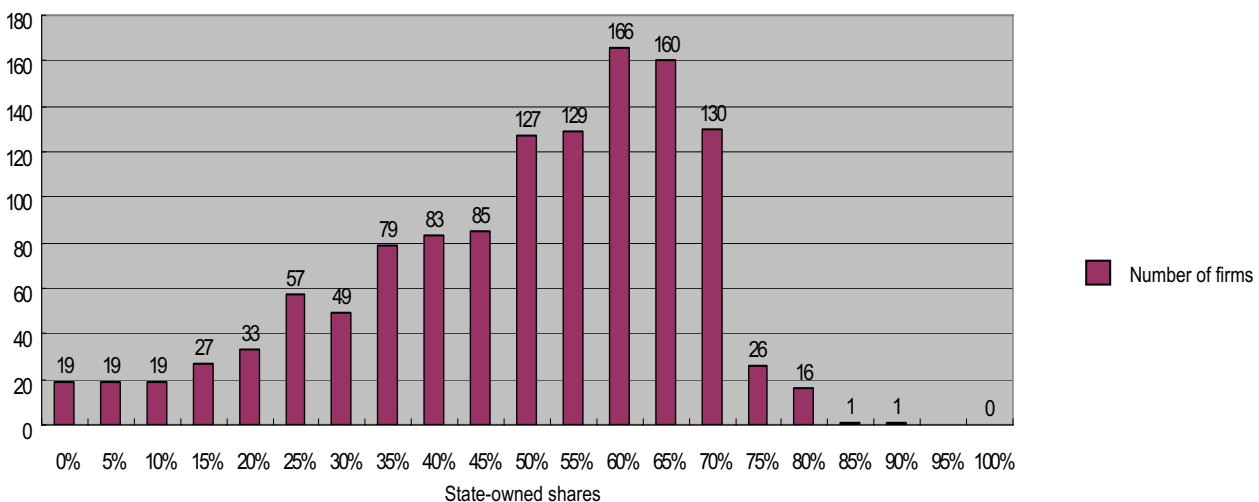


Fig. 1. Distributions of listed companies regarding the proportion of the state ownership