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Ownership structure, corporate governance, and collateral requirements: evidence from China's listed firms

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**OWNERSHIP STRUCTURE, CORPORATE GOVERNANCE, AND COLLATERAL REQUIREMENTS:
EVIDENCE FROM CHINA'S LISTED FIRMS**

*A thesis submitted in partial fulfilment of the
requirements for the award of the degree

DOCTOR OF PHILOSOPHY

from

UNIVERSITY OF WOLLONGONG

by

Can An

SCHOOL OF ACCOUNTING, ECONOMICS AND FINANCE, FACULTY OF BUSINESS

2014

CERTIFICATION

I, Can An, declare that this thesis, submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy, in the School of Accounting, Economics & Finance of the Faculty of Business, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Can An

15 March 2014

DEDICATION

This dissertation is dedicated to my parents

Songhua An and Deqin Zhang

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My first and most sincere appreciation goes to my principal supervisor Professor Gary Tian. He showed kindness and patience throughout my enrolment in the PhD programme at the University of Wollongong. He also gave me helpful advice and comments at every stage, and supported me while attending international conferences and then revising my thesis accordingly. I really appreciated his constant encouragement to complete this thesis. Professor Tian taught me about the strict and scientific attitude needed for academic research, whilst his insight, criticism, and intellectual rigor and academic enthusiasm influenced me profoundly.

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ABSTRACT

Since the 2007 financial crisis the use of collateral has again come back into the focus of academics and practitioners. However, the existing literature on the determinants of collateral has concentrated mostly on developed markets, especially the U.S. and the U.K., although collateral is even more important due to the opaque information that exists in developing markets. This thesis conducted useful tests of whether the theories that have been established and applied to explain the determinants of collateral in developed markets are applicable to the world's largest emerging market, China. Since China introduced economic reforms in the late 1970s, it has been growing at high speed, with the banking sector being the primary source of finance for its growing economy (Bailey et al., 2011). With this pronounced economic expansion and increasing competition for funds, the investigation of collateral requirements in bank loans has been an extrusive issue in China.

Firstly, this research examined the effect of ownership structure on collateral requirements using a sample of China's listed firms. I found that compared to non-state-owned enterprises (non-SOEs), state-owned enterprises (SOEs) were less likely to be required to pledge collateral. The empirical results also showed that banks were more willing to offer unsecured loans to companies with more foreign ownership or with more bank loans guaranteed by third parties, and the aforementioned effect of state ownership on reducing collateral requirements became weaker in those companies. This research also found that the aforementioned effect of state ownership on reducing collateral requirements became more pronounced for firms operating in regions with more government intervention.

Secondly, this research examined the effect of ownership structure on the lending relationships in China's listed firms. The findings indicated that SOEs were more likely to receive bank loans from state-owned banks than non-SOEs. The empirical results also showed that firms with more foreign ownership were more likely to receive bank loans from foreign banks. There was no significant difference between SOEs and non-SOEs in the probability of obtaining loans from joint stock commercial banks, while firms with more foreign ownership were more likely to obtain loans from this type of banks. Moreover, both SOEs and firms with more foreign ownership were more likely to maintain multiple banking relationships. It was also found that firms that operated in regions with a better institutional environment had more concentrated ownership in bank loans rather than multiple banking relationships. My findings also implied that joint stock commercial banks have a comparative advantage in processing private information and delivering relationship lending rather than collateral based lending, while concentrated banking relationships were also helpful for gathering information and reducing collateral requirements. Moreover, the role of concentrated banking relationships in reducing collateral requirements was greater for firms that borrow from joint equity commercial banks.

Finally, this research examined the effect of internal and external corporate governance mechanisms on collateral requirements from a tunnelling perspective. Using a sample of China's listed firms, I found that better-governed firms were less likely to be expropriated by their controlling shareholder and therefore had lower collateral requirements. In particular, large owners other than the largest one could form coalitions and challenge the opportunistic dominant shareholder and the collateral requirements were accordingly lower, and the effect of other large shareholders was more significant in non-SOEs. In terms of the board of directors and the supervisory board, the collateral

requirements were lower for firms with a smaller board of directors, a larger fraction of independent directors, where the chairman and CEO positions were separate, and where there was a larger supervisory board. Moreover, the effects of these board characteristics were more significant for SOEs than non-SOEs. I also found evidence that a better institutional environment within China helped to reduce collateral requirements and the role of institutions were more significant for non-SOEs. Finally, I found that employing professional experts on the supervisory board showed the benefit of reducing the collateral requirements for both SOEs and non-SOEs, and the role of professional supervisors was more significant in more developed regions than in less developed regions.

In summary, this thesis contributes to the literature of collateral based lending, banking relationship, and corporate governance, and provides evidence that corporatisation and privatisation exercised significant effects on the level of collateral requirements when China's listed firms were used as an example. Specifically, ownership structure can impact on the collateral requirements and also on the banking relationships. The effect of corporate governance on collateral requirements varied across the ownership types.

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ABBREVIATIONS

CBRC	China Banking Regulatory Commission
CEO	Chief Executive Officer
CSMAR	China Stock Market & Accounting Research Database
CSRC	China Securities Regulatory Commission
FDI	Foreign Direct Investment
GDP	Gross Domestic Production
IPO	Initial Public Offering
NAO	National Auditing Office
SASAC	State-Owned Assets Supervision and Administration Commission
SOEs	State Owned Enterprises
SOECGs	State Owned Enterprises affiliated to central government
SOELGs	State Owned Enterprises affiliated to local government
ST	Special Treatment
PT	Particular Transfer
OLS	Ordinary Least Squares
2SLS	Two-Stage Least Squares
U.S.	United States
U.K.	United Kingdom

CHAPTER ONE: INTRODUCTION

1.1 Research motivation

Collateral requirements are terms that are widely used in loan contracts. Credit market research explains collateral as either an attempt to compensate ex ante asymmetric information (Bester, 1985, Chan and Kanatas, 1985; Besanko and Thakor, 1987) and/or a method of reducing ex post incentive problems (Thakor and Udell, 1991), which arise in transactions between borrowers and lenders. Literature also find empirical evidence that collateral requirements relates to measures of borrower risk and proxies for private information (e.g., Jimenez et al., 2006, 2009). Just as Menkhoff et al. (2006, 2012) showed, most studies focus on mature U.S. and European markets, while the evidence about the determinants of collateral requirements in emerging markets is scarce. Therefore, the first motivation was the scarcity of research into the determinants of collateral requirements in an emerging market such as China. Although China has been one of the fastest growing economies, it also has an under developed legal system and financial market (Allen et al., 2005; Firth et al., 2009), where the banking sector has been the primary source of finance for its growing economy (Bailey et al., 2011). In the light of these facts the Chinese government introduced a series of reforms to the banking sector to promote the allocation of bank loans. Accordingly, this study presents evidence about the determinants of collateral requirements in lending decisions in China and tests whether they are consistent with the theories that have developed from mature markets.

Second, it is well documented that government ownership could provide an implicit protection against bankruptcy through state-owned banks (e.g., Faccio et al., 2006; Firth et al., 2009; Lin, 2011), but the effect of state ownership on collateral requirements in

different scenarios have not been answered yet. China's listed firms provide an excellent environment in which to examine the effect that ownership structure has on collateral requirements because one of the important features of China's listed firms is that the ownership of the dominant shareholder, which in many cases is the state, far exceeds that of the second largest shareholder. On that basis this research was able to assess the implications that this type of controlling shareholder would have when determining the collateral requirements.

Third, this research performed a complete test for the role of ownership structure in banking relationships, including both bank ownership type and number of banking relationships. A number of important policy and research issues concern the banking relationships with business firms, for which existing literature also suggests that such relationships may play key roles in resolving information problems and mitigating imperfections in the financial market (Berger et al., 2008). This thesis adds to the extant literature by testing the relationship between firms' ownership structures and different bank ownership types, and investigating the impact of ownership structure on the number of banking relationships. Moreover, the empirical literature has not yet settled some important issues such as the effect that the number of banking relationships has on collateral requirements and how the interactive effect between bank ownership type and number of banking relationships affects collateral requirements.

Fourth, recent studies also showed that banks reward borrowers with a higher quality of corporate governance with less collateral requirements because they are less likely to be tunnelled by their controlling shareholders (e.g., Francis et al., 2012; Ge et al., 2012). However, Larcker et al. (2007) argued that existing studies do not have a consensus on the appropriate measurement of good corporate governance indicators or the number of

corporate governance dimensions, and very little is known about the relative importance of various governance mechanisms. To address this issue, this thesis focused on comprehensive measures and dimensions of corporate governance practices in Chinese companies and examined their effects on collateral requirements. Moreover, it is still a question as to whether the effect of internal and external governance mechanisms on collateral requirements depends on the type of controlling shareholder.

Finally, it is still an unresolved question about whether the determinants of collateral requirements can be ascribed to the evolution of the country's market institutions even though the law and finance literature has indicated that institutional features play a very important role on collateral requirements across countries (e.g., Qian and Strahan, 2007; Bae and Goyal, 2009). China has been suffering significant problems with regional disparity, despite having achieved great progress in its market-oriented institutional transformation (Fan et al., 2011). This enabled this research to test the relationship between the institutional environment and the collateral requirements within one country, and the under-researched joint impact of the institutional features and borrower's characteristics such as ownership structure and corporate governance. Moreover, the law and finance literature has examined the association between the institutional environment and the number of banking relationships through cross-country studies. China's dataset provided an excellent opportunity to test this question, which has major advantages over cross-country studies in addressing the issues related to accounting rules, culture, and other country-level variables (Li et al., 2009).

1.2 Research findings

This research empirically examined the determinants of collateral requirements by hypothesizing that collateral requirements are a function of firm-specific and macroeconomic variables. The research findings are documented in three parts.

Chapter 3 outlines the fact that SOEs have lower collateral requirements than non-SOEs. Moreover, there is a negative relationship between collateral requirements and foreign ownership, and the effect of state ownership in reducing collateral requirements is weaker for firms with more foreign ownership. Firms with more guaranteed loans are relatively less risky and will use less collateral loans, and the benefit of state ownership in reducing collateral requirements is weaker for firms with more third party guaranteed loans. Finally, this research showed that disparity in regional government intervention matters where state ownership plays a role in collateral requirements; specifically, more intervention by regional government related to a stronger role of state ownership in reducing collateral requirements. Although the state often retains substantial ownership in China's listed firms, this ownership is undertaken by different types of agencies, each of which has different motivations and incentive structures. Following Firth et al. (2006) and Chen et al. (2009), this research grouped SOEs into those affiliated to central government (SOECGs) and those affiliated to local government (SOELGs) and found that SOECGs had the lowest level of collateral requirements, SOELGs were in the middle, and non-SOEs had the highest collateral requirements. This thesis also argues that state ownership is important for bank finance in the Chinese private sector; indeed I found that having a state minority ownership significantly reduces the collateral requirements of non-SOEs.

In Chapter 4, China's banks were divided into four types (policy state-owned banks¹, the big four state-owned banks², joint stock commercial banks and foreign banks) to examine whether they have different lending relationships with borrowers' ownership structures. I found that SOECGs and SOELGs have a higher probability of obtaining loans from policy state-owned banks and the big four state-owned banks, respectively. Moreover, there was no significant difference between SOEs and non-SOEs in the probability of obtaining loans from joint stock commercial banks, while firms with more foreign ownership were more likely to obtain loans from this type of banks. I also found firms with more foreign shares have a higher probability of obtaining loans from foreign banks. In terms of the number of banking relationships, it increases with state control and foreign ownership, and decreases with institutional development. Finally, this research found that the policy state-owned banks were less likely to require firms to pledge collateral than the big four state-owned banks. Moreover, joint stock commercial banks are less likely to require firms to pledge collateral than foreign banks. Compared to the multiple banking relationships, concentrated banking relationships reduce collateral requirements and the benefits of these concentrated relationships are greater for firms that borrow from joint stock commercial banks.

In Chapter 5 the role of corporate governance in the collateral requirements of bank loans was investigated from a tunnelling perspective. I found that a negative relationship existed between the monitoring from non-controlling block shareholders to controlling shareholder and collateral requirements. Moreover, collateral is less likely to

¹ Policy state-owned banks include the Agricultural Development Bank of China (ADBC), the China Development Bank (CDB), and the Export-Import Bank of China (EXIMBC).

² The big four state-owned banks include the Bank of China (BOC), the People's Construction Bank of China (PCBC), the Agriculture Bank of China (ABC), and the Industrial and Commercial Bank of China (ICBC).

be required when the corporate board of directors is smaller, has more independent directors, or the CEO and chairman are separate. In terms of the supervisory board, firms with a larger supervisory board and more expertise in laws and accounting have lower collateral requirements. It was also found that the development of external governance was negatively associated with collateral requirements. Some governance attributes are more significant for SOEs (e.g., board size, independence, separation of CEOs and chairman, and supervisory board size), whereas other governance attributes such as the internal governance of other large shareholders and the development of external governance were more significant for non-SOEs. Finally, a detailed investigation indicated that supervisory expertise and external governance complemented each other in reducing the collateral requirements.

1.3 Contributions

This thesis has made the following contributions:

Firstly, microeconomic theories of banking and financial contracting have explained the widespread use of collateral as a means of reducing credit rationing under asymmetric information. In developed markets, empirical literature has also been well documented about the determinants of collateral requirements in loan contracts (Menkhoff, 2006, 2012). This research used data on financial loans extended to listed firms in China, the largest developing country, to provide a useful test of whether the theories that were established and applied to explain determinants of collateral requirements in developed markets are applicable to emerging markets. These findings could also provide a useful template for future comparative research based on other emerging and developed markets.

Secondly, there is a growing body of economic literature on the association between state ownership and access to finance in developing and transition countries (e.g., Borisova and Megginson, 2011). This thesis presented fresh evidence on the effect of state ownership and its interaction effect with firms or regional factors on the collateral requirements in loan contracts. In addition, because partially privatised and fully state-owned companies maintain dominant positions in all emerging market economies and continue to be the most important and valuable companies in the European economies, the relationship between the state ownership of business firms and bank lending policies that this research documented can also help guide governments that are undertaking wide privatisation waves.

Thirdly, this thesis adds to the extant literature about banking relations (e.g., Berger et al., 2008) by testing the relationship between firms' ownership structures and different bank ownership types, and investigating the impact of ownership structure on the number of banking relationships. Moreover, there have been limited studies which examine the association between banking relationships and collateral requirements as this research did, so this thesis offers a more complete research framework and empirical evidence.

Ever since SOEs were reformed and restructured in 1978, corporate governance has been a major issue in China, so by using a more complex and multi-dimensional construct to measure the quality of corporate governance, this research not only contributed to the discussion about the effect of corporate governance on contract requirements (Francis et al., 2012; Ge et al., 2012), it also provides an empirical basis for evaluating the effectiveness and relative importance of corporate governance mechanisms in China. This research also presents the output for SOEs and non-SOEs,

respectively, which provided a more detailed examination of whether the effects of governance mechanisms on the collateral requirements in Chinese listed firms depends on the type of controlling shareholder.

1.4 Structure of the thesis

The thesis is presented in six chapters, with the main structure of each being as follows:

Chapter 1 introduces an overview of the research motivation, research findings, professional significance of the thesis, and organization of the dissertation.

Chapter 2 provides an overview of the Chinese economic reform and the potential implication for collateral requirements in China, such as ownership structure, the banking sector, corporate governance mechanisms, and institutional development across different provinces.

Chapter 3 examines the association between ownership structure and collateral requirements. It begins with a general introduction of the topic, the relevant background is investigated, and then the basic hypotheses on the determinants of collateral requirements such as state ownership and its association with other firm characteristics or government intervention based on reviews of the historical research is presented. To test this primary hypothesis the corresponding data was collected and summarised, and then an estimation model was proposed and the empirical evidence was presented. Finally, some robust checks and additional investigation was conducted.

In addition, to establish a complete research framework, the association between ownership structures and banking relationships was investigated in Chapter 4. In particular, the main conclusion obtained from Chapter 3 (that SOEs have lower

collateral requirements) is mainly a consequence of the good bank-firm relationships. As no direct empirical evidence has been presented on this issue, Chapter 4 is a timely investigation and provides additional evidence from the emerging market. Then in Chapter 5, the role of corporate governance mechanisms in collateral requirements, based on the type of controlling shareholders, was investigated. Overall, this research empirically examined the determinants of collateral requirement by hypothesizing that collateral requirement is a function of firm-specific and macroeconomic factors.

Chapter 6 includes a summary of the thesis, the implications of the research, and its limitations and recommendations for future research.

CHAPTER TWO: INSTITUTIONAL BACKGROUND

Extant literature has well documented China's transition from a centrally planned socialist economy to a rapidly expanding commercially oriented economy; a transition with significance for the formation of the ownership structure of Chinese listed firms. This transformation also involves improvements in the commercial banking system and the development of a contracting environment. These factors have enabled this research to check whether the collateral requirements differ depending on ownership structures and banking relationships, or whether it can be ascribed to the evolution of the country's market institutions. There has also been a widespread adoption of western corporate governance practices in China, but the effects of these mechanisms on collateral requirements are still unanswered questions.

2.1 Ownership structure

China began its transition from a centrally planned economy to a market-based economy in 1978. Under its communist system the government collected revenues from SOEs and provided financing to those firms according to the state budget, so there was no need for risk management by banks making use of collateral. Since the reformation of SOEs began the state tried to give autonomy to enterprises, link reward to performance and subsequently relinquish its shareholding. That was followed in the early 1980s by the adoption of the "loan for (fiscal) grant" (*bo gai dai*) scheme which was aimed at increasing financial incentives and hardening budget constraint faced by SOEs. A new phase of reform began in 1984 when the separation between management and ownership was further emphasised. In the Third Plenary session of the Fourteenth Chinese Communist Party Congress held in 1993, a new goal, the establishment of a modern enterprise system, was set for SOE reform. A reform of shareholding was then

extended throughout the nation, which resulted in many SOEs being restructured into joint stock companies and being listed on the stock exchanges in Shanghai and Shenzhen, and with shares sold to the public. However, governments at various levels often retained enough shares to maintain control, although some of the equity carved out of SOEs is now majority owned by private investors, and there are a growing number of private firms that are now listed.

According to the “Guidelines on Shareholding Experiments” and “Regulatory Opinions on Joint Stock Companies” issued in 1992, shares in China’s listed firms are classified into six types: state, legal person³, foreign, management, employee, and individual. On average, about one third of shares are owned by the state, one third are owned by legal entities, and one third are owned by individuals and private institutions. Foreign, management, and employee shares represent less than 10% of the outstanding shares so they do not constitute major voting blocks.

A distinct characteristic of Chinese firms is that they often have one dominant shareholder whose ownership is much higher than the second largest shareholder. It was revealed that on average, the largest shareholder owns 36.6% (median is 35.3%) of a firm while the second largest owns 8.46% (median is 5.63%), which indicates that the largest shareholder has substantial control over the firm. Chen et al. (2009) points out that China’s firms should be categorised according to the type of controlling shareholder instead of the share type that followed the legal classification of the shares because early studies that treated state shares and legal person shares as two distinct groups do not adequately acknowledge the different objectives and incentives of the shareholders. In

³ Legal person shares are owned by the state and by private firms.

line with recent literature, this thesis investigated both shares of China's listed companies based on the ultimate identification of the controlling shareholders and ownership concentration by other large shareholders and accounted for how they faced different comparative advantage of access to direct bank credit.

2.2 Evolution of the banking sector

The Chinese banking system has experienced fundamental structural reforms along with China's comprehensive economic reforms that began in 1978. The aim was to transform the sector from being state-owned, monopolistic and policy driven to a multi-ownership, competitive, and profit-oriented system. This section contains brief reviews of the reform procedure of the banking industry that have important implications for their commercialised operations.

The reform process can be divided into three periods:

2.2.1 First stage of financial reform (1978–1993)

To support a centrally planned economy China established the People's Bank of China (PBOC) in December of 1948. Prior to 1978, the Chinese financial system followed a mono-bank model that only consisted of PBOC. The banks in the PBOC system were part of the hierarchy to ensure that national production plans would be fulfilled. During 1978–1993, the financial system began the first round of financial reform aimed at restructuring the operations of its banking system. The PBOC was designated as the central bank while the government established the "Big Four" wholly state-owned and specialised banks to take over the lending functions of the PBOC. This included the Bank of China (BOC) which specialised in transactions related to foreign trade and investment; the People's Construction Bank of China (PCBC) which specialised in

transactions related to fixed investments; the Agriculture Bank of China (ABC) which specialised in all the banking business in rural areas, and the Industrial and Commercial Bank of China (ICBC) which took over all the commercial transactions of the PBOC. Sequentially, the Big Four banks were allowed to enter and compete in all sectors in 1985, but bank loans based on government direction and policies rather than commercial principles still predominated in the Chinese banking sector in the 1980s and early 1990s (Linton, 2006), so there was little room or need for risk management by the use of collateral.

2.2.2 Second stage of financial reform (1994–2002)

The structure of the Chinese banking system evolved further over time, such that in 1994 three wholly state-owned policy banks were established, including the Agricultural Development Bank of China (ADBC), the China Development Bank (CDB), and the Export–Import Bank of China (EXIMBC). Specifically, ADBC took over the policy lending role of the ABC, while CDB took over the policy lending role of the ICBC and PCBC, and EXIMBC took over the policy lending role of BOC. The government set up the policy banks to assume responsibility for non-commercially oriented loans, so the Big Four banks would be free to pursue commercial objectives.

Second, in May 1995 the government enacted the “Commercial Banks Law of the People’s Republic of China” to construct a legal commercial banking system, and officially commercialised the operations of state-owned banks by directing them towards commercial business based on the market principles of capital adequacy, profitability, risk, and liquidity. As a result, securities such as collateral and third party guarantees become widely used by commercial banks as important risk management tools.

Additionally, a breed of dynamic joint stock commercial banks (banks organised as companies limited by shares) has been rapidly emerging. Contrary to state-owned banks which had the state as the single shareholder, joint stock commercial banks have a plurality of shareholders. As argued elsewhere, the plurality of shareholders may significantly reduce political interference in the business of these banks, thus delivering better performance (Lin and Zhang, 2009).

2.2.3 Third stage of financial reform (2003–present)

The third stage was from 2003 when the China Banking Regulatory Commission (CBRC) was established, primarily to monitor the lending behaviour of banks. The “Commercial Banks Law of the People’s Republic of China” was also revised at the end of 2003 to oversee banking reforms and regulate banking operations. The Law also stipulated that banks evaluate each customer’s level of credit risk and collateral ability in their lending decisions. Until 2004, the Big Four banks were still SOEs with one owner – the Chinese government – but in 2005 they began to be privatised by recruiting strategic investors and being listing on the stock exchange. However, the government was still the largest shareholder and retained control of the Big Four banks while the stock control of the joint stock commercial banks was fairly diversified (Ferri, 2009).

With the WTO commitments, the Chinese banking sector was also fully opened to foreign financial institutions in December 2006. Foreign banks are allowed to enter China to build a commercial presence through four forms of entry: foreign bank branch, wholly owned foreign banks, joint ventures, and foreign equity investment. Among these categories, foreign banks branch, wholly owned foreign banks, and joint ventures are defined as foreign (funded) banks operating in China. Foreign equity investment in Chinese banks is an important form of foreign entry, but because foreign investors can

only acquire minority ownership of domestic banks at present, those banks remain Chinese banks.

As of 2006, China's commercial banking system consisted of the Big Four banks, policy banks, joint stock commercial banks, and foreign banks. The structure of China's banking industry is summarised in Table 2.1. According to Almanac of China's Finance and Banking, it is shown that the Big Four banks continue to dominate, with market shares well in excess of 50% in both deposits and loans, followed by the joint stock commercial banks, policy banks, and then foreign banks. Note that the outstanding amount of bank loans is significantly greater than the equity or corporate bonds. For example, bank loans accounting for 87% of total funds were raised by China's non-financial sector as of June 2006 (Bailey et al., 2011). Overall, China's banking sector has been the primary source of finance for China's growing economy, so how firms rely on their banking relationships has become a key issue.

Insert table 2.1 about here

2.3 Two-tier board structure

These listed firms are governed by two-tier boards that are similar to the German-Japanese corporate governance approach, and consist of a supervisory board and a board of directors. The "Company Law of the People's Republic of China" issued in 1993 first put forward the basic framework for a two-tier board structure, and then it was amended three times in 1999, 2004, and 2005, respectively. The "Code of Corporate Governance for Listed Firms in China" published by the China Security Regulatory Commission (CSRC) expanded on the Company Law by specifying the duties and responsibilities of directors in greater detail. Following this guideline, the

board of directors was made accountable to shareholders, and was instructed to treat all shareholders equally and be concerned with the interests of the firm's various stakeholders. It was recommended that a board consist of 5 to 19 directors. In 2001, the independent director system was mandated by the CSRC, and listed firms were required to have at least one third of their board members being independent directors by June 30, 2003. The CSRC also strongly encouraged firms to separate the roles of chairman and CEO. However, China introduced the modern corporation concept and culture whilst extending the reforms of the state-owned economy. Although the responsibilities and duties of directors closely paralleled those in the West, it is doubtful whether they played a positive governance role in China because the laws and guidelines in China on who must propose directors are silent, so in practice large owners tend to appoint directors and their representatives tend to dominate the board (Wu et al., 2009).

According to the Company Law a listed company must also have a supervisory board that consists of no less than three members, including representatives of the shareholders and representatives of the company's staff and workers. According to the Corporate Law, the supervisory board mainly carries out financial monitoring functions which include examining the company's financial status, and supervising the actions of the directors and managers to prevent any violations of laws and regulations. It also states that supervisory members should have professional knowledge and work experience in accounting and law. A key difference between a board of directors and a supervisory board is that supervisors of the company cannot concurrently serve as its directors, managers, and financial officers, so investors expected it to exercise an oversight role over the performance of the directors and senior management in a relatively impartial manner (Dahya et al., 2003; Firth et al., 2007a, b; Ding et al., 2009, 2010).

Although the supervisory board in China still does not have the right to appoint and dismiss executive directors unlike the German-Japanese approach to corporate governance, the latest Corporate Law amendment (2005) largely addressed several important constraints that prevented supervisory boards from functioning properly. First, supervisory boards now do have the power to propose dismissal of directors and top managements convicted of crimes, and to sue directors and top managements who commit fraud. Second, supervisors were allowed to attend board meetings, but the latest amendment gave them the right to ask questions and make suggestions. Furthermore, supervisory boards now have the right to submit proposals to shareholder meetings. Finally, when the board of supervisors discovers something unusual in the operation of the company, it can conduct an investigation into the operating situation, with the company bearing the expense. Overall, this thesis can add to the literature via a detailed investigation of the impact of internal governance on collateral requirements, which has not been previously examined yet.

2.4 Institutional development across different provinces

China's listed firms also operate in regions with different degrees of market development. In reality, China has been suffering a significant and growing problem of regional disparity despite having achieved great progress in its market-oriented institutional transformation and economic development. According to Allen et al. (2005), the overall shareholder (and creditor) rights of China falls in between those countries with a common-law legal origin benefiting from the highest protection and those countries with a French civil-law legal origin which exhibit the lowest protection. Yet this enforcement tends to vary considerably across provinces and municipalities. Besides, China's transition from a planned to a market economy necessitated the

establishment of an almost entirely new set of institutions, which touches on a broad range of economic, political, and social institutions. According to the World Bank's (2006) survey of the investment climate in 120 Chinese cities, the average per-capita GDP in Southeast China is more than 50 per cent higher than the Northeast, and 150 per cent above the average for Central and Southwest China. The major factors behind these economic disparities could be the difference in the institutions and economic policies. Instead of proposing a straightforward connection between the institutional environment and economic growth, this research considered the unique inter-regional differences to be one of the important determinants of a firm's ability to access unsecured bank finance, and on that basis investigated whether there is an interactive effect of the institutions and firm characteristics on collateral requirements. Compared to a cross country study, sub-national data can focus on specific aspects of the institutional and political system and control for the diversity in accounting rules, culture and other country-level variables (Li et al., 2009). It is believed that relevant findings will add to the growing literature relating to law, institutions, finance and economic growth.

2.5 Conclusion

This chapter has extensively investigated the ownership structure of China's listed firms, the evolution of its banking sector, the corporate governance mechanisms in China, and institutional development across China's provinces. Firms in China have a unique ownership structure, including a high proportion of SOEs and high ownership concentration. It is an unanswered question about whether the specific character has a quite distinct influence on collateral requirements. This chapter also reviewed the institutional history of the Chinese banking system, which is made of policy banks, the Big Four banks, joint stock commercial banks and foreign banks. Furthermore, this

chapter investigated the two-tier board system adopted in China as a means of promoting better governance. Finally, it was indicated that China provided a good research laboratory for the effect of institutional development on collateral requirements because it combined greater heterogeneity in institutional development across provinces with homogeneity in other country level variables.

CHAPTER THREE: OWNERSHIP STRUCTURE AND COLLATERAL REQUIREMENTS: EVIDENCE FROM CHINA'S LISTED FIRMS

3.1 Introduction

The use of collateral has been a common feature of loan contracts between borrowers and lenders. Based on theories of asymmetric information, research into the credit market has revealed that the requirements for collateral are the consequence of adverse selection (Bester, 1985; Chan and Kanatas, 1985; Besanko and Thakor, 1987), and/or moral hazard (Thakor and Udell, 1991). These researchers argued that collateral can limit potential losses for lenders and sort observationally equivalent borrowers because safer borrowers are less likely to default (and therefore lose control of the collateral) and are more likely to pledge collateral in exchange for a lower interest rate on the secured loans. Another strand of literature has well documented that the government often puts pressure on the banking system to lend primarily to SOEs, and then the expected government bailouts of troubled SOEs further increases the supply of bank loans to these enterprises (Cull et al., 2009; Li et al., 2009). Despite this, there is little evidence to show how state ownership impacts on collateral requirements.

This thesis extends the existing literature and examines the relationship between ownership structure and collateral requirements using a sample of China's listed firms from 2007 to 2009. China's listed firms provided an excellent environment in which to examine the effect that ownership structure has on collateral requirements. One important feature of China's listed firms is that the ownership of the dominant shareholder, which in many cases is the state, far exceeds that of the second largest shareholder. On that basis this research was able to assess the

implications regarding the type of controlling shareholder would have on the setting of collateral requirements. Meanwhile, as the stock market opened up to foreign investors⁴ listed firms were allowed to issue foreign shares, and the empirical evidence suggests that firms with foreign ownership were able to improve their information environment (Baker et al., 2002; Lang et al., 2003). A natural question to ask would be how the interaction between foreign ownership and state ownership affects the collateral requirements? Furthermore, recent literature emphasizes the importance of third party guarantees as a substitute for collateral, which also reduces the risk of the lender not recovering their loans (Menkhoff et al., 2012). Not much is known about whether ownership structure and guarantees could substitute for each other. China also combines greater heterogeneity in government intervention across provinces. These differences in government intervention therefore enable this study to determine whether the link between collateral requirements and state ownership is affected by the transition process from a government command economy to a market oriented economy.

The empirical evidence strongly supports the fact that the requirements for collateral are lower in SOEs than in non-SOEs. There is also a negative relationship between collateral requirements and foreign ownership, whereas the negative relationship between state control and collateral requirements is weaker in firms with more foreign ownership. Firms with more guaranteed loans are relatively less risky and will use less collateral loans, while the benefit of state control in reducing the collateral requirements is weaker for firms who borrow

⁴ Recently, individuals in China have been allowed to buy foreign shares if they have access to foreign currency. However, firms with foreign shares are still different from their counterparts without foreign ownership because they issue financial statements that are compliant with international standards (Firth et al., 2007a).

from banks with more third party guarantees. This research also showed that more intervention by regional government is related to a stronger role of state control in reducing collateral requirements.

Although the state often retains substantial ownership in China's listed firms, this ownership is undertaken by different types of agencies, each of which has different motivations and incentive structures (as will be explained later). Additionally, following Chen et al. (2009), I grouped SOEs into those affiliated to central government (SOECGs) and those affiliated to local government (SOELGs), and found that SOECGs had the lowest level of collateral requirements, SOELGs are in the middle, and non-SOEs face the highest collateral requirements. I also argued that state ownership is important for bank finance in the Chinese private sector; indeed this chapter found that having a state minority ownership significantly reduced the collateral requirements of non-SOEs.

This chapter contributes to the literature in three significant ways. Firstly, it provides a useful test of whether the theories that were established and applied to explain the determinants of collateral in developed markets are applicable to emerging markets. Menkhoff et al. (2006, 2012) sought to determine whether there were systematic differences in collateral based lending between mature and emerging markets. They analysed a data set of credit files from Thai financial institutions, and discovered that the need for collateral was higher in less developed markets, and borrowers could overcome the threatening lack of collateral by substitutes such as third party guarantees and relationship lending. This thesis complements their studies, and also found that firms with a close relationship with the government were more likely receive unsecured loans than

their counterparts without such a relationship, and its role in reducing their collateral requirements could be substituted by third party guarantees. Firms can also reduce the use of collateral by issuing foreign shares, which also weakens the effect that state ownership has in gaining access to unsecured loans.

Secondly, I present fresh evidence on the interaction between state ownership and institutions of government intervention to affect collateral requirements. Existing studies have indicated the role of more marketised institutions in encouraging the use of unsecured financing (Hainz, 2003; Jimenez et al. 2006; Qian and Strahan, 2007; Bae and Goyal, 2009). A priori, however, it is not clear how state ownership interacts with the level of government intervention to influence collateral requirements. My finding indicates that the role for state ownership in the use of collateral is based on government intervention, a practice that can also hold lessons for other developing countries who are struggling with imperfect institutional environments and nascent financial markets.

Finally, state ownership in China has been gradually declining, just like other countries in transition, which motivated Chen et al. (2008) to investigate the performance of China's listed firms when there was a change of the type of controlling shareholder. This research provided an empirical basis for predicting the impact that changes in the type of ownership control will have on restrictions in loan contracts from the perspective of collateral requirements, which is instrumental in explaining how the type of controlling shareholder affects corporate performance. Understanding this relationship can help the government to formulate further reform policies for the corporate sector.

This chapter proceeds as follows. The next section describes the research background and hypotheses. Section 3.3 outlines the data and methodology. Section 3.4 presents the results of the main tests. Section 3.5 provides additional tests and Section 3.6 concludes.

3.2 Development of hypothesis

Previous theories suggest that if lenders are aware of a borrower's reliability, they will demand that high risk borrowers provide collateral that protects their loans in case of a default. For example, Gonas et al. (2004) found that firms with better public ratings are less likely to be required to pledge collateral. In the Chinese financial system, bank loans are the main external finance for firms which are under the control of the government. These state-owned banks are inclined to lend to SOEs with lower collateral requirements because their banking relationships have already been established, and non-SOEs face severe discrimination when seeking bank loans. Moreover, when SOEs run into financial trouble, they often look to the government for additional funding and they are more likely to be bailed out by the government because of their political and social objectives (Faccio et al., 2006; Brown and Dinc, 2011). In this sense, banks may require lower collateral against SOEs relative to non-SOEs. Empirically, Brant and Li (2003) showed that private enterprises and privatised township and village enterprises are more likely to pledge collateral than township and village enterprises in China's rural areas. For publicly listed firms, Chen et al. (2013) find that from 2001 to 2006, SOEs in China were less likely than non-SOEs to pledge collateral for bank loans. However, it is an empirical question as to whether the presence of state-owned controlling shareholders still plays a role in gaining

access to unsecured loans for a more recent sample period, and I propose the following hypothesis:

H3.1: SOEs have lower collateral requirements than non-SOEs.

In addition to bank loans and equity financing in the domestic markets, funding is also available from overseas markets. Collateral may impose opportunistic costs on borrowers by tying up assets that might otherwise be put to more productive use (Smith, 1993). Borrowers can also suffer fluctuations in the availability of credit as the values of their securable assets vary (Berger et al., 2011). If the costs of collateralised loans are high, then alternative sources of financing would probably substitute for the collateralised loans. Indeed, foreign capital has become an increasingly important source of finance for firms in emerging markets. Moreover, in China, most foreign investors are foreign financial institutions from developed economies and they have more resources to analyse firm performance. Therefore, companies with access to global capital markets have an improved visibility and reputation (Baker et al., 2002; Lang et al., 2003), and they enjoy a lower cost of capital than their counterparts without access to global capital markets (e.g., Errunza and Miller, 2000; Doidge et al., 2004; Hail and Leuz, 2004). In China, it has also been found that foreign ownership affects the informativeness of earnings, which supports the theory that foreign shareholders improve firm's accounting information and transparency (Firth et al., 2007a). Shan and Xu (2012a, 2012b) further found that foreign investors tend to be attracted by Chinese companies with good profitability and efficiency to safeguard their investment. Therefore, firms' foreign ownership may ultimately reduce their collateral requirements.

The net benefits of state ownership may depend on the presence of foreign ownership because the degree of information asymmetry is higher for more opaque borrowers and the risk proxies and relationship lending variables have higher explanatory power for them. For example, Menkhoff et al. (2006) find the current ratio for the direct risk variable has a greater effect on collateral requirements for smaller firms. Kano et al. (2011) argued that the benefits of close bank-borrower relationships on loan contract terms and credit availability are greater for those without audited financial statements than those with audited financial statements. Firms with foreign ownership are safer and less opaque, so it is expected the role of state control to diminish. On that basis the following hypothesis is proposed:

H3.2: The role of state control in reducing collateral requirements is weaker for firms with more foreign ownership.

Due to the lack of information, theory suggests that the request for collateral is higher in less developed markets than in developed markets (Hainz, 2003, Menkhoff et al., 2006; Bae and Goyal, 2009). The importance of collateral results in a problem for borrowers in emerging markets because collateral requirements are expected to be very high while their ability to provide collateral is comparatively low compared to borrowers in developed markets. Collateral is therefore not necessary and lenders can issue some credit through relationship lending and third party guarantees. Therefore, Menkhoff et al. (2012) find that guaranteed loans are relatively less risky and there is less likelihood of having to pledge further collateral.

Moreover, the effect of substitutes depends on whether another substitute is present and they can substitute for each other because substitutes work independently of each other. For example, both Behr et al. (2011) and Menkhoff et al. (2012) find the effect of relationship lending, which is proxy for the incidence that the borrower is a previous customer of the lender, on reducing the use of collateral is larger when a third party guarantee is not used. Thus, if state ownership helps entrepreneurs access unsecured loans because of relationship lending, I expect that the role of state ownership may differ according to the level of third party guarantees, and therefore propose the following hypothesis:

H3.3: The role of state control in reducing collateral requirements is weaker for firms with more third party guarantees.

China's banks remain largely constrained by government intervention at different levels. In regions with more government intervention, the government is more likely to put pressure on the banking system to lend to SOEs, while on the empirical side, Firth et al. (2009) found that a state minority ownership is instrumental in obtaining bank loans for China's non-SOEs in areas where the banking sector is less market oriented, but it plays no role in lending decisions for firms in regions where the banking sector is more market oriented. Li et al. (2009) used a sample of non-publicly traded Chinese firms to explore the role of ownership structure and institutional development in debt financing. They found that SOEs tended to have more debt than their non-state-owned counterparts in areas with poorly developed institutions, whereas the role of state ownership is insignificant in areas with developed institutions. Moreover, in a more market oriented region, there are more efficient financial intermediaries and more

available information about the firms' activities (Jian and Xu, 2012). Therefore, I hypothesize that the role of state ownership in reducing collateral requirements depends on the level of government intervention, and it is argued that:

H3.4: The role of state control in reducing collateral requirements is more pronounced for firms in regions with more government intervention.

3.3 Data and variables

3.3.1 Sample selection

The initial sample consisted of all the firms listed on the Shanghai and Shenzhen Stock Exchanges from 2007 to 2009. The bank loan sample was manually collected from the footnotes of the annual reports of listed firms. As of 1998, publicly traded Chinese companies were required to furnish detailed accounting information in the footnotes of the financial statements in annual reports, such as the type of bank loan (guaranteed, collateralised, or unsecured), and the amount of loans for each type. Other corporate financial data used in this research was gathered from the China Stock Market and Accounting Research (CSMAR) database. The proxies for the extent of government intervention were sourced from the NERI (National Economic Research Institute) Index of Marketisation of China's Provinces⁵ (Fan et al., 2011). Both the marketisation index and database have been widely used in previous research (e.g., Chen et al., 2006; Firth et al., 2006, 2007a and 2007b; Li et al., 2009).

⁵ This thesis provided a detailed description of the index measure in Appendix A.

In the beginning there were 4,969 firm-year observations available on the CSMAR database from 2007 to 2009. I eliminated 523 observations with no outstanding loans, and of the remaining 4,446 observations, 18 in the financial industry were also deleted. 109 observations were also removed because the type of bank loan could not be identified in the financial reports, and another 170 observations without enough financial information were also excluded from the sample. 387 ST and *ST firm-year observations⁶ were also eliminated. The final sample consisted of 3,762 firm-year observations. The sample selection process is summarised in Table 3.1.

Insert table 3.1 about here

3.3.2 The estimation model

In the empirical analysis I used the percentage of total loans that were collateralised as a proxy for total collateral requirements and control for variables that were identified by the current literature in empirical corporate finance (e.g., Chen et al., 1998; Jimenez et al., 2006, 2009; Menkhoff et al., 2006, 2012; Allen and Li, 2011). The measures of the fraction of collateralised loans at the firm-year level are, by definition, censored, and range between zero and one⁷. Since the dependent variable contains a cluster of zeroes and ones, the OLS results would

⁶ According to the rules introduced by the China Securities Regulatory Commission (CSRC) in 1999, a firm is designated as a special treatment (ST) firm if it incurs losses for two consecutive years and a particular treatment (PT) firm if it continues to report a loss for another year. If a PT firm does not become profitable in one year, it is delisted. PT stocks can be traded only on Fridays and are limited to a maximum 5% price increase over the previous Friday's close, but have no downside limit. Since 2002, the CSRC has ceased the PT designation. Instead, it introduced a new designation labeled *ST, which is similar to ST but without the transition period. In other words, if a firm incurs losses for three consecutive years, it is de-listed without a PT period.

⁷ According to observation summary, 852 observations are left-censored at zero, 2,632 observations are uncensored, and 278 observations are right-censored at one.

give biased and inconsistent coefficients. Therefore, the tobit model as an extension of a censored regression model is appropriate (Greene, 2002)⁸.

In order to gain a sense of the magnitude of these effects, this research also checked the marginal effects evaluated at the means of the independent variables. The marginal effect of a dummy variable was calculated as the discrete change in the expected value of the dependent variable, as the dummy variable changed from 0 to 1.

First of all this research examined the effect of state ownership on collateral requirements for the full sample and then specified the regression model as:

$$\begin{aligned}
 Collateral_{it} = & \beta_0 + \beta_1 SOE_{it} + \beta_2 Foreign_{it} + \beta_3 Guarantee_{it} + \beta_4 Size_{it} + \beta_5 AE_{it} \\
 & + \beta_6 B/M_{it} + \beta_7 ROA_{it} + \beta_8 Leverage_{it} + \beta_9 LTDEBT_{it} \\
 & + \beta_{10} Tangibility_{it} + \beta_{11} Liquidity_{it} + years + \varepsilon_{it}
 \end{aligned}
 \tag{3.1}$$

where $Collateral_{it}$ is the percentage of total loans that are collateralised for firm i in year t , β_0 is the constant, and ε is a normally distributed error term. SOE is a dummy variable coded one for firm years whose ultimate controlling shareholder are central or local governments, otherwise zero for a firm year whose ultimate owners are private investors. $FOREIGN$ is the proportion of foreign ownership, and $GUARANTEE$ is the percentage of guaranteed loans scaled by total loans.

⁸ The same approach has been used by Hulburt and Scherr (2003) and Allen and Li (2011).

In terms of the remaining control variables, one characteristic is firm size (*SIZE*). Smaller firms should use secured debt more frequently because they have a higher probability of liquidation and less ability to access capital markets than larger firms (Leeth and Scott, 1989; Barclay and Smith, 1995b). Smaller firms, with less information available to lenders, may also use more secured debt to signal their quality (Chan and Kanatas, 1985). However, both Leeth and Scott (1989) and Chen et al. (1998) argued that larger firms (who therefore borrow more) would find it more economical to use security because the fixed monitoring and administrative costs associated with secured loans fall on a per unit basis as the total amount of loan financing rises, and therefore the use of collateral is expected to increase with the size of the loan. This research measures firm size as the natural logarithm of total assets and the expected sign is ambiguous⁹.

If lenders do not know what a borrower's credit quality is, high quality (undervalued) firms are more likely to pledge collateral than low quality (overvalued) firms to signal their credit worthiness to lenders. The chance of high quality (undervalued) firms defaulting and losing control of the collateral is smaller, so the lower interest rate on a secured loan makes such financing more attractive. Following Barclay and Smith (1995a and 1995b), this research uses abnormal earnings (*AE*) to empirically measure firm quality. High quality (undervalued) firms are more likely to have positive future abnormal earnings

⁹ An alternative approach is to employ a measure of firm size to capture the former and a measure of total dollar borrowings to capture the latter (as in Chen et al., 1998). Unfortunately, this approach may give rise to substantial multi-collinearity problems as the two measures are highly correlated in our samples. As shown by Menkhoff et al. (2006, 2012), this research drops the credit volume variable from the regression and also avoids a simultaneous-equation bias.

while low quality (overvalued) firms are more likely to have negative future abnormal earnings.

The use of secured debt may also mitigate Jensen and Meckling's (1976) asset substitution problem and Myers' (1977) underinvestment problem. Therefore, firms with greater opportunities for future growth (more flexibility in its choice of future investments and thus more serious problems) should use a greater fraction of collateralised loans. Following Dittmar (2000), this research uses the ratio of the book value of the firm's assets to the market value of the firm's assets as an inverse indicator for growth options (B/M).

Accounting statements provide measures of profitability, solvency, and liquidity. Profitability is measured by the return on assets (ROA). The solvency variable is leverage, debt/assets ($LEVERAGE$); term structure, long term loans/total loans ($LTDEBT$); and tangibility, fixed assets/total assets ($TANGIBILITY$). The liquidity variable is cash and cash equivalents/total assets ($LIQUIDITY$). I also include a set of dummy variables to control for the year fixed effects.

This chapter also explored the effects of government intervention on the role of state ownership in reducing collateral requirements. SOEs can also be divided into SOEs affiliated to the central government (SOECGs) and SOEs affiliated to local government (SOELGs). SOECGs refer to SOEs controlled by the central government under the State-owned Assets Supervision and Administrative Commission (SASAC)¹⁰. Administratively, these SOEs belong to and are closely monitored by the central government, but are located across provinces and

¹⁰ With the changing process of central enterprises, there are 161 SOECGs in 2007, 151 SOECGs in 2008, and 142 SOECGs in 2009.

industries. On the other hand, SOELGs are SOEs directly controlled by a local government. These SOELGs constitute the largest group of shareholders in listed companies in China. SOECGs were excluded from the sample because this research wanted to take advantage of the variations of government intervention where the SOELGs operate, following Fan et al. (2012), and the following model is estimated¹¹:

$$\begin{aligned}
 Collateral_{it} = & \beta_0 + \beta_1 SOELG_{it} + \beta_2 Foreign_{it} + \beta_3 Guarantee_{it} + \beta_4 Size_{it} \\
 & + \beta_5 AE_{it} + \beta_6 B/M_{it} + \beta_7 ROA_{it} + \beta_8 Leverage_{it} + \beta_9 LTDEBT_{it} \\
 & + \beta_{10} Tangibility_{it} + \beta_{11} Liquidity_{it} + \beta_{12} GI_{it} + years + \varepsilon_{it}
 \end{aligned}
 \tag{3.2}$$

where *SOELG* is a dummy variable coded one for firm years whose ultimate controlling shareholder is a state-owned enterprise affiliated to local government. Government size was viewed as the degree of government intervention in prior empirical studies (Kotera et al., 2012), so this research used a government size index (*GI*), which is based on the ratio of employment by the government and various social organisations to population. The government size index is inversely related to the level of government intervention¹². Table 3.2 lists the definitions of all variables used in the analysis.

Insert table 3.2 about here

¹¹ The regressions suggest that the results are robust to include SOECGs with registered office address (untabulated).

¹² The higher government size index means the smaller the government size in the province, and the lesser the extent of government intervention in the province.

3.3.3 Summary statistics

Table 3.3 lists the summary statistics of variables for the full sample. Panel A presents descriptive statistics on collateral requirements and panel B shows the distribution of the sample by the types of controlling shareholder. Panel C presents the summary statistics of the main variables to be used in the regression analysis, and panel D reports detailed statistics for collateral requirements based on years. In Panel A, it is found that the mean (median) of collateral requirements is 33.8% (23.4%). The means (medians) in Panel D indicate that the level of collateral requirements was stable across the sample period, which ranged from 32.3% (22.4%) to 34.5% (25.0%). Panel B shows that the collateral requirements varied across firms according to the different categories of dominant shareholder. The mean (median) for SOEs was 26.9% (15.1%), whereas the mean (median) for non-SOEs was 45.1% (42.0%). Panel C shows that foreign ownership has a mean (median) of 3.9% (0), while 14.6% of sample firms have foreign ownership (untabulated). Apart from collateral for a loan, a third party guarantee was also widely used in loan contracts to protect lender investments. I found that 38.6% of the sample firms' loans were guaranteed by a third party. In terms of government intervention, the size of the government index has a mean of 5.435¹³.

For control variables, Panel C shows that the average firm size (*SIZE*) of the sample firms, measured by the natural logarithm of firms' total assets, is 21.691 (median as 21.535). This is approximately equivalent to RMB 7,831 million (about US \$1,280 million), and the average abnormal earning (*AE*) is 0.004, and

¹³ Firms in Tibet and Xinjiang province are excluded, because the indices appear to be outliers.

the average growth (B/M) is 0.536. Panel C also shows average return on assets (ROA) is 0.034 and the average leverage ratio ($LEVERAGE$) is 0.242. Finally, the average ratio of long term loan to total loans ($LTDEBT$) is 0.310, the average ratio of fixed assets to total assets ($TANGIBILITY$) is 0.281, and the average ratio of cash and cash equivalents to total assets ($LIQUIDITY$) is 0.165.

Insert table 3.3 about here

3.4 Empirical results

3.4.1 Univariate tests

To provide some preliminary information, Table 3.4 presents univariate comparisons of the collateral requirements and the proportion of SOEs between firms with different microeconomic or macroeconomic factors. I firstly find firms with foreign ownership are less likely to be required to pledge collateral than firms without foreign ownership (29.3% versus 34.0%), which is consistent with the fact that foreign ownership reduces the firms' collateral requirements, and I did not find a significant difference in the proportion of SOEs with foreign ownership compared to SOEs without foreign ownership. Second, I compared firms with high and low proportion of guaranteed loan. It is found that firms with more third party guarantees than the median value are less likely to pledge collateral than firms with less third party guarantees (20.6% versus 47.0%), whereas the proportion of SOEs are similar across different levels of guarantee requirements. Finally, I find that firms in more marketised regions have similar levels of collateral requirements compared to firms in regions with more government intervention, and better developed regions are associated with less SOEs. The above summary statistics are suggestive of the effects of

macroeconomic and microeconomic factors on collateral requirements and I present the regression results in the next section.

Insert table 3.4 about here

3.4.2 Multivariate tests

Before running the regressions this research also checked the correlation matrix and the variance inflation factor (VIF). It appears that the VIF was less than 2.44 for all the regressions (untabulated) and all the correlation coefficients were less than absolute 0.392, which implies that multi-collineality is not a critical issue here.

Insert table 3.5 about here

As Table 3.6 showed, Column 1 indicates that the percentage of collateralised loans for SOEs, *ceteris paribus*, were 15.8% lower than non-SOEs, which was consistent with hypothesis H3.1, and indicated that state ownership still played a key role in gaining access to unsecured bank finance in China.

Column 2 showed that foreign ownership had a negative relationship with the collateral requirements of Chinese listed firms. Specifically, an increase in ownership by foreigners from the median to the 95th percentile reduced the collateralised proportion by 6.48% for non-SOEs, while the role of foreign ownership was just slightly negative for SOEs. The significantly positive coefficient on the interaction variable between *SOE* and *FOREIGN* shows that the increase in ownership by foreigners from the median to the 95th percentile reduced the role the state controlling shareholder in reducing the proportion of

collateralised loans by 6.26%. This means that foreign ownership reduced the role of state ownership in obtaining unsecured loans, which proved hypothesis H3.2.

Column 3 showed a negative association between the guarantee requirements and the collateral requirements, which suggested that a loan guarantee acted as a substitute for collateral and allowed a lender to enforce loans without collateral. For SOEs (non-SOEs), an increase by 1% in the guaranteed proportion was likely to reduce the degree of collateral requirements by 0.686% (0.398%). The significantly positive coefficient on the interaction variable between *SOE* and *GUARANTEE* suggested that in firms without a third party guarantee, the difference in collateral requirements between SOEs and non-SOEs was larger than in firms with a third party guarantee, which was consistent with H3.3.

These results also indicated that the collateral requirements of Chinese firms were affected by the same characteristics as firms in developed countries, that is, the likelihood of collateral requirements decreased with the size of the borrower (*SIZE*). Furthermore, better profitability (*ROA*) and tangibility (*TANGIBILITY*) also implied a lower likelihood of having to pledge collateral. The current ratio (*LIQUIDITY*) was negatively associated with the collateral requirements, but the role was insignificant, whereas the levels of leverage (*LEVERAGE*) and term structure (*LTDEBT*) were both positively related to collateral requirements. Like Barclay and Smith (1995b), Chen et al. (1998) and Dennis et al. (2000), I found no strong support for the signalling hypothesis because the relevant variable (*AE*) showed an unexpected sign. I also did not find a postulated positive relationship between growth opportunities and the proportion of secured debt, which was consistent with previous studies (e.g., Barclay and Smith, 1995b). Given an

inverse relationship between growth opportunities and indebtedness in the Chinese context (Bhabra et al., 2008), an inverse relationship between the former and the secured debt ratio may be interpreted as a general tendency of growing firms to decrease the size of debt financing, especially collateralised loans.

Insert table 3.6 about here

With regards to the impact of government intervention, the results of the regression are shown in Table 3.7. In Column 1 this research controlled for the government's size index (*GI*), with the result indicating there was no significant relationship between this index and collateral requirements. In Column 2 this research controlled for *GI*, along with the corresponding variable that represents its interaction with *SOELG*. The significantly positive coefficient on the interaction variable between *SOELG* and *GI* (coefficient= 0.020, $p < 0.05$) seems to suggest that SOEs were less likely to be required to pledge collateral than private firms when there was more government intervention in the region but the gap between these two types of firms decreased as government intervention in the region decreased, indicating that H3.4 is approved. I also run the regressions that control for economic development to absorb unmeasured variation in credit demand and risk¹⁴, and the results remain unchanged.

Insert table 3.7 about here

¹⁴ Such economic development may be “outcomes” of government intervention and correlated to government intervention (Jian and Xu, 2012). Controlling for such outcomes might therefore attenuate the total impact of government intervention.

3.5 Additional tests

3.5.1 Regression results for further dividing SOELGs and SOECGs

Compared to SOELGs, SOECGs are typically large, complicated and strategically important enterprises across the nation (e.g., infrastructure, power, transportation, petrochemicals, steel, telecom, and oil & gas), so it is unlikely that the government will allow companies such as these to go bankrupt. In addition, local governments may have less resource than the central government to carry out bailouts (Cheung et al., 2010). As Table 3.3 indicates, the mean (median) of collateral requirements for SOELGs was 28.7% (17.2%) while the mean (median) for SOECGs was 21.3% (9.5%), and about one quarter of SOEs are SOECGs. I thus expected that listed firms controlled by SOECGs would have lower collateral requirements than those controlled by SOELGs, and the regression model is specified as:

$$\begin{aligned} Collateral_{it} = & \beta_0 + \beta_1 SOELG_{it} + \beta_2 SOECG_{it} + \beta_3 Foreign_{it} + \beta_4 Guarantee_{it} \\ & + \beta_5 Size_{it} + \beta_6 AE_{it} + \beta_7 B/M_{it} + \beta_8 ROA_{it} + \beta_9 Leverage_{it} \\ & + \beta_{10} LTDEBT_{it} + \beta_{11} Tangibility_{it} + \beta_{12} Liquidity_{it} + years + \varepsilon_{it} \end{aligned} \quad (3.3)$$

where *SOELG* coded one for firm years whose controlling shareholder is a state-owned enterprise affiliated to local government, and the dummy variable *SOECG*, coded one for firm years whose controlling shareholder is a state-owned enterprise affiliated to central government. Table 3.8 indicates that SOECGs have a percentage of collateralised loans that is 19.0% lower than non-SOEs and 4.9% lower than SOELGs. The unreported F-statistics also indicate that these

differences are economically significant. These results can be further summarised as follows: SOECGs have the lowest level of collateral among all the types of the controlling shareholder while non-SOEs collateralise most, and SOELGs are between non-SOEs and SOECGs.

Insert table 3.8 about here

3.5.2 Regression results for non-SOEs

Although control has been transferred from the state to private investors due to privatisation, the state often retains a material portion of the company's shares as a non-dominant or minority shareholder. Table 3.3 shows that state ownership has a mean (median) of 1.7% (0) for non-SOEs in the sample, while unreported statistics indicate that 19.2% of non-SOEs have state minority shareholders. Evidence also exists to indicate that non-SOEs with a state minority shareholder have access to more bank loans than other non-SOEs (e.g., Firth et al., 2009). It might be motivated by having more information about these firms. Furthermore, private firms with state ownership are more likely to get help from governments in time of financial difficulties, which may pose less risk for banks, but whether this determines the collateral requirements in non-SOEs is a question that is under researched. If this research focused on the role of state ownership in the collateral requirements for non-SOEs, the model can be expressed as follows:

$$\begin{aligned}
 Collateral_{it} = & \beta_0 + \beta_1 Dstate_{it} + \beta_2 Foreign_{it} + \beta_3 Guarantee_{it} + \beta_4 Size_{it} \\
 & + \beta_5 AE_{it} + \beta_6 B/M_{it} + \beta_7 ROA_{it} + \beta_8 Leverage_{it} + \beta_9 LTDEBT_{it} \\
 & + \beta_{10} Tangibility_{it} + \beta_{11} Liquidity_{it} + years + \varepsilon_{it}
 \end{aligned}$$

(3.4)

where *DSTATE* is a dummy variable that equals one if the state is a minority shareholder of non-SOEs. I also considered the proportion of state-owned shares to total shares (*STATE*) as an alternative indicator. For the sub-sample of non-SOEs, Column 1 of Table 3.9 shows that the presence of state minority ownership is likely to reduce the proportion of collateral requirements by 4.6%, while Column 2 indicates that an increase of 1% in state ownership is likely to reduce the collateralised proportion for non-SOEs by 0.448%. As with prior studies which documented that retaining state ownership are important means for non-SOEs gaining access to bank finance, the results suggest that the state ownership also helps to reduce restrictions in loan contracts.

Insert table 3.9 about here

I also used an alternative approach for the Tobit model and constructed ranks for the collateral requirements which can be based on 25 percentiles of the collateral requirements. Hence, the continuous measure of collateral requirements is transformed into an ordinal variable with four ranks. To analyse a ranked dependent variable, I applied the ordered logit approach. The regressions suggest that the results are robust to the model change. In addition, because the loan guarantee requirements and collateral requirements are jointly determined in the loan contracts, I addressed this potential endogeneity problem by using the instrumental variable approach. My instrumental variables are *LAYER*, which is defined as the number of layers from the ultimate shareholder to the listed firm. Prior literature suggests that firms within a complex group with more pyramidal

layers are more likely to use guaranteed loans because there are more candidates who can act as guarantors for the loans within a more complex group (Jian and Xu, 2012). I find my results are robust with regards to the instrumental variable approach.

3.6 Conclusion

This research examined the collateral requirements for a sample of China's listed firms from 2007 to 2009, based on a manually gathered database of Chinese business lending. Besides the firm-specific characteristics which have already been studied in the literature, this chapter examined the effect of ownership structure on collateral requirements. The empirical analysis revealed that the percentage of collateralised loans for SOEs was lower than for non-SOEs. It also shows that the collateral required for firms with foreign ownership and/or a third party guarantee was reduced, and the role of state control in reducing collateral requirements was also weakened in these firms. Finally, this study shows that the role of state control in reducing collateral requirements was more pronounced for firms in regions with more government intervention.

CHAPTER FOUR: OWNERSHIP STRUCTURE AND BANKING RELATIONSHIPS: EVIDENCE FROM CHINA'S LISTED FIRMS

4.1 Introduction

Ownership structure is documented to have a potential effect on collateral requirements and, in particular, SOEs have lower collateral requirements compared to the collateral requirements of non-SOEs. The benefit of lower borrowing requirements for SOEs is mainly a result of the SOEs' banking relationships with state-owned banks (Firth et al., 2009; Lin, 2011). However, little is known about how ownership structure influences the firms' banking relationships which, in turn, leads to the impact on collateral requirements. Thus, in this chapter, I investigate the relationship between ownership structure and banking relationships, and aim to provide a more complete research framework on the issue of collateral requirements.

The relationship between firms and lenders are key characteristics of credit markets. Many papers have investigated the motives for multiple banking relationships (e.g., Ongena and Smith, 2000), but little is known about the relationship between the borrower ownership structure and the number of banking relationships. Recent studies also began to contribute to this literature by comprehensively investigating the matching of firm and bank characteristics. Information based theories of banking relationships (e.g., Stein, 2002) suggested that foreign banks are viewed as having a comparative advantage over domestic banks in underwriting the loans of more transparent firms that rely on quantitative and transferable information, referred to as *hard* information, because they can enjoy scale economies in evaluating such information, while they have a

comparative disadvantage in underwriting loans of opaque firms that primarily rely on qualitative non-transferable information, referred to as *soft* information, because of difficulties in transmitting information through banking organizations with headquarters in another nation. At the same time, domestic state-owned banks often have direct mandates to serve state-owned firms, despite that the findings of Berger et al. (2008) provide only mixed support for the hypothesis that state-owned banks establish relationships with state-owned firms. In this chapter the major research question addressed is: whether the firms' ownership structures determine the banking relationships? The analysis of banking relationships included a study of the reason for the number of banking relationships and the reasons why a particular bank is chosen.

China's data set provides an excellent opportunity to test the question, with information on firms, banks, and their relationships, as well as data on local market conditions. First of all, the Chinese banking sector is dominated by the Big Four state-owned banks¹⁵ which absorbed the bulk of those losses from SOEs. The unhealthy link between SOEs and the Big Four banks is among the chief worries concerning the future of China's economic miracle. To alleviate this problem, the Chinese government established three state-owned policy banks to take over the policy-lending activities from the Big Four banks. Alongside the problematic state-owned banks, a breed of dynamic joint stock commercial banks that organised themselves as companies limited by shares is rapidly emerging. As a precondition to joining the WTO, China also pledged to open its domestic

¹⁵As of 2009, the Big Four banks owned more than 50% of total banking deposits and loans according to Almanac of China's Finance and Banking.

business to foreign banks. Overall, China's banking system enables this research to provide a more complete test for the determinants of lending bank types.

Research on multiple banking relationships suggests that an exclusive banking relationship for a firm may improve the availability of credit or terms of contract through relationship lending based on the private information of a single relationship bank (e.g., Diamond, 1984; Ramakrishnan and Thakor, 1984; Boyd and Prescott, 1986; Boot and Thakor, 1994; Petersen and Rajan, 1995; Elsas, 2005). On the other hand, multiple banking relationships might be driven when one bank cannot meet all the demand of a firm (e.g., Houston and James, 1996; Detragiache et al., 2000; Machauer and Weber, 2000; Berger et al., 2001, 2005; Farinha and Santos, 2002). Firms may also seek multiple banking relationships to mitigate the hold-up problem of a single relationship bank (e.g., Greenbaum et al., 1989; Sharpe, 1990; Rajan, 1992; Petersen and Rajan, 1994; Ongena and Smith, 2000). This incentive may be greater when banking markets are less competitive and offer fewer potential alternatives. Moreover, multiple banking may arise in response to the soft-budget-constraint problem—a situation where a relationship bank may refinance unprofitable projects (in the hope of recovering earlier loans), creating an incentive for strategic defaults on the part of the borrower (Dewatripont and Maskin, 1995). By complicating the refinancing process, multiple banking enables banks not to extend further inefficient credit and reduces the borrowers' incentives to default (Bolton and Scharfstein, 1996).

As discussed in Chapter 2, the ownership of the dominant shareholder, which in many cases is the state, far exceeds that of the second largest shareholder. This research was therefore able to assess the implications of the type of controlling

shareholder for setting the type of bank they match. Furthermore, the Chinese government has historically mandated the banking relationship with SOEs, so the bank may have more interaction with them than non-SOEs, being motivated by having more information about these firms. Meanwhile, listed firms are allowed to issue some foreign shares coupled with the opening up of the stock market to foreign investors. It remains an open question whether the presence of foreign ownership affects banking relationships. Because China also combines greater heterogeneity in institutional development across provinces with homogeneity in other country-level variables (Li et al., 2009), these differences in the institutional environment enabled this research to check whether the firm-bank connection can be ascribed to the evolution of the country's market institutions.

The empirical evidence strongly supports the notion that SOEs are more likely obtain bank loans from state-owned banks than non-SOEs. In particular, SOECGs are more likely obtain bank loans from policy state-owned banks, and SOELGs are more likely obtain bank loans from the Big Four state-owned banks. The empirical results also showed that firms with more foreign ownership were more likely to obtain bank loans from foreign banks, and firms with higher liquidity were also more likely to obtain loans from foreign banks. There was no significant difference between SOEs and non-SOEs in the probability of obtaining loans from joint stock commercial banks, while firms with more foreign ownership or higher profitability were more likely to obtain loans from this type of banks. The results also indicated that multiple relationships may arise when firms have state control or foreign ownership, while firms that operated in regions with better institutional development had more concentrated ownership in bank loans rather than multiple relationships.

This research also introduced the lending relationship variables to the determinants of collateral requirements and found that policy banks are less likely to require firms to pledge collateral than the Big Four banks. Joint stock commercial banks are less likely to require firms to pledge collateral than foreign banks, while a concentrated banking relationship is associated with lower collateral requirements, the benefits of which are greater for those firms that borrow more from joint stock commercial banks.

This research therefore contributes to the body of knowledge discussed below. Firstly, extant studies have ranked the efficiency of different types of banks and found that commercial banks outperform state-owned banks, which indicates that China's high growth rates cannot be maintained indefinitely without a significant reform of the banking system (Berger et al., 2009). My empirical research investigated the link between bank type and the ownership structure of borrowers. This research therefore contributes to the assessment and comparison of bank efficiency with empirical evidence that state-owned banks are burdened with loans of SOEs. Such a loan policy is an impediment for state-owned banks trying to improve their competitiveness.

This research also complements the growing empirical literature that studies the impact of foreign bank competition on domestic corporate finance and real outcomes in a within-country context (e.g., Berger et al., 2001; Haber and Musaccio, 2005; Mian, 2006), and indicates that deregulation of market entry for foreign banks could meet the financing needs of firms with more foreign ownership that require international financing services and firms with higher liquidity. Moreover, domestic joint stock commercial banks have begun to apply

economic criteria to a greater extent in their lending decisions, which encourages the further development of domestic banks.

This research also provides a useful test of the determinants of the number of banking relationships. Qian and Strahan (2007) and Hernandez-Canovas and Koeter-Kant (2010) suggested that the firm-level characteristics and the quality of laws and institutions affect the costs and benefits of multiple banking relationships which finally determine the number of banking relationships. This present chapter complements their studies and finds that the ownership structure is an important factor in determining the number of banking relationships in Chinese firms. It also presents fresh evidence pertaining to the role that institutions play in the number of banking relationships using the sub-national data of China. The advantage of this approach compared to cross-country studies, is that the result regarding the effect of institutions is free of contamination due to country differences in accounting rules, culture, and other country-level variables (Li et al., 2009).

The structure of the remainder of the chapter is as follows. Section 4.2 develops the hypotheses based on the Chinese institutional environment. Section 4.3 outlines the data and methodology. Section 4.4 reports the results of the empirical analyses. Section 4.5 provides additional tests, and Section 4.6 concludes.

4.2 Development of hypothesis

Borrowers with different types of ownership control have different motivations and incentives which influence the type of bank they match. Commercial banks primarily aim to maximise the returns on capital contributed by its shareholders

while state-owned banks follow the objectives set by the government to maintain employment and social stability. In terms of borrowers, politically connected firms transfer the resources of firms for political objectives, while also benefitting from preferential access to financial resources from state-owned banks. For example, Khwaja and Mian (2005) find politically connected firms borrow 45 per cent more and have 50 per cent higher rates of default. Such preferential treatment occurs exclusively in government banks. What is unique to China, are the dual roles the government plays as the controlling shareholder of SOEs and as the owner of state-owned banks. As a result, the controlling government shareholder is expected to use SOEs and state-owned banks to achieve those policy goals, even though they may conflict with banks' own interests. Several papers have shed some light on the effects of China's bank ownership type and show that state-owned banks were less efficient than non-state-owned banks (Lin and Zhang, 2009). Further investigation indicates that Chinese SOEs receive a disproportionately large share of the credit because state-owned banks dominate China's banking sectors (Gordon and Li, 2003; Allen et al., 2005). Thus, the following hypothesis is proposed:

H4.1a: SOEs have a higher probability of obtaining loans from state-owned banks than non-SOEs.

The nationality of a bank may be a second important characteristic determining its attractiveness to a firm. Information based theories of banking relationships (e.g., Stein, 2002) suggest that foreign banks are less able to process information about opaque firms and/or their local market conditions, and may be more likely to enter into relationships with more transparent firms. Empirical evidence that shows how

foreign banks establish relationships with large and visible firms is consistent with the above theories (Mian, 2006; Berger et al., 2008). With regards to financial transparency, more foreign ownership could attract stricter scrutiny from more sophisticated investors from developed economies (Baker et al., 2002; Lang et al., 2003). Moreover, companies that issue foreign shares must adopt international accounting standards which also supports the view that foreign shareholders improve firm's accounting information and transparency (Firth et al., 2007a). Therefore, I expected that firms with foreign ownership were more likely obtain loans from foreign banks because they are more transparent, and on that basis proposed the following hypothesis:

H4.1b: Firms with more foreign ownership have a higher probability of obtaining loans from foreign banks.

Prior studies also investigated the criterion that leads firms to establish a single relationship rather than multiple banking relationships. Part of the relevant literature supports the idea of maintaining an exclusive bank–firm relationship built on the belief that a firm with close ties to financial institutions would have greater access to gaining relevant information and obtaining funds than a firm without such ties (e.g., Diamond, 1984; Ramakrishnan and Thakor, 1984; Boyd and Prescott, 1986; Boot and Thakor, 1994; Petersen and Rajan, 1995; Elsas, 2005). However, a single relationship may not fulfil all needs of the borrowers (e.g., Houston and James, 1996; Detragiache et al., 2000; Machauer and Weber, 2000; Berger et al., 2001, 2005; Farinha and Santos, 2002), and there are problems that arise from both soft-budget-constraint problems and hold-up problems when a relationship is close. Since the Chinese government has historically mandated the

banking relationship with SOEs, the bank has more interaction with them than non-SOEs. Because of the long term and repeated lending relationship, banks have developed good channels for obtaining credit information about SOEs, while non-SOEs may find themselves disadvantaged in this regard and more opaque (Firth et al., 2009; Lin, 2011). Therefore, I expected SOEs to be more likely to have multiple relationships because they don't require single relationships to address opacity problems as often as non-SOEs, but they may need multiple relationships to fulfil their needs for funds or set out soft-budget-constraint problems and hold-up problems. Thus, the following hypothesis is proposed:

H4.2a: SOEs have a larger number of banking relationships than non-SOEs.

As discussed above, firms with foreign shares are more transparent so I expected them to need single relationships to address opacity problems less often, whereas banks with a single relationship may not fulfil all their credit requirements or result in soft-budget-constraint problems and hold-up problems. Above all, given that such multi-national firms are often in many localities and require both domestic and international services, local banks may not have offices in all the localities where the firm needs services, or have sufficient expertise in the local services. Therefore, I expected that firms with more foreign ownership may keep a larger number of banking relationships, and on that basis, proposed the following hypothesis:

H4.2b: Firms with more foreign ownership have a larger number of banking relationships.

The sample firms operated across various institutional environments because different regions in China are moving towards a market-based economy at

different speeds, including both market competition and law enforcement. As discussed above, firms may seek multiple banking relationships to meet the demands of financing or to mitigate the hold-up problem of a single relationship bank. This incentive may be greater when banking markets are less competitive and offer fewer potential alternatives in the future event that their bank tightens contract terms dramatically. For example, Besanko and Thakor (1987) found that banking sector competition lowers the rents of lenders in all the states of the world. Regarding the soft-budget constraint motivation for multiple banking, Ongena and Smith (2000) found that firms maintain a higher number of banking relationships in countries with inefficient judicial systems and poor law enforcement, where the potential for problems with soft-budget constraints might be greater. Qian and Strahan (2007) also concluded that across the world, loans have more concentrated ownership under better legal and institutional environments. Unlike these cross-country studies, the measure of the quality of the institutional framework is with respect to different regions within one country, i.e., China, which can address the country specific idiosyncrasies (Li et al., 2009). Accordingly, the following hypothesis is proposed:

H4.2c: The level of institutional development is negatively associated with the number of banking relationships decreases with local market development.

4.3 Data and variables

4.3.1 Sample selection

The initial sample consisted of all the firms listed on the Shanghai and Shenzhen Stock Exchanges for the years 2007 to 2009. The bank loan sample was manually collected from the footnotes of the annual reports of listed firms. To be included

in the sample, the footnote should contain detailed information such as the term of the loan (long term or short term), the type of bank loan (collateralised, guaranteed, or credit), and the amount of loans for each type. Moreover, this chapter focused on long-term bank loans because the CSRC also required all listed companies to report the identity of the lender for long term loans. Other corporate financial data used in this research was gathered from the China Stock Market and Accounting Research (CSMAR) database, which has been widely used in previous research. The level of institutional environments is controlled by using the NERI (National Economic Research Institute) Index of Marketization of China's Provinces (Fan et al., 2011). Each loan observation contains the identity of the lending bank, the type of bank loan, the amount of loans for each type, and sufficient data to calculate various control variables. Observations in the financial industry and ST or *ST firm-year observations are deleted. The final sample includes 1,487 firm-year observations. Details of the sample selection process are summarised in Table 4.1. Note that this type of sample selection has also been used in previous research (e.g., Allen and Li, 2011).

Insert table 4.1 about here

4.3.2 Empirical models

4.3.2.1 Determinants of bank ownership type

This research estimated Equation (4.1) to investigate the effects of ownership structure on the likelihood of a firm's reliance on a particular type of bank:

*Bank ownership type*_{it}

$$= \beta_0 + \beta_1 SOELG_{it} + \beta_2 SOECG_{it} + \beta_3 Foreign_{it} + \beta_4 Size_{it} + \beta_5 ROA_{it} \\ + \beta_6 Leverage_{it} + \beta_7 Liquidity_{it} + \beta_8 BD_{it} + regions + years + \varepsilon_{it}$$

(4.1)

where *Bank ownership type*_{it} is a dummy variable code one if one or more of the relationship banks of a firm is of a given ownership type (policy banks, the Big Four banks, joint stock commercial banks, and foreign banks) and 0 otherwise for firm i in year t. It was used to examine whether the firm uses at least one bank of a particular ownership type. β_0 is the constant and ε is a normally distributed error term. Because the dependent variable is a dummy variable, this research used a probit model to estimate Equation (4.1).

This research explored the bank ownership type for different types of ownership control. SOECGs refer to SOEs controlled by the central government under the State-owned Assets Supervision and Administratively Commission (SASAC). SOELGs refer to SOEs directly controlled by a local government. I also included the proportion of foreign ownership (*FOREIGN*). Overall, this model enabled a test to be made on whether SOEs tend to establish relationships with state-owned banks and whether firms with foreign ownership tend to establish relationships with foreign banks.

This research also included measures of firm size, financial performance, market characteristics, and location. This research measures firm size (*SIZE*) as the natural logarithm of total assets. Accounting statements provide measures of

profitability, indebtedness and liquidity. Profitability is measured by return on assets (*ROA*). The indebtedness variable is leverage, debt/assets (*LEVERAGE*); the liquidity variable is cash and cash equivalents/total assets (*LIQUIDITY*).

Local market characteristics included the banking development index (*BD*) developed by Fan et al. (2011) to represent the convenient choice of bank type in the region where the firm's headquarters are located.

This research also controlled for the region (east, central, west, or northeast) where the firm was located to capture the overall economic development of each region¹⁶. I also include a set of dummy variables to control for the year fixed effects.

4.3.2.2 Determinants of number of relationships

In this section the factors influencing the actual number of banking relationships were examined.

Number of relationships_{it}

$$= \beta_0 + \beta_1 SOELG_{it} + \beta_2 SOECG_{it} + \beta_3 Foreign_{it} + \beta_4 Size_{it} + \beta_5 ROA_{it} \\ + \beta_6 Leverage_{it} + \beta_7 Liquidity_{it} + \beta_8 Marketisation_{it} + years + \varepsilon_{it}$$

(4.2)

¹⁶ According to Fan et al. (2011), the east China includes Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, and Hainan. The central China includes Shanxi, Anhui, Jiangxi, Henan, Hubei, and Hunan. The west China includes Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang. The northeast China includes Liaoning, Jilin, and Heilongjiang.

where *Number of relationships_{it}* is a positive integer with count data so a Poisson regression methodology was used to estimate Equation (4.2), where β_0 is the constant and ε is a normally distributed error term. The firm characteristics in Equation (4.2) are identical to those in Equation (4.1). This research expected transparent firms with state ownership or foreign ownership to be more likely to have multiple relationships because they don't require single relationships to address opacity problems very often and they can use multiple banking relationships to fulfil their needs for funds, or set out soft-budget-constraint problems and hold-up problems.

The local market characteristics differ from those in Equation (4.1) and this model included the marketisation index (*MARKETISATION*) to control the institutional development. The sample firms operated under various institutional environments because different regions in China are moving towards a market-based economy at different speeds. The index this research used characterises the progress of the transition towards the market economy in areas that include the extent of government intervention, the degree of market competition, the development of product and factor markets and the strength of legal environment, for 31 provinces and special administrative regions. A higher marketisation index is associated with a better institutional environment. Table 4.2 lists the definitions of all variables this research used in the analysis.

Insert table 4.2 about here

4.3.3 Summary statistics

Table 4.3 lists the summary statistics of variables for the full sample. Panel A presents descriptive statistics on the relationship bank ownership type. Panel B shows the number of banks the borrower has transactions with. Panel C shows the ownership structure of sample firms. Panel D presents the summary statistics of the main variables to be used in the regression analysis.

Panel A shows that most firms, 75.1%, have a relationship with a Big Four bank, 19.4% have a relationship with a policy bank, 55.4% have a relationship with a joint stock commercial bank, and 10.0% have a relationship with a foreign bank. Further analysis in Panel D shows that the majority of loans were issued by the Big Four banks (54.8%), 11.8% of total loans came from policy banks, 29.8% of total loans came from joint stock commercial banks, and the remaining 3.6% was borrowed from foreign banks. For the number of banks the firm negotiates with, the mean was 2.581, as shown in Panel B. 40.2% of firms have exclusive banking relationships, 37.7% have two or three banking relationships around the mean value of 2.581, and 22.1% have banking relationships greater than 3. As shown in Panel C, SOEs comprise 61.2% of the sample, and about one quarter of SOEs are SOECGs. Foreign ownership has a mean (median) of 3.2% (0). The untabulated statistics indicates that 13.1% of the sample firms have foreign ownership and the average (median) foreign ownership is 24.7% (25.8%), conditional on there being non-zero foreign ownership. The firm size (*SIZE*) in the sample has a mean of RMB 5,496 million¹⁷ (about US \$898 million). Panel D shows firm performance,

¹⁷ Accordingly, the average firm size in the sample is 21.679 in the natural logarithm.

including return on assets (*ROA*) and the ratio of total debt to total assets (*LEVERAGE*) was used to control for profitability and indebtedness. The average return on assets (*ROA*) was 0.034 and the average leverage ratio was 0.259. I also included controls for the firm's location in regressions, but do not display these in the tables. In terms of the banking development index (*BD*), the mean of index was 12.106 whereas the marketisation index (*MARKETISATION*) had a mean of 8.644.

Insert table 4.3 about here

4.4 Empirical results

4.4.1 Univariate test

To provide some preliminary information, this chapter compared the mean and median of banking relationship cross firm ownership structure to test whether there were any significant differences. The results are interpreted in Table 4.4. Firstly, both the mean and median probability of obtaining bank loans from the policy banks in SOECGs is significantly higher than in SOELGs and non-SOEs, while there is no significant difference in SOELGs and non-SOEs. Secondly, SOELGs got a significantly larger probability of obtaining loans from the Big Four banks than SOECGs and non-SOEs, whereas no significant difference was found between SOECGs and non-SOEs. Third, SOECGs are found to be more likely to rely on joint stock commercial banks than non-SOEs, and SOECGs are found to be more likely to rely on foreign banks than SOELGs. One potential explanation is that SOECGs are typically larger and more complex, so they require more types of services from different types of banks, whereas the mean bank number of non-SOEs was much smaller than SOEs, including both SOELGs

and SOECGs. Finally, firms with more foreign ownerships are more likely to rely on foreign banks and tended to have a larger number of lending banks.

Insert table 4.4 about here

4.4.2 Multivariate tests

Before running the regressions, this research also checked the correlation matrix and the variance inflation factor (VIF). It turns out that the VIF is less than 2.23 for all regressions (untabulated) and all the correlation coefficients are less than absolute 0.381¹⁸. This implied that multi-collineality was not a critical issue here.

Insert table 4.5 about here

Tables 4.6 showed the regression results for the determinants of the bank ownership types. The probit regression coefficients give the change in the z-score for a one unit change in the predictor. In order to gain a sense of the magnitude of these effects the marginal effects evaluated at the means of the independent variables were also checked. The marginal effect of a dummy variable is calculated as the discrete change in the expected value of the dependent variable, as the dummy variable changes from 0 to 1. Column 1 shows SOECGs have 7.6 percentage points higher likelihood of maintaining a relationship with a policy bank and Column 2 shows SOELGs have 5.1 percentage points higher likelihood of maintaining a relationship with a Big Four bank, which is consistent with hypothesis H4.1a that SOEs have a higher probability of obtaining loans from

¹⁸ The correlation matrices show a larger positive correlation ($p=0.457$) between the two macroeconomic control variables, *BD* and *MARKETISATION*, but they are not simultaneously controlled.

state-owned banks. Specifically, local governments in China have strong incentives to provide loss-making SOELGs with bank loans from the Big Four banks in order to achieve policy goals. At the same time, strategically important SOECGs have a higher probability of obtaining loans from policy banks, which aim to assume responsibility for non-commercially oriented loans of strategically important SOECGs. The results in Columns 3 show there is no significant difference between non-SOEs and SOEs in maintaining the relationship with joint stock commercial banks. In addition, well-performing firms and firms with foreign ownership have a higher likelihood of maintaining a relationship with joint stock commercial banks. It indicates joint stock commercial banks have begun to apply economic criteria in their lending decisions. In Column 4, the significantly positive coefficient on the variable, *FOREIGN*, shows that the increase in ownership by foreigners is associated with a higher probability of obtaining loans from foreign banks, which supports hypothesis H4.1b. Specifically, an increase in ownership by foreigners from the median to the 95th percentile raises the likelihood that firms have established a relationship with a foreign bank by 7.03 percentage points. Finally, it is found larger firms (measured by *SIZE*) and firms with more credit demand and indebtedness (measured by *LEVERAGE*) have a higher likelihood of securing a relationship with all types of banks. I also use the logistic model and the untabulated results are unchanged¹⁹.

Insert table 4.6 about here

¹⁹ The cumulative distribution function (CDF) is the normal distribution function for the probit model and the CDF is the logistic distribution for the logit model, The CDFs of the normal and logistic distributions are similar, so the two models will produce similar results and the choice of probit versus logit depends largely on individual preferences (Baum, C.F., 2006).

This research also examined the factors influencing the number of banking relationships in Table 4.7. Column 1 shows the result from a Poisson model for the actual number of relationships. The Poisson model report the expected increase in log count for a one-unit increase in independent variable and this research also presented the regression results as incident rate ratios in parentheses. It was found that controlling for a number of firm-level variables both SOELGs and SOECGs firms were much more likely to maintain a higher number of relationships relative to non-SOEs, which approves H4.2a. The incident rate for SOELGs and SOECGs is 1.183 and 1.251 times the incident rate for non-SOEs, respectively. In Column 1 this research also found that firms with more foreign ownership were much more likely to maintain a higher number of relationships relative to those without foreign ownership, which is consistent with H4.2b. In particular, an increase in ownership by foreigners from the median to the 95th percentile raises the number of bank-firm relationship by 28.6 percentage points. As expected in hypothesis H4.2c, Column 1 also shows a negative association between the marketisation index (*MARKETISATION*) and the *Number of banking relationships*, which suggests that loans have more concentrated ownership in regions with developed institutions. The change in the incident rate of *Number of banking relationship* is a decrease of 3.2 percentage points for every unit increase in the marketisation index (*MARKETISATION*).

As a robustness check, the logarithm of the number of banks was used as the dependent variable. The Ordinary Least Squares (OLS) estimation in Column 2 is qualitatively similar. I also used an ordered logit regression to examine the likelihood that a firm exhibits multiple banking relationships rather than a single banking relationship. Specifically, I used a dummy for the dependent variable

which equals zero if the firm exhibits a relationship with a single bank, one if the firm is associated with 2–3 banks (given that the average number of bank–firm relationship is 2.581) and two if the number of bank–firm relationships exceeded 3. The ordered logit model report the log odds and this research also presented the regression results as odds in parentheses. It was found that for SOELGs and SOECGs the odds of multiple relationships versus the exclusive relationship were 1.514 and 1.593 greater than non-SOEs, given that all of the other variables in the model are held constant. In addition, an increase in ownership by foreigners from the median to the 95th percentile raises the odds of multiple relationships versus the exclusive relationship by 48.5 percentage points. Furthermore, Column 3 indicates that the change in the incident rate of multiple relationships versus the exclusive relationship was a decrease of 7.9 percentage points for every unit increase in the marketisation index (*MARKETISATION*). Following Detragiache et al. (2000), this research also estimated a two-step Heckman selection model. In the first stage the likelihood that a firm has more than one banking relationship was estimated, and in the second stage the logarithm of the number of relationships was estimated. The same exclusion restriction was then used to identify the two-step model. It was assumed that firms' R&D expense ratio helps explain whether the firm has more than one banking relationship, because high-intensity research firms may be subjected to more rent extraction by a single relationship bank, but beyond that it will have no effect on the actual number of relationships. Column 4 shows the second stage of the two-stage selection model and the sign of independent variables in Column 2 and 4 are generally consistent.

Insert table 4.7 about here

4.5 Banking relationships and collateral requirements

In this section the lending relationship variables were introduced to the determinants of collateral requirement regressions. Prior studies indicated that lenders could mitigate the effect of informational asymmetries through use of collateral. Compared to foreign banks, domestic banks have more flexibility to evaluate credit using specific information on firms obtained in the course of lending, which in turn results in lower demands for collateral (Boot and Thakor, 1994; Petersen and Rajan, 1994; Berger and Udell, 1995; Harhoff and Korting, 1998). Specifically, there is an assumption for purely profit-maximising financial institutions, while state-owned banks may lack the incentive to identify the most profitable firms because of government influences. Menkhoff et al. (2012) suggested that policy banks disburse policy loans or subsidised loans and also confirmed that policy banks require less collateral on these loans than other banks with a sample of Thai household loans. Using a hand gathered database of Chinese business lending, however, Allen and Li (2011) found that politically connected borrowers received higher collateral requirements in the Big Four banks relative to other banks, which was consistent with a backlash against cronyism at the Big Four banks after a clawback program had been introduced. Prior literature also investigated the impact that the number of banking relationships had on collateral requirements and consistently found that exclusive banking relationships relaxed collateral requirements due to prior information in the single bank (e.g., Boot and Thakor, 1994; Petersen and Rajan, 1994, 1995; Berger and Udell, 1995; Cole, 1998; Elsas and Krahnen, 1998; Machauer and Weber, 2000). In particular, if a financial institution operates as the exclusive bank for a firm, the firm mostly communicates with this particular bank.

Obviously, this intense communication between both parties creates a mutual trust and reduces the banks' risk in granting credit and requirements for collateral. Moreover, Harhoff and Korting (1998) pointed out that if the number of lenders is relatively high, any lender will be confronted with a less transparent situation regarding its access to the firm's unsecured assets in the case of bankruptcy. Hence, collateral requirements should increase with the increase in the number of banking relationships.

According to the hypotheses and variables described in Chapter 3, this research estimated the following models for regressions:

$$\begin{aligned}
 \text{Collateral}_{it} = & \beta_0 + \beta_1 \text{Policy bank}_{it} \\
 & + \beta_2 \text{Joint stock bank}_{it} + \beta_3 \text{Foreign bank}_{it} + \beta_4 \text{SOE}_{it} + \beta_5 \text{Foreign}_{it} \\
 & + \beta_6 \text{Guarantee}_{it} + \beta_7 \text{Size}_{it} + \beta_8 \text{AE}_{it} + \beta_9 \text{B/M}_{it} + \beta_{10} \text{ROA}_{it} \\
 & + \beta_{11} \text{Leverage}_{it} + \beta_{12} \text{Tangibility}_{it} + \beta_{13} \text{Liquidity}_{it} + \beta_{14} \text{Exclusivity}_{it} \\
 & + \text{regions} + \text{years} + \varepsilon_{it}
 \end{aligned}
 \tag{4.3}$$

where *Collateral_{it}* is the percentage of total loans collateralised for firm *i* in year *t*. To account for the possible impact of lender types, the ratio of total loans from policy banks, joint stock commercial banks and foreign banks was used. *POLICY BANK* is the percentage of long term loans from policy banks. *JOINT STOCK BANK* is the percentage of long term loans from joint stock commercial banks. *FOREIGN BANK* is the percentage of long term loans from foreign banks. *EXCLUSIVITY* takes the value of 1 if the firm works with one lender and 0 otherwise. Ownership structure and other control variables are as defined in chapter 3.

Column 1 of Table 4.8 shows that the coefficient on *POLICY BANK* is significantly negative, which indicates that compared to the Big Four banks, policy banks are less likely to require collateral, although both are state-owned. In addition, the coefficient on *FOREIGN BANK* is insignificant, which suggests there is no significant difference in collateral requirements between the foreign banks and Big Four banks. Finally, the significantly negative coefficient on *JOINT STOCK BANK* indicates that joint stock commercial banks are less likely to require collateral and attach more importance to private information in lending. This research also analysed the influence that the concentration of banking relationships had on collateral requirements. The coefficient of *EXCLUSIVITY* was significant and negative in the regression, and indicated that firms that maintain concentrated banking relationships have a lower probability of pledging collateral. The percentage of collateralised loans for firms that work with a single lender was lower than with multiple lenders by 9.3%.

The next step was to analyse whether the effect of the concentrated banking relationships differed according to the type of lenders. If the joint stock commercial banks are more likely to make loans based on private information, the benefits of exclusive banking relationships would be greater for those firms that borrow from this type of banks. In Column 3, the cross product term of exclusivity of relationship (*EXCLUSIVITY*) and the lender type of joint stock commercial banks (*JOINT STOCK BANK*) was introduced and the interaction term was significantly negative. This indicated that the benefits from exclusive relationships in reducing collateral requirements were larger in joint stock commercial banks than other banks. In particular, the percentage of collateralised loans for firms that borrow from a single joint stock commercial bank was lower

than from a single other bank by 12.2%. Finally, controlling the macroeconomic conditions does not affect the result, which is shown in Columns 2 and 4.

Insert table 4.8 about here

4.6 Conclusion

This research examined the ownership structure and banking relationship for a sample of China's listed firms from 2007 to 2009, based on a manually gathered database of Chinese business lending. The empirical analysis revealed that SOEs tended to have banking relationships with state-owned banks and firms with foreign ownership were more likely to have a banking relationship with foreign banks. There was also no significant difference in probability between SOEs and non-SOEs of obtaining loans from joint stock commercial banks, while firms with more foreign ownership or higher profitability were more likely to rely on joint stock commercial banks. This research also found that firms with state or foreign ownership were more likely to maintain a larger number of relationships, while firms in region with better institutions were more likely maintain a smaller number of relationships.

CHAPTER FIVE: CORPORATE GOVERNANCE AND COLLATERAL REQUIREMENTS: EVIDENCE FROM CHINA'S LISTED FIRMS

5.1 Introduction

The agency conflict between large controlling shareholders and other investors has long been viewed as the key to analysing those corporations with dominant shareholders. In such firms the largest shareholders will pursue their own interests by diverting firm resources and transferring assets and profits out of companies or committing funds to unprofitable projects for private benefits (La Porta et al., 1999; Claessens et al., 2000). Since these activities increase the probability of financial distress and bankruptcy, lenders may resort to collateral to protect themselves against the potential risk of expropriation (Cremers et al., 2007).

The effective governance mechanisms (including both internal and external governance) can decrease the ability and incentive of the controlling shareholders to expropriate, and thereby decrease the credit risk faced by lenders. Consistent with this view, an emerging stream of literature with cross-country evidence indicates that borrowers with better governance are rewarded with lower collateral requirements (e.g., Francis et al., 2012; Ge et al., 2012). However, Larcker et al. (2007) argue that existing studies do not have a consensus on the appropriate measurement of good corporate governance indicators or the number of corporate governance dimensions. This prompts a natural question: how do various governance mechanisms affect collateral requirements? In particular, this research investigated the mechanisms through which the credit risk induced by the expropriation activities of controlling shareholders at the borrowing firm can be mitigated or strengthened.

To answer the question, the relationship between actual corporate governance practices and collateral requirements is examined using a sample of China's listed firms between 2007 and 2009, and rather than relying on the corporate governance index and country-specific governance (e.g., Francis et al., 2012; Ge et al., 2012), the monitoring role of other large shareholders to the controlling shareholder, two-tier boards (including both the board of directors and the supervisory board) and institutions (e.g., Huyghebaert and Wang, 2012) are tested. China's environment is an excellent laboratory in which to conduct the research for the following reasons. First, China's listed firms are featured with concentrated ownership and in many cases the government is the controlling shareholder. It indicates that the largest shareholder has substantial control over the firm and potentially exposes creditors to expropriation by dominant owners. Therefore, this research is able to assess how the governance mechanisms are used to prevent tunnelling and impact the collateral requirements, and how it interacts with the type of ownership control. Second, this chapter intends to shed light on the impact that the supervisory board has on collateral requirements, which is an important but unexplored corporate governance element that is unique to China²⁰. Last, being a large emerging economy with uneven institutional development across different regions (Fan et al. 2011), China is also an exciting laboratory for examining whether the collateral requirements can be ascribed to the evolution of external governance, compared to country-specific governance with cross-country studies.

²⁰ The supervisory board in China still lacks rights to appoint and dismiss executive directors, compared to the German-Japanese corporate governance approach.

Briefly, the results revealed that the governance mechanisms do influence the collateral requirements of China's listed firms, but their effect on collateral requirements differs according to the types of controlling shareholders. First, I found that the role of other large shareholders in reducing collateral requirements and the role of other large shareholders is more significant for non-SOEs. In terms of a two-tier board structure it was found that firms with a smaller board of directors, a larger proportion of independent directors, separate chairman and CEO positions, and a larger supervisory board could decrease their collateral requirements, and the characteristics of a two-tier board were more significant for SOEs. Furthermore, it was found that a better regional institution was negatively related to the collateral requirements of borrowers and the role of regional institutions was more significant for non-SOEs. Finally, the increase in the proportion of expert supervisors on the supervisory board in areas of law and accounting can reduce collateral requirements, and the role is more significant in better developed regions for SOEs and non-SOEs.

This research contributes to the literature in several ways. First, fresh evidence proving how internal governance by other large shareholders affects firm's collateral requirements has now been presented. Extant evidence shows that other large shareholders can prevent controlling shareholders from tunnelling and increase firm value (e.g., Liu and Lu, 2007), and this research extends the literature by providing evidence of the economic consequences that banks consider about how other large shareholders can reduce tunnelling when designing loan contracts. The empirical estimation of this relationship was instrumental in explaining how the internal governance of other large shareholders affects corporate values.

Second, Chinese companies are required to establish two-tier boards consisting of board of directors and supervisory boards. Indeed, the supervisory board is a typical feature of the German-Japanese governance system. Although Chinese supervisory boards resemble the German-Japanese governance structure, they still lack the right to appoint and dismiss executive directors. A new version of Corporate Law became effective at the beginning of 2006, which largely addressed the constraints that prevented supervisory boards from functioning properly. Accordingly, the data used in this study were collected after this critical point, so there is now a good opportunity to examine whether the collateral requirements have been affected by the characteristics of the supervisory board. Moreover, this transition is not natural but an artificial and mutative process that parallels the development of modern corporation governance in China. This research also evaluated the effectiveness of these two-tier board structures by examining whether the characteristics impact on collateral requirements.

Third, prior studies show that country-specific governance mechanisms, such as the development of laws and institutions, deter expropriation and are instrumental in obtaining bank credit (Francis et al., 2012; Ge et al., 2012). This chapter recognised large variations in institutional environments across the regions in China as a unique opportunity for single-country research into the relationship between external governance and firms' loan collateral requirements. Compared to cross-country studies, the use of sub-national data has major advantages in addressing the issues related to other country-level variables (Li et al., 2009).

Finally, this detailed investigation indicated that supervisor expertise and external governance complement each other in reducing collateral requirements, which

suggests that policy makers should work on improving the institutional quality and monitoring power of supervisory boards together. Besides this interaction effect, all the sample firms were categorised as SOEs and non-SOEs, so this chapter provided detailed evidence to the effect that the internal and external governance mechanisms pertaining to the collateral requirements in Chinese listed firms, dependent on the type of firm's ownership control.

The structure of the remainder of this chapter is as follows. Section 5.2 reviews the Chinese institutional environment and develops the hypotheses. Section 5.3 outlines the data and methodology. Section 5.4 reports the results of the empirical analyses. Section 5.5 provides additional tests, and Section 5.6 concludes.

5.2 Development of hypothesis

An active takeover market does not exist in China, but other large shareholders, apart from the controlling shareholder, can challenge opportunistic controlling shareholders. Other large shareholders could constitute a serious obstacle to expropriation activities by the controlling shareholder in order to protect their own interests and also generate benefits for other investors, including the banks. For example, it was found there was a negative relationship between tunnelling in Chinese listed companies and the presence of other large shareholders (Liu and Lu, 2007). If governance by other large shareholders reduces expropriation by controlling shareholders and thereby reduces the risk of default, it is also expected to be negatively related to collateral requirements. In particular, this chapter outlines the concentration of ownership by other large shareholders such as Liu and Lu (2007), which is positively related to the governance of other large shareholders, and thus proposed the following hypothesis:

H5.1: A concentration of ownership by other large shareholders is negatively associated with collateral requirements.

In terms of the board of directors, board size is one variable that affects the effectiveness of the board control function. Compared to small boards, large boards have a greater risk of being dominated by powerful shareholders, which enhances the vulnerability of other investors to expropriation. For example, Huyghebaert and Wang (2012) found board size to be positively related to minority-investor expropriation in China's SOEs. If the board loses its ability to protect creditors from expropriation as its size increases, it is expected that firms with larger board are more likely to be required to pledge collateral by their creditors. This leads to the following hypothesis:

H5.2a: Board size is positively associated with collateral requirements.

In addition, agency theorists consider independence to be a crucial aspect of a board's monitoring role. In the context of China, which is characterised by conflicts of interest between the controlling shareholders and other investors, independent directors should ensure that financial decisions are made to maximise firm value and should not result in earnings or cash flows that are biased toward the controlling shareholders (CSRC, 2002). On the empirical side, for example, Huyghebaert and Wang (2012) found evidence from China's listed firms that a larger fraction of independent directors can reduce expropriation by the controlling shareholder through party related transactions. If more independent boards can reduce expropriation by controlling shareholders and therefore reduce the firms' credit risk, it is expected that firms with more independent board are

less likely to provide further collateral. The hypothesis to be tested is as stated below:

H5.2b: The fraction of independent directors is negatively associated with collateral requirements.

Some researchers argue that the position of CEO should be separate from the chairman of the board because a dual appointment of CEO and chairman reduces its independence and its monitoring effectiveness. For example, Liu and Lu (2007) argued that when the CEO is also the chairman of the board, it is more difficult for minority shareholders to have a say on important issues and the controlling shareholders have larger discretionary power in their financial reporting and tunnelling. Accordingly, this research assumed that the separation of CEO from the chairman's position would be better at preventing controlling shareholders from expropriation, so it can be predicted that in an alternative form, when borrowers have a dual chairman and CEO, they also have higher collateral requirements. The hypothesis to be tested is as stated below:

H5.2c: Board duality is positively associated with collateral requirements.

In terms of a supervisory board, prior studies indicated that a larger supervisory board is more likely to successfully protect the stakeholders' interests. Banks and other stakeholders seem to value supervisory boards and appreciate their activities. For example, Dahya et al. (2003) found that a negative market reaction occurred when a company failed to include a supervisory report in its annual report, and more recent research by Shan (2013) discovered that a larger supervisory board can reduce asset appropriation by the controlling shareholder. If the large

supervisory board of a borrower can effectively decrease expropriation risks it is then expected to reduce the risk of default and the corresponding loan collateral requirements. The hypothesis to be tested is as below:

H5.3a: Supervisory board size is negatively associated with collateral requirements.

With respect to the final internal governance characteristics, the professional knowledge and experience of supervisors in areas such as law and accounting should be able to promote the governance of a supervisory board. Dahya et al. (2003) pointed out that supervisors are expected to have the necessary competencies in terms of knowledge and experience to perform their monitoring role, while Shan (2013) also argued that more supervisors with professional knowledge or work experience on the supervisory board are related to less expropriation by the controlling shareholder. If a supervisory board that has more supervisors with the appropriate professional knowledge or work experience is in a better position to promote corporate governance, it is predicted to be negatively related to the level of collateral requirements. The hypothesis to be tested is as stated below:

H5.3b: The fraction of supervisors with professional knowledge or work experience on the supervisory board is negatively associated with collateral requirements.

5.3 Data and variables

5.3.1 Sample selection

The initial sample consisted of all firms listed on the Shanghai and Shenzhen Stock Exchanges for the years 2007 to 2009. The bank loan sample was manually collected from the footnotes of the annual reports of listed firms. To be included in the sample the footnote should contain detailed information of the bank loans such as loan maturity (long term or short term), the type of bank loan (guaranteed, collateralised, or unsecured), and the amount of loans for each type. This research also used the annual reports to identify the independent directors and professional supervisors. Other corporate financial data used in this research was gathered from the China Stock Market and Accounting Research (CSMAR) database. The level of institutional environments was controlled using the NERI (National Economic Research Institute) index of Marketisation of China's Provinces (Fan et al., 2011). Both of these sources have been widely used in previous research (e.g., Chen et al., 2006; Firth et al., 2006, 2007a and 2007b; Li et al., 2009).

Initially there were 4,969 firm-year observations available on CSMAR database from 2007 to 2009. Table 5.1 describes the sample selection process. First, 523 observations with no outstanding loans were eliminated, and 18 observations in the financial industry were deleted. 109 observations were then eliminated because the type of bank loan cannot be identified in the financial reports, and a further 170 observations with insufficient data to calculate financial data were also deleted. Moreover, an additional 387 ST or *ST firm-year observations were also eliminated, as were 579 observations that had insufficient data to calculate

corporate governance data. The final sample consisted of 3,183 firm-year observations.

Insert table 5.1 about here

5.3.2 The estimation model

As described in Chapter 3, this section used the percentage of total loans that were collateralised as the proxy for the level of collateral requirements and the tobit model with double censoring. In order to make sense of the magnitude of the effects, this research also checked the marginal effects evaluated at the means of the independent variables. The marginal effect of a dummy variable was calculated as the discrete change in the expected value of the dependent variable as the dummy variable changed from 0 to 1. According to the hypotheses described in the previous section, this research estimated the following models for regressions:

$$\begin{aligned}
 Collateral_{it} = & \beta_0 + \beta_1 SOE_{it} + \beta_2 Foreign_{it} \\
 & + \beta_3 Top2_10_{it} + \beta_4 Board\ size_{it} + \beta_5 Independence_{it} + \beta_6 Duality_{it} \\
 & + \beta_7 SB\ size_{it} + \beta_8 SB\ expertise_{it} + \beta_9 Guarantee_{it} + \beta_{10} Size_{it} \\
 & + \beta_{11} AE_{it} + \beta_{12} B/M_{it} + \beta_{13} ROA_{it} + \beta_{14} Leverage_{it} + \beta_{15} LTDEBT_{it} \\
 & + \beta_{16} Tangibility_{it} + \beta_{17} Liquidity_{it} + \beta_{18} Marketisation_{it} + years \\
 & + \varepsilon_{it}
 \end{aligned}
 \tag{5.1}$$

where $Collateral_{it}$ is the percentage of total loans collateralised for firm i in year t , β_0 is the constant, and ε is a normally distributed error term.

First, I used the sum of the percentage points of shareholding by the second to the tenth largest shareholders as an indicator of ownership concentration by other large shareholders (*Top2_10*).

Second, I measured the two-tier board structure by looking at five aspects: the size and independence of the board of directors, the duality of the CEO and chairman positions, the size of the supervisory board, and the proportion of professional supervisors. I used the number of directors on the board to measure the size of the board of directors (*Board size*), and the proportion of independent directors on the board to measure its independence (*INDEPENDENCE*)²¹. I also included *DUALITY*, a dummy variable coded 1 for the duality of CEO and chairman and 0 otherwise. For the supervisory board, I included the number of supervisors to measure the size of the supervisory board (*SB size*). Finally, I constructed a variable that equals the ratio of supervisors on the supervisory board with the professional knowledge or work experience in areas such as law and accounting to measure the professional level of the supervisory board (*SB expertise*).

To account for regional disparities in market development, a regional market development index (*MARKETISATION*) was inserted in the 31 provinces of China. A higher index means that the extent of market development in the province was greater and it exhibited better external governance.

²¹ Since 2003 at least one-third of the directors have to be independent and there is little inter firm variability in the proportion of independent directors in the sample of this research. In light of this, this research re-classified independent directors as those who also have other directorships because of their greater board experience (e.g., Ferris et al., 2003).

The specification of the remaining control variables was based on the current literature in empirical corporate finance, as described in Chapter 3. Table 5.2 lists the definitions of all the variables used in the analysis.

Insert table 5.2 about here

5.3.3 Summary statistics

Table 5.3 lists the summary statistics of variables for the full sample. Panel A presents descriptive statistics on collateral requirements; Panel B shows the characteristics of ownership structure; Panels C shows the characteristics of the internal governance; Panel D presents the descriptive statistics of the index that measures the levels of institutional development; Panel E presents the summary statistics of other control variables to be used in the regression analysis; and Panel F reports the collateral requirements based on years. Panel A shows that the mean (median) of collateralised proportion was 36.0% (27.1%), while the means (medians) in Panel F indicate that the level of collateral requirements were stable across the sample period, which ranged from 34.3% (25.3%) to 37.0% (28.6%). As Panel B shows, SOEs comprise 55.8% of the sample. Panel B also shows that foreign ownership has a mean (median) of 3.6% (0), and 13.6% of sample firms have foreign ownership (untabulated). In addition, Panel C shows that the mean and standard deviation for the concentration of ownership of the second to the tenth largest shareholders were 19.2% and 13.0%, respectively. Panel C also shows that the average board size was 9.208 and the median was 9, while the proportion of outsider directors on the board has a mean of 31.5% and a standard deviation of 18.4%, and about 15.9% of the CEOs were also the chairman of the board of directors. Meanwhile, the average (median) of supervisory board size is

3.965 (3) and the proportion of supervisors with professional knowledge or work experience on the supervisory board has a mean of 20.0% and a standard deviation of 21.4%. Panel D shows that the sample firms operated under various institutional environments where the average (median) score of the marketisation index was 8.490 (8.75).

Insert table 5.3 about here

5.4 Empirical results

5.4.1 Univariate tests

To provide some preliminary information, Table 5.4 presents univariate comparisons of the governance characteristics between SOEs and non-SOEs. The results clearly suggested that non-SOE had more concentrated ownership by other large shareholders with an average of 0.229 and a median of 0.220, while the average is 0.163 and the median is 0.134 for SOEs. In terms of a two-tier board structure, the board size in firms controlled by SOEs was 9.570 in mean, which was significantly larger than non-SOEs with a mean of 8.752. In addition, SOEs had a smaller proportion of independent directors with a mean of 0.308 than non-SOE (0.323). Table 5.4 also shows that the SOE are less likely have a duality of CEO and chairman with an average of 0.105, while the average for non-SOEs was 0.228. In terms of a supervisory board, the non-SOE had a significantly smaller supervisory board, 3.586 in mean and 3 in median, while SOEs had a typical size of 4.267 persons on average and 5 in median. In addition, non-SOEs had a smaller proportion of supervisors with professional knowledge or work experience on the supervisory board, with an average of 0.173, than SOEs (0.222). With the geographic locations, it was found the external governance of non-SOEs is better

than SOEs. Specifically, the marketisation index of SOEs was 8.357 on average and 8.73 in median, while the marketisation index of non-SOEs was 8.656 on average and 8.76 in median.

Overall, this section found that the governance characteristics differed across firms classified by types of controlling shareholders. SOEs had larger boards (including both the board of directors and supervisory board), a higher proportion of separation between CEO and chairman, and a higher proportion of supervisors with professional knowledge or work experience on the supervisory board. Non-SOEs had more concentrated ownership by other large shareholders, more independent boards, and operated in regions with better institutional development.

Insert table 5.4 about here

5.4.2 Multivariate tests

Before running the regressions, the correlation matrix and the variance inflation factor (VIF) were checked, and it turned out that the VIF was less than 2.57 for all the regressions and all the correlation coefficients were less than absolute 0.397, which implied that multi-collineality would not be a critical issue here.

Insert table 5.5 about here

Table 5.6 provides the results from the tobit regressions of the association between governance of other large shareholders and collateral requirements. First of all, the results in Column 1 indicated that the loan collateral requirements of Chinese firms were affected by the same firm characteristics as the determinants shown in Chapter 3, that is, there is a negative association between the guarantee

requirements (*GUARANTEE*) and the collateral requirements; this suggests that a loan guarantee acts like a collateral substitute and allows a lender to enforce collateral-free loans. The likelihood of collateral requirements also decreases with the size of the borrower (*SIZE*), while better profitability (*ROA*), tangibility (*TANGIBILITY*), and liquidity (*LIQUIDITY*), also implied a lower likelihood of pledging collateral. In addition, the leverage levels (*LEVERAGE*) and term structure (*LTDEBT*) were both positively related to collateral requirements. This research found no strong support for the signalling hypothesis because the relevant variable (*AE*) showed a negative sign. This research also did not find a postulated positive relationship between growth opportunities and the proportion of secured debt, which may be interpreted as a general tendency of growth firms to decrease the size of debt financing, especially collateralised loans.

As Column 2 shows, the percentage of collateralised loans for SOEs, *ceteris paribus*, was 13.9% lower than for non-SOEs. This indicates that state ownership still plays a key role in gaining access to unsecured bank finance in China. Column 3 shows that foreign ownership (*FOREIGN*) has a negative relationship with the collateral requirements of Chinese listed firms. It suggests that the availability of alternative financial resources and improved transparency was instrumental in gaining access to unsecured bank loans. Column 4 shows there was a negative relationship between the ownership concentration of other large shareholders (*Top2_10*) and collateral requirements, which proves hypothesis H5.1, and indicates that the second to tenth largest investors can offset expropriation and help firms obtain collateral free loans.

Insert table 5.6 about here

Table 5.7 provides the results from the tobit regressions on the association between a two-tier board structure and collateral requirements. The variables *Board size* and *SB size* were taken in logarithmic form due to their right-skewed distribution. As expected from hypothesis H5.2a, the coefficient for board size (*Board size*) was positive and significant at the 10% level in Column 1, which suggests that smaller boards are perceived to be better at controlling key business decisions and ensuring that the interests of all investors are pursued, including lenders. This research further included the measure for board independence (*INDEPENDENCE*), from which it was observed there was a negative and statistically significant relationship between the proportion of independent directors and collateral requirements. This result is consistent with the prediction that banks value the monitoring role of independent directors, and it also proves hypothesis H5.2b. In terms of the board of directors, this research finally included the effect of CEO/chairman duality on the collateral requirements using a binary variable, *DUALITY*. The empirical result indicates it was positively and significantly related to collateral requirements, which is consistent with hypothesis H5.2c, and it also implies that banks consider the separation of CEO and chairman as a good governance mechanism and reward them with lower collateral requirements.

Because a supervisory board is important in monitoring the controlling shareholders and providing credible financial information to banks, Column 2 examined the relationship between the structure of a supervisory board and the collateral requirements. It was found that the coefficient for the size of a supervisory board (*SB size*), and the coefficient for the professional supervisor proportion (*SB expertise*) were both significant and negative. These coefficients

indicate that an increase in the size of a supervisory board and its combined expertise can reduce the collateral requirements of Chinese listed firms, which is consistent with hypothesis H5.3a and b. In Column 3, this research combined all of the variables in a single regression to test the incremental explanatory powers of different two-tier board characteristics on bank collateral requirements. Again, it was found that board structure (including size, independence, and duality) and supervisory structure (including size and professional knowledge) still have an impact on collateral requirements, while the other results also remain intact. In addition, I included the index for institutional development (*MARKETISATION*) and found a significantly negative relationship between the marketisation index and collateral requirements. It indicated that banks in well-developed regions are more likely to lend on a credit basis while banks in poor regions are more likely to lend based on the amount of collateral.

Insert table 5.7 about here

One important research question is whether the effects of internal and external governance mechanisms on the collateral requirements in Chinese listed firms depend on the type of controlling shareholder. To gain further insight, this research split the sample into two groups based on the type of controlling shareholder. The results of the split sample regression are reported in Table 5.8.

It was found here that the degree of ownership concentration by other large shareholders (*Top2_10*) were insignificantly related to the collateral requirements in SOEs through Column 1, but were negatively and significantly related to collateral requirements for non-SOEs through Column 3. In the sample, *ceteris paribus*, a one standard deviation increase in ownership concentration by other

large shareholders reduced the predicted collateralised proportion by 4.14% in non-SOEs. With an increase of ownership concentration by other large shareholders, however, the collateral requirements in SOEs did not show any significant decreases, possibly because of ownership uncertainty and any relevant uncertainty of government bailout (Tian and Estrin, 2008; Borisova and Megginson, 2011).

It was also found there was a significantly positive coefficient of the variable *Board size*, in Column 1 for SOEs, which showed, ceteris paribus, that one standard deviation increase in board size increased the predicted percentage of collateralised loans by about 5.51%. The first regression also indicated that an increase of board independence (*INDEPENDENCE*) can significantly reduce the collateral requirements of SOEs, that is, an increase in board independence from the 5th to the 95th percentile reduced the predicted collateralised proportion by 5.56% for SOEs. It was then found that the percentage of collateralised loans for SOEs with a duality of chairman and CEO (*DUALITY*), ceteris paribus, was 6.00% higher than SOEs with a separation of chairman and CEO. Column 3 shows that the coefficient signs for non-SOEs' board characteristics are the same as SOEs but are insignificant at the traditional level. For the supervisory board, the variable *SB size*, was instrumental in obtaining unsecured bank loans for SOEs, but it played no significant role in lending decisions for non-SOEs. Ceteris paribus, an increase in the size of a supervisory board from the 5th to the 95th percentile can significantly reduced the predicted collateralised proportion by 5.25% for SOEs. It was also found that the significant negative relationship between a firm's collateral requirements and the variable, *SB expertise*, only existed in non-SOEs (this research explains it later).

Finally, it was found there was an insignificantly negative relationship between institutional development (*MARKETISATION*) and collateral requirements in SOEs. This result is consistent with the work of Jian and Xu (2012), which showed that the benefits of institutional development in loan contracts requirements decreased for SOEs because the benefits of government intervention in putting pressure on the banking system to lend to SOEs simultaneously decreased in regions with better institutional development. Moreover, courts in China have a long tradition of protecting state interests because the Chinese judicial system is still treated as part of the government's administrative system, but such benefits for SOEs also decrease in regions with better institutional development (Jiang et al., 2010). For non-SOEs, the significant negative coefficient on the variable *MARKETISATION* showed that firms in regions with more developed institutions were less likely to be required to pledge collateral. Ceteris paribus, an increase in the index from the 5th to the 95th percentile can significantly reduced the predicted collateralised proportion by 4.20% for non-SOEs. In addition, the costs of a monitoring role by professional supervisors are quite high, so in practice it may be that firms only benefit from employing experts in more developed regions where the monitoring cost is lower due to competition in market intermediaries. Besides, in less developed regions a large number of judges are former government officers without formal education in law, banks may not reward a more professional supervisory board with less collateral requirements. Therefore, I added an interaction term between the proportion of professional supervisors (*SB expertise*) and the institutional development index (*MARKETISATION*). It was found that an increase in the proportion of professional supervisors reduced the collateral requirements when the index was

larger than 8.06 for SOEs and 6.98 for non-SOEs, respectively. The overall results suggest that SOEs can reduce their collateral requirements by improving their two tiered board structures, and non-SOEs can further work on ownership restructuring and supervisory expertise complemented with institutional development.

Insert table 5.8 about here

5.5 Additional tests

5.5.1 Robustness check of the general results

This research conducted some sensitivity tests to check the robustness of the results and then compared them with the findings in Table 5.7. The results in Column 1 of Table 5.9 show that using the natural logarithm of total assets adjusted board size (*Board size*) and supervisory board size (*SB size*) do not change the quality of the findings and the explanatory power of the model. In the untabulated analysis, I also used a Herfindahl index (*HERF*) of the second to the tenth largest shareholdings to capture the internal governance of other large shareholders. *HERF* is defined as the sum of the squares of the proportional shareholdings of the second to the tenth largest shareholders in the company, and the results remain unchanged. Because independent directors may be more effective at monitoring if they have consistency in the work place with the address of the registered office of the listed firm, I used a dummy variable to indicate work place consistency and found that it remained negatively related to collateral requirements²². I also re-classified the variable *DUALITY*, because of those CEO

²² Company usually invests a few independent directors, and it is subject to the working place of the independent director with professional accounting title. If there are two independent directors

who are also vice chairman or director. This alternative definition of duality yielded similar results to those already reported when using the original definition.

As stated in Chapter 3, this research also used an alternative approach for the tobit model and constructed ranks for the collateral requirements which can be based on 25 percentiles of the collateral requirements. Hence, the continuous measure of collateral requirements was transformed into an ordinal variable with four ranks. To analyse a ranked dependent variable this research applied the ordered logit approach. Column 2 shows the result of the ordered logit models and the marginal effects for the probability of outcome when the collateral requirements are in the highest quarter in parentheses. The regression result was similar to those in Table 5.7, which suggests that the results are robust to the model change.

Endogeneity of ownership type was less of a problem because it is usually selected by the state or requires the state's approval (Firth et al., 2007a). Identifying instruments for each of the governance quality characteristics is a virtually impossible task, so this research combined the six statistically significant firm-level governance quality characteristics into a single governance quality index (*GQI*) and then used an instrument for that index in a two-stage least squares model (2SLS) as Fields et al. (2012). This research created this governance quality index by assigning a value of one within the index if a continuous firm governance characteristic was above its cross-sectional median, and assigned a zero value otherwise, (but this research added a value of one if the board size was lower than the median value). For the duality dummy (*DUALITY*),

with accounting professional title, it should be regard as different if the working place of either of them is different from the registered office address of the company.

I added a value of one to the other governance quality variable points if there was a separation of CEO and chairman. Therefore, the index has a maximum of six and a minimum of zero. Next, I used the firms' *Beta* as the instrumental variable. The variable *Beta*, which is a proxy for market risk, may motivate the controlling shareholder to adopt weak governance because controlling shareholders are more likely to profit from inside information when their firm has higher market risk, and *Beta* are only related to firm-level governance but not loan contracting terms (Francis et al., 2012). Column 3 reports the second stage of the two-stage model where this research replaced the governance quality characteristics with the governance quality index. In the first stage (untabulated), the value of *Beta* was negative and statistically significant. The second-stage results continued to reveal that the *GQI* was significantly and negatively related to collateral requirements. Based on these results, I concluded that lenders are less likely to require borrowers to provide collateral in response to their superior governance, which is consistent with those reported in Table 5.7. For the split-sample regression, this research also ran sensitivity tests as in the general result analyses. The results from the sensitivity tests showed that the conclusions based on the results in Table 5.8 are robust to variable definitions and measurement, model specifications, and endogeneity issues.

Inset table 5.9 about here

5.5.2 Why is corporate governance important?

In the previous section this research found that corporate governance to be an important determinant of collateral requirements and then investigated where corporate governance is important to collateral requirements across SOEs and

non-SOEs. This study then went a step further and investigated why corporate governance is important to collateral requirements. Since it has been argued that corporate governance helps entrepreneurs prevent tunnelling, I can carry out more direct tests of these predications by estimating the effects of corporate governance on various measures of tunnelling. The first measure was inter-corporate loans (also called funds occupation), which is a primary tool that controlling shareholders use for tunnelling. Following Jiang et al. (2010), other receivables to total assets (*ORECTA*) are used to measure inter-corporate loans to controlling shareholders. However, Jiang et al. (2010) also showed that for those firms in the top three deciles of “other receivables”, only 30 per cent to 40 per cent of loans were made to dominant owners and their affiliates.

In China, according to “Content and Format Standards of Information Disclosure for Securities Issuing Companies no. 7”, listed firms are required to disclose the amount of transactions between related parties in their financial statements²³. Following Cheung et al. (2006), I collected data of business dealings with related parties²⁴ and calculated the ratio of sales of goods/services to related parties relative to primary operating revenues and divided the purchases of goods/services from related entities by primary operating expenses, correspondingly.

²³ Detailed disclosures are required within two working days after signing the contract if, for one party, the total amount of transactions between related parties is larger than 1,000,000 Renminbi (RMB) or 0.5 per cent of audited net assets, whichever is higher. Moreover, these dealings have to be approved by the general meeting of shareholders as soon as their size exceeds 10,000,000 RMB or 5 per cent of audited net assets.

²⁴ To capture potential tunnelling, this research only looks at the deals occurring between the listed firm and its parent company, other firms controlled by its parent, other firms controlled by investors exerting a large influence on the listed firm, as well as other firms controlled by members of the immediate families of any of these parties.

In the first regression reported in Table 5.10, whether internal and external governance helped a firm prevent tunnelling was tested by using the other receivables deflated by total assets as the dependent variable to measure tunnelling. The first regression showed that both internal and external governance do indeed prevent tunnelling, with the *GQI* being negative and significant at the 5% level and marketisation index (*MARKETISATION*) being negative and significant at the 1% level. This finding that internal and external governance helps a firm to prevent tunnelling through inter-corporate loans may partially explain why such governance affords firms certain advantages in reducing collateral requirements.

Regression 2 and 3 reported the empirical findings for the log odds of related sales and related purchases above cross-sectional median with logit model and the odds ratio is reported in parentheses, respectively. Overall, the main findings are largely consistent when using these two variables. First, there was a significant negative influence of internal governance on both related sales and related purchases (coefficient = -0.078, $p < 0.05$ in Column 2; and coefficient = -0.110, $p < 0.01$ in Column 3). These results are also in line with the finding in Column 3 of table 5.9 and it indicates that internal governance can significantly reduce the expropriation of controlling shareholders through business dealings and reduce collateral requirements accordingly. This research also noted the negative effect of the marketisation index (*MARKETISATION*) on related sales and related purchases (coefficient = -0.041, $p < 0.05$ in Column 2; and coefficient = -0.040, $p < 0.05$ in Column 3). It was shown that firms operating in regions with better institutions were less likely to be tunnelled by controlling shareholders through business dealings than firms operating in regions with poor institutions.

Insert table 5.10 here

5.6 Conclusion

Using a sample of China's listed firms during 2007–2009, this research investigated the effect of internal and external governance on the collateral requirements of loan contracting, and found that banks were more willing to offer unsecured loans to non-SOEs with more ownership of the second to tenth largest shareholders. These results also support the conclusion that two-tier board structures impact on collateral requirements because banks were less likely to require SOEs to provide collateral if they had a smaller board of directors, more independent directors, separation of chairman and CEO, or a larger supervisory board. There was also a negative association between the level of regional institutional development and non-SOEs' collateral requirements, and furthermore, the benefits of employing professional experts in reducing collateral requirements began to emerge in more developed regions than less developed regions for both SOEs and non-SOEs. Overall, these results suggest that both internal and external governance can mitigate the agency problem and thereby facilitate access to unsecured finance.

CHAPTER SIX: CONCLUSION

Collateral is a regular ingredient of risky lending. It serves to limit potential losses for lenders and serves as an incentive mechanism and commitment signal for borrowers. China's banking industry and SOEs have undergone significant reforms since the late 1970s, and there is also a significant and even growing problem of regional disparity. Despite having an imperfect legal system and an under developed financial market, China's economy has still been growing at high speed. However, research on developing nations and the financial growth nexus strongly suggests that these high growth rates cannot continue indefinitely without significant reform of the banking system and the legal/financial infrastructure (Berger et al., 2009). Loan financing is the predominant source of external funds for China's corporations. This research chose the issue of loan collateral requirements in Chinese listed companies with the expectation of developing some preliminary groundwork in the area of corporate finance. The findings from this thesis are as follows:

6.1 Type of controlling shareholders

In Chapter 3, this thesis examined the effect that the type of controlling shareholders has on collateral requirements. The empirical results show that SOEs, which have more government guarantee and less private information with their lenders, are less likely to pledge collateral. These results are consistent with the asymmetric information theory that collateral is used by lenders to limit their potential losses while being used by borrowers to signal their credit worthiness to lenders. Moreover, such a connection between the type of controlling shareholders and collateral requirements is weaker for firms with more foreign ownership due

to less information asymmetry. In addition, the role of state control in reducing collateral requirements can also be substituted by third party guarantees. Overall, the results imply that existing theory could satisfactorily explain the effect that the type of controlling shareholder and its interaction with firm characteristics has on collateral requirements.

6.2 Lending environment

With regard to the resources of firm loans, this research further investigated their detailed construction, that is, the type of bank ownership and the number of banking relationships. I first tested for the types of firms that established relationships with different types of bank ownership, and identified four specific types of bank ownership: foreign banks, two types of state-owned banks, and joint stock commercial banks. These results suggested that SOEs were more likely to establish relationships with state-owned banks to accomplish a political goal, and firms with foreign shares may better fit the procedures and approval process of foreign banks. Furthermore, both SOEs and firms with foreign ownership were more likely to enter into multiple banking relationships because they are less opaque. Moreover, the empirical results indicated that lending relationships are quite an important factor in determining the proportion of collateralised loans of listed companies. The empirical analysis suggests that an exclusive banking relationship is instrumental for getting collateral-free loans and the benefits of such close banking relationships are greater for those firms that borrow from joint stock commercial banks, who can procure some advantage in producing, processing, and disseminating private information.

6.3 Effect of corporate governance

In restructuring SOEs into corporate entities in transition economies, the forms for the governance structures of these enterprises are significant, but there is difficulty in generating reliable and valid measures for corporate governance. Therefore, this research adopted a complex and multi-dimensional construct and collected the relevant information of corporate governance from annual reports, and then presented the output for SOEs and for non-SOEs, respectively.

In Chapter 5 the empirical results showed that banks were less likely to require collateral for firms with high concentration of ownership in the hands of the second to tenth largest stockholders in non-SOEs. It was also found that loan contracts have fewer collateral requirements for SOEs when the board of directors is smaller, more independent, and where the CEO and chairman are separate. In terms of supervisory boards, a larger supervisory board can reduce the collateral requirements in SOEs, while non-SOEs are more likely to obtain collateral free loans if there is more financial expertise on the supervisory board on average. These results suggest that banks perceive the strength of firm-level governance to be a factor that reduces the tunnelling of controlling shareholders and reduces the collateral requirements accordingly.

6.4 Regions' institutional development

Because China is currently confronted with various levels of institutional development across different provinces, this thesis used data from the Chinese provinces to study the relationship between the contracting environment and financial contracts. Chinese provinces provide a good case for testing this

relationship because sub-national data can address country specific idiosyncrasies (Li et al., 2009), and the institutions in these provinces show remarkable variations (Fan et al., 2011). This thesis controlled for different market development conditions by using the NERI (National Economic Research Institute) Index of Marketization of China's Provinces. These indexes have been used by previous research, and the areas and indicators that compose the index were chosen according to the theoretical framework and the characteristics of current stages of the reform process in China.

On the empirical side, this research observed that the institutional reform process differs among the regions concerned and that difference plays important roles in loan contracts, including collateral requirements and the number of banking relationships. Overall, in Chapter 3, this research found the role of state ownership in reducing collateral requirements to be stronger in regions with more government intervention. In Chapter 4, the results suggested that the number of banking relationships decreased with the development of a local market, while in Chapter 5 it was found that regional institutional development can reduce the collateral requirements and enhance the role of supervisory expertise in reducing collateral requirements.

6.5 Implications

The empirical results and analytical solutions in this research can be possible references for scholars conducting further research and for policy makers involved in further economic reform.

First, this research has significant implications for the development of a comprehensive theory for the determinants of collateral. This current research demonstrated that much of the existing theoretical literature on collateral requirements can be applied to emerging markets, and specifically in China. The significance of state ownership and its interaction effect with firm-level and region-level characteristics raises the importance of including ownership characteristics variables in collateral requirements. This research can also be used by policy makers as they analyse past experience and develop strategies for future ownership reform. For example, the findings suggest that introducing foreign shareholders can reduce information asymmetry, which helps to eliminate the need for costly collateral in China.

Second, it provides evidence that ownership structure has an important role in Chinese firms' financing decisions when choosing the type of bank and number of banking relationships. Recently, research suggests that the high growth rates in China cannot be maintained indefinitely without a significant reform of the banking system (Berger et al., 2009), and the results suggest that in the course of current banking reforms, state-owned banks still maintain relationships with SOEs, which can explain their lower profitability than joint stock commercial banks and foreign banks, and also encourage further reform of bank ownership. This research also indicates policies that encourage the development of institutions will help to solve the soft-budget-constraint and hold-up problems, and therefore can reduce the motivation for multiple banking relationships.

Finally, this research investigated the effect of internal and external governance on the collateral requirements of loan contracting. Overall, the results suggest that

both internal and external governance can mitigate the expropriation problems, and thereby facilitate access to unsecured finance. From the perspective of policy makers, the results suggest that listed firms could further open up the corporate sector to other large shareholders for more favourable loan contracts. The empirical results in this research also echo the measures taken by the authorities to encourage better corporate governance of listed firms by recommending changes in the two-tier board structures, which is of great importance to protecting banks. For example, this research provided support for recent regulatory and listing requirements (see the newly amended Chinese Corporate Law 2005) concerning more actively involved and professional boards of supervisors, with the evidence that more professional supervisors is associated with lower collateral requirements. In addition, this research might be relevant to reforms to encourage the development of institutions, and indicates that regional institutions and professional governance mechanisms complement each other in influencing loan contracting terms.

6.6 Limitations and prospects for future research

There are some limitations in this study which could also favour further research interests. The first limitation was sample selection, and while all of China's listed firms were used, the situation in the small and unlisted firms was unclear because data was not available. China's listed companies comprise a significant part of the Chinese economy. By 2007, there were 1,625 firms that traded in either one of the two stock exchanges. The total market value of these firms has grown to RMB 12,137 billion, comprising almost one-third of GDP in 2007. However, the insights of small and unlisted firms are still important because many of the factors

that hypothetically influence collateral requirements may differ between small and large firms. For example, using small firms allows for the presence of various legal forms (e.g., proprietorships and partnerships), and a firm's form of legal organization determines its liability, taxation, and other factors that may affect collateral requirements. This factor has received little attention in prior research and this current research could be further improved by surveying and collecting information from unlisted firms.

Because the data was limited this research also did not have sufficient time periods to observe the relationship between the institutional change of each region and changes in firms' banking relationships and contract requirements, so a rigorous time series was impossible. Instead, this research conducted a cross-sectional analysis making use of the unequal institutional development of different regions in China. When data becomes available, further research could be done to examine the effects of change in institutional environments over time.

Finally, further research could be done to examine possible financial and non-financial consequences to members with different degrees of collateralised loans in order to verify the conjectures about the costs and benefits of the use of collateral more extensively.

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APPENDIX A DETAILED DESCRIPTION OF THE MARKETISATION INDEX

This thesis discussed how the collateral requirements are affected by development of institutional environments. The NERI (National Economic Research Institute) Index of Marketisation of China's Provinces was used in this research to test their effects.

The methodology

The NERI index and all the components are measured in a scale of 0-10. Each province gets an index value between 0-10 based on the values of all the respective components of the index. However, it should be noted that the 0-10 scale does not indicate the “distance” between the current states of a region to the fully developed market economy because there is no such thing as a “fully developed market economy”. What the index shows is the relative position in its progress towards a fully developed market economy compared to other provinces. This means, for instance, that compared to the competition index value 5.99 that Hunan province gets, Guangdong, which gets 8.33, is more advanced than Hunan in terms of market competition. The index compares the “relative distance” between “marchers” on the road, not the “absolute distance” between marchers to the destination (Fan et al., 2011).

Two steps were taken to construct the actual data into the provincial index. The first step was to transform all the component variables into 0-10 scale values. Depending upon whether higher values are indicative of more or less economic freedom, alternative formulas were used to transform the variables into 0-10 scale values. For some indicators, higher values were indicative of higher degrees of marketisation reforms.

The formula used to derive the 0-10 rating for these indicators was $\left[\frac{V_i - V_{min}}{V_{max} - V_{min}} \right] * 10$,

where V_i is the province's actual value for the component variable, V_{max} is the maximum value for a province in the 1997 base year, and V_{min} is the minimum base-year value for the component. This formula was then used to derive the ratings for all years. A province's rating will be close to 10 when its value for the component is near the base-year maximum, but the rating will be near 0 when the observation for a province is near the base year minimum. For some indicators, higher actual values are indicative of less progress in marketisation. Government intervention provides the example. In such a case, the formula used to derive the 0-10 rating for these indicators was $\left[\frac{V_{max} - V_i}{V_{max} - V_{min}} \right] * 10$. This formula will assign higher ratings to provinces with actual values that are closer to the base year minimum.

The second step was to determine the “weights” for each component. The final marketisation index is an arithmetic average of 23 components, noting that using the principal components analysis to determine the weights on each of the 23 components leads to no major difference in the relative ranking of regions. Moreover, the 23 components (indicators) of institutional arrangements and policies were classified in 5 major areas and the same procedure was also used to derive the weights for each index in the construction.

The structure of the Index

This Index is a comprehensive one that captures the following aspects of the regional market development:

1. Relationship between government and markets:

a. The role of markets in allocating resources using the ratio of government spending to GDP.

b. The level of tax burden on rural residents using the ratio of farmer families' tax bills to their annual income.

c. The role of government in business using the convenience and simplicity of administrative examination and approval procedures.

d. The level of enterprise burden in addition to normal taxes using the ratio of non-tax levies to sales.

e. The size of government using the ratio of employment by the central and local government, and various social organisations to population.

2. Development of the non-state sector in the economy:

a. The ratio of industrial output by the private sector to total industrial output.

b. The ratio of capital investment by the private sector to total capital investment.

c. The ratio of employment by the private sector to total employment.

3. Development of product markets:

a. The extent to which prices are set by market supply and demand.

i. The extent to which prices of retail merchandises are set by market supply and demand.

ii. The extent to which the prices of production factors are set by market supply and demand.

iii. The extent to which prices of farm products are set by market supply and demand.

b. The extent of regional trade barriers using the ratio of number of trade barriers to GDP.

4. Development of factor markets:

a. Banking development.

i. Competitiveness of the banking sector using the ratio of deposits taken by non-state-owned financial institutions to total deposits.

ii. The extent to which banks employ economic criteria in their capital allocation using the ratio of short-term loans to the non-state sector (such as agricultural loans, loans to village/township enterprises, loans to private enterprises and loans to foreign-owned enterprises) to total short-term loans.

b. Foreign direct investment (FDI) using the ratio of FDI to GDP.

c. Mobility of labour using the ratio of employment provided by migrant workers to total employment.

d. Commercialisation of technological innovation using the ratio of volume of technological transfers to employment by the technology sector.

5. Development of market intermediaries and legal environment:

a. Development of market intermediary service.

- i. Conditions of service of lawyers, accountants, and other market intermediaries.
- ii. The degree of industry associations to help the enterprise.
- b. Protection of producers' legal rights using the ratio of number of economic crimes to GDP.
- c. Protection of property rights.
 - i. The average number of patents applied per engineer.
 - ii. The average number of patents approved per engineer.
- d. Protection of consumer rights using the ratio of number of consumer complaints received by the Consumer Association to GDP.

Tables

Table 2.1 Chinese banks: shares of deposits and loans from 2007 to 2009

Banks	Deposits-2007 (billion yuan)	Deposits-2008 (billion yuan)	Deposits-2009 (billion yuan)	Loans-2007 (billion yuan)	Loans-2008 (billion yuan)	Loans-2009 (billion yuan)
Policy banks	42781 (0.08)	56456 (0.09)	69456 (0.09)	39203 (0.08)	52648 (0.09)	65593 (0.09)
Big Four banks	280071 (0.55)	318358 (0.53)	400890 (0.53)	264330 (0.55)	298784 (0.53)	379026 (0.53)
Joint stock commercial banks	172918 (0.34)	213452 (0.35)	276807 (0.36)	163221 (0.34)	200613 (0.36)	260198 (0.36)
Foreign banks	12525 (0.02)	13448 (0.02)	13492 (0.02)	11353 (0.02)	12028 (0.02)	11818 (0.02)
Total	508295	601713	760645	478108	564073	716635

Table 3.1 Sample selection and distribution

Sample selection	Observations
Firms available in CSMAR database from 2007 to 2009	4,969
Less:	
Firms without outstanding loans	523
Loans borrowed by companies in the financial industry	18
Type of loans (collateralised loans, guaranteed loans or credit loans) cannot be identified	109
Observations missing financial data	170
ST or *ST firms	387
Total observations	3,762

Table 3.2 Definitions of variables

Variables	Definition
COLLATERAL	Percentage of total loans that are collateralised
Non-SOE	Takes a value of 1 if the ultimate controlling shareholder is a private firm or individual
SOE	Takes a value of 1 if the ultimate controlling shareholder is a state-owned enterprise
SOELG	Takes a value of 1 if the ultimate controlling shareholder is a state-owned enterprise affiliated to local government
SOECG	Takes a value of 1 if the ultimate controlling shareholder is a state-owned enterprise affiliated to central government
FOREIGN	Percentage of foreign ownership
GUARANTEE	Percentage of total loans that are guaranteed
SIZE	Natural logarithm of total assets
AE	Earnings per share in year t+1 minus earnings per share in year t, divided by the share price in year t
B/M	Total assets in book value/total assets in market value
ROA	Return on assets
LEVERAGE	Total debts/total assets
LTDEBT	Long term loans/total loans
TANGIBILITY	Fixed assets/total assets
LIQUIDITY	Cash and cash equivalents/total assets
DSTATE	Takes a value of 1 if the state is a minority shareholder of the non-SOE
STATE	Percentage of state ownership
GI	Index based on employment by the central and local government and various social organisations/population

Table 3.3 Descriptive statistics

Variables	N	Mean	Median	5 th Percentile	95 th Percentile	Std. Dev.
<i>Panel A: Collateral requirements</i>						
COLLATERAL	3762	0.338	0.234	0	1	0.337
<i>Panel B: Collateral requirements based on the type of ultimate controlling shareholder</i>						
Non-SOE	1416	0.451	0.420	0	1	0.351
SOE	2346	0.269	0.151	0	0.993	0.309
SOELG	1778	0.287	0.172	0	0.999	0.316
SORCG	568	0.213	0.095	0	0.933	0.277
<i>Panel C: Firm or loan characteristics</i>						
FOREIGN	3762	0.039	0	0	0.310	0.109
GUARANTEE	3762	0.386	0.339	0	1	0.339
SIZE	3762	21.691	21.535	20.102	23.886	1.192
AE	3762	0.004	0.000	-0.054	0.077	0.068
B/M	3762	0.536	0.488	0.181	1.031	0.264
ROA	3762	0.034	0.035	-0.064	0.125	0.084
LEVERAGE	3762	0.242	0.232	0.020	0.506	0.150
LTDEBT	3762	0.310	0.214	0.000	0.962	0.320
TANGIBILITY	3762	0.281	0.251	0.020	0.625	0.186
LIQUIDITY	3762	0.165	0.136	0.029	0.401	0.123
STATE	1416	0.017	0	0	0.136	0.052
GI	3116	5.435	5.52	2.52	8.02	1.820
<i>Panel D: Collateral requirements based on year</i>						
2007	1184	0.323	0.227	0	1	0.327
2008	1260	0.344	0.250	0	1	0.336
2009	1318	0.345	0.224	0	1	0.347

Notes: *COLLATERAL* is the percentage of total loans that are collateralised. *Non-SOE* is a dummy variable coded 1 for firm years whose ultimate controlling shareholder is a private firm or individual. *SOE* is a dummy variable coded 1 for firm years whose ultimate controlling shareholder is a state-owned enterprise. *SOELG* is a dummy variable coded 1 for firm years whose ultimate controlling shareholder is a state-owned enterprise affiliated to local government. *SOECG* is a dummy variable coded 1 for firm years whose ultimate controlling shareholder is a state-owned enterprise affiliated to

central government. *FOREIGN* is the proportion of foreign ownership. *GUARANTEE* is the percentage of guaranteed loans. *SIZE* is the natural logarithm of total assets. *AE* is earnings per share in year $t+1$ minus earnings per share in year t , divided by the share price in year t . *B/M* is the ratio of the book value of the firm's assets to the market value of the firm's assets. *ROA* is return on assets. *LEVERAGE* is debt/assets. *LTDEBT* is long term loans/total loans. *TANGIBILITY* is fixed assets/total assets. *LIQUIDITY* is cash and cash equivalents/total assets. *STATE* is the proportion of state ownership in non-SOEs. *GI* is the government size index based on the ratio of employment by the government and various social organizations to population. The figures for all the value variables are in China's currency, RMB.

Table 3.4 Results of univariate test

<i>Panel A: Mean comparison grouped by borrowers' share type</i>					
Variable	B or H Share		A-Share		Diff.
	Mean	Std.	Mean	Std.	Mean
COLLATERAL	0.293	0.325	0.340	0.337	0.047**
SOE	0.585	0.494	0.626	0.484	0.041
<i>Panel B: Mean comparison grouped by borrowers' guaranteed level</i>					
Variable	Top tercile		Bottom tercile		Diff.
	Mean	Std.	Mean	Std.	Mean
COLLATERAL	0.206	0.201	0.470	0.390	0.263***
SOE	0.612	0.487	0.635	0.481	0.023
<i>Panel C: Mean comparison grouped by government intervention</i>					
Variable	Top tercile		Bottom tercile		Diff.
	Mean	Std.	Mean	Std.	Mean
COLLATERAL	0.354	0.334	0.365	0.348	0.011
SOE	0.525	0.500	0.596	0.491	0.071***

Table 3.5 Multicollinearity diagnostics

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	1											
(2)	-0.008	1										
(3)	-0.010	-0.093***	1									
(4)	0.324***	0.170***	-0.070***	1								
(5)	0.017	0.002	-0.014	0.001	1							
(6)	0.193***	0.069***	0.015	0.392***	0.045***	1						
(7)	-0.065***	0.010	-0.045***	0.106***	-0.308***	-0.159***	1					
(8)	0.089***	-0.031*	0.090***	0.196***	0.095***	0.246***	-0.267***	1				
(9)	0.122***	0.030*	-0.124***	0.373***	0.007	0.167***	0.029*	0.237***	1			
(10)	0.177***	0.016	0.010	0.097***	0.025	0.088***	-0.091***	0.294***	0.103***	1		
(11)	-0.140***	0.036**	0.025	-0.120***	-0.040**	-0.205***	0.202***	-0.366***	-0.125***	-0.365***	1	
(12)	-0.043**	0.083***	-0.029	-0.066***	0.014	-0.011	0.017	0.005	-0.076***	-0.075***	0.064***	1

Notes: (1) is SOE; (2) is FOREIGN; (3) is GUARANTEE; (4) is SIZE; (5) is AE; (6) is B/M; (7) is ROA; (8) is LEVERAGE; (9) is LTDEBT; (10) is TANGIBILITY; (11) is LIQUIDITY; (12) is GL.

Table 3.6 Ownerships and the collateral requirements—tobit estimations

Dependent variable: collateral requirements						
	(1)		(2)		(3)	
	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic
Independent variable						
INTERCEPT	2.605***	19.59	2.651***	19.74	2.559***	19.40
SOE	-0.198***	-15.56	-0.206***	-15.62	-0.339***	-13.88
	(-0.158)		(-0.165)		(-0.272)	
FOREIGN	-0.127**	-2.16	-0.266***	-3.08	-0.125**	-2.07
	(-0.100)		(-0.209)		(-0.099)	
SOE*						
FOREIGN			0.257**	2.24		
			(0.202)			
GUARANTEE	-0.640***	-32.92	-0.638***	-32.80	-0.866***	-28.12
	(-0.504)		(-0.503)		(-0.686)	
SOE*						
GUARANTEE					0.364***	9.22
					(0.288)	

SIZE	-0.093*** (-0.074)	-14.18	-0.096*** (-0.075)	-14.39	-0.087*** (-0.069)	-13.23
AE	-0.299*** (-0.236)	-3.62	-0.300*** (-0.236)	-3.63	-0.271*** (-0.215)	-3.42
B/M	0.218*** (0.172)	6.13	0.216*** (0.170)	6.06	0.219*** (0.174)	6.29
ROA	-0.624*** (-0.491)	-4.51	-0.624*** (-0.491)	-4.49	-0.601*** (-0.476)	-4.69
LEVERAGE	0.309*** (0.244)	6.36	0.315*** (0.248)	6.48	0.287*** (0.227)	6.04
LTDEBT	0.252*** (0.199)	10.54	0.254*** (0.200)	10.59	0.240*** (0.190)	10.01
TANGIBILITY	-0.372*** (-0.293)	-10.37	-0.370*** (-0.291)	-10.30	-0.345*** (-0.273)	-9.68
LIQUIDITY	-0.107 (-0.085)	-1.58	-0.103 (-0.081)	-1.52	-0.101 (-0.080)	-1.49
Year	Yes		Yes		Yes	
Sample size	3762		3762		3762	
Log likelihood	-1942.55		-1939.79		-1895.18	

(McFadden)

Adjusted R2	0.309	0.310	0.326
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Notes: ***, **, and * indicate 0.01, 0.05 and 0.10 significance levels, respectively, in a two-tailed test.

Marginal coefficient is in parentheses.

The *t*-statistics are computed using the robust standard error (White).

Table 3.7 Joint impacts of ownerships and government intervention on the collateral requirements, including SOELGs and non-SOEs only—tobit estimations

Dependent variable: collateral requirements				
Independent variable	(1)		(2)	
	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic
INTERCEPT	2.753***	16.24	2.802***	16.48
SOELG	-0.175*** (-0.143)	-13.15	-0.283*** (-0.230)	-7.32
FOREIGN	-0.184*** (-0.149)	-2.88	-0.184*** (-0.149)	-2.89
GUARANTEE	-0.679*** (-0.552)	-32.14	-0.677*** (-0.551)	-32.04
SIZE	-0.099*** (-0.080)	-11.80	-0.098*** (-0.080)	-11.71
AE	-0.298*** (-0.242)	-3.22	-0.305*** (-0.249)	-3.34
B/M	0.221*** (0.180)	5.59	0.216*** (0.176)	5.48
ROA	-0.589*** (-0.479)	-3.95	-0.592*** (-0.482)	-3.99
LEVERAGE	0.299*** (0.243)	5.56	0.304*** (0.247)	5.67
LTDEBT	0.255*** (0.208)	9.75	0.255*** (0.208)	9.75
TANGIBILITY	-0.410*** (-0.334)	-10.66	-0.408*** (-0.332)	-10.60
LIQUIDITY	-0.167** (-0.136)	-2.31	-0.159** (-0.129)	-2.19
GI	0.000 (0.000)	0.01	-0.012** (-0.010)	-2.38

SOELG*GI		0.020***	2.95
		(0.016)	
Year	Yes	Yes	
Sample size	3116	3116	
Log likelihood	-1541.35	-1537.52	
(McFadden)			
Adjusted R2	0.347	0.348	

Notes: ***, **, and * indicate 0.01, 0.05 and 0.10 significance levels, respectively, in a two-tailed test.

Marginal coefficient is in parentheses.

The *t*-statistics are computed using the robust standard error (White).

Table 3.8 Ownerships and the collateral requirements, further dividing SOELGs and SOECGs—tobit estimation

Dependent variable: collateral requirements		
	(1)	
	Coefficient	<i>t</i> -Statistic
Independent variable		
INTERCEPT	2.477***	18.13
SOELG	-0.180*** (-0.141)	-13.86
SOECG	-0.268*** (-0.190)	-12.96
FOREIGN	-0.120** (-0.094)	-2.03
GUARANTEE	-0.645*** (-0.509)	-33.31
SIZE	-0.087*** (-0.069)	-12.85
AE	-0.306*** (-0.241)	-3.62
B/M	0.201*** (0.159)	5.62
ROA	-0.643*** (-0.507)	-4.60
LEVERAGE	0.312*** (0.246)	6.43
LTDEBT	0.248*** (0.195)	10.40
TANGIBILITY	-0.370*** (-0.292)	-10.32
LIQUIDITY	-0.100	-1.48

	(-0.079)
Year	Yes
Sample size	3762
Log likelihood	-1930.21
(McFadden)	
Adjusted R2	0.314

Notes: ***, **, and * indicate 0.01, 0.05 and 0.10 significance levels, respectively, in a two-tailed test.

Marginal coefficient is in parentheses.

The *t*-statistics are computed using the robust standard error (White).

Table 3.9 Ownerships and the collateral requirements, including non-SOEs only—
tobit estimations

Dependent variable: collateral requirements				
	(1)		(2)	
	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic
Independent variable				
INTERCEPT	2.182***	8.92	2.188***	8.91
DSTATE	-0.051** (-0.046)	-2.15		
STATE			-0.502*** (-0.448)	-2.93
FOREIGN	-0.295*** (-0.263)	-3.31	-0.287*** (-0.257)	-3.20
GUARANTEE	-0.858*** (-0.766)	-29.22	-0.855*** (-0.763)	-29.22
SIZE	-0.069*** (-0.061)	-5.55	-0.069*** (-0.062)	-5.57
AE	-0.320** (-0.286)	-2.43	-0.315** (-0.281)	-2.42
B/M	0.225*** (0.201)	4.06	0.231*** (0.206)	4.13
ROA	-0.591*** (-0.527)	-2.86	-0.599*** (-0.535)	-2.88
LEVERAGE	0.278*** (0.248)	3.68	0.277*** (0.248)	3.66
LTDEBT	0.243*** (0.217)	6.60	0.243*** (0.217)	6.59
TANGIBILITY	-0.304*** (-0.271)	-5.39	-0.302*** (-0.270)	-5.36
LIQUIDITY	-0.196**	-2.30	-0.190**	-2.24

	(-0.175)	(-0.170)
Year	Yes	Yes
Sample size	1416	1416
Log likelihood	-572.64	-570.62
(McFadden)		
Adjusted R2	0.471	0.473

Notes: ***, **, and * indicate 0.01, 0.05 and 0.10 significance levels, respectively, in a two-tailed test.

Marginal coefficient is in parentheses.

The *t*-statistics are computed using the robust standard error (White).

Table 4.1 Sample selection and distribution

Sample selection	Observations
Firms available in CSMAR database from 2007 to 2009	4,969
Less:	
Firms without outstanding loans	523
Loans borrowed by companies in the financial industry	18
Type of loans (collateralised loans, guaranteed loans or credit loans) cannot be identified	109
Observations missing financial data	170
ST or *ST firms	387
Observations without long term loan	1,073
Lenders cannot be identified (type or number)	1,203
Total observations	1,486

Table 4.2 Definitions of variables

Variables	Definition
At least 1 policy	Dummy variable equal to 1 if at least one relationship bank is a policy bank and 0 otherwise
At least 1 Big Four	Dummy variable equal to 1 if at least one relationship bank is a Big Four bank and 0 otherwise
At least 1 joint stock	Dummy variable equal to 1 if at least one relationship bank is a joint stock commercial bank and 0 otherwise
At least 1 foreign	Dummy variable equal to 1 if at least one relationship bank is a foreign bank and 0 otherwise
Number of Relationships	Numerical variable equal to the number of banking relationships
COLLATERAL	Percentage of total long term loans that are collateralised
Non-SOE	Takes a value of 1 if the ultimate controlling shareholder is a private firm or individual
SOELG	Takes a value of 1 if the ultimate controlling shareholder is a state-owned enterprise affiliated to local government
SOECG	Takes a value of 1 if the ultimate controlling shareholder is a state-owned enterprise affiliated to central government
BIG FOUR	Total long term loans from the big four banks/total long term loans
POLICY BANK	Total long term loans from policy banks/total long term loans
JOINT STOCK BANK	Total long term loans from joint stock commercial banks/total long term loans
FOREIGN BANK	Total long term loans from foreign banks/total long term loans
EXCLUSIVITY	Takes a value of 1 if the firm works with one lender and 0 otherwise
FOREIGN	Percentage of foreign ownership
GUARANTEE	Percentage of total long term loans that are guaranteed
SIZE	Natural logarithm of total assets
AE	Earnings per share in year t+1 minus earnings per share in year t, divided by the share price in year t

B/M	Total assets in book value/total assets in market value
ROA	Return on assets
LEVERAGE	Total debts/total assets
TANGIBILITY	Fixed assets/total assets
LIQUIDITY	Cash and cash equivalents/total assets
R&D expenses	Ratio of R&D expenses/total assets
BD	Competitiveness of the banking sector and the extent to which banks employ economic criteria in their capital allocation
MARKITISATION	A comprehensive index that captures the regional market development

Table 4.3 Descriptive statistics

Variables	N	Mean	Min	5%	Median	95%	Max	Std. Dev.
<i>Panel A: Bank ownership type</i>								
At least 1 policy	1486	0.194	0	0	0	1	1	0.396
At least 1 Big Four	1486	0.751	0	0	1	1	1	0.433
At least 1 joint stock	1486	0.554	0	0	1	1	1	0.497
At least 1 foreign	1486	0.100	0	0	0	1	1	0.300
<i>Panel B: Status of firms by number of banking relationships</i>								
EXCLUSIVITY	1486	0.402	0	0	0	1	1	0.491
Equal to 2-3	1486	0.377	0	0	0	1	1	0.485
Greater than 3	1486	0.221	0	0	0	1	1	0.415
Total	1486	2.581	1	1	2	7	17	2.113
<i>Panel C: Ownership structure</i>								
SOELG	1486	0.472	0	0	0	1	1	0.499
SOECG	1486	0.140	0	0	0	1	1	0.347
FOREIGN	1486	0.032	0	0	0	0.288	1	0.100
<i>Panel D: Firm or loan characteristics</i>								
COLLATERAL	1486	0.474	0.000	0.000	0.432	1.000	1.000	0.435
POLICY BANK	1486	0.118	0.000	0.000	0.000	1.000	1.000	0.282
BIG FOUR	1486	0.548	0.000	0.000	0.620	1.000	1.000	0.412
JOINT STOCK BANK	1486	0.298	0.000	0.000	0.067	1.000	1.000	0.379
FOREIGN BANK	1486	0.036	0.000	0.000	0.000	0.208	1.000	0.158
GUARANTEE	1486	0.344	0.000	0.000	0.088	1.000	1.000	0.404
SIZE	1486	21.679	19.218	20.270	21.583	23.445	27.809	0.989
AE	1486	0.004	-0.936	-0.062	0.000	0.083	0.545	0.066
B/M	1486	0.541	0.075	0.193	0.490	1.018	1.697	0.256
ROA	1486	0.034	-2.746	-0.065	0.036	0.127	0.400	0.099

LEVERAGE	1486	0.259	0.000	0.043	0.246	0.503	0.742	0.140
TANGIBILITY	1486	0.280	0.001	0.014	0.262	0.613	0.960	0.186
LIQUIDITY	1486	0.157	0.001	0.031	0.129	0.391	0.798	0.117
R&D	1486	0.042	0.000	0.000	0.000	0.099	31.209	0.821
<i>Panel E: Loan market characteristics</i>								
BD	1486	12.106	4.17	7.67	12.92	14.61	14.65	2.137
MARKETISATION	1486	8.644	0.38	5.23	8.77	11.54	11.80	2.040

Notes: *At least 1 policy* is a dummy variable equal to 1 if at least one relationship bank is a policy bank and 0 otherwise. *At least 1 Big Four* is a dummy variable equal to 1 if at least one relationship bank is a Big Four bank and 0 otherwise. *At least 1 joint stock* is a dummy variable equal to 1 if at least one relationship bank is a joint stock commercial bank and 0 otherwise. *At least 1 foreign bank* is a dummy variable equal to 1 if at least one relationship bank is a foreign bank and 0 otherwise. *Exclusivity* is a dummy variable equal to 1 if the number of banking relationships is one and 0 otherwise. *Equal to 2-3* is a dummy variable equal to 1 if the number of banking relationships is between 2 and 3, and 0 otherwise. *Greater than 3* is a dummy variable equal to 1 if the number of banking relationships is larger than 3 and 0 otherwise. *SOELG* is a dummy variable that takes a value of 1 if the ultimate controlling shareholder is a state-owned enterprise affiliated to local government. *SOECG* is a dummy variable that takes a value of 1 if the ultimate controlling shareholder is a state-owned enterprise affiliated to central government. *FOREIGN* is the proportion of foreign ownership. *COLLATERAL* is the percentage of total long term loans that are collateralised. *POLICY BANK* is measured as the ratio of total long term loans from policy banks. *BIG FOUR* is measured as the ratio of total long term loans from the Big Four banks. *JOINT STOCK BANK* is measured as the ratio of total long term loans from joint stock commercial banks. *FOREIGN BANK* is measured as the ratio of total long term loans from foreign banks. *GUARANTEE* is the percentage of long term loans that are guaranteed. *SIZE* is the natural logarithm of total assets. *AE* is earnings per share in year t+1 minus earnings per share in year t, divided by the share price in year t. *B/M* is the ratio of the book value of the firm's assets to the market value of the firm's assets. *ROA* is return on assets. *LEVERAGE* is debt/asset. *TANGIBILITY* is the ratio of fixed assets to total assets. *LIQUIDITY* is cash and cash equivalents/total assets. *R&D* is the ratio of R&D expenses to total asset. *BD* is based on competitiveness of the banking sector and the extent to which banks employ economic criteria in their capital allocation. *MARKETISATION* is a comprehensive index that captures the regional market development.

Table 4.4 Results of univariate test

<i>Panel A: Mean comparison grouped by ownership structure</i>												
	Mean comparison			Mean comparison			Mean comparison			Mean comparison		
	SOELGs	SOECGs	t/z	SOELGs	Non-SOEs	t/z	SOECGs	Non-SOEs	t/z	Without foreign ownership	With foreign ownership	t/z
At least 1 policy	0.175	0.269	2.998***	0.175	0.191	0.699	0.269	0.191	-2.385**	0.189	0.231	1.374
At least 1 Big Four	0.789	0.697	-2.761***	0.789	0.724	-2.689***	0.697	0.724	0.749	0.749	0.764	0.453
At least 1 joint stock	0.569	0.601	0.814	0.569	0.518	-1.823*	0.601	0.518	-2.056**	0.547	0.600	1.391
At least 1 foreign	0.084	0.135	2.175**	0.084	0.106	1.315	0.135	0.106	-1.126	0.087	0.185	4.277***
Number of relationships	2.753	2.990	1.300	2.753	2.224	-4.776***	2.990	2.224	-4.700***	2.521	2.979	2.834***
<i>Panel B: Median comparison grouped by ownership structure</i>												
	Median comparison			Median comparison			Median comparison			Median comparison		
	SOELGs	SOECGs	t/z	SOELGs	Non-SOEs	t/z	SOECGs	Non-SOEs	t/z	Without foreign ownership	With foreign ownership	t/z
At least 1 policy	0	0	2.985***	0	0	0.699	0	0	-2.378**	0	0	1.373
At least 1 Big Four	1	1	-2.751***	1	1	-2.682***	1	1	0.750	1	1	0.453
At least 1 joint stock	1	1	0.814	1	1	-1.821*	1	1	-2.052**	1	1	1.391
At least 1 foreign	0	0	2.171**	0	0	1.314	0	0	-1.126	0	0	4.252***
Number of relationships	2	2	0.195	2	2	-4.612***	2	2	-2.790***	2	2	0.953

Table 4.5 Multicollinearity diagnostics

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)SOELG	1								
(2)SOECG	-0.381***	1							
(3)FOREIGN	-0.022	0.022	1						
(4)SIZE	0.131***	0.019	0.039	1					
(5)ROA	-0.098***	0.012	0.037	-0.066**	1				
(6)LEVERAGE	0.017	-0.010	-0.071***	-0.000	-0.330***	1			
(7)LIQUIDITY	-0.053**	0.027	0.037	-0.125***	0.168***	-0.243***	1		
(8)BD	-0.023	-0.143***	0.031	-0.056**	0.020	-0.011	0.038	1	
(9)MARKETISATION	-0.090***	-0.084***	0.151***	-0.043*	0.072***	-0.067***	0.065**	0.457***	1

Table 4.6 Determinants of bank ownership types—probit estimations

	(1)		(2)		(3)		(4)	
	At least 1 policy		At least 1 Big Four		At least 1 joint stock		At least 1 foreign	
	Coefficient	z-Statistic	Coefficient	z-Statistic	Coefficient	z-Statistic	Coefficient	z-Statistic
Independent variable								
INTERCEPT	-1.789***	-5.29	-0.634**	-2.01	0.130	0.45	-1.528***	-3.93
SOELG	-0.084	-0.99	0.167**	2.05	0.117	1.59	-0.140	-1.37
	(-0.023)		(0.051)		(0.046)		(-0.022)	
SOECG	0.261**	2.26	-0.093	-0.82	0.170	1.61	0.078	0.56
	(0.076)		(-0.029)		(0.066)		(0.013)	
FOREIGN	0.551	1.50	0.055	0.15	0.672**	1.97	1.519***	3.87
	(0.148)		(0.017)		(0.265)		(0.244)	
SIZE	0.230***	2.94	0.253***	3.34	0.200***	2.93	0.394***	4.08
	(0.062)		(0.077)		(0.079)		(0.064)	
ROA	0.055	0.68	0.123	1.54	0.208***	2.90	0.104	1.05
	(0.015)		(0.037)		(0.082)		(0.017)	
LEVERAGE	1.131***	3.81	2.082***	6.83	1.631***	6.04	0.820**	2.25
	(0.305)		(0.633)		(0.644)		(0.132)	

LIQUIDITY	0.408 (0.110)	1.03	-0.600 (-0.182)	-1.65	-0.401 (-0.158)	-1.17	1.185** (0.190)	2.55
BD	0.050* (0.013)	1.84	0.012 (0.004)	0.48	-0.055** (-0.022)	-2.31	-0.001 (0.000)	-0.70
Region	Yes		Yes		Yes		Yes	
Year	Yes		Yes		Yes		Yes	
Sample size	1486		1486		1486		1486	
Log likelihood (McFadden)	-710.37		-769.15		-982.57		-453.84	
Adjusted R2	0.030		0.078		0.038		0.058	

Notes: ***, **, and * indicate 0.01, 0.05 and 0.10 significance levels, respectively, in a two-tailed test.

Marginal coefficient is in parentheses.

The z-statistics are computed using the robust standard error (White).

Table 4.7 Determinants of the number of relationships

	(1) Poisson Number of banking relationships Coefficient <i>t/z</i>		(2) OLS Logarithm of the number of banking relationships Coefficient <i>t/z</i>		(3) Ordered logit Multiple versus exclusive relationship Coefficient <i>t/z</i>		(4) 2 nd stage Heckman Logarithm of the number of banking relationships Coefficient <i>t/z</i>	
Independent variable								
INTERCEPT	0.280**	2.34	0.097	0.80			0.621**	2.28
SOELG	0.168*** (1.183)	4.60	0.144***	4.15	0.414*** (1.514)	3.74	0.019**	2.16
SOECG	0.224*** (1.251)	4.53	0.159***	3.23	0.465*** (1.593)	2.87	0.095***	3.76
FOREIGN	0.689*** (1.992)	4.56	0.460***	2.90	0.988** (2.685)	1.97	0.411***	2.63
SIZE	0.276*** (1.318)	8.24	0.245***	7.59	0.753*** (2.123)	7.20	0.185***	3.65
ROA	0.224*** (1.251)	6.50	0.169***	5.01	0.453*** (1.573)	4.14	1.555***	3.94
LEVERAGE	2.064***	16.91	2.011***	16.08	1.203***	11.06	1.314***	3.24

	(7.874)				(3.329)			
LIQUIDITY	-0.250	-1.39	-0.100	-0.61	-0.205	-0.39	-0.279	-1.62
	(0.779)				(0.815)			
MARKETISATION	-0.032**	-2.68	-0.026**	-2.09	-0.082**	-2.11	-0.019**	-2.30
	(0.968)				(0.921)			
Year	Yes		Yes		Yes		Yes	
Sample size	1486		1486		1486		1486	
Log likelihood	-2718.27				-1423.92			
(McFadden)								
Adjusted R2	0.084		0.209		0.102			

Notes: ***, **, and * indicate 0.01, 0.05 and 0.10 significance levels, respectively, in a two-tailed test.
The *t/z*-statistics are computed using the robust standard error (White).

Table 4.8 The effect of banking relationships on collateral requirements—tobit estimations

Dependent variable: collateral requirements								
	(1)		(2)		(3)		(4)	
	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic
Independent variable								
INTERCEPT	4.039***	8.01	4.109***	8.09	3.998***	7.98	4.069***	8.02
POLICY BANK	-0.218***	-2.82	-0.219***	-2.82	-0.209***	-2.79	-0.210***	-2.80
	(-0.125)		(-0.126)		(-0.120)		(-0.121)	
JOINT STOCK BANK	-0.334***	-5.24	-0.341***	-5.30	-0.221***	-2.89	-0.230***	-3.00
	(-0.192)		(-0.196)		(-0.127)		(-0.133)	
FOREIGN BANK	-0.172	-1.07	-0.161	-1.02	-0.181	-1.38	-0.170	-1.30
	(-0.099)		(-0.093)		(-0.104)		(-0.098)	
SOE	-0.320***	-7.63	-0.317***	-7.47	-0.319***	-7.53	-0.315***	-7.42
	(-0.183)		(-0.182)		(-0.183)		(-0.181)	
FOREIGN	-0.298	-1.39	-0.337*	0.089	-0.301	-1.55	-0.338*	-1.71
	(-0.171)		(-0.194)		(-0.173)		(-0.195)	
GUARANTEE	-1.632***	-27.18	-1.634***	-27.10	-1.630***	-24.69	-1.632***	-24.65
	(-0.937)		(-0.940)		(-0.938)		(-0.941)	

SIZE	-0.130*** (-0.074)	-5.55	-0.132*** (-0.076)	-5.66	-0.130*** (-0.075)	-5.48	-0.132*** (-0.076)	-5.57
AE	-0.732*** (-0.420)	-2.81	-0.726*** (-0.418)	-2.74	-0.741** (-0.426)	-2.27	-0.735** (-0.424)	-2.24
B/M	0.513*** (0.295)	4.26	0.509*** (0.293)	4.19	0.512*** (0.295)	4.28	0.508*** (0.293)	4.24
ROA	-0.574** (-0.329)	-1.99	-0.602** (-0.347)	-1.97	-0.593* (-0.341)	-1.89	-0.622* (-0.359)	-1.92
LEVERAGE	0.481*** (0.276)	2.84	0.491*** (0.283)	2.89	0.487*** (0.280)	3.04	0.497*** (0.286)	3.10
TANGIBILITY	-0.592*** (-0.340)	-5.53	-0.569*** (-0.327)	-5.19	-0.582*** (-0.335)	-5.23	-0.559*** (-0.322)	-4.96
LIQUIDITY	-0.061 (-0.035)	-0.29	-0.054 (-0.031)	-0.26	-0.048 (-0.028)	-0.25	-0.041 (-0.024)	-0.22
EXCLUSIVITY	-0.164*** (-0.093)	-3.18	-0.168*** (-0.096)	-3.25	-0.096* (-0.055)	-1.71	-0.102* (-0.058)	-1.81
EXCLUSIVITY*								
JOINT STOCK BANK					-0.217** (-0.122)	-2.12	-0.212** (-0.119)	-2.07
Region			Yes				Yes	

Year	Yes	Yes	Yes	Yes
Sample size	1486	1486	1486	1486
Log likelihood	-1103.04	-1101.69	-1100.80	-1099.54
(McFadden)				
Adjusted R2	0.322	0.323	0.323	0.324

Notes: ***, **, and * indicate 0.01, 0.05 and 0.10 significance levels, respectively, in a two-tailed test.

Marginal coefficient is in parentheses.

The *t*-statistics are computed using the robust standard error (White).

Table 5.1 Sample selection and distribution

Sample selection	Observations
Firms available in CSMAR database from 2007 to 2009	4,969
Less:	
Firms without outstanding loans	523
Loans borrowed by companies in the financial industry	18
Type of loans (collateralised loans, guaranteed loans or credit loans) cannot be identified	109
Observations missing financial data	170
ST or *ST firms	387
Observations missing governance data	579
Total observations	3,183

Table 5.2 Definitions of variables

Variables	Definition
COLLATERAL	Percentage of total loans that are collateralised
SOE	Takes a value of 1 if the ultimate controlling shareholder is a state-owned enterprise
FOREIGN	Percentage of foreign ownership
Top2_10	Sum of the percentage of shares held by the second to tenth largest shareholder
Board size	Number of directors on the board
INDEPENDENCE	Percentage of independent directors on the board
DUALITY	Dummy variable taking the value one if the chairman and CEO positions are held by the same person
SB size	Number of supervisors on the supervisory board
SB expertise	Percentage of supervisor who has the professional knowledge or work experience in areas such as law and accounting on the supervisory board
MARKETISATION	A comprehensive index that captures the regional market development
GUARANTEE	Percentage of total loans that are guaranteed
SIZE	Natural logarithm of total assets
AE	Earnings per share in year t+1 minus earnings per share in year t, divided by the share price in year t
B/M	Total assets in book value/total assets in market value
ROA	Return on assets
LEVERAGE	Total debts/total assets
LTDEBT	Long term loans/total loans
TANGIBILITY	Fixed assets/total assets
LIQUIDITY	Cash and cash equivalents/total assets

Table 5.3 Descriptive statistics

Variables	N	Mean	Median	5 th	95 th	Std. Dev.
<i>Panel A: Collateral requirements</i>						
COLLATERAL	3183	0.360	0.271	0	1	0.342
<i>Panel B: Ownership structure</i>						
SOE	3183	0.558	1	0	1	0.497
FOREIGN	3183	0.036	0	0	0.297	0.107
<i>Panel C: Internal governance</i>						
Top2_10	3183	0.192	0.170	0.025	0.434	0.130
Board size	3183	9.208	9	6	13	1.910
INDEPENDENCE	3183	0.315	0.300	0.000	0.636	0.184
DUALITY	3183	0.159	0	0	1	0.366
SB size	3183	3.965	3	3	6	1.288
SB expertise	3183	0.200	0.200	0.000	0.667	0.214
<i>Panel D: External governance</i>						
MARKETISATION	3183	8.490	8.75	4.94	11.02	2.075
<i>Panel E: Other controls</i>						
GUARANTEE	3183	0.397	0.358	0.000	1.000	0.338
SIZE	3183	21.565	21.461	20.057	23.523	1.063
AE	3183	0.003	0.000	-0.052	0.075	0.066
B/M	3183	0.530	0.482	0.180	1.029	0.262
ROA	3183	0.034	0.035	-0.064	0.124	0.087
LEVERAGE	3183	0.240	0.232	0.023	0.487	0.144
LTDEBT	3183	0.303	0.202	0.000	0.965	0.317
TANGIBILITY	3183	0.278	0.248	0.019	0.618	0.185
LIQUIDITY	3183	0.167	0.137	0.029	0.400	0.123
<i>Panel F: Collateral requirements based on year</i>						
2007	1006	0.343	0.253	0.000	1.000	0.331
2008	1067	0.366	0.286	0.000	1.000	0.339
2009	1110	0.370	0.271	0.000	1.000	0.353

Notes: *COLLATERAL* is the percentage of total loans that are collateralised. *SOE* is a dummy variable that takes a value of 1 if the ultimate controlling shareholder is a state-owned enterprise. *FOREIGN* is the proportion of foreign ownership. *Top2_10* is the sum of the percentage of shares held by the second to tenth largest shareholder. *Board size* is the number of directors on the board. *INDEPENDENCE* is the percentage of independent directors on the board. *DUALITY* is a dummy variable taking the value one if the chairman and CEO positions are held by the same person. *SB size* is the number of members on the supervisory board. *SB expertise* is the percentage of supervisor who has the professional knowledge or work experience in areas such as law and accounting on the supervisory board. *MARKETISATION* is a comprehensive index that captures the regional market development. *GUARANTEE* is the percentage of total loans that are guaranteed. *SIZE* is the natural logarithm of total assets. *AE* is earnings per share in year $t+1$ minus earnings per share in year t , divided by the share price in year t . *B/M* is the ratio of the book value of the firm's assets to the market value of the firm's assets. *ROA* is return on assets. *LEVERAGE* is debt/asset. *LTDEBT* is long term loans/total loans. *TANGIBILITY* is the ratio of fixed assets to total assets. *LIQUIDITY* is cash and cash equivalents/total assets.

Table 5.4 Results of univariate test

Variables	SOEs	Non-SOEs	Difference (t-test)	SOEs	Non-SOEs	Difference (z-test)
Top2_10	0.163	0.229	14.657***	0.134	0.220	14.554***
Board size	9.570	8.752	-12.305***	9	9	-11.704***
INDEPENDENCE	0.308	0.323	2.190**	0.300	0.300	2.062**
DUALITY	0.105	0.228	9.606***	0	0	9.471***
SB size	4.267	3.586	-15.367***	5	3	-15.322***
SB expertise	0.222	0.173	-6.478***	0.200	0.000	-7.519***
MARKETISATION	8.357	8.656	4.059***	8.73	8.76	4.703***

Table 5.5 Multicollinearity diagnostics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)	1										
(2)	-0.031*	1									
(3)	0.017	-0.076***	1								
(4)	0.312***	0.099***	0.001	1							
(5)	0.017	-0.006	-0.010	-0.020	1						
(6)	0.203***	0.037**	0.028	0.397***	0.044**	1					
(7)	-0.071***	0.008	-0.034*	0.126***	-0.303***	-0.146***	1				
(8)	0.093***	-0.050***	0.090***	0.185***	0.082***	0.227***	-0.255***	1			
(9)	0.121***	-0.005	-0.130***	0.348***	0.007	0.157***	0.023	0.205***	1		
(10)	0.187***	0.008	0.029*	0.064***	0.019	0.072***	-0.087***	0.235***	0.055***	1	
(11)	-0.148***	0.048***	0.027	-0.122***	-0.036**	-0.206***	0.199***	-0.344***	-0.125***	-0.343***	1
(12)	-0.251***	0.182***	-0.101***	-0.129***	-0.010	-0.203***	0.127***	-0.138***	-0.016	-0.057***	0.234***
(13)	0.213***	0.047***	0.005	0.253***	0.005	0.089***	0.034*	0.088***	0.099***	0.133***	-0.033*
(14)	0.039**	0.056***	0.002	0.100***	-0.009	0.003	0.094***	-0.006	0.062***	-0.009	0.044**
(15)	-0.168***	0.034*	-0.011	-0.130***	-0.033*	-0.102***	0.014	-0.073***	-0.098***	-0.048***	0.059***
(16)	0.263***	-0.016	0.002	0.205***	0.003	0.097***	0.002	0.100***	0.108***	0.153***	-0.096***
(17)	0.114***	0.042**	0.009	0.109***	0.011	0.034*	0.030*	0.020	0.062***	-0.011	-0.005
(18)	-0.072***	0.139***	0.024	0.052***	-0.004	0.020	0.058***	-0.019	-0.082***	-0.133***	0.079***
	(12)	(13)	(14)	(15)	(16)	(17)	(18)				
(12)	1										
(13)	0.068***	1									
(14)	0.060***	0.095***	1								
(15)	0.058***	-0.098***	-0.038**	1							
(16)	-0.045**	0.307***	0.014	-0.095***	1						
(17)	-0.005	0.014	0.101***	-0.071***	0.049***	1					
(18)	0.000	-0.026	0.017	0.040**	-0.058***	-0.039**	1				

Notes: (1) is SOE; (2) is FOREIGN; (3) is GUARANTEE; (4) is SIZE; (5) is AE; (6) is B/M; (7) is ROA; (8) is LEVERAGE; (9) is LTDEBT; (10) is TANGIBILITY; (11) is LIQUIDITY; (12) is Top2_10; (13) is Board size; (14) is INDEPENDENCE; (15) is DUALITY; (16) is SB size; (17) is SB experience; and (18) is MARKETISATION.

Table 5.6 Governance of other large shareholders and the collateral requirements—tobit estimations

Dependent variable: collateral requirements								
	(1)		(2)		(3)		(4)	
	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic
Independent variable								
INTERCEPT	3.178***	19.8	2.776***	17.06	2.718***	16.49	2.769***	16.6
SOE			-0.170*** (-0.139)	-12.96	-0.173*** (-0.141)	-13.18	-0.182*** (-0.149)	-13.94
FOREIGN					-0.186*** (-0.152)	-2.93	-0.148** (-0.121)	-2.28
Top2_10							-0.188*** (-0.154)	-3.49
GUARANTEE	-0.679*** (-0.545)	-32.23	-0.675*** (-0.549)	-32.74	-0.680*** (-0.554)	-32.84	-0.685*** (-0.559)	-32.93
SIZE	-0.122*** (-0.098)	-15.41	-0.100*** (-0.081)	-12.34	-0.097*** (-0.079)	-11.75	-0.097*** (-0.079)	-11.81
AE	-0.287***	-3.02	-0.300***	-3.26	-0.302***	-3.26	-0.292***	-3.19

	(-0.231)		(-0.244)		(-0.246)		(-0.238)
B/M	0.177***	4.52	0.213***	5.54	0.214***	5.57	0.196***
	(0.142)		(0.173)		(0.174)		(0.160)
ROA	-0.472***	-3.5	-0.596***	-4.04	-0.608***	-4.09	-0.575***
	(-0.379)		(-0.484)		(-0.495)		(-0.468)
LEVERAGE	0.354***	6.5	0.311***	5.9	0.301***	5.7	0.300***
	(0.285)		(0.253)		(0.245)		(0.244)
LTDEBT	0.248***	9.49	0.253***	9.91	0.250***	9.78	0.254***
	(0.199)		(0.205)		(0.203)		(0.207)
TANGIBILITY	-0.493***	-12.53	-0.422***	-11.04	-0.415***	-10.88	-0.407***
	(-0.396)		(-0.343)		(-0.338)		(-0.332)
LIQUIDITY	-0.168**	-2.28	-0.191***	-2.67	-0.180**	-2.53	-0.146**
	(-0.135)		(-0.156)		(-0.147)		(-0.119)
Year	Yes		Yes		Yes		Yes
Sample size	3183		3183		3183		3183
Log likelihood	-1653.76		-1574.69		-1569.65		-1563.17
(McFadden)							
Adjusted R2	0.314		0.347		0.349		0.352

Notes: ***, **, and * indicate 0.01, 0.05 and 0.10 significance levels, respectively, in a two-tailed test.

Marginal coefficient is in parentheses.

The *t*-statistics are computed using the robust standard error (White).

Table 5.7 Two-tier board structure and the collateral requirements—tobit estimations

Dependent variable: collateral requirements						
	(1)		(2)		(3)	
	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic
Independent variable						
INTERCEPT	2.699***	15.6	2.787***	16.68	2.764***	15.93
Board size	0.059*	1.85			0.074**	2.26
	(0.048)				(0.060)	
INDEPENDENCE	-0.084**	-2.46			-0.081**	-2.37
	(-0.068)				(-0.066)	
DUALITY	0.043**	2.52			0.042**	2.48
	(0.035)				(0.035)	
SB size			-0.043**	-2.05	-0.055**	-2.54
			(-0.035)		(-0.045)	
SB expertise			-0.061**	-2.04	-0.054*	-1.82
			(-0.049)		(-0.045)	
MARKETISATION					-0.009***	-2.88

					(-0.007)	
SOE	-0.181***	-13.55	-0.174***	-12.89	-0.175***	-12.78
	(-0.148)		(-0.142)		(-0.143)	
FOREIGN	-0.146**	-2.26	-0.147**	-2.26	-0.122*	-1.86
	(-0.119)		(-0.120)		(-0.100)	
Top2_10	-0.196***	-3.62	-0.183***	-3.4	-0.200***	-3.69
	(-0.160)		(-0.150)		(-0.164)	
GUARANTEE	-0.684***	-32.93	-0.685***	-32.96	-0.683***	-33.03
	(-0.559)		(-0.559)		(-0.558)	
SIZE	-0.098***	-11.78	-0.095***	-11.58	-0.095***	-11.57
	(-0.080)		(-0.078)		(-0.078)	
AE	-0.282***	-3.1	-0.288***	-3.11	-0.271***	-2.93
	(-0.230)		(-0.235)		(-0.221)	
B/M	0.198***	5.17	0.196***	5.12	0.204***	5.33
	(0.162)		(0.160)		(0.166)	
ROA	-0.550***	-3.79	-0.565***	-3.92	-0.518***	-3.69
	(-0.449)		(-0.461)		(-0.423)	
LEVERAGE	0.301***	5.71	0.304***	5.78	0.313***	5.96
	(0.246)		(0.248)		(0.255)	
LTDEBT	0.259***	10.09	0.256***	9.99	0.254***	9.84

	(0.211)		(0.209)		(0.207)	
TANGIBILITY	-0.415***	-10.84	-0.404***	-10.57	-0.424***	-11.03
	(-0.339)		(-0.329)		(-0.346)	
LIQUIDITY	-0.147**	-2.04	-0.148**	-2.06	-0.148**	-2.06
	(-0.120)		(-0.121)		(-0.121)	
Year	Yes		Yes		Yes	
Sample size	3183		3183		3183	
Log likelihood	-1555.61		-1558.94		-1546.89	
(McFadden)						
Adjusted R2	0.355		0.354		0.359	

Notes: ***, **, and * indicate 0.01, 0.05 and 0.10 significance levels, respectively, in a two-tailed test.

Marginal coefficient is in parentheses.

The *t*-statistics are computed using the robust standard error (White).

Table 5.8 Collateral requirements, group by the type of ultimate controlling shareholder—tobit estimations

Dependent variable: collateral requirements								
Independent variable	(1)		(2)		(3)		(4)	
	SOEs		SOEs		Non-SOEs		Non-SOEs	
	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic
INTERCEPT	2.735***	11.54	2.631***	10.76	2.326***	8.94	2.219***	8.41
Board size	0.107**	2.34	0.106**	2.32	0.043	0.91	0.045	0.95
	(0.079)		(0.078)		(0.039)		(0.040)	
INDEPENDENCE	-0.121***	-2.72	-0.119***	-2.67	-0.028	-0.55	-0.026	-0.51
	(-0.089)		(-0.087)		(-0.025)		(-0.023)	
DUALITY	0.079***	2.79	0.076***	2.69	0.021	1.02	0.022	1.05
	(0.060)		(0.058)		(0.019)		(0.020)	
SB size	-0.084***	-2.95	-0.085***	-3.02	-0.016	-0.48	-0.016	-0.47
	(-0.062)		(-0.063)		(-0.014)		(-0.014)	
SB expertise	-0.015	-0.36	0.350**	2.03	-0.084**	-2.02	0.389**	2.1
	(-0.011)		(0.258)		(-0.075)		(0.349)	

MARKETISATION	-0.008 (-0.006)	-1.65	0.002 (0.002)	0.34	-0.008** (-0.007)	-1.99	0.001 (0.001)	0.18
SB expertise*								
MARKETISATION			-0.044** (-0.032)	-2.17			-0.055*** (-0.050)	-2.64
Top2_10	-0.006 (-0.004)	-0.07	-0.008 (-0.006)	-0.1	-0.351*** (-0.315)	-4.71	-0.345*** (-0.309)	-4.64
FOREIGN	-0.006 (-0.004)	-0.05	-0.005 (-0.004)	-0.04	-0.229** (-0.205)	-2.41	-0.227** (-0.203)	-2.4
GUARANTEE	-0.544*** (-0.401)	-18.97	-0.546*** (-0.403)	-19.02	-0.850*** (-0.762)	-29.33	-0.849*** (-0.762)	-29.36
SIZE	-0.107*** (-0.079)	-9.86	-0.106*** (-0.078)	-9.74	-0.072*** (-0.064)	-5.71	-0.070*** (-0.063)	-5.6
AE	-0.273** (-0.201)	-2.44	-0.273** (-0.201)	-2.48	-0.271** (-0.243)	-2.19	-0.269** (-0.241)	-2.2
B/M	0.190*** (0.140)	3.77	0.193*** (0.143)	3.84	0.195*** (0.175)	3.51	0.190*** (0.170)	3.41
ROA	-0.574*** (-0.423)	-3.23	-0.590*** (-0.435)	-3.29	-0.461** (-0.413)	-2.47	-0.474** (-0.426)	-2.51
LEVERAGE	0.332***	4.71	0.333***	4.71	0.268***	3.56	0.262***	3.5

	(0.245)		(0.245)		(0.241)		(0.236)	
LTDEBT	0.242***	6.78	0.240***	6.73	0.244***	6.58	0.243***	6.56
	(0.178)		(0.177)		(0.219)		(0.218)	
TANGIBILITY	-0.447***	-8.65	-0.446***	-8.64	-0.308***	-5.45	-0.306***	-5.45
	(-0.330)		(-0.329)		(-0.276)		(-0.275)	
LIQUIDITY	-0.024	-0.2	-0.018	-0.15	-0.133	-1.52	-0.132	-1.51
	(-0.018)		(-0.014)		(-0.119)		(-0.118)	
Year	Yes		Yes		Yes		Yes	
Sample size	1777		1777		1406		1406	
Log likelihood	-924.87		-922.38		-559.21		-555.56	
(McFadden)								
Adjusted R2	0.253		0.255		0.484		0.487	

Notes: ***, **, and * indicate 0.01, 0.05 and 0.10 significance levels, respectively, in a two-tailed test.

Marginal coefficient is in parentheses.

The *t*-statistics are computed using the robust standard error (White).

Table 5.9 Robustness check of the general results

	(1)		(2)		(3)	
	Tobit		Ordered logit		2SLS	
	Collateral requirements		High versus low collateral requirements		Collateral requirements	
	Coefficient	t/z	Coefficient	t/z	Coefficient	t/z
Independent variable						
INTERCEPT	2.805***	16.26			3.012***	12.88
GQI					-0.167***	-2.60
Board size	0.155**	2.05	0.309***	2.92		
	(0.127)		(0.082)			
INDEPENDENCE	-0.079**	-2.32	-0.247**	-2.23		
	(-0.065)		(-0.066)			
DUALITY	0.042**	2.48	0.117**	2.12		
	(0.035)		(0.032)			
SB size	-0.226**	-2.11	-0.166**	-2.34		

	(-0.184)		(-0.044)			
SB expertise	-0.054*	-1.82	-0.084**	-2.02		
	(-0.044)		(-0.022)			
MARKETISATION	-0.009***	-2.88	-0.029***	-2.94	-0.008***	-2.993
	(-0.007)		(-0.008)			
SOE	-0.176***	-12.83	-0.547***	-12.27	-0.154***	-12.74
	(-0.144)		(-0.149)			
FOREIGN	-0.123*	-1.87	-0.479**	-2.39	-0.143***	-2.68
	(-0.100)		(-0.128)			
Top2_10	-0.198***	-3.65	-0.405**	-2.28		
	(-0.162)		(-0.108)			
GUARANTEE	-0.683***	-32.96	-1.897***	-26.43	-0.623***	-35.23
	(-0.557)		(-0.505)			
SIZE	-0.094***	-11.53	-0.285***	-10.47	-0.087***	-12.58
	(-0.077)		(-0.076)			
AE	-0.271***	-2.94	-0.737**	-2.14	-0.190**	-2.17
	(-0.221)		(-0.196)			
B/M	0.203***	5.32	0.788***	6.2	0.219***	6.46
	(0.166)		(0.210)			
ROA	-0.517***	-3.68	-1.326***	-2.89	-0.337***	-4.68

	(-0.422)		(-0.353)			
LEVERAGE	0.312***	5.95	1.414***	8.23	0.343***	7.68
	(0.255)		(0.377)			
LTDEBT	0.254***	9.85	0.687***	8.31	0.206***	10.60
	(0.207)		(0.183)			
TANGIBILITY	-0.424***	-11.04	-1.460***	-11.42	-0.388***	-11.66
	(-0.347)		(-0.389)			
LIQUIDITY	-0.147**	-2.04	-0.615***	-2.82	-0.170***	-3.28
	(-0.120)		(-0.164)			
Year	Yes		Yes		Yes	
Sample size	3183		3183		3183	
Log likelihood	-1548.19		-3679.63		-6076.08	
(McFadden)						
Adjusted R2	0.358		0.169			

Notes: ***, **, and * indicate 0.01, 0.05 and 0.10 significance levels, respectively, in a two-tailed test.

Marginal coefficient is in parentheses.

The t/z -statistics are computed using the robust standard error (White).

Table 5.10 Corporate governance and tunnelling

	(1)		(2)		(3)	
	OLS		Logit		Logit	
	Other receivables		High versus low related sales of goods and services		High versus low related purchases of goods and services	
	Coefficient	t/z	Coefficient	t/z	Coefficient	t/z
Independent variable						
INTERCEPT	0.102***	4.5	7.889***	8.11	10.798***	10.18
GQI	-0.001**	-1.98	-0.078**	-2.41	-0.110***	-3.27
			(0.925)		(0.896)	
MARKETISATION	-0.002***	-3.94	-0.041**	-2.23	-0.040**	-2.15
			(0.960)		(0.961)	
SOE	-0.004***	-2.61	-0.610***	-7.71	-0.616***	-7.7
			(0.543)		(0.540)	
FOREIGN	-0.015***	-3.17	-0.590	-1.6	-0.440	-1.17
			(0.554)		(0.644)	
SIZE	-0.002*	-1.91	-0.342***	-7.27	-0.468***	-9.14
			(0.710)		(0.626)	

B/M	0.001	0.15	-0.169 (0.845)	-0.74	-0.463* (0.629)	-1.9
ROA	-0.088*	-1.89	0.529 (1.697)	1.19	-0.150 (0.860)	-0.31
LEVERAGE	-0.004	-0.64	0.466 (1.593)	1.62	0.249 (1.283)	0.85
Year	Yes		Yes		Yes	
Sample size	3183		3183		3183	
Log likelihood (McFadden)			-2053.59		-1980.51	
Adjusted R2	0.069		0.054		0.082	

Notes: ***, **, and * indicate 0.01, 0.05 and 0.10 significance levels, respectively, in a two-tailed test.
The t/z -statistics are computed using the robust standard error (White).