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Essays on Investment, Financing, and Institutions in China

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Abstract

China's unique approach to the market economy during its transitional phase has provoked widespread interest among researchers. While the Western literature can certainly not be directly applied under Chinese economic conditions, it offers important theoretical grounds on which we can build our understanding of different behaviour of firms and banks in China.

In the first chapter, we employ a unique set of data on financial information of over 6,000 firms and study the lending pattern of banks in China at a firm level. We find that in addition to common factors such as profitability, size, and credit history, state ownership is highly correlated with banks' lending decision; the evidence is consistent with the existence of soft budget constraint.

The debate over whether such lending bias is caused by the supply side (banks) leads us to the second chapter. We examine and compare investment behaviour of firms under different ownership, with a focus on investment to cash flow sensitivity, using financial and accounting data on over 1,700 listed firms in China. We find opposite effects of cash flow on firms when sample is split between different ownership, with privately owned firms showing a higher sensitivity of investment to cash flow. This result enables us to establish that the cause of lending bias and soft budget constraint in China is indeed a supply side effect. We also find that such sensitivity is positively correlated with firm size and age, but not related to Tobin's q , which we interpret as indicating the lack of market value information about firms in China.

Institutional development in the sense of enhancement of the effectiveness of the market is widely viewed as the core to economic reform in transition economies. As privately owned firms generally outperform their state owned counterparts (see Estrin et al. 2009), we study the impact of regional institutions on total factor productivity (TFP) of firms under different ownership. We find that the quality of institutions is highly correlated with firms' TFP, and that improving institutions to facilitate business operations is crucial for firms to achieve higher effectiveness and sustainable growth. The results also suggest that urgent reform is needed for the state owned sector in China.

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Introduction

China's fast growth and its economic reform in the recent decades have been thought provoking. Researchers are particularly interested in comparing Chinese firms and their behaviour to their Western counterparts, aiming to study whether literature developed on the basis of developed economies can be applied in the Chinese context (B. Chen & Feng, 2000; G. C. Chow, 1993; Wang & Yao, 2003; Wu, 2000; Zhang & Zou, 1998).

It is particularly of our interest to look into the capital market as well as how firms behave differently in the Chinese context compared to their Western counterparts. The partial privatization of state owned firms and commercialization of state owned banks raises the question of whether the reform was thorough and successful. The development of institutions in China also prompts us to examine the institutional impact on firm performance. The co-existence of state and privately owned firms as well as the massive difference in institutions across regions enables us to test for such impact. Our work is able to draw on new data not in the public domain, which greatly facilitates our regression analysis.

In a broad sense, the aim of our study is to shed light on the results of recent reforms and examine whether such reform has made significant changes in bank lending practice as well as more generally to the institutional environment. Specifically, we begin with examining banks' interaction with firms and the determinants of bank lending in the first chapter, before moving on to how such lending pattern has affected firms within different institutional ownership sectors, by testing the difference in investment to cash flow sensitivity, in the chapter that follows. We also test for the factors that influence such sensitivity and argue the rationale behind it. Finally in chapter three we focus on the institutional differences across regions in China and estimate how institutional changes have impacted firm performance in term of total factor productivity (TFP).

The thesis therefore contains three chapters, each of which represents a standalone study on different aspect of financing, investment and firm performance under the context of China's economic and institutional reform.

It is usually assumed by economic theory that all firms have equal access to capital market, and that in such a perfect capital market, firms' responses to changes in the cost of capital differ only because of difference in investment demand (Modigliani & Merton, 1958). Studies of Western developed economies then go on to explain the practice in presence of a "financing hierarchy" caused by market imperfections and frictions, in which internal funds or cash have a cost advantage over debt or equity issuance. In China, the story is slightly more complex. Due to the fact that the Chinese capital market is still in its developing stage and quite immature in comparison to those of developed economies, firms in China still rely heavily on bank financing when the need for external capital arises, and bank loans counts for more than 80 per cent of all external finance in China (Tian and Estrin, 2007).

Therefore, banks play very important roles in finance by determining the availability and the cost of credit. The availability and cost of credit, in turn, determine company capital structure and cost of capital. In addition to their role of facilitating capital flows, banks also monitor their debtors, thereby providing valuable governance oversight to the entire economy.

With China's ever so rapid market progress, the development and growth of firms within various industries has become the focus to consider. The sustainability of economic development, and bank financing is crucial to this, as the availability of loans can enable and nurture growth. Since the People's Republic of China (PRC) launched its open door economic policy in 1978, the Government has embarked on a series of banking sector reform programs.

Prior to 1979, the banking system in China was very centralized and did little to promote the growth of firms in terms of provision of essential credit. The primary duty of banks was to allocate investment through budget grants (Ma, 1997). To reform the banking system, the Chinese government first introduced the two tier structure with People's Bank of China acting as the policy bank and with four specialized banks (Bank of China, Agricultural Bank of China, Industrial and Commercial Bank of China, and Construction Bank of China) under its direct control. Such transformation was completed by 1994. The most important reform at

this stage was replacing credit allocation with interest-bearing loans to limit the soft budget problems.

Since the establishment of the two tier banking system, the reform of the banking sector has been focusing on improving the lending practice of the four specialized banks by separating commercial and policy lending. Other reforms included removing credit plans, reducing government intervention in credit allocation, (partial) entry deregulation, (partial) interest rate deregulation, tightening of accounting and prudential norms, and financial sector restructuring (Shirai, 2002).

However, such reform has not solved the main problems of soft budget constraints or non-performing loans. By late 1990s, the People's Bank of China launched IPO plans for the four specialized banks in attempt to attract foreign investment both in terms of assets as well as Western style management.

But government ownership still prevails in both listed companies and banks (Tian and Estrin, 2007), and state ownership clearly promotes firms' access to bank finance, which can be extremely valuable for firms with a healthy growth prospect and future investment plans.

Despite the efforts of the Chinese government to introduce competition and enhance governance mechanisms, the banking system is still dominated by state-owned banks (SOBs) and characterised by a high level of non-performing loans (NPLs). As the government owns both the SOBs and state owned firms (SOFs), it is usually suggested that, given the paternalistic behaviour of the Chinese government, the former are obliged to grant loans to the latter in the form of "relationship lending": that is, lending by SOBs to SOFs is largely due to political pressure (from the local and central governments) rather than based on commercial considerations (OECD, 2005). Chow and Fung (2000) state that most firms in China, like in other transition economies, rely heavily on bank loans because equity and bond markets are either not fully developed to a mature stage or not developed at all and the cost to enter is high. Banking institutions that emerged from the first wave of reforms are still characterized by large financial inefficiencies, lack of competition, and extensive government involvement in credit allocation (Miurinand

Sommariva, 1993). The state banking system assumes a dual role in the Chinese economy, functioning as a financial intermediary as well as a quasi-fiscal institution. All of the four major banks are subject to extensive government regulations and control and they are required to make policy loans to the state owned firms which generally operate under soft budget constraints so that there is no risk associated with increased borrowing. In case of failure, they can get a bailout by the government (Tam, 1986). Also in order to avoid massive unemployment, central and local government officials force the state banks to keep lending to the state owned firms, no matter how financially unsound these firms are (Blanchard, 1997). When state owned firms fail to generate profits to repay bank loans, banks have to increase their lending to support the continuation of all affected projects (Tam, 1986; Perotti, 1993).

In addition to the banking sector's unsatisfactory commercialization progress, the state owned enterprise sector is under government policy direction to become more privatized and efficient. Some firms have successfully transformed themselves into semi-private firms (Jefferson, Rawski and Zhen, 1992; Gelb, Jefferson and Singh, 1993). The state sector is also often given many advantages in addition to easy access to bank finance. Data show that listed firms in China remained to be largely state-owned. The proportion of State ownership (the sum of state-owned and legal person shares) is in the 40% - 80% range in about 90% of all listed firms (People's Bank of China, 2009), indicating that the state owned firms also have external financing options. Despite the ownership being transferred from central government to local authorities or local government owned enterprises, the firms remain under direct control of the State.

Many listed firms also operate in the protected sectors (energy, raw materials, etc), which are largely monopolistic (Shirai, 2002). These sectors benefit greatly from specific policies, better tax rates, as well as government subsidies. However, Wei and Wang (1997) states that despite the spectacular success of China's economic reform in the past few decades, the slow progress in the state owned sector is a major disappointment as well as a significant stumbling block to any further reforms in other sectors.

More often than not, state owned firms are under-performers compared to privately owned ones (Bai, Lu, & Tao, 2006; Jefferson & Su, 2006; X. Xu & Y. Wang, 1999). China's dynamic private sector has increasingly been contributing to the rapid economic growth in the recent years. It has been producing over half of industry value added and around half of China's trade surplus. The private sector has also counted for most employment creation and over one-third of fixed-asset investments. Nevertheless, in terms of formal external financing – both direct and indirect – its share remains very low. This suggests that in China, the financing sources for private enterprises are limited (Molnar and Tanaka, 2007). Privately funded companies accounted for only under 20% of total loans by the state owned banks in 2011, despite the fact that the non-public sector of the economy has become the largest among urban fixed-asset investor accounting for 58.9% of the national total and one third of the nation's export total (ACFIC, 2012). In the absence of formal external financing, the Chinese domestic private sector heavily relies on financing from retained earnings and borrowing from the informal sector (Allen, Qian, & Qian, 2005; Hasan, Wachtel, & Zhou, 2009).

Could it be that the favouritism in lending policy has choked the overall pace of the reform? Although some studies on issues related to lending bias in China have been published, such as those of Wei and Wang (1997) and Cull and Xu (2003), few research papers has been published shedding light on all of the possible determinants of bank lending in China. The study by Wei and Wang (1997) finds that China's bank loans favour state owned industrial firms and argues that the lending bias diminishes the effectiveness of other measures designed to promote the growth of the private sector or to induce state owned firms to restructure. Many have argued that the existence of a lending bias is self-evident, and others have suggested that the lending bias, if it existed before, has disappeared in recent years. In this chapter, we aim to test for whether such effect still remains after years of reform. Shirai (2002) and Lu, Thangavelu, and Hu (2001) both carried out studies using firm level data from listed firms in China examining the banks' lending behaviour and firms' corporate financing pattern, and provided a more comprehensive picture. Determinants of bank lending are tested in both researches and a positive correlation between the state ownership and the accessibility to bank loans was found, indicating systematic bias in lending decisions and the presence of

soft budget constraints, which is a major cause of NPLs. Lu et al. (2001) point out that banks often find it difficult to enforce loan contracts in the event of loan default of non-state owned firms, which also increase their preference towards state owned firms. Low transaction costs with state owned firms as a result of a long term relationship may have also given rise to the lending bias.

To fill the gap in the literature on the relationship between the lending behaviour of banks and bank borrowing by manufacturing firms, we investigate the determinants of lending by banks in China to firms with state as against private ownerships in different industrial sectors. We also examine whether banking sector reforms and equity market development have had any significant impact on banks' lending behavior and firms' corporate financing pattern by comparing the results with previous studies. Specifically, we aim to reveal the relationship between bank lending and firm ownership and consider selected control variables that are related to bank credit management practices, including firm size, profitability, age, past credit history, and collateral.

This chapter also provides detailed analysis of various aspects of firms that could affect the banks' lending behaviour. After three decades of reform, state ownership still plays a significant role in China's industrial sector, and arguably, still determines to a certain extent a firm's ability to obtain bank loans. State-owned commercial banks still dominate the Chinese banking sector and it is widely postulated that the local and central governments influence the loan activities of these banks. If such is the case, then political pressure from governments may matter more in bank lending than the commercial practices adopted by the banks in order to select loans applicants rationally and correctly. This chapter aims to investigate from both the demand and supply side of the story and shed more light on the rather opaque nature of Chinese bank lending practice.

Based on original data on over 6,000 medium to large size firms in the Hubei Province, the main purpose of the research is to investigate the financing patterns of Chinese firms and if private firms are discriminated against by state-owned banks during the lending process. Data are examined to test whether firms' characteristics such as size and ownership determine their accessibility to bank loans, and if so, to

what extent. The results confirm the presence of soft budget constraints leading up to the major reform and IPO plans for Chinese state owned banks in 2006. Also the fact that some state owned firms prefer bank loans over equity finance, despite considerable amount of retained earnings, suggests that banks either provided favourable financing conditions which may be due to corruption, or lack of borrowers' incentive to diversify their financing sources. It is concluded that the banking sector reforms need to be strengthened and privatized further in order to improve their risk management skills and lower lending biases.

In addressing the question of whether lending bias/financial constraints can be proven by showing results on the comparison of bank finance level in state owned and privately owned firms alone, we extend our research to examine the investment behaviour of Chinese firms; notably their means of financing affect such behaviour and implementing their investment plans. The rationale behind the research interest is that, if privately owned firms exhibit high investment sensitivity to internal finance in the form of retained earnings or cash flow, in combination with the findings in the previous chapter of the low leverage level of privately owned firm, we can confirm the presence of bank lending bias in China. Moreover, it strengthens the view that such bias is caused by supply side decisions such as policy lending.

In fact, the existing literature provides a puzzling picture in terms of what drives investment and more specifically, the role of cash flow plays on investment decisions and its sensitivity to the level of investment, even for western economies. Moreover, there are few studies focusing on investment models in Chinese firms but we feel that it is crucial to shed some light on what influences firm investment in China due to the unique character of the rapid growth and its institutional environment which is very different from most other countries.

China has maintained very high capital accumulation levels and aggregate investment ratios(Bai, Hsieh, & Qian, 2006; Song, Liu, & Jiang, 2001). At the same time, state-sector fixed investment, which accounts for a dominant share of gross fixed investment, has displayed conspicuous cyclical patterns in its annual growth rate. We believe that studying emerging market firm behaviour has been proven to

be of great importance and can provide policy implications for future economic development(Hoskisson, Eden, Lau, & Wright, 2000), especially by guiding and motivating the improvement of the capital market in China.

To be precise, we aim to thoroughly investigate the role of cash flow on investment behaviour of firms and what firm-specific features influences investment to cash flow sensitivity. The current literature states that it is unclear in the western context whether a high sensitivity of investment to cash flow is a plausible indicator for firms being financially constrained. Here we intend to provide a clear view on that for China, and in doing so further support the conclusion of the first chapter. In this chapter we aim to pin down the factors which influence the firms' investment decision and, by looking at the impact of cash flow on investment from State owned firms and privately owned firms separately, we will be able to identify whether privately owned firms are in fact more deprived of external financing, especially in terms of bank loan, compared to their state owned counterparts. We propose therefore to pin down whether the apparent state of "financial constrainedness" of privately owned firms in China is caused by factors from the demand side.

There are few studies in existing literature that investigate the cash flow–investment relationship based on data from the emerging market. In the Chinese context, Chen (2004) finds that the trade-off model has limited explanatory power in China in the sense that, for example, the effects costs of financial distress (earning volatility, bankruptcy costs) are not significant. It may be because the Chinese environment still retains some features of a centrally planned economy. The state is still the principal stakeholder of firms and the owner of banks as well as the beneficiary of tax. If the state does not change its controlling behaviour towards corporatized SOEs, those firms are less likely to run into a financial crisis compared with their counterparts in private sectors, so the costs of financial distress is likely to have much less effect on firms' capital structure and further influence firms' investment behaviour.

For the analysis, we proceed in three steps. Firstly we test a model in which investment is explained by a number of explanatory and control variables for all data observations, in order to test for and estimate the relationship between cash

flow and investment. We then utilize the fact that privately owned firms appear to be more deprived of external financing compared to their state owned counterparts as demonstrated in the first chapter, and divide the sample according to ownership type. This way investment to cash flow sensitivity can be estimated in two sub samples to test for whether such sensitivity is higher for the financially constrained group. Finally, based on the results of first two tests, we test for the level of significance of correlation between such sensitivity and other firm features.

Institutional development is widely held to be essential to induce businesses to improve their economic efficiency. We aim to examine whether it applies to China. Institutions, defined as in formal and informal rules of doing business as well as market intermediaries, shape many cost factors, in particular costs of using the market, but also the costs of interacting with government authorities, labour markets, financial service intermediaries and courts (North, 1990, 2005; Ingram and Silverman, 2002, Meyer and Peng, 2005). Moreover, institutions shape the opportunities for knowledge creation and sharing, and thus for raising the level of technology in use in firms (Lundvall, Johnson, Andersen and Dalum, Mudambi, R. 2008). By impacting on both the value added created by firms, and the costs they incur in the process, they indirectly impact on corporate performance and economic growth.

Research on institutions has traditionally focused on cross-national variations. However, the cross-national variations are often very large and correlated with other aspects of the respective economies (e.g. Easton and Walker, 1997; Bevan, Estrin and Meyer, 2004; Berggren and Jordahl, 2005). Therefore, researchers have recently began to exploit the intra-country variation in emerging economies such as China, Russia and Vietnam to study how institutions affect the strategies and performance of foreign investment firms (Meyer and Nguyen, 2005; Du, Lu and Tao, 2007) and of local firms (Johnson and McMillan, 2002; Cull and Cu, 2005; Hallward-Driemeier, Wallstein and Xu, 2006; Bruno, Bychkova and Estrin, 2010). This approach allows us to conduct a more fine-grained analysis of the impact of institutions on firm performance.

The concept of firm performance is often the core of many economic studies and many theories have been developed on economic efficiency of firms. Pareto (1896) defines allocative efficiency as a situation where no one could be made better off without someone at least as worse off. Allocative efficiency is achieved when the price of output equals the cost of resources used to produce the goods (price = marginal costs). Leibenstein (1975) argues that most empirical studies have illustrated results showing that by improving allocative efficiency or Pareto efficiency, output can only be increased by a very small fraction. X-efficiency is closely related to and affected by the efficiency of labour and management; in a simplified framework, X-inefficiency refers to the excess of actual costs over minimum cost for a given output (Leibenstein, 1978). In the previous two chapters of this PhD thesis, we mostly looked at how to improve firm performance by reallocating available resources, for instance, by making available funds more accessible to privately owned and more profitable firms rather than firms with state ownership but poor profitability. In this chapter, we look into how to improve firm performance from another perspective, which is the effectiveness (or technical efficiency) of firms, also known as total factor productivity (TFP).

We therefore focus on the impact on total factor productivity (TFP) as measure of corporate performance. TFP is the proportion of firms' output that is not explained by the quantity of inputs in a production process (Comin et al., 2006; Mahadevan, 2004). It thus is a measure of how effectively a firm exploits its inputs of capital, labour and materials. Earlier studies have identified TFP as a critical mediating variable that influences both corporate performance and economic growth (Bosworth and Collins, 2003; Felipe, 1999; Rodrik, 1998). In this study, we investigate the impact of institutional development on TFP with the dual aims to advance theory and generate policy advice. In particular, we put forward a more fine-grained analysis of institutions to analyse the prevailing question, which institutions really influence firm behaviour?

The effects of institutions on transaction cost have been observed throughout economic history. The need for impersonal contract enforcement surfaced along with increasing labour diversification. Innovations of institutions that lowered transaction costs consisted of legal changes, instruments, and specific techniques

and enforcement characteristics that lowered the costs of engaging in long distance exchange. Company laws enable a wide range of organizational forms and complex governance structures that limit the problems of agency in hierarchical organizations. In capital markets, secure property rights, which entail a polity and judicial system, lower the costs of contracting. In the integrated societies of the 21st century, specialization increases the number of inter-firm interfaces, and thus transactions between economic agents, making institutions particularly critical (North, 1990, 2005; Peng and Heath, 1996; Commander and Svejnar, 2007).

Institutional theory has been developed mainly by two types of work: First, longitudinal or historical studies explore in great detail how institutional frameworks and businesses evolve over time. Second, cross-sectional work has mostly exploited the fact the nation states vary in their institutional make-up, and explored how cross-national variations of institutions impact on the strategies of foreign investors (Bevan, Estrin and Meyer, 2004; Globermann & Shapiro, 2003; Meyer, Estrin, Bhaumik and Peng, 2009; Zhou, Delios and Yang, 2002), and entrepreneurial start-ups (Bruno, Bytchkova and Estrin 2008), on business performance (Scarpetta, Hemmings, Tressel and Woo, 2002), as well as economic variables such as economic growth (North, 1990; Rodrik 1998). However, such an approach is relatively crude in that variations across countries tend to be large and correlated with many other features of the pertinent countries.

A new opportunity to advance institutional theory has emerged with the opening up of emerging economies that are both large and internally diverse in their institutional set-up. Such studies proxy institutions at subnational units of analysis, such as provinces and cities. This allows for a more detailed analysis of the role of institutions in an economy because national characteristics are held constant in the study. In particular, institutional frameworks vary across regions or provinces within large transition economies, such as China, Russia and Vietnam, that have a federal structure of governance (Hallward-Driemeier, Wallstein and Xu, 2006; Johnson, McMillan and Woodruff, 2002; Li, Yue and Zhao, 2009). In these economies, market-oriented reforms have often been rolled out by central government authorities, yet their implementation in each province varies considerably. While formal changes may be initiated centrally, local

implementation often depends on local informal institutions such as traditions and attitudes (Meyer and Nguyen, 2005).

One obstacle to institutional research exploiting intra-country variation has been the availability of suitable measures. In this study, we have collected suitable indices from a variety of studies and papers (Fan et al, 2007, Du, Lu and Tao, 2007, World Bank, 2006) to overcome the limitations of earlier research.

The varying pace as well as different regional focuses of reforms in China have led to considerable variation within China with respect to the actual institutional framework at the level of provinces (Bai, Du, Tao and Tong, 2004; Cao, Qian and Weinstein, 1999; Fan et al. 2007; Yueh 2010). For example, the Chinese authorities often authorized specific regions to conduct experiments with market reforms under special policy and regulations – such as the industrial zone in the 1990s (Cartier, 2002). Even though the evolving formal institutional framework may be fairly similar across China, its implementation varies across provinces, such considerable variations could be observed in aspects such as corruption, contract enforcement, and intellectual property rights protection (Du et al., 2007). In contrast to Russia, China was never a fully centralised country, yet neither has it ever been quite decentralised (in terms of New China after 1945). The market economy has taken over the planned economy since the 1980s and the short period of government centralization in the 1960s/70s left very little impact on the country's economic activities (Hu and Khan, 1997; Chai, 1998; Kambur and Zhang, 2005). Furthermore, with the combination of loose specification and weak implementation of certain policy and regulations, provincial and local authorities in China have considerably higher degree of influence over economic activity than, for example, local authorities in the UK. This creates ideal conditions to examine institutional variations at the province level.

For our empirical analysis, we utilize the fact that some aspects of the institutions vary considerably across provinces in China, in order to measure the quality of institutions at the level of provinces. Traditionally, many Chinese firms were adapted to the state-dominated economy, and were thus operating with relatively low efficiency, including most notably overstaffing. Market reforms since the 1980s have created new opportunities and incentives schemes, that have induced

many, but not all, firms to substantially reform their operations, and to improve their productivity (Jefferson & Rawski, 1994; J. Y. Lin, Cai, & Li, 1998). In this study we aim to shed more light on the question how variations in institutional change, in particular their variations across Chinese provinces, affect firm performance.

The thesis has contributed to both theoretical and empirical side of the literature. The first chapter utilizes original data which was never published and has not been used by other researchers. The majority of previous studies have used similar datasets available through a number of databases, but these datasets either are highly aggregated (city or province level) or comprise of only listed firms which are mostly State-owned, large in size, and profitable, which can produce misleading results due to sampling limitations. Our data also cover the period of 2003 to 2005, leading up to the major introduction of foreign investment and IPO plans for the big four national banks in China (Bank of China, Industrial and Commercial Bank of China, China Construction Bank, and Agricultural Bank of China). Consequently the data capture a phase during which the banks are making changes to adapt to future policies and management alteration. Secondly, our research has enriched the empirical literature of bank financing in China as few researchers have examined similar topics due to limitations in data. Thirdly, the study contributes to the theoretical side of literature in identifying factors affecting lending behaviour in China. Fourthly, the results are highly robust and show a strong correlation between firms' ownership and their level of accessibility to bank loans. This strongly suggests the existence of a soft budget constraint, whilst past studies on similar topics provided us with ambiguous results. Finally, our study comments on the facilitating role of debt on managerial exploitation in Chinese firms, as oppose to the governance role it assumes in the Western economy.

The investment chapter offers the following contributions. Due to the overinvesting nature of Chinese firms, it is of great research interest to estimate the investment function in China at a more disaggregated level. We employed disaggregated firm level data in testing for the correlation between internal finance and firms' investment implementation. Our findings extend investment to cash flow sensitivity theories to firms in China and further to firms in the emerging market and

developing economy. We also try to pin down the ownership effect on another financing-related measure of firms, the investment to cash flow sensitivity and have found a significant correlation, indicating the influential role of ownership in China. This chapter also complemented the first chapter on bank lending, as it provides a rounded argument on the fact that the restriction of external financing to privately owned firms is indeed a result of lending bias and not a demand side effect.

The third chapter on institutions contribute in the following aspects. Firstly, we provide a more fine-grained understanding of institutional variations by examining the impact of institutional quality across regions within the same country. Many previous papers have attempted the subject of institutional impact on firm performance, mostly based on cross-country datasets. The reason being in most cases, the differences in institutions across region within the same country are not significant enough for results to be significant. Problems can arise with this approach as the variation can be caused not by differences in institutions alone but also other country-specific factors. Thus most cross-country studies of institutional impact on performance overlook that the causes of difference in firm performance could include factors that are country specific other than institutions (e.g. population, culture, market size). By measuring institutions at the provincial level across regions in China, we are able to link specific institutions to firms in different regions while controlling for other province-level effects, which provide more accurate results on the impact of institutional changes on firm level. Few studies have provided analysis on data with such a low level of aggregation. Secondly, we test for a rich variety of institutional measures, thus providing a more fine-grained understanding which institutional arrangements matter for firm effectiveness. Third, we investigate how state-ownership, an important institutional arrangement in most transition economies, interacts with other characteristics of the firm and its institutional environment. Specifically, we found it to have a significant negative effect that is moderated by the firm's age and size but not by other province level institutional influences. Lastly, we have constructed a unique firm level dataset that incorporates province level institutions that enables investigation of intra-country variations on firms' strategies and performance.

Therefore the thesis offers contributions in extending and applying the Western theoretical literature to the Chinese context, and testing these theories with unique firm level data set and shedding light on how banks and firms behave differently under different institutions in China compared to their western counterparts.

Chapter 1

Bank Finance and Firm Performance in China

Abstract

It is widely believed that, in China, direct state ownership benefits firms in the borrowing process when acquiring loans from banks. However, little empirical evidence is present in current studies to confirm such an impact and to further investigate into the banks' soft budget constraints and other determinants on firm-level lending. This chapter studies the lending pattern of banks in China at a firm level. It intends to shed some light on the decades' long debate of whether private firms are discriminated against by the banks in the lending process and whether they enjoy the same level of accessibility to loans as their state-owned counterparts. The chapter also intends to fill the gap in the literature on the relationship between the lending behaviour of banks and bank borrowing by firms with various ownerships, as well as providing empirical evidence for theoretical predictions in the Chinese context. Utilizing data on financial information on over 6,000 firms in Hubei province, we find that state ownership is highly correlated with banks' lending decision and as privately owned firms are generally better performers in term of profitability in China (Bai, Lu, et al., 2006; Jefferson & Su, 2006; X. Xu & Y. Wang, 1999). Such a finding is consistent with the existence of soft budget constraint for banks. We also find that, regardless of ownership status, profitability is negatively correlated with firms' accessibility to loans, indicating what would be irrational behaviour on the lender side in a capitalist economy. Credit history variable is also found to be negatively correlated to the level of debt, indicating banks view past borrowing as an indicator for financial distress as well as a risk on loan repayment. In addition, results indicate that firm size, growth rate, and collateral level all have positive impact on firms' likelihood of obtaining bank loans. We also find evidence supporting the argument that debt does not reduce corporate agency costs, but instead, facilitate the exploitation by managers in state owned firms as without the risk of bankruptcy and financial distress, more debt simply means more fund for to be exploited and invested to fulfil management's personal agenda. Such results are robust with respect to alternative performance measures, lagged time periods and also sample periods. Our empirical results confirm that banks' favouritism towards state owned firms disregarding the profitability and growth outlook of other firms.

1.1 Introduction

It is assumed in theory that all firms have equal access to capital market, and that firms' responses to changes in the cost of capital differ only because of difference in investment demand in a perfect capital market (Modigliani & Merton, 1958). Studies of Western developed economies then argue the presence of a "financing hierarchy" caused by market imperfections and friction, in which internal funds have a cost advantage over new debt or equity issuance due to the higher costs associated with external financing (Modigliani & Merton, 1958). In China, the story is slightly more complex. Due to the fact that the Chinese capital market is still in its developing stage and quite immature in comparison to those of developed economies, firms in China still rely heavily on bank financing when the need for external capital arises, and bank loans counts for more than 80 per cent of all external finance in China (CBRC Annual Banking Report , 2006).

Therefore, banks in China play very important roles in finance by determining the availability and the cost of credit. The availability and cost of credit, in turn, determine company capital structure and cost of capital (Modigliani & Merton, 1958). In addition to their role of facilitating capital flows, banks also monitor their debtors, thereby providing valuable governance oversight to the entire economy (Jensen, 1986).

With China's ever so rapid market progress, the development and growth of firms within various industries has become the focus of the country's sustainability of economic development, and bank financing is crucial to such development as the availability of loans can enable and nurture such growth. Since the People's Republic of China (PRC) launched its open door economic policy in 1978, the Government has embarked on a series of banking sector reform programs.

Starting from the late 1970s, the Chinese government began its reform of banks, which were all state owned and mostly functioned as the distribution agency of capital. The banks then also did not function as effective intermediaries between savers and investors. The reform program focused on a two-tier system which comprises of a central policy bank with four specialized state owned banks (Bank of China, China Construction Bank, Industrial and Commercial Bank of China, and Agricultural Bank of China, collectively known as the Big Four) under direct control of government. In 1994, the second wave of reform struck the Big Four aiming to further commercialize the banks, separate policy and commercial lending activities, and most importantly, manage the nonperforming loans (NPLs). During the next few years, the management of the Big Four focused on reducing government intervention, removing credit allocation and further regulating and tightening accounting practices. By 2001, the banking system in China was attempting to adopt Western-styled management and planned to open to foreign shareholding within the Big Four by 2006 (Shirai, 2002). To the current date, Chinese banks are still arguably characterized by large cash holdings due to the heavy deposit nature of their customers and relative low efficiency on lending on firm level.

Chow and Fung (2000) state that most firms in China, like in other transition economies, rely heavily on bank loans because equity and bond markets are either not yet developed or only in the infant stage and the cost to enter is high. Banking institutions that emerged from the first wave of reforms are still characterized by large financial inefficiencies, lack of competition, and extensive government involvement in credit allocation (Miurin and Sommariva, 1993). The state banking system assumes a dual role in the Chinese economy, functioning as a financial intermediary as well as a quasi-fiscal institution.

However, despite the efforts of the Chinese government to introduce competition and enhance governance mechanisms under the banking reform, the banking system is still dominated by state ownership and characterized by a high level of non-performing loans (NPLs). In 2002, the official figure for NPLs was reported to be 25% of total loans, amounting to US\$500 billion and equivalent to 40% of China's GDP (CBRC Annual Banking Report, 2006). However, in a subsequent

report on the Chinese banking system by Ernst & Young, a figure for NPLs was reported six times higher than the official figure. The report was later withdrawn by the accounting firm.¹ In 2010, the official figure of NPLs stands at just over \$177bn (CBRC Annual Banking Report, 2010). Perotti(1993) and Brainard (1991) state that in transition economies banks are saddled with a large amount of bad loans, which reflect their former role as passive channel of subsidies to the state-owned sector. These loans are also concentrated, so that very few or even just one bank typically hold the bulk of borrowing of individual companies (Estrin et al. 1992). Profit maximizing behaviour by banks, while desirable, is not sufficient to establish proper lending incentives in absence of a through restructuring of bank balance sheets.

As the government owns both the Big Four and state owned firms (SOFs), it is usually suggested that, given the paternalistic behaviour of the Chinese government, the former are obliged to grant loans to the latter in the form of “relationship lending”:that is, lending by banks to SOFs is largely due to political pressure (from the local and central governments) rather than based on commercial considerations (OECD, 2005). All of the four major banks are subject to extensive government regulations and control and they are required to make policy loans to the state owned firms which generally operate under soft budget constraints so that there is no risk associated with increased borrowing. In case of failure, they can get a bailout by the government (Tam, 1986). Also in order to avoid massive unemployment, central and local government officials force the state banks to keep lending to the state owned firms, no matter how financially unsound these firms are (Blanchard, 1997). When state owned firms fail to generate profits to repay bank loans, they have to increase their lending to support the continuation of all affected projects (Tam, 1986; Perotti, 1993).

In addition to the banking sector’s unsatisfactory commercialization progress, the state sector is under government policy direction to become more privatized and efficient. Some of them have successfully transformed themselves into semi-private firms (Gelb, Jefferson and Singh, 1993). However, Wei and Wang (1997) states

¹ Bloomberg, ‘Bank slams ‘distorted’ estimate of bad loans’, South China Morning Post, (12 May 2006); Agence France-Press, ‘Ernst & Young withdraws ‘erroneous’ bad loan report’, South China Morning Post, (15 May 2006).

that despite the spectacular success of China's economic reform in the past few decades, the slow progress in the state owned sector is a major disappointment as well as a significant stumbling block to any further reforms in other sectors. Studies indicate that the shared ownership of banks and the state sector is a major cause for slow progress in banking reform and poor performance in the state sector (Wei and Wang, 1997). Surprisingly, privately funded companies accounted for only under 20% of total loans by the state owned banks in 2011, despite the fact that the non-public sector of the economy has become the largest among urban fixed-asset investor accounting for 58.9% of the national total and one third of the nation's export total (ACFIC, 2012).

Could it be that the biased lending policy has choked the overall pace of the reform? To fill the gap in the literature on the relationship between the lending behaviour of banks and bank borrowing on firm level, this chapter investigates the determinants of bank lending in China, and examines whether banking sector reforms and equity market development had made any noticeable impact on banks' lending behavior and firms' corporate financing pattern by comparing the results with previous studies. Specifically, we aim to reveal the relationship between bank lending and firm ownership and consider selected control variables that are related to bank credit management practices, including firm size, profitability, age, past credit history, and collateral.

This chapter also provides detailed analysis of various aspects of firms that could affect the banks' lending behaviour. After three decades of reform, state ownership still plays a significant role in China's industrial sector, and arguably, still determines to a certain extent a firm's ability of obtaining bank loans. State-owned commercial banks still dominate the Chinese banking sector. It is postulated that the local and central governments influence the loan activities of these banks. If such is the case, then political pressure from governments appears to matter more in bank lending than other commercial practices adopted by the banks in order to select loans applicants rationally and correctly. This paper aims to investigate from both the demand and supply side of the story and to shed more light on the arguably opaque nature of Chinese bank lending practice.

Based on data on over 6,000 medium to large sized firms in the Hubei Province, the main purpose of the research is to investigate the financing patterns of Chinese firms and whether private firms are discriminated against by State-owned banks during the lending process. Data will be examined to test whether firms' characteristics such as size and institutional ownership determine their accessibility to bank loans, and if so, to what extent. The results confirm the presence of soft budget constraints leading up to the major reform and IPO plan for Chinese state owned banks in 2006. Also the fact that some state owned firms prefer bank loans over equity finance despite considerable amount of retained earnings suggests that banks provide favourable financing conditions which may be due to corruption, or lack of borrowers' incentive to diversify their financing sources. It is concluded that the banking sector reforms need to be strengthened and banks privatized further in order to improve their risk management skills and reduce lending biases. The estimation results also find significant correlation between bank finance and firms' size, growth rate, and collateral level.

The chapter offers the following contribution. Firstly, the study utilizes original data which was directly obtained from the National Bureau of Statistics of China and therefore more reliable and accurate compared to these obtained from other data services in China. The dataset was not published and has not been used by other researches. The majority of past studies have used similar datasets available through a number of databases, but these either have many missing values and errors, or comprise of listed firms only which are mostly State-owned, and largely profitable, which can produce misleading results due to sample size limitation. The dataset employed by our study also covers the period of 2003 to 2005, leading up to the major reform and IPO plans of the big national banks in China. Consequently the data would capture a phase during which banks are trying to adapt to changes in policies and management. Secondly, few researchers have examined similar hypotheses and similar studies in this field mostly lack comprehensibility due to limitations of data. Thirdly, the study contributes to the theoretical side of literature (in hypothesis development). As the banks in China are largely state-owned, factors other than firm profitability will affect the lending decision, and such lending behaviour isn't clearly stated in the relevant theories. Lastly, the results are highly robust and show strong correlation between firms' ownership and their level of

accessibility to bank loans, whilst past studies that have examined such lending behaviour provided us with ambiguous results.

The main body of this chapter will be divided into the following sections: first we go into the previous literature and review the key theoretical arguments and similar studies. On this basis, we then develop hypotheses to be tested before moving onto methodology section, where the data and estimation strategy will be explained in detail. Finally the results are reported and discussed for conclusions and future policy implications.

1.2 Literature Review and Hypothesis Development

“The key questions... are, first, what the interests of the political actors are, and second, how these interests translate into policies and institutions that further the objectives of the political actors.”

Shleifer and Vishny (1998)

Literature on corporate finance and banking has long been focusing on the relationship between banks and firms, given how greatly firm performance is influenced by bank finance, in forms of credit availability, cost of external finance, as well as capital structure(Lin, Zhang and Zhu, 2009). Also the relatively scarce options on external capital market financing and weak corporate governance in emerging markets means it is likely that banks play an even more dominating and influential role in such markets. According to the China Banking Regulation Commission, the big four banks of China still provide more than 80% of all loans to Chinese firms (CBRC Annual Banking Report, 2006). At the same time, because of the differences between the emerging markets and the developed markets in terms of economic and institutional context, it is naive to assume that banks voluntarily play as effective monitoring roles in emerging markets as they do in developed markets (Barth et al., 2000; and Laeven, 2001).

Government ownership still prevails in both listed companies and banks (Tian and Estrin, 2007), and state ownership clearly promotes firms' access to bank finance, which can be extremely valuable for firms with a healthy growth prospect and future investment plans. However, more often than not, state owned firms are under-performers compared to privately owned ones (Bai, Lu, et al., 2006; Jefferson & Su, 2006; X. Xu & Y. Wang, 1999). China's dynamic private sector has increasingly been contributing to the rapid economic growth in the recent years. It has been producing over half of industry value added and around half of China's trade surplus. The private sector has also counted for most employment creation and over one-third of fixed-asset investments. Nevertheless, in terms of formal external financing – both direct and indirect – its share remains very low. This suggests that in China, the financing sources for private enterprises are limited (Molnar and Tanaka, 2007). In the absence of formal external financing, the Chinese domestic private sector heavily relies on financing from retained earnings and borrowing from the informal sector (Allen, et al., 2005; Hasan, et al., 2009).

Several studies point out that in emerging economies, bank relationships are often politically motivated and come at the cost of weak governance (Cull and Xu, 2000, Cull and Xu, 2005 and Tian, 2004). Perotti (1993) points out that state owned banks in Eastern Europe are showing preferences favouring state owned firms during the lending process. He argues that there are several reasons for excessive bank lending to state owned firms. Banks may be reluctant in cutting off their former clients which are mostly state owned as a result from the past allocating role of Eastern European banks before reform. Also even when the state owned firms are partially privatized after reform, the state still assumes financial responsibility and retains indirect control. Berger et al. (2008) demonstrate that there are interesting differences between the relationship between banks with different ownership and firms. A plausible corollary is that the state owned firms have closer relationship with state owned banks than private sector firms. Bhaumik and Piesse (2008) demonstrate that there is significant persistence in lending by banks in India, using bank level data, and thereby complement the study of Banerjee and Duflo (2002) which uses contract level data from an individual bank to research the same conclusion. This line of literature argues that there is significant persistence in the

lending behaviour of banks, such that older firms with longer bank relationships (i.e. state owned firms) may crowd out newer firms (i.e. privately owned firms).

Could we assume similar situation for the relationship between Chinese state owned banks and firms? Lardy (1998) argues that the economic reform in China has not sufficiently changed banks' lending behaviour in terms of the allocation of capital. The banks, although operating in a reformed environment, still follow government directions through either policy lending guidance or corruption/collusion, and are under local government pressure to keep unprofitable state owned firms leveraged due to political concerns of unemployment. One reason why state owned firms get more access to loans is the presence of information asymmetry between corporate managers and investors, as the costs of obtaining information can be reduced by the specialised knowledge by banks of the firm. Low transaction costs with state owned firms as a result of long-term relationships have given rise to the lending bias.

Several studies have examined the capital structure of Chinese firms and the determinants of such a structure (for example, Chow and Fung , 2000; Lu, Thangavelu, and Hu, 2001; Shirai, 2002; Nagano, 2003; Huang and Song, 2006) but few have looked at the possibility of such structure being the outcome of supply side constraints. A handful of studies that have examined the determinants of bank financing in China have based their estimation on data of listed firms, most of which are state owned and large in size which could produce biased results (Cull and Xu, 2000; Heytens and Karacadag, 2001; Shirai, 2002). The study by Wei and Wang (1997) have tested for such lending behaviour from an aggregated point of view by using city-level data and estimating ownership effect by using the percentage of state ownership as a proxy. Additionally, these studies fail to provide an explanation regarding why state owned firms face such favourable lending bias and what implications it has on banking reform and policies.

Although some studies on issues related to lending bias in China have been published, such as those of Wei and Wang (1997) and Cull and Xu (2003), few research papers has been published shedding light on all of the possible determinants of bank lending in China. The study by Wei and Wang (1997) finds

that China's bank loans favour state owned industrial firms and argues that the lending bias diminishes the effectiveness of other measures designed to promote the growth of the private sector or to induce state owned firms to restructure. Many have argued that the existence of a lending bias is self-evident, and others have suggested that the lending bias, if it existed before, has disappeared in recent years. In this chapter, we aim to test for whether such effect still remains after years of reform. Shirai (2002) and Lu, Thangavelu, and Hu (2001) both carried out studies using firm level data from listed firms in China examining the banks' lending behaviour and firms' corporate financing pattern, and provided a more comprehensive picture. Determinants of bank lending are tested in both researches and a positive correlation between the state ownership and the accessibility to bank loans was found, indicating systematic bias in lending decisions and the presence of soft budget constraints, which is a major cause of NPLs. Lu et al. (2001) point out that banks often find it difficult to enforce loan contracts in the event of loan default of non-state owned firms, which also increase their preference towards state owned firms. Low transaction costs with state owned firms as a result of a long term relationship may have also given rise to the lending bias.

Similar research was conducted by Huang and Song (2005) and they find that neither ownerships in general nor state ownership in particular has a significant impact on the capital structure, using 1,200 Chinese listed companies to document their capital structure characteristics. As in other countries, the paper argues that leverage in Chinese firms increases with firm size and fixed assets, and decreases with both profitability and growth opportunity among other factors.

There are some drawbacks to these studies. First, the study by Wei and Wang (1997) is an indirect test of the lending bias of SOBs, whilst the study of Cull and Xu (2003) focuses only on data only consisting state owned firm information. Second, the findings of many studies are useful but somewhat outdated, and do not reflect the impact of the reforms on state owned firms and banks after the year 2000. Third, the scope of these studies is quite limited, and they are unable to identify potential variations in lending bias towards certain firms or industries.

In China, when firms share the same ownership with the banks, lenders may forego their own financial interests to benefit borrowing firms under the direction of the government. The government as owner has multiple objectives such as financial returns, social welfare and consolidation of political powers (Estrin and Perotin, 1991).

The Chinese government has also required its banks to provide “policy loans” to state owned firms that are making losses in order to keep the state owned sector from going into financial distress and/or out of business. When political interests interfere with financial ones, which is often the case as state owned firms and banks are under the same ownership, the disciplinary function of debt may not operate well. Under this circumstance, debt will not reduce managerial agency costs but instead expand the resources managed by firm managers and facilitate managerial exploitation (Shleifer and Vishny, 1994).

However, at times it is also in the banks’ own interest to lend to state owned firms. Banks favour state owned firms as they carry state guarantees, which makes them less risky borrowers (Shirai, 2002). Nevertheless, by lending extensively to unproductive investment projects proposed by inefficient state owned firms under the guidance of the government, banks easily accumulated huge amount of NPLs and have become increasingly risk averse. On the other hand, under this circumstance of directed lending and implicit guarantees of repayment, there is less need to monitor firms, and with state ownership there is little incentive to gain higher return at the expense of higher risk. Given the lack of accumulated experience in risk management and monitoring, banks probably still prefer to lend to state owned firms, even though now there is a possibility to charge higher interest rate for higher risk. And this risk averse lending behaviour of the banking sector encourages private firms to look for alternative financing sources (Molnar and Tanaka, 2007).

The Western literature suggests that in developed market economies, debt financing should improve corporate governance, and the governance role of debt comes from “the threat of bankruptcy, the reduction of free cash flows, and due diligence monitoring by creditors” (Jensen, 1986). Aghion and Bolton (1992) model the shift

of control to debt holders when profits are low. Gilson (1990) argues that when firms are in financial distress, creditors take over the dominant role in disciplining the managers, replacing incumbent managers that were assigned by shareholders. Grossman and Hart (1982) and Jensen (1986) argue that debt carves out free cash flows and reduces managerial agency costs. Managers are also prone to over-investment and empire building. McConnell and Servaes (1995) find that leverage is positively correlated with firm value when growth opportunities are scarce. Furthermore, banks have incentives to collect information and monitor firms to ensure the returns to the depositors (diamond, 1984). However, such theories may not apply to the Chinese practice as bank and firms could be under the same ownership.

Tian and Estrin (2007) use a large sample of public listed companies from China and find that an increase in bank loans increases the size of managerial perks and free cash flows and decreases corporate efficiency. Managerial perks represent disguised income for management teams. Such perks are common and also contribute to the majority of income of Chinese managers as the wages are usually low. It is a common practice for a firm to pay the communication, transportation and entertainment bills for family and friends of the senior management. Debt is found to act as a facilitating role on managerial agency costs instead of a governance one. They argue that the shared government ownership of lenders and borrowers may be the cause of weak corporate governance and further nurtures soft budget constraints. Kornai (1998) also argues that soft budget constraints come with government ownership.

Nagano (2003) investigates micro-economic variables and examines their impact on lending activities in East Asian countries (Indonesia, Korea, Malaysia, the Philippines and Thailand). They find a significant negative relationship between firm profitability and corporate debt-to-equity ratio in all sample countries.

Wei and Wang (1997) argue there is a close link between the slow reform of both state owned firms and state owned banks. One major reason for the poor performance of state owned firms is their soft budget constraint (Kornai, 1992), because when state owned firms lose money, they can “lobby for subsidies

including subsidized loans, rescheduling for overdue loans or even outright transfers from the state banking sector”. On the other hand, profit is not the main objective of the state owned banking sector. If political or economic favour can be exchanged/purchased by extending loans to loss-making state owned firms, the banks would do so. And since very few bankruptcies have occurred since 1986, it seems plausible that loss making and soft budget constraints represent a mutually supporting, equilibrium, phenomena (Qian, 1993).

The study by Cull and Xu (2003) investigates the factors that determine the source of finance for firm level fixed investment, including retained earnings, bank finance, and government transfers. Their results shows that despite the insignificant correlation between bank loans and profitability at the beginning of the sample period, banks increasingly allocated credit to profitable state owned firms as banks start to assume bailout responsibilities in place of the government since the early 1990s.

To test whether there is still a lending bias present in the state owned banks after decades of reform, we propose our first hypothesis:

H1: Firms with state ownership have easier access to bank loans compared to privately owned firms.

From a capital structure point of view, leverage benefits a firm in many ways, one of which is tax shield (Heinkel, 1982; Merton, 1977). By paying banks interests on debt, firms are able to lower the amount of corporate tax payable. The tax benefits, among other factors, influence a firm’s decision on capital structure and encourage borrowing. When a firm is profitable, such tax benefits are even greater when debt is issued, therefore giving firms incentives to borrow and increase the demand for loans (Graham, 2000; Leland, 1994; Miles & Ezzell, 1985; Myers, 1977). On the other hand, banks also favour profitable applicants in many ways. Both Stiglitz and Weiss (1981) and Bester (1985) argue the presence of credit rationing in a capital market with imperfect information. Credit rationing occurs when not all applicants receive loans due to the limited information held by banks on loan applicants (Bester, 1985). Stiglitz and Weiss (1981) argue that the lending banks are

concerned about the interest rate of the loan (expected return) and its riskiness (probability of return). The profit of the banks on loans is largely based on the probability of the loan repayment by the borrowing firm. Thus, in a world of imperfect information, high profitability of firms can signal positively to the lending body and thus increase the chance of loan issuance.

In the Chinese context, banks identify firms that are most likely to make the full repayment aside of the guaranteed return from state owned firms, and one of the most direct and efficient ways of doing so is by evaluating a firm's performance based on its profitability and retained earnings in the past. High profitability signals high likelihood of interest payment as well as low default risk in the future.

However, it is unclear whether banks in China follow such rationing practice, as it has a long standing history of bailing out unprofitable state owned firms in order to plump up employment figure and promote general social/economic stability. And the lack of a credit rating system and qualified and experienced bank staff means that technical credit scoring models are still being relied upon heavily to price credit properly and to distinguish desirable borrower from low quality ones. Under such practice, judgement is often inaccurate and this explains why many privately owned firms resort to informal loans and borrow at a higher interest rate. The state owned banks could also only possess knowledge in more state owned sector and therefore overlooking potential profitability demonstrated by the privately owned firms.

The question of whether state owned banks still participate in the bailout practice and lend heavily to unprofitable state owned firms promoted us to develop the second hypothesis:

H2: Firms with higher profitability do not enjoy higher accessibility to bank loans.

Stiglitz and Weiss (1981) state that asymmetric information between firms and potential suppliers of external finance creates adverse selection and moral hazard problems in the credit market in developed market economies. Transaction costs,

asymmetric information, and agency problems are all factors that can create a financial hierarchy (Gertler, 1988).

But financing constraints impact firms unequally as costs for obtaining external finance varies for different firms (Chow and Fung , 2000). Costs of external finance is commonly thought to be higher for small firms because they are more disadvantaged than their larger counterparts due to several factors: 1) asymmetric information problem is even more prominent for small firms as their public information is generally not widely available and can exclude small firms from the bond and share markets (Oliner & Rudebusch, 1992); 2) the signalling literature (Campbell , 1980; Merton , 1985; Hughes , 1986) suggests that the level of the firms' debt will be inversely related to firm quality that can be signalled through size; 3) as a results of unavailability of external finance, small firms tend to rely more heavily on bank loans than their larger counterparts (Carpenter, Fazzari, and Petersen , 1994) or resort to informal loans; 4) when small firms do get bank finance they try to establish long term relationships with the bank in order to secure a stable supply of future credit (Berger and Udell, 1995; Petersen and Rajan, 1994), and these banks can exercise their market power in lending to small firms (Cowling et al. 1991; Keasey and Watson, 1993; Binks and Ennew, 1993; Cowling and Sudgen, 1995). Chow and Fung (2000) have used a firm level data of manufacturing enterprises in Shanghai during the period of 1989 – 1992 and the same conclusion is supported; 5) trade-off theory also predicts an inverse relationship between size and probability of bankruptcy, therefore leading to a positive relationship between size and supply of loan (Shyam-Sunder & C. Myers, 1999).

The study by Nagano (2003) finds that the larger the company, the greater the effect of so-called scale-effect of liability. Nagano (2003) also suggests a strong tendency for banks to allow large firms to have higher liability ratio because of their higher assumed credibility. Additionally, Cull and Xu (2002) point out that larger firms in China also generally produce a “strategically important product” or are within a state-protected industry, which implies advantages to large firms in obtaining external finance.

Furthermore, even when bank finance is available, bargaining power of the contractual terms and the size of loan are all positively correlated with firm size. Firm size is expected to be directly related to the bargaining power and information transparency of the borrower and to the level and size of loan, which allows the lender to achieve production cost economies. This implies advantages to large firms in negotiating loan terms in addition to obtaining external finance. Therefore it is also of managers' incentive to expand the firm, either through growth, merger, or acquisition. Larger firms also have the ability to manipulate lenders.

Dennis and Sharpe (2005) included interactive terms of firm size and other determinants of bank loans, and finds that as borrower size increases, negotiating power with the lender and information transparency increase, while the lender is able to spread the fixed costs of loan production across a larger dollar value of the loan. They argue that this is caused by the fact that lenders can easily distinguish creditworthiness and are able to offer different contracts accordingly. When the information of the borrower is opaque, the lender may impose a pooling equilibrium on the borrower in order to avoid being selected against if a menu of maturity choices were provided.

The literature on asymmetric information, transaction costs, and agency problems all suggests that small firms should face tighter liquidity constraints and rely more on internal funds to finance their investment projects. Therefore we propose...

H3: Larger firms have easier access to bank loans.

Perotti (1993) finds that banks have certain incentives to fund former debtors due to the unique nature of transition economies and the common state ownership prior to reform. Despite being less efficient and more risky than private firms, state owned firms are still preferred as banks gain the potential repayment of previous debts. The study argues that such practice could lead to a lower productivity of investment and a greater concentration of risk, causing the expansion of more efficient private firms to be delayed and leading to a slower recovery and a greater risk of financial crisis. The fact that state owned firms have long established relationship with the banks and have enjoyed easy access to bank finance for many years under policy

lending, it is easy to assume that firms with good credit history will gain easier access to external finance.

However, a mixed effect of stock of debt and bank finance can be expected. Higher level of debt in a firm can indicate either good credit history or the probability of financial distress² the firm is under. On the other hand, the lack of experienced bank personnel and lending criteria in Chinese banks can also result in insignificant correlation between stock of debt and bank finance. Study by Molnar and Tanaka (2007) finds that firms with past bank borrowing borrow more from the informal sector in China therefore suggesting a negative sign for the coefficient of credit history variable.

Therefore we propose H4:

H4: Firms with good credit history do not have easier access to bank loans.

When there is need for investment and expansion, firms are in need of finance. Therefore it is apparent why growth prospect of the firm would be influencing the banks' decision on loans. When there is a clear prospect of the investment projects in need for finance, banks can assess the NPV of investment based on given information and are less reluctant in lending due to signalling effect and information transparency. A study by Shirai (2002) has found a significant correlation between firms' growth of assets and banks' willingness in financing. Here we propose hypothesis 5:

H5: Firms with better growth prospect have easier access to bank loans.

Leeth and Scott (1989) argue that, "collateral or any other type of bond covenant will not change a firm's value if the firm's investment policy is constant or if mechanisms other than covenants induce managers to choose a firm-value

² As there is no substantial domestic corporate bond market and trade credits do not contribute greatly to corporate governance, the main measure of financial leverage in Chinese firms is the ratio of bank loans to total assets. This ratio indicates the liability of the firm and the probability of financial distress (Tian and Estrin, 2007).

maximizing production/investment policy”, however they point out that by firms pledging collateral, the cost of debt is reduced. A collateral provision by firms will entitle lenders to the ownership to a certain asset in the case of default, thus reducing cost of debt by eliminating negotiation on how such assets should be divided among other lenders or claimants. Secured debt can also reduce agency costs by reducing underinvestment problems.

While there is a significant amount of research addressing the effect of collateral on credit risk premium on bonds and bank loans, there is little empirical work on whether being in the position of possessing high level of collateral correlates positively with banks’ lending decisions. Theoretically collateral can play a number of roles, such as facilitating signalling, controlling information asymmetry problems, mitigating moral hazard problems, and providing respite against default and bankruptcy loss (Leeth and Scott, 1989; (Berger & Udell, 1990; Stulz & Johnson, 1985; Triantis, 1992). When there is presence of significant information asymmetry between borrowers and lenders, collateral can convey valuable information to lender.

Besanko and Thakor(1987) and Chan and Thakor(1987) develop models that demonstrating that, within a class of borrowers that appear equally risky, a borrower’s willingness to provide collateral will be inversely related to the default risk on the loan. Collateral thus facilitate firms in obtaining bank finance. The theoretical models of Townsend (1975) and Bester (1985) also predict that collateral will be associated with higher quality borrowers. Borrower’s willingness to provide collateral is largely based on whether the firm is in possession of such collateral, therefore the assets level of firms can signal positively to banks.

Dennis, Nandy, and Sharpe (2000) also find evidence that collateral is more likely to be a requirement in the presence of information asymmetry. The evidence suggests that riskier loans are much more likely to be secured due to banks’ risk averse behaviour.

Moral hazard occurs when borrowers face incentives to take large risks during the life of the loan of when they have bargained in bad faith. Financial theory predicts

that securing a loan reduces the probability that borrowers will engage in underinvestment, asset substitution, or provide an inadequate supply of effort. Boot, Thakor, and Udell (1991) demonstrate that collateral serves to mitigate moral hazard in loan contracting, even though the extent of the relation varies.

Myers (1977) demonstrates how the use of collateral eliminates underinvestment in profitable projects and reduces the probability of bankruptcy. Igawa and Kanatas(1990) followed Myers' study to test Myers' theories and found similar results. Stulz and Johnson (1985), Smith and Warner (1979) also find that collateral prevents a borrower from underinvesting or engaging in costly asset substitution.

Collateral also protects the lender, in our case, the banks, from potential loss by granting title to specific assets in the event of default (Leeth & Scott, 1989). Scott (1977) points out that because secured claims have priority, collateralized debt can limit the degree of loss in the event of bankruptcy. Many more studies have confirmed this (Swary and Udell, 1988; Boot, Thakor, and Udell, 1991; Black and deMeza, 1992; Berger and Udell , 1990).

However the correlation between the level of collateral or fixed assets and the level of liability is not always clear in all empirical studies. In Nagano's (2003) study of East Asian countries, the relationship between corporate debt-to-equity ratio and firm's tangibility is entirely insignificant even in the post crisis period, proving to be significantly different from the situation in more developed economies.

Gonas, Highfield, and Mullineaux (2004) find no evidence supporting the predictions of certain theoretical models that high-quality firms signal by providing collateral. Their results show that banks are less likely to secure loans than nonbanks, and that certain loan characteristics also influence the banks' decision on whether loans need to be secured.

In the Chinese context, banks perceive a high level of assets as desirable in terms of capital allocation as the firms in possession of such are more likely to be profitable with healthy growth, which increases the probability of future repayment and protects the banks against default risk. Collateral provision arguably is more

important for privately owned firms during the application process for bank finance, however, as state owned firms generally have high asset level therefore the correlation between collateral and banks' lending decision is still to be predicted as a positive one. Therefore, it is natural we propose our hypothesis 6:

H6: Firms with higher level of assets which can act as collateral have easier access to bank loans.

1.3 Methodology

1.3.1 Data

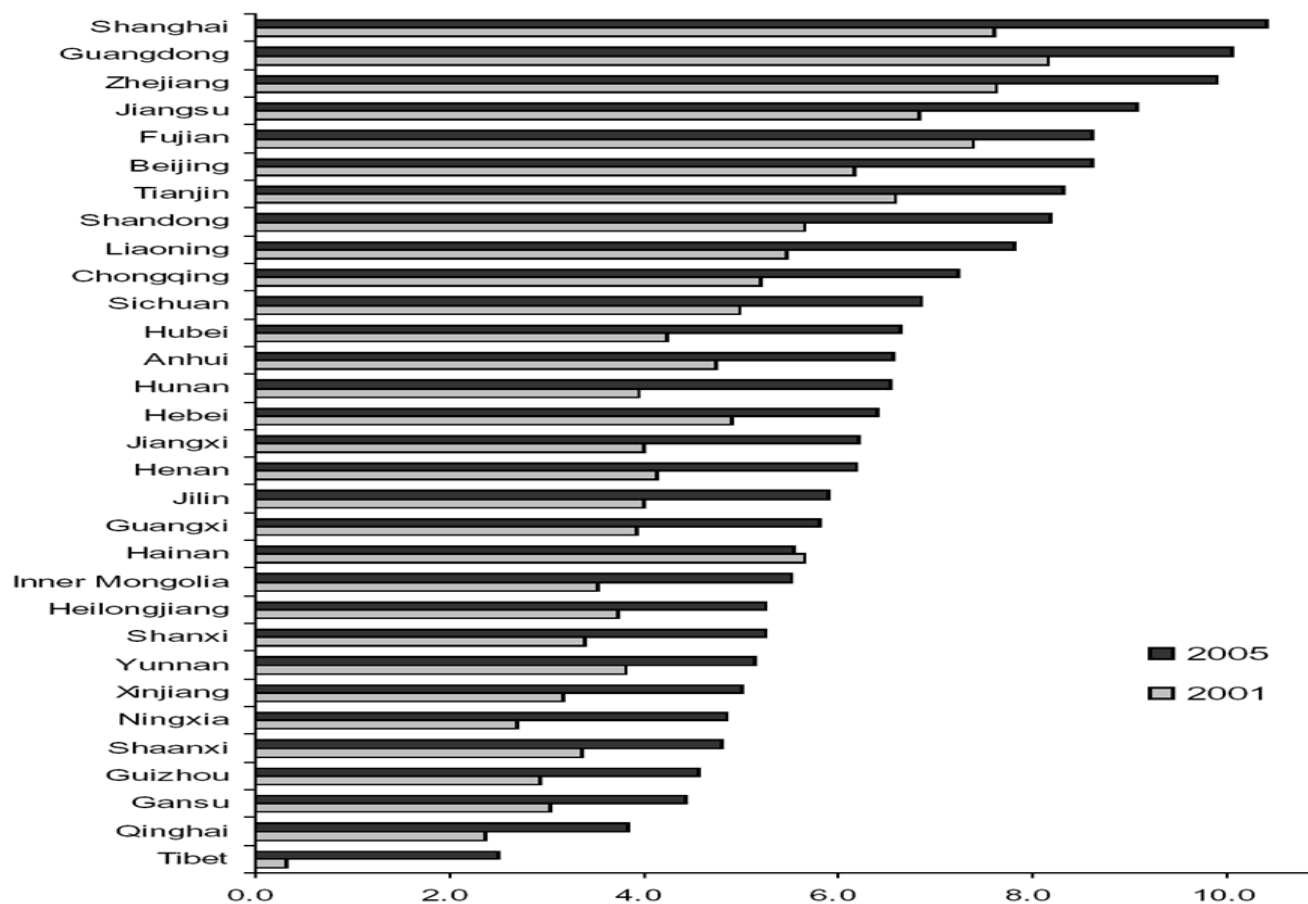
The dataset employed in this paper is obtained directly from the National Bureau of Statistics of China in the summer of 2007, which includes a wide range of financial and accounting data on more than 6,000 unlisted firms in the province of Hubei for the period of 2003 to 2005. The variable list also includes information on firm characteristics such as location, institutional ownership, year of establishment and industry category. The dataset is of great interest to us as it captures the bank's lending behaviour leading up to the third wave of banking reform and IPO plan in 2006.

The dataset possess the following advantages. This is the first time the data set is ever estimated as it is not publicly available, thus contributing greatly to the originality of the results and findings. Most studies examining firm capital structure or bank finance in China have used data on publicly listed companies on either Shenzhen or Shanghai Stock Exchange. These data can produce biased results as these listed firms are by nature large, profitable, and mostly owned by the state. One study which regressed similar model as ours to test for the determinants of lending used similar firm level data (Mok, Yeung and Xu, 2008), but on a much

smaller scale, with 800 firms in the manufacturing sector for one year in the province of Guangdong. In comparison our data is much larger and more comprehensive. The data sample is also more adequate in representing the whole population as Hubei Province has an average level of marketization and economic growth (see figure 1.1) whilst Guangdong province is within the economic reform zone established in the 1990's and is much more developed compared to the rest of China.

Figure 1.1: Neri Index – Provincial Level Marketization

(source: Fan, Wang, and Zhu, 2007, NERI Index of Marketization for China's Provinces: 2006 report)



However, we also encountered difficulties in dealing with this dataset. One of the biggest obstacles is that data on firms need to be manually matched for different years to construct a three-year panel set, as no firm names or any other types of identification of the firm is given out following the rules by the National Bureau of Statistics. Unfortunately, the Bureau adopted a new way of categorising ownership in 2004 and therefore only 2004 and 2005 can be matched using a unique code constructed by merging industry code, year of establishment, ownership code and address code. 2,777 firms were matched and variables such as growth of assets, flow of debt and flow of short loan are available and lagged value of investment, revenue etc. can be used in the regression. In the regressions we used both 2,777 matched observations and the total observations of 18,873 of three years using year dummy variables.

1.3.2 Dependent variable

We adopt three dependent variables in the regression analysis, short term loan, flow of debt and total stock of debt, all in natural logarithms. The reason that the value of natural logarithms are used here as well as for explanatory variables rather than the real level value is that it is simply a much better fit in terms of R squared and F-Stats, because of underlying non-normality of the data. ShortLoan is defined as the flow of short term bank loans granted at time t , calculated as the difference in short term debt between the two periods 2004 and 2005. Here we use the log value of ShortLoan to estimate short term loan rather than using the standard percentage of short term loan to total debt. One reason for doing so is to keep all regressions unified in format, and the other reason is that it generates similar results to regressions using percentage of short term loan to long term debt as dependent variable. DebtFlow is defined as the total flow of debt between time t and $t-1$. TotalDebt is defined as the total stock of debt at time t . Outliers of all dependent variables are dropped to ensure robustness and analytical power of the regression results. Unlike the Western economy, China is in disequilibrium in terms of the level of debt thus we are able to use those dependent variables, including the total stock of debt, as proxies for loans credited by the banks, as based on a field survey in Shenzhen, Guangdong Province, in 2005, about 70-80% of

total liabilities were bank loans and these bank loans are mostly granted by the big four banks in China. Firms in China do not have many other funding alternatives for their businesses.

1.3.3 Explanatory variables

The first explanatory variable is the dummy variable Ownership, which captures the different institutional ownerships each firm belongs to, and it is represented in five categories – State-owned, Collectively-owned, Privately-owned, Foreign ventures and Shareholding and others. Some people could argue that the profitability of a firm could be related to the ownership and therefore it's inaccurate to have both of them in the same equation. However, the relationship between them is not necessarily a linear one, but rather a U shaped one, as findings suggest in research by Tian and Estrin (2008). LnRoA (return on assets) is used as a measure of firms' profitability as well as the level of retained earnings. For this variable we use lagged value when possible as banks can only base their decisions on profitability reported for the previous period. LnRoS (return on sales) is also used to test for robustness of the profitability variable. Next is LnRevenue, which is a measurement of the firm size. We select Revenue as a measurement because, firstly, some past studies have used the level of assets as a proxy, however a firm's assets can be industry related. For example, certain industries might require more tangible assets such as machinery etc., while other industries do not, such as internet businesses. Another often used measurement is employment. In the case of China, most state-owned firms tend to over employ either due to government pressure or managers' personal interest therefore making employment an inaccurate measure. Furthermore, firms' asset growth (LnAssetsGrowth) is used to take into account trends of individual activities or business cycles. LnDebt, which represents the debt outstanding for firm i , and here we use lagged value (when available) to control for endogeneity. LnAssets is also used as one of the explanatory variables in this equation, as a proxy for firms' tangibility as well as the real level of investment, due to the lack of data on fixed assets.

A correlation table (table 1.1) is provided to show that there is no serious multicollinearity between the explanatory variables. Correlation results generated for the 18,873 observation sample produce similar results hence not listed in tables.

Table 1.1. Correlation table based on 2,777 observations

	<i>LnRoA</i>	<i>LnRoS</i>	<i>LnRevenue</i>	<i>LnAssetGrowth</i>	<i>LnWorkingCapital</i>	<i>LnInvestment</i>
<i>LnRoA</i>	1.0000					
<i>LnRoS</i>	0.4333	1.0000				
<i>LnRevenue</i>	0.1378	0.1205	1.0000			
<i>LnAssetGrowth</i>	0.0570	0.0344	-0.0660	1.0000		
<i>LnWorkingCapital</i>	0.1842	0.2038	0.2831	-0.0470	1.0000	
<i>LnInvestment</i>	-0.0476	0.0054	0.3737	0.0281	0.1226	1.0000

1.3.4 Control variables

The first control variable adopted in the analysis is *LnInvestment* to control for the prospect of firm investment opportunities, as external finance will be in more need when firms have future investment plans. Here *LnInvestment* is taken as the logarithm value of investment at time *t*.

We also adopt age, *LnWorkingCapital* and Industry as control variables. Age is calculated by subtracting the year of establishment of a firm from 2008. *LnWorkingCapital* is defined as total assets minus total liabilities. Industry is utilized as a dummy variable and is firm specific which controls for industry effect.

Table 1.2 provides some summary statistics on independent variables.

Table 1.2. Summary statistics for variables

Variable	Obs	Mean	Std. Dev.	Min	Max
ShortLoan	2777	9465.10	128599.90	-1249785.00	4154399.00
WorkingCapital	2777	44910.47	593565.20	-689899.00	29600000.00
DebtFlow	2777	11582.41	176015.60	-1837179.00	5196641.00
TotalAssets	2777	108726.00	1203604.00	241.00	57900000.00
AssetGrowth	2777	0.5866	5.2027	-0.9999	224.4398
TotalLiabilities	2777	63815.48	626283.70	0.00	28300000.00
Revenue	2777	82749.73	855036.40	0.00	40100000.00
RoA	2777	0.0395	0.1355	-1.7579	2.8172
RoS	2777	0.0082	0.2183	-6.3826	4.5000
Age	2777	14.04	13.38444	3.00	106.00
industry	2777	2.02	0.27	1.00	3.00

Table 1.3 lists the explanatory and control variables adopted in the estimation analysis.

Table 1.3.Variable list

LnDebt	Natural logarithm of stock of debt
LnInvestment	Natural Logarithm of Investment
LnRevenue	Natural logarithm of sales
LnAssets	Natural logarithm of total assets
LnGAssets	Natural logarithm of the growth rate of assets
LnWorkingCapital	Natural logarithm of working capital (total assets – total liabilities)
LnROA/ LnROS	Natural logarithm of return on assets or return on sales
Industry Dummies	The benchmark industry is the mining industry, coefficients for manufacturing and utility industries are shown in the regression results
State-Owned	Firms which are stated as State-owned in the data set
Collectively-Owned	Firms which are stated as collectively-owned
Privately-Owned	Firms which are owned privately
Foreign Ventures	Firms are wholly or partially owned by foreign companies or companies in Hong Kong, Macau and Taiwan
ShareHolding and Others	Share holding companies (which are not clearly stated in the data set if state-owned or otherwise)
NonState	Firms which are neither State-owned or Collectively-owned
Age	Years of establishment of the firm
Age*LnROA	Years of establishment of the firm times the natural logarithm of firm's return on assets (used as instrument in two stage least square test)
Year Dummies	Benchmark year is Year_2003

1.3.5 Estimation strategy

In a neoclassical perfect capital market, firms are all considered as profit maximising agents, including the banks. Therefore if banks are to maximise their profit, the relationships between the listed factors and different measures of loans and debt can be predicted. In table 1.4, + and – indicate the signs of coefficients of respective explanatory variables. The presence of both signs simultaneously indicates the possibility of both directions according to theoretical prediction.

Here a loan equation for Chinese firms is estimated which captures the characteristics of firms evaluate during lending process. The regression model is estimated based on the theoretical predictions as well as practice guidelines that are generally adopted by banks in lending process³.

$$\ln\text{ShortLoan}/\ln\text{DebtFlow}/\ln\text{TotalDebt} = \alpha + \beta_1\ln\text{DEBT} + \beta_2\ln\text{INVESTMENT} + \beta_3\ln\text{REVENUE} + \beta_4\ln\text{ASSETS} + \beta_5\ln\text{GASSETS} + \beta_6\ln\text{WORKINGCAPITAL} + \beta_7\ln\text{ROA} + \beta_8\text{INDUSTRY} + \beta_9\text{OWNERSHIP} + \mu$$

³ Based on internal documents provided by the local management chief in Bank of China, most banks consider the level of debt, profitability, industrial sector, level of managerial expertise and the quality of investment proposal as main determinants in the lending process.

Table 1.4. Theoretical predictions

<i>Hypothesis</i>	<i>Explanatory variable being tested</i>	<i>Independent Variable being tested</i>	<i>Predicted sign</i>
H1	Ownership dummy	Short term loan	- for non state ownership dummies
		Flow of debt	
		Stock of debt	
H2	Profitability (LnRoA, LnRoS)	Short term loan	-
		Flow of debt	-
		Stock of debt	-
H3	Size (LnRevenue)	Short term loan	+
		Flow of debt	+
		Stock of debt	+
H4	Credit history (LnDebt)	Short term loan	-
		Flow of debt	-
		Stock of debt	N/A
H5	Growth (LnAssetsGrowth)	Short term loan	+
		Flow of debt	+
		Stock of debt	+
H6	Collateral (LnAssets)	Short term loan	+
		Flow of debt	+
		Stock of debt	+

1.4 Results

We estimate the bank lending model in a few ways to test for 1) robustness of results and 2) interactive effect of profitability and institutional ownership. We have tested all variables both using the data set as a matched small panel of 2,777 firm-observations (only one period of the panel is used in order to utilize the lagged values) as well as using data on three years data on over 6,000 firms as a cross sectional sample with over 18,000 observations.

Table 1.5 shows results of estimation using 2,777 observations. Both LnROA and LnROS are used to measure profitability of firms. As both variables produce similar results and are consistent throughout the data analysis exercise, we use LnROA as it generates slightly stronger results (LnROSstats is shown for one regression for reference and comparison). The variable LnInvestment is taken out of the equation at times to avoid serial correlation in estimation due to the short lag period.

The results are strongly significant with R-sq value ranging from 0.2996 to 0.7894.

Table 1.5. Regression results using 2777 observations

	<i>LnShortLoan</i> (<i>LnROA</i>)	<i>LnShortLoan</i> (<i>LnROS</i>)	<i>LnShort</i> (<i>LnROA and no</i> <i>LnInvestment</i>)	<i>LnDebtFlow</i> (<i>LnROA</i>)	<i>LnTotalDebt</i> (<i>LnROA</i>)
<i>Collectively-owned</i>	-0.158 (-0.99)	-0.162 (-1.02)	-0.167 (-1.04)	-0.091 (-1.30)	-0.103 (-1.37)
<i>Privately-owned</i>	-0.320** (-2.39)	-0.321** (-2.41)	-0.341** (-2.56)	-0.171*** (-3.22)	-0.263*** (-4.61)
<i>Foreign_Ventures</i>	-0.376** (-2.31)	-0.383** (-2.35)	-0.409** (-2.53)	-0.242*** (-3.40)	-0.308*** (-4.06)
<i>ShareHolding and others</i>	-0.231* (-1.87)	-0.229* (-1.86)	-0.244** (-1.98)	-0.084* (-1.79)	-0.111** (-2.20)
<i>LnROA</i>	-0.445 (-1.43)		-0.444 (-1.43)	-0.807*** (-3.82)	-0.980*** (-4.24)
<i>LnROS</i>		-0.215 (-0.96)			
<i>LnRevenue</i>	0.104** (2.50)	0.096** (2.22)	0.106** (2.54)	0.043* (1.79)	0.065** (2.46)
<i>LnDebt</i>	-0.685*** (-19.41)	-0.683*** (-19.32)	-0.684*** (-19.42)	-0.734*** (-23.85)	
<i>LnGAssets</i>	0.869*** (9.74)	0.869*** (9.74)	0.879*** (9.95)	0.916*** (28.56)	0.895*** (26.22)
<i>LnAssets</i>	0.606*** (10.08)	0.613*** (9.98)	0.622*** (10.75)	0.740*** (18.33)	1.027*** (42.25)
R2	0.3002	0.2999	0.2996	0.6458	0.7894
F-Statistic	45.36	44.97	48.31	120.99	1249.78
N	2777	2777	2777	2777	2777

Hypothesis H1: The results indicate strong and clear correlation between firms' institutional ownership and all three types of dependent variables on bank finance. Here State-ownership is omitted and thus our benchmark. All coefficients for ownerships are negative and significant (at either 1% or 5% significance level), with the exception of collective ownership, which is arguably a different type of state ownership. The results simply indicate that, State-owned firms have high level of both flow of bank finance as well as debt stock. This is consistent with our hypothetic prediction and illustrates a lending bias favouring state owned firms.

The presence of such lending bias could be caused by several factors. Firstly, due to the long standing relationship between state owned banks and state owned firms, it is relatively easy for banks to lend to previous borrowers as both the costs of transaction and information asymmetry is low. It is expected that State-owned firms use established past relationship to gain easy access to loans from State-owned banks.

Secondly, the risk associated with lending to private firms are much higher in comparison, as when state owned firms are making losses and repayment cannot be guaranteed, the government steps in and writes it off or simply order the bank to lend more to the struggling firm. There is hardly any default risk involving state owned firms as the government will always bail them out financially.

Thirdly, it is common for Chinese government to require banks to provide "policy loans" to state owned firms that are not profitable, either due to their own political agenda of consolidating political powers, or because personal favours have been promised. Banks often face considerable pressure from (local) government to lend on a non-commercial basis. Bank managers usually have to comprise with the local government as the managers need local support, or they could benefit from some sort of personal gain from it. Therefore, collusion and corruption are major causes for such lending bias too. It is also of the government's interest to protect the state owned firms as most of them are large in size and over-stuffed. If a large state owned firm goes bankrupt, it will cause a heavy burden on local unemployment and thus costs for the government. The networks between State owned banks and State owned

firms means that it is almost a historical “tradition” to lend more to State-owned firms.

Lastly, it is not uncommon that bank managers authorise a loan to privately owned firms at a higher interest rate, but register it under policy lending to state owned firms to profit from the difference in interest rate. The double counting problem means that the lending bias could be exaggerated in our model.

In short, results state that institutional ownership still matters in terms of firms’ access to bank loans. A survey conducted by the Fujian government revealed that “86 per cent of privately-funded small and medium-sized enterprises in the province have difficulty in securing bank loans”. The 48 most financially reputable SMEs in Fujian received less than half of the 2.58 billion bank loans that they sought in 2004 (Jiang, 2005). Zhou (2007) also notes in his study the fall of Nanjie Village in the Henan Province. Nanjie was known for adopting the socialist economy and various enterprises set up in the region are all state-owned and follow socialist rewarding practices such as low wage and allocation of basic resources. To promote the image of communism party and the socialist way of living, the banks are under direct or indirect instructions from the state to lend heavily to Nanjie in order to support its high growth rate. State owned firms in Nanjie village are examples of “high growth, low efficiency”, as in 2006 the village became practically bankrupt due to inefficient management and corruption.

Although banks seem to grant more loans to State-owned firms, is it necessarily a bias? Could it be that the State-owned firms are simply better performers and banks see more profitability in lending to them? Thus we generate means on several variables to see whether state owned firms perform better than their privately owned counterparts. Table 1.6 shows the results, categorised by year, and divided into total, State, and Non-state. In this table we can see clearly that the mean return on both assets and sales for non-State-owned firms are consistently higher than those of State-owned firms, and total stock of debt for non-State-owned firms are consistently lower than those of State-owned firms. A big jump of total stock of debt in the year 2004 can be observed, as discussed previously, it is caused by generous lending which increased by 18% in 2004 compared to the year 2003.

Such a comparison is still necessary even though we have controlled for profitability in the regression models, as the signs of the coefficients can be of different levels of significance or even of the opposite directions.

Sun , Tong and Tong (2002) also find that state owned firms in China are generally considered poor performers compared to their privately owned counterparts. This is generally explained by the government’s lack of transferable residual claims, government’s choice of social and political policy goals over profit maximization, the government’s employment of staff based on political connections rather than ability to perform, or the greater information asymmetries and higher transaction costs in the government (Vining and Boardman, 1992; Boardman et al. 1989; Megginson, Nash and Van Randenborgh, 1994). However, the literature also suggests that state ownership is not necessarily less efficient than private ownership (Caves and Christensen, 1980; Kay and Thompson, 1986; Wortzel and Wortzel, 1989; Martin and Parker, 1995; Kole and Mulherin, 1997; and Dewenter and Malatesta, 1998). Therefore a lending bias is probably present in the Chinese banks’ lending process.

Table 1.6. Table of debt level and firm profitability

	Number of Observations	Total Stock of Debt	Return on Assets	Return on Sales
2003 Total	6041	66034.26	0.066	-0.002
2003 State	1704	129980.5	0.055	-0.026
2003 Non-State	4337	40909.88	0.070	0.008
2004 Total	6162	69699.36	0.037	-0.008
2004 State	1246	170019.3	0.015	-0.088
2004 Non-State	4916	44272.47	0.042	0.013
2005 Total	6670	72478.34	0.052	-0.030
2005 State	1010	249735.6	0.034	-0.042
2005 Non-State	5660	40847.63	0.055	-0.028

As seen from the previous results, the coefficient for collectively owned is not significant, and coefficients for privately owned, foreign ventures and shareholding and others are all significant and the t-stats are similar. So we test for the difference of coefficients and the results indicate that, coefficient of state ownership variable is

significantly different from coefficients of privately owned, foreign owned and shareholding variables, but not significantly different from collectively owned variable. In addition, the coefficients of privately owned, foreign owned and shareholding variables are not significantly different from each other. Therefore we group the five ownership dummies into two - state owned and non-state owned. State-owned is composed of state owned and collectively owned in the previously defined five ownership categories, and the non-state owned contained the rest. Again, as shown in table 1.7, the results are consistent and strongly significant.

Table 1.7. Regression results with redefined ownership dummies

	<i>LnShortLoan</i> (2777 observations)	<i>LnDebtFlow</i> (2777 observations)	<i>LnTotalDebt</i> (2777 observations)	<i>LnTotalDebt</i> (total observations)
<i>Non-State</i>	-0.185** (-2.13)	-0.087** (-2.29)	-0.141*** (-3.47)	-0.075*** (-4.68)
<i>LnROA</i>	0.574 (0.86)	-0.348 (-1.60)	-0.438* (-1.92)	-0.631*** (-7.18)
<i>LnRevenue</i>	0.098** (2.44)	0.038 (1.61)	0.059** (2.26)	0.046*** (5.13)
<i>LnDebt</i>	-0.683*** (-19.50)	-0.732*** (-23.89)		
<i>LnGAsset</i>	0.883*** (10.05)	0.914*** (28.64)	0.893*** (26.36)	
<i>LnAsset</i>	0.611*** (10.51)	0.741*** (18.47)	1.036*** (45.11)	1.193*** (128.24)
<i>R2</i>	0.3007	0.6449	0.7883	0.7644
<i>F-Statistic</i>	53.59	139.35	1411.37	6022.33
<i>N</i>	2777	2777	2777	18873

Hypothesis H2: We then test the bank lending model for the effect of profitability, with LnROA and LnROS as measures. The two measures are tested separately to avoid collinearity and LnROA shows better predictive power, therefore we show only results on LnROA in most regressions. Results on both measures of profitability showed insignificance for the flow of short term loan and become of strongly negative significance for both the flow and the stock of debt at 1% significance level. This certainly contradicts the usual prediction by Western literature as logically banks tend to finance more profitable firms for higher probability of return. However it is consistent with our hypotheses due to the unique nature of the Chinese banking sector.

There could be several explanations for this. First of all, the government's reform policy changed drastically, arguably for the better, in 2003 when Wen Jiabao took over the premiership from Zhu Rongji. Zhu's policy focused on recapitalizing return for operational restructuring but no privatization. The banks are expected to grow their way out of the nonperforming loans problems after recapitalization before opening up to foreign competition in 2006. Such a strategy prompted an extreme pro-growth policy that created economic bubbles in various sectors. The state owned banks tried to grow out of their NPLs by lending generously and widely between 2002 and 2004, thus feeding speculation in property, auto, steel and other unprofitable industries. The lending by banks grew 18% per year between 2002 and 2004 (CBRC Annual Banking Report, 2004). This could be part of the reason why the ROA appear negative as banks were not selective of to whom they granted loans during this period of time.

Secondly, as mentioned previously, the lack of a credit rating system and qualified and experienced bank staff means that technical credit scoring models are still being relied upon heavily to price credit properly and to distinguish desirable borrower from low quality ones. Under such practice, judgement is often inaccurate and this explains why many privately owned firms resort to informal loans and borrow at a higher interest rate. The state owned banks could also only possess knowledge in more state owned sector and therefore overlooking potential profitability demonstrated by the privately owned firms.

Thirdly, the negative correlation between profitability and level of debt in private firms can be caused by government agenda associated with loans. It is not unusual that the local government grant out bank loans based on conditionality that the privately owned firms do not wish to accept, such as intake of certain number of unemployed workers, or promise of a certain investment project that could promote the image of the local authority.

Lastly, in China the stock of debt in no way represent an equilibrium picture for supply of debt because of China's unique economic condition. And because bankruptcy still does not exist largely in China, the stock of debt could represent a large amount of loans that are accumulated throughout the years by firms with no ability of repayment. And that's also why we see no effect of LnROA on flow of short term loan and long term debt. Also, profitable firms can resort to retained earnings or equity when the need of finance arises, therefore making them less likely to apply for finance due to the cost premium on issuing bank debt.

In order to test the robustness of our findings so far, we run the estimation model again using the full 18873 observations using year dummies and slightly different independent variables⁴. Lagged values and flows of both short term and long term debt are no longer available as the firms cannot be matched up using our coding exercise and the whole dataset is utilized as a cross sectional sample. Therefore we only run regressions on total debt stock. Table 1.8 shows the results. The results are significant and show strong explanatory power with high R-sq value.

⁴ We also run a two stage least square test in order to control for the endogeneity in the variable revenue. The instruments used for this test are age and the interactive term of age and LnRoA. Results are consistent with all other regression estimates and therefore not reported in the tables.

Table 1.8. Regression results using all data observations

	<i>LnTotalDebt</i> (<i>LnROA</i>)	<i>LnTotalDebt</i> (<i>LnROS</i>)	<i>LnTotalDebt</i> (<i>LnROA with no</i> <i>LnInvestment</i>)	<i>LnTotalDebt</i> (<i>LnROS with no</i> <i>LnInvestment</i>)
<i>Collectively-owned</i>	-0.018 (-0.61)	-0.026 (-0.91)	-0.020 (-0.70)	-0.028 (-0.99)
<i>Privately-owned</i>	-0.133*** (-6.09)	-0.133*** (-6.09)	-0.139*** (-6.45)	-0.139*** (-6.45)
<i>Foreign-ventures</i>	-0.178*** (-5.67)	-0.180*** (5.70)	-0.191*** (-6.13)	-0.192*** (-6.17)
<i>Share-holding and others</i>	-0.026 (-1.32)	-0.024 (-1.20)	-0.029 (-1.48)	-0.027 (-1.35)
<i>LnROA</i>	-0.572*** (-7.96)		-0.571*** (-7.95)	
<i>LnROS</i>		-0.119*** (-2.90)		-0.119*** (-2.91)
<i>LnRevenue</i>	0.049*** (5.43)	0.031** (3.38)	0.049*** (5.44)	0.031*** (3.39)
<i>LnAsset</i>	1.188*** (122.75)	1.209*** (126.92)	1.194*** (129.58)	1.216*** (134.18)
<i>R2</i>	0.765	0.7639	0.7649	0.7638
<i>F-Statistic</i>	5172.15	5179.45	4970.29	4980.73
<i>N</i>	18873	18873	18873	18873

We can see here that results on institutional ownership and profitability are consistent with previous results and significant. Ownership dummies are negative and mostly significant, especially for privately owned firms. LnROA variable has produced similar and consistent results as before.

To further test the role of profitability and ownership in this regression, interactive variables are adopted, which are basically generated by multiplying the ownership dummies LnROA. Regressions with LnROS are run and similar results are obtained and therefore not shown here. We would expect no significant relationship between State-ownership*LnROA but a positive coefficient for Privately-owned*LnROA. As demonstrated in table 1.9, the ownership effects, after putting the interaction terms in, remain negative and significant, and the interaction terms are mostly negative as well for the ones that are significant (Privately-owned*LnROA). LnROA remains negative for results that are significant enough. Results show most significance on the interactive variable of private ownership and profitability. This suggests that, other things hold equal, banks tend to select the privately owned firms that have lower return on assets, which are a bit puzzling but again consistent with the story on profitability before.

Table 1.9. Regression results using interaction variables

	<i>LnShortLoan</i> (2777 observations)	<i>LnDebtFlow</i> (2777 observations)	<i>LnTotalDebt</i> (2777 observations)	<i>LnTotalDebt</i> (total observations and <i>LnROA</i>)	<i>LnTotalDebt</i> (total observations and <i>LnROS</i>)
<i>Collectively-owned</i>	-0.226 (-1.45)	-0.141* (-1.88)	-0.159** (-1.98)	-0.022 (-0.74)	-0.034 (-1.21)
<i>Privately-owned</i>	-0.293** (-2.21)	-0.158*** (-3.00)	-0.242*** (-4.28)	-0.123*** (-5.57)	-0.135*** (-6.15)
<i>Foreign_Ventures</i>	-0.388** (-2.35)	-0.254*** (-3.27)	-0.329*** (-3.98)	-0.189*** (-5.84)	-0.191*** (-6.07)
<i>ShareHolding and others</i>	-0.228* (-1.84)	-0.077 (-1.62)	-0.107** (-2.07)	-0.026* (-1.29)	-0.036* (-1.78)
<i>LnROA</i>	-0.750 (-0.80)	-0.460** (-2.51)	-0.563** (-2.44)	-0.283** (-2.01)	
<i>LnROS</i>					0.074 (1.29)
<i>Coll*LnROA</i>	-0.121 (-0.09)	0.515 (0.92)	0.557 (0.97)	-0.255 (-1.17)	-0.436** (-2.46)
<i>Priv*LnROA</i>	-1.903* (-1.86)	-0.656* (-1.74)	-0.897** (-2.11)	-0.471** (-2.50)	-0.786*** (-5.01)
<i>Fore*LnROA</i>	-0.952* (-0.73)	-0.490 (-0.10)	0.106 (0.21)	-0.019 (-0.10)	-0.169 (-1.42)
<i>Shar*LnROA</i>	-1.470 (-1.25)	-0.631 (-1.16)	-0.619 (-1.01)	-0.315 (-1.61)	-0.211*** (-2.86)
R2	0.3022	0.6469	0.7904	0.7652	0.7643
F-Statistic	35.25	100.08	944.89	3966.38	3986.29
N	2777	2777	2777	18873	18873

Table 1.9 (continued). Regression results using interaction variables

	<i>LnShortLoan</i> (2777 observations)	<i>LnDebtFlow</i> (2777 observations)	<i>LnTotalDebt</i> (2777 observations)	<i>LnTotalDebt</i> (total observations and LnROA)	<i>LnTotalDebt</i> (total observations and LnROS)
<i>LnRevenue</i>	0.107** (2.55)	0.044* (1.81)	0.066** (2.50)	0.050*** (5.48)	0.033*** (3.63)
<i>LnDebt</i>	-0.688*** (-19.56)	-0.735*** (-23.94)			
<i>LnGAssets</i>	0.869*** (9.77)	0.916*** (28.62)	0.895*** (26.36)		
<i>LnAssets</i>	0.604*** (10.06)	0.740*** (18.38)	1.024*** (41.83)	1.186*** (120.73)	1.206*** (126.38)
<i>R2</i>	0.3022	0.6469	0.7904	0.7652	0.7643
<i>F-Statistic</i>	35.25	100.08	944.89	3966.38	3986.29
<i>N</i>	2777	2777	2777	18873	18873

Hypothesis H3: We then move on to empirical results on the impact of firm size on banks' lending behaviour. LnRevenue proxies for firm size, and all coefficients are positive across all samples and mostly significant at 5% significance level. This indicates that firm size indeed has a positive influence on banks' lending process and larger firms will have easier access to bank finance.

This is partially because large firms can signal their quality through size and reduces information asymmetry. There is also the scale effect of loan, suggesting banks to allow large firms to have higher liability ratio because of their higher assumed credibility (Nagano, 2003). Large firms are also more likely to have borrowed previously and therefore may have established a long term stable relationship with the banks. It is also evident in past studies that large firms possess higher bargaining power when it comes to bank finance (Dennis and Sharpe, 2005). Large firms also are more likely to take out larger size loans in comparison to small firms, and it is preferred by the banks as such issuing costs of banks can be spread out and achieves a type of economy of scale.

Hypothesis H4: We can observe that throughout the whole five sets of equations, LnDebt is always significant (at 1% significance level) and negative, this is consistent with the theoretical prediction of a negative sign on the supply side. There could be two reasons for this. First one will be that see higher level of debt as associated with higher default risk and lower probability of successful repayment. The second one will be that the firm itself is in financial distress and will not want more loans otherwise they will easily bankrupt. Study by Molnar and Tanaka (2007) also suggest that firms with past bank borrowing experience borrow more from the informal sector.

Hypothesis H5: Growth of assets can be viewed as a proxy for future growth opportunity of firms. The coefficients are all positive and strongly significant at the 1% significance level. And this is consistent with the prediction as well, as the growth of assets can be seen as a proxy for the future outlook of a firm and banks will tend to lend to a firm with a healthy growth.

Hypothesis H6: The results indicate strong and positive correlation between LnAssets and bank financing at 1% significance level. This is consistent with the prediction as

assets is utilized here as a proxy for fixed assets/collateral. Collateral can affect lending decisions as they can signal their performance and profitability by providing banks with collateral, and if the loan is secured against assets, the borrower is restricted to using debt for specific projects and improve guarantee of repayment for lenders, therefore significantly reducing the risks of firm underinvestment, assets substitution, or providing inadequate amount of effort.

Control variables: The coefficient on LnInvestment variable is consistently positive and mostly significant throughout the entire estimation analysis, indicating that banks may lend more heavily to firms with good investment opportunities so to significantly lower the risk of moral hazard, underinvestment and agency problem.

The industry effect isn't significant for loan and become more significant as we move towards the debt. Industry two represents the manufacturing industry, and this positive effect might be caused by the high level of fixed assets such as machinery and buildings etc for such industry, and again similar story with collateral.

Finally, table 1.10 shows the comparison of theoretical predications, empirical findings, and our findings from this empirical study. For short term loan, we found that State-owned firms definitely have advantages in obtaining bank loans compared to other firms, and that firm profitability, unlike what theories predict, have a negative relationship with short term loans. We confirmed a positive relationship between growth opportunity and loans, and found that stock of debt has a negative impact on loans. And all other results in the finding are consistent with the loan.

Table 1.10. Comparison of empirical work and theoretical predictions

<i>Hypothesis</i>	<i>Explanatory variable being tested</i>	<i>Independent Variable being tested</i>	<i>Predicted sign</i>	<i>Actual sign</i>	<i>Confirmation of Hypothesis</i>
H1	Ownership dummy	<i>Short term loan</i>	- for non state ownership dummies	- for all non state owned dummies for all three independent variables	yes
		<i>Flow of debt</i>			yes
		<i>Stock of debt</i>			yes
H2	Profitability (LnRoA, LnRoS)	<i>Short term loan</i>	-	not significant	no
		<i>Flow of debt</i>	-	-	yes
		<i>Stock of debt</i>	-	-	yes
H3	Size (LnRevenue)	<i>Short term loan</i>	+	+	yes
		<i>Flow of debt</i>	+	+	yes
		<i>Stock of debt</i>	+	+	yes
H4	Credit history (LnDebt)	<i>Short term loan</i>	-	-	yes
		<i>Flow of debt</i>	-	-	yes
		<i>Stock of debt</i>	N/A	N/A	N/A
H5	Growth (LnAssetsGrowth)	<i>Short term loan</i>	+	+	yes
		<i>Flow of debt</i>	+	+	yes
		<i>Stock of debt</i>	+	+	yes
H6	Collateral (LnAssets)	<i>Short term loan</i>	+	+	yes
		<i>Flow of debt</i>	+	+	yes
		<i>Stock of debt</i>	+	+	yes

1.5 Conclusion and Implications

Utilizing panel and cross section time series data on financial information on over 6,000 firms in Hubei province, we find that state ownership is highly correlated with banks' lending decision and as privately owned firms are generally better performers in term of profitability in China (Bai, Lu, et al., 2006; Jefferson & Su, 2006; X. Xu & Y. Wang, 1999), such a finding confirms the existence of the banks' soft budget constraint. The results suggest that despite three decades of reform, ownership of firms still matters for bank lending. The results support the research hypothesis of discrimination towards privately owned firms in banks' lending process in China. Banks lend heavily to state owned firms for reasons including guarantee of repayment, higher information transparency, local employment benefit, personal gain, as well as collusion and corruption between management of local banks and state owned firms.

We also find that, despite ownership status, profitability is negatively correlated with firms' accessibility to loans, indicating what would be irrational behaviour on the lender side in a capitalist economy. Credit history variable is also found to be negatively related to the level of debt, indicating banks view past borrowing as a risk on loan repayment. In addition, results indicate that firm size, growth rate, and age all have positive impact on firms' likelihood of obtaining bank loans.

Such results are robust to alternative performance measures, lagged time periods and also sample periods. Our empirical results suggest that Chinese banks show favouritism towards state owned firms without regard for their profitability and growth outlook compared with other firms.

The results show signs indicating the Chinese banks are more prudent in lending practice than they might seem to most of the Western opinions. The banks prefer firms with established credit history with good (or guaranteed) record of loan repayment, thus minimizing their risks of default loans.

However these findings are not indicators of good practice as such behaviour does not promote healthy market competition and firms have no incentives to improve performance or efficiency. When banks tend to lend to a typical type of firms only, it could lead to a lower productivity of investment and a greater concentration of risk, leading to a greater risk of financial crisis (Perotti, 1993). It also does not promote sustainable growth and correct management style.

The banks also lack in expertise in certain industrial sectors that many privately owned firms belong to, or the technology these firms adopt, which in turn results in higher rate of loan refusals for privately owned firms. Profitable privately owned firms face the risk of being crowded out of the market due to difficulty and high costs of external financing, and eventually may result in weaker and unstable economy. Studies by Tian and Estrin (2007) and Roland, Kornai and Maskin (2003) point out the facilitating role of soft budget constraints plays in the collapse of the banking sector of East Asian economies in the 1990s.

Highly concentrated risk means that a deeper and more thorough reform is needed for the Chinese banking sector, mainly through the privatization of state owned banks. Diversification of loans to profitable firms with sustainable growth would permit greater financial stability. Government needs to cut policy lending and promote more efficient, mature, and transparent managerial behaviour.

Chapter 2

Investment and Capital Structure in China

Abstract

Following the first chapter on determinants of bank lending in China, which finds evidence consistent with the existence of a soft budget constraint in the Big Four (Bank of China, Industrial and Commercial Bank of China, China Construction Bank, and Agricultural Bank of China) as well as a lending bias, it is suggested that Chinese banks disregard profitability and other measures of firm performance and growth prospect, and therefore cause privately owned firms to be deprived of bank loans in comparison to their state owned counterparts. In this chapter we go on to investigate whether such shortage of banks loans available to privately owned firms is in fact a *demand side* effect, caused by low investment opportunities. We examine and compare firms' investment behaviour according to ownership type, in particular whether private firms are restricted in their access to bank loans or these firms have lower financing needs (i.e. higher cash flow or retained earnings).

To be precise, we investigate the role of cash flow in determining investment implementation by firms, hoping to produce a clearer picture of the relationship as well as a plausible explanation for it. We also use regression analysis to examine a number of other factors which may impact on firms' investment behaviour and investment to cash flow sensitivity, such as firm size, age, performance and institutional ownership. The chapter employs data collected and supplied by the GTA data service in China with financial information from over 1000 listed firms in China's Shenzhen and Shanghai Stock Exchange. On this basis, we were able to establish empirically the impact of cash flow on firm investment as well as to test hypotheses about what affects the sensitivity of investment to cash flows. We find

that retained earnings/cash flow has a strong positive impact on firms' investment implementation, probably because it offers financing at the lowest cost. Also, as hypothesized, we find cash flow sensitivity to investment to be the highest and most significant for privately owned firms, indicating that these firms face higher costs of external finance and are financially constrained. This finding is consistent with the empirical findings in the first chapter and strongly suggests that lending bias is not caused by low demand on the firm side, but rather by banks' favouritism in their lending practice. Additionally, we also find cash flow sensitivity to be higher for firms that are smaller in size and younger but do not identify a significant relationship between firm performance/profitability and cash flow sensitivity.

2.1 Introduction

The existing literature does not yet provide an unambiguous picture of what drives investment in Western economies, and more specifically, on the role that cash flow plays in investment decisions. Once we move to the Chinese context, there are very few studies trying to model investment of Chinese firms despite its unique nature, given the rapid growth of economy under such an institutional environment that is drastically different from the Western economy. We therefore feel that it is crucial conceptually and for policy purposes to provide a more fine-grained picture on what really influences firm investment in China.

This chapter is a follow up from the first chapter where the determinants of bank lending are examined and results indicate that there is a lending bias favouring state owned firms. We aim to thoroughly investigate into the role of cash flow on investment behaviour of firms and what firm-specific features influences the sensitivity of investment to cash flow. The current literature states that it is not clear in western economies whether high sensitivity of investment to cash flow is a plausible indicator for firms being financially constrained. Here we hope to provide an unambiguous answer to that question in the Chinese context. We aim to pin

down the factors which influence the firms' investment decision and by looking at the impact of cash flow on investment from State owned firms and privately owned firms separately, we are able to identify whether privately owned firms are in fact more deprived of external financing, especially in terms of bank loans, compared to their state owned counterparts. This allows us to identify whether the apparent state of "financial constrained-ness" of privately owned firms in China is caused by factors from the demand side.

China has maintained very high capital accumulation levels and aggregate investment ratios (Bai, Hsieh, et al., 2006; Song, et al., 2001). At the same time, state-sector fixed investment, which accounts for a dominant share of gross fixed investment, has displayed conspicuous cyclical patterns in its annual growth rate. We believe that studying emerging market firm behaviour has been proven to be of great importance and can provide policy implications for future economic development (Hoskisson, et al., 2000), especially by guiding and motivating the improvement of the capital market in China.

For the analysis, we proceed in three steps. Firstly we explore the relationship between investment and a number of explanatory and control variables using all the data observations, in order to test for and estimate the relationship between cash flow and investment. We then utilise the fact that privately owned firms appear to be more deprived of external financing compared to their state owned counterparts as demonstrated in the first chapter and various studies (e.g., Shirai, 2002), and further divide the sample according to ownership type. By adopting such a method, investment to cash flow sensitivity can be estimated in two sub-samples to test for whether such sensitivity is higher for the financially constrained group. Finally based on the results of first two tests, we test for the level of significance of correlation between such sensitivity and other firm features.

This chapter offers the following contributions: first, due to the overinvesting nature of Chinese firms, it is of great research interest to us to estimate the factors influencing investment decisions and investment to cash flow sensitivity in China by examining data on a disaggregated level. We employ firm level data of listed

companies in China to observe their investment behaviour in order to test what drives investment of these firms. There are few studies that have tested the cash flow to investment relationship and our results show strong significance and are in accordance to our theoretical predictions. Therefore the chapter extends investment– cash flow sensitivity theories to the Chinese context and further to the emerging market and developing economy. Secondly, we shed furtherlight on the uniqueownership effects on investment in Chinese firms. Lastly, we also provide a two sided argument that the fact that privately owned firms are deprived of bank financing is indeed a result of lending bias rather than a demand side effect.

The chapter is organised in the following sections. The next section reviews the theoretical groundwork of investment models and what drives investment in firms in a perfect capital market. In this section we also look into the pioneering studies on investment –cash flow sensitivity and examine why “financial constrained-ness” could influence such sensitivity. On this basis, we develop the hypotheses and explain why cash flow is an important factor affecting investment behaviour of firms and why the effects may vary for firms with different forms of ownership as well as other firm-specific features. Section three provides an overview of the dataset and estimation method used, and the measures of the explanatory variables. Section four reports empirical results and discusses the results in details. Finally in section five we proceed to conclude the chapter with findings and implications for future research and policy.

2.2 Literature Review and Hypotheses Development

There is a large financial and macroeconomic literature on firms’ financing constraints/condition and investment decisions. In theory, a firm’s financial status is irrelevant for real investment decisions in a world of perfect and complete capital markets, because external funds provide the perfect substitute for internal capital. Therefore firm’s investment decision would be independent of its financial condition. Modigliani and Miller (1958) provide the theoretical basis for

demonstrating the irrelevance of financial structure and financial policy for real investment under certain conditions. So in perfect capital markets, a firm's financial structure should not affect its market value, and real firm decisions are independent of financial factors such as internal liquidity, debt leverage or dividend payment (Merton & Modigliani, 1961).

However, financial structure may be relevant to the investment decisions of companies facing uncertain prospects that operate in imperfect or incomplete capital markets where the cost of external capital exceeds that of internal funds (Modigliani & Merton, 1958). In reality, many factors such as transaction costs, asymmetric information, and agency problems all indicate that the real capital market does not satisfy the conditions of a perfect market. Investment will depend on financial factors such as the availability of internal capital, access to new debt or equity finance, or the functioning of particular credit markets.

Fazzari, Hubbard, and Petersen (1988) argue that if the "wedge" between internal and external financing (cost disadvantage) is insignificant, retention practice or the level of previously accumulated retained earnings/cash would have little influence on the firm's investment decision as external financing would act as a near perfect substitute to internal funds. If such a disadvantage is large, firms who face high costs in obtaining external financing may need to rely solely on their retained cash for investment projects and therefore their investment should be driven by the fluctuation of the level of cash flow (Auerbach, 1979; Bennett, 2001; Bradford, 1981).

To provide a foundation for links between a firm's financial structure and its real investment spending, one must identify why internal and external finance are not perfect substitutes in practice. Transaction costs, tax advantages, agency problems, costs of financial distress, and asymmetric information are the main reasons (King, 1977; Auerbach, 1979; Bradford, 1981). When firms opt for external financing, the asymmetric information problem arises (Akerlof, 1970; Myers and Majluf, 1984; Greenwald, Stiglitz, and Weiss, 1984), which lead to lemon premiums ((Akerlof, 1970) in the capital market and agency problems within the firm (Jensen, 1986)and

thus laying down the ground basis of Pecking order or financing hierarchy view (Myers, 1984).

To summarize, if the cost of capital differs by source of funds, the availability of finance will likely have an effect on the investment practices of some firms. In financing hierarchy models, the availability of internal funds allows firms to undertake desirable investment projects without resorting to high-cost external finance. In addition, to the extent that a firm seeks debt finance at the margin, greater internal cash flow enhances its balance sheet and net worth positions, lowering the cost of new debt. In studies ranging from the early work of Meyer and Kuh (1957) to the more recent work of Fazzari, Hubbard, and Petersen (1988), the literature emphasizes the fact that cash flow or other measures of internal funds is highly correlated with investment. This correlation arises in models of capital market imperfections, because either “investment is directly tied to available internal funds in the case of credit rationing”, or more plausibly in the Western economy, because “shocks to current earnings affect future net worth and therefore the terms of credit available to the firm” (Gilchrist and Himmelberg, 1995).

Many studies have tested and confirmed the importance of cash flow/cash holdings on firms' ability of carrying out future investment plans (DeAngelo & Masulis, 1980; Frank & Goyal, 2003; Leland, 1998; Leland & Toft, 1996; Myers, 2001; Shyam-Sunder & C. Myers, 1999). Jorgenson & Siebert (1968) use data on 15 large manufacturing firms and found that the neoclassical theory is superior to the internal finance theory of investment. However, in the study by Elliot (Elliott, 1973), the findings are completely reversed and the liquidity model was assigned the top ranking.

There are few studies in existing literature that investigate the cash flow–investment relationship based on data from the emerging market. In the Chinese context, Chen (2004) finds that the trade-off model has limited explanatory power in China in the sense that, for example, the effects costs of financial distress (earning volatility, bankruptcy costs) are not significant. It may be because the Chinese environment still retains some features of a centrally planned economy. The state is still the principal stakeholder of firms and the owner of banks as well as the

beneficiary of tax. If the state does not change its controlling behaviour towards corporatized SOEs, those firms are less likely to run into a financial crisis compared with their counterparts in private sectors, so the costs of financial distress is likely to have much less effect on firms' capital structure and further influence firms' investment behaviour.

As we saw in the first chapter, firms' profitability is negatively correlated with the level of debt. Intuitively, such a relationship seems to support the pecking order model. However, there may be other reasons for this negative relationship rather than those proposed by the pecking order hypothesis such as to avoid underinvestment problems and new projects being mispriced. As far as leverage is concerned, although banks are willing to provide long-term bank loans to the listed firms because of the influence of government-directed credit policy, their capital resources are very much stretched. The bond market is also underdeveloped. In addition, due to the corporate governance problems and the lack of enforcement of company laws, individual shareholders do not have adequate investment protection. Retained earnings is therefore probably the quickest and easiest source of finance for most companies in China, compared with new equity issuance, due to the transaction costs associated with share issuance and the restrictions on firms' operating performance for applying for new equity issuance. Therefore, retained profit is the preferred primary method of raising additional capital.

Here we propose our first hypothesis:

H1: The level of cash flow in Chinese firms has a positive impact on the implementation of future investment plans.

It is difficult to construct an appropriate proxy for investment opportunity for the firm and the standard approach in the previous literature has been to use Tobin's q . By adding cash flow to a model in which Tobin's q is (theoretically) a sufficient statistic for investment opportunities, the literature interprets residual sensitivity of investment to cash flow as evidence of financing constraints (Fazzari, Hubbard, and Petersen, 1988; Devereux and Schianterelli, 1989; Hoshi, Kashyap, & Scharfstein, 1991; Oliner & Rudebusch, 1992; Schaller, 1993; Himmelberg and Petersen,

1994; Gilchrist & Himmelberg, 1995; Hubbard 1996; Arslan, Florackis, & Ozkan, 2006).

Following the seminal study by Fazzari, Hubbard and Petersen (FHP) (1988), many further studies have followed the same methodology estimating the impact of financial constraints on the investment behaviour of firms (Chirinko and Schaller, 1995; Hubbard et al. 1995; Calomiris and Hubbard, 1995; Pratap, 2003) and have found similar results.

However, not all views on role of cash flow on firm investment behaviour are unified. More recent studies (Kaplan and Zingales, 1995, 1997; Cleary, 1999, 2006) have arrived at the opposite results indicating that less financially constrained firms actually exhibit higher levels of investment to cash flow sensitivity. Many other researchers have followed and attempted to examine the non-monotonicity between firms' capital structure/financial constraints and their investment behaviour, as well as whether investment to cash flow sensitivity is sufficient to determine whether a firm is financially constrained (Moyen, 2004; Povel, Raith, and Cleary, 2007; Almeida and Campello, 2007; Hirth and Uhrig-Homberg, 2010).

The study by Kaplan and Zingales (1995) is among the most notable works which challenge the generality of the conclusions summarized by Fazzari, Hubbard and Petersen (1988). They investigate the sources of the correlation between corporate cash flow and investment by undertaking an analysis of the 49 low-dividend firms identified in the study by Fazzari et al. as having an unusually high investment-cash flow sensitivity. They find that cash flow sensitivity is higher for those firms that appear less financially constrained, and therefore, argue that a higher sensitivity cannot be interpreted as evidence that a firm is more financially constrained. They also suggest these results contradict Fazzari, Hubbard and Petersen's study (1988) and "capture general features of the relationship between corporate investment and cash flow", and are "not specific to the sample or techniques utilised".

However, there are quite a few limitations to these studies (Schianterelli, 1995; Fazzari, Hubbard, and Petersen, 2000). First of all, the sample is extremely small at only 49 firms. In addition, it is questionable whether the categorising methodology

of firms is appropriate. In China, the bond market is much more underdeveloped compared with the Western economy and firms have tendency to overinvest. Therefore to shed light on the extent to which the investment-cash flow sensitivity is linked to the imperfections in the supply of external funds in China, it is of great interest to us that we propose the second hypothesis:

H2: Investment to cash flow sensitivity is higher for privately owned firms in China in relation to state owned firms, and privately owned firms are more sensitive to capital market pressure in the implementation of their investment plans.

The rationale behind the second hypothesis is that, if the cost disadvantage of external finance is large, it should have the greatest impact on firms that retain most of their income. If the cost disadvantage is slight, then retention practices should reveal little about financing practices, q value, or investment behaviour. The idea is that, when a firm has good investment opportunities, observed retention practices provide a useful a priori criterion for identifying firms that are likely to face relatively high costs of external finance. In China, as explained previously, private-owned firms are more likely to face financial constraints due to discrimination from State-owned banks. FHP grouped firms in their dataset according to dividend behaviour; our approach is to divide the firms in terms of ownership status.

Therefore, after controlling for other factors that might affect a firm's position on the scale of "financially constrained-ness", firms that are most financially constrained should show the highest cash flow to investment sensitivity, as those firms will have to exhaust their internal funds in order to finance an investment project because external finance is too costly or difficult to obtain. Consequently, with state-owned banks being the major source of bank loans (roughly 80% of all Chinese bank loans are granted by the state-owned banks (CBRC, 2006) and their preferential relationship with the state-owned firms, privately-owned firms will show greater cash flow to investment sensitivity, with the benchmark being state-owned firms, and will therefore invest less when possessing same amount of cash as state-owned firms.

Additionally, the level of cash stock holding may relate differently to the level of investment cash flow sensitivity in firms which are financially constrained compared to those that are not or less so. Boyle & Guthrie(2003) point out that the possibility to delay investment can reverse the relation between the availability of internal funds and investment. A financially constrained firm can purposely hold retained earnings and cash for a period of time in order to accumulate enough cash reserve to undertake an investment project which was being considered a while back. Therefore the level cash stock as well as its lagged value can be an indicator on firms' investment decision based how financially constrained they are. As empirical evidence explained in chapter one indicates that privately owned firms in China are more financially constrained due to the presence of a lending bias, here we propose H2a:

H2a: Investment to cash stock sensitivity is higher for privately owned firms than state owned firms.

Investment to cash flow sensitivity is not affected by the level of restrictions on firms' financing options alone, a number of other factors also contribute to the fluctuation of the ratio.

Theoretically, the relationship between size and leverage is unclear. According to the trade-off model, large firms are expected to have a higher debt capacity and are able to be more highly leveraged. Large firms are likely to be more diversified, and thus less exposed to the risk of bankruptcy. They may also be able to reduce transaction costs associated with long-term debt issuance. For mature and sizable firms, their financial condition might well be independent from the firm's investment decision as they can signal their projected profitability much more easily compared to their smaller and younger counterparts and gain access to more external finance at lower costs. However for less developed firms the case is very different as they have limited/costly access to external finance as most likely they have not established a solid relationship with banks. Another possibility is that larger firms may have a more diluted ownership, and thus have less control over individual managers. Managers may then issue debt to reduce the risk of personal loss resulting from bankruptcy (Friend and Lang, 1988).

Empirically, firm size has been regarded as an important determinant of financial constraints in studies of the credit channels within countries (Gertler and Gilchrist, 1994; Oliner and Rudebusch, 1996; Vermeulen 2002) and may explain differences between countries. In addition, small firms are generally younger, with higher levels of firm-specific risk, and less collateral, making them less likely to attract external finance. Rajan and Zingales (1995) and Wald (1999) suggested that size was positively correlated with debt based on the data from developed countries with Germany as an exception. Marsh's (1982) survey of the literature concluded that large firms more often chose long-term debt while small firms chose short-term debt. As for China, the capital market is under-developed which further exacerbates the situation where external funds provide the firms with imperfect substitution for internal finance. Banks in China tend to grant loans on a long-term basis (People's Bank of China, 2009) and smaller firms therefore are often left without a choice of a short-term debt that is smaller in size which suits their needs. On the other hand, as presented in the first chapter, the big four banks in China favour large state owned firms in their lending practice and therefore leave smaller privately owned firms with little opportunity to obtain bank financing.

Evidence also suggests that large firms are less sensitive to monetary policy tightening than smaller firms (Gertler and Gilchrist, 1994). This is particularly true in the Chinese context, as the majority of large firms are state owned, and they are not strongly affected by most monetary policy changes or tightening, as the state owned banks will always make sure these firms have sufficient funds based on credit rationing. Gilchrist and Himmelberg (1995) confirm higher sensitivity for small firms, and those without a bond rating or commercial paper issue in their sample. According to Schaller (1993), small firms and those that do not belong to a corporate group in Canada are more sensitive to cash flow than others.

In contrast, Fazzari, Hubbard and Petersen (1988) point out that when they split samples according to size, small firms have relatively low cash flow coefficients. Also, Hu and Schiantarelli (1998) find that larger firms are more likely to be financially constrained and argue that firm size may be inversely related to concentration of ownership, which tends to mitigate agency problems. On the basis

of a formal framework that relates theory to empirical investment models, Chirinko (1997) argues that firm size and retention behaviour are not appropriate criteria for identifying financially constrained firms.

Mizen and Vermeulen (2005) stress the need of being careful in projecting results as US firms are different from their European counterparts in terms of the different level of accessibility to bond markets and commercial paper market between small and large firms. Their study found no evidence that size is a determinant of investment to cash flow sensitivity.

In the Chinese context, as shown in the first chapter, we find that size has a positive impact on firms' level of leverage and that larger firms are more likely to be state owned and enjoy easier access to external financing. Hence we propose hypothesis H3:

H3: Investment to cash flow sensitivity is higher for firms that are smaller in size, when other factors being held equal.

Most empirical models of investment rely on the assumption that firms are able to respond to prices set in securities markets through the cost of capital or q . An alternative approach emphasizes the importance of cash flow as a determinant of investment spending, based on pecking order theory. The study by Meyer and Kuh (1957) is among the early studies that focused on the link between investment and liquidity and provides a base for many subsequent studies in relevant field. As we discussed above, by controlling for expected profitability using the forward looking information in Tobin's q , it is feasible to examine whether liquidity and profitability drives investment. In most studies, liquidity is found to be significant despite the inclusion of q . Thus, Hu and Schiantarelli (1998) find that firms with weaker balance sheets are more likely to be constrained. Cleary (1999) finds that profitability and sales growth are the two most important variables in a discriminant analysis used to select firms that increase or decrease dividends (which he interprets as reflecting the absence or presence of financing constraints). Mizen and Vermeulen (2005) argue that difference in investment to cash flow sensitivities by size and industry classes can ultimately be caused by differences in

creditworthiness by firms. Their study examines whether there are some industries or some firm classes that are more sensitive to cash flow than others (even if they are the same industries in different countries) because their poor performance on these criteria makes them more reliant on internal finance for investment at the margin. Their results confirm the importance of creditworthiness of the firms on cash flow sensitivity. Therefore on the basis of above mentioned studies, we propose the fourth hypothesis:

H4: Investment to cash flow sensitivity is lower for firms with lower profitability and lower market value.

The previous literature has pointed out that older firms have an established reputation in the market, which facilitates their access to external finance mainly because their relationships with their creditors are settled within a longer time span (Berger and Udell, 1995). Therefore, younger firms are likely to face higher level of financial constrained-ness in comparison to older firms and hence show a higher sensitivity of investment to cash flow, and this may well also apply in the Chinese context. This leads us to propose,

H5: Investment to cash flow sensitivity is higher for younger firms.

2.3 Methodology

2.3.1 Data description

We used firmlevel data from China Listed Firm's Corporate Governance Research Database published by GTA Information Technology Company Limited. The dataset covers a wide range of variables which includes company balance sheet items, equity/debt information and corporate governance profile and changes. The firms in the data set are typically large and publicly listed on the Shanghai Stock Exchange or Shenzhen Stock Exchange in China and the availability of information on firms with equity will allow us to test the hypotheses on firms which accord more closely with those analysed in the theory.

Information is obtained for 1,775⁵ publicly listed firms in China, over the period of 19 years (1990 to 2008). However, not all variables are available for all firm-years as most firms enter the capital market after 2000. In China, relatively standardized and internationalized financial regulations were introduced and enforced from 1997; therefore information after this year is considered more accurate. Here we separate the data into groups based on their institutional ownership. The data sample consists seven ownership categories which are collective-owned enterprise (0.97%)⁶, enterprise with funds from Hong Kong, Taiwan and Macaw (0.14%), foreign-funded enterprise (0.84%), non-state-owned enterprise (0.01%), private enterprise 31.62%), sino-foreign joint venture enterprise (0.17%), and state-owned enterprise (66.25%). As results show in the first chapter, state-owned firms possess advantages in terms of obtaining loans from state-owned banks compared to non-state-owned firms. And therefore if the cost disadvantage of external finance is large, it should have the greatest effect on firms that are non-state-owned. As firms of certain ownership categories only make up less than 1% of the total number of firms, the seven categories are further grouped into state-owned enterprise⁷ (67.22%), privately-owned enterprise⁸ (31.63%), and other enterprise⁹ (1.15%).

⁵ Only data on 1,613 listed firms are used as the rest are national banks or financial institutes.

⁶ The percentages are in terms of firm-years instead of number of firms

⁷ State-owned enterprise group is made up of state-owned enterprise and collective-owned enterprise

⁸ Private-owned enterprise group is made up of private-owned enterprise and non-state-owned enterprise

Due to the small number of firms as well as observations of the last ownership category in the data sample (only 77 observations in the first regression), we focus our estimation and analysis mainly on the state owned and privately owned categories.

Several summary statistics for the firms in each group are presented in table 2.1. Due to the unbalanced nature of the panel data, we present number of firms as well as number of firm-years.

⁹ Other enterprise group is made up of enterprise with funds from Hong Kong, Taiwan and Macaw, foreign funded enterprise, and sino-foreign joint venture enterprise

Table 2.1: Summary statistics of the firms in different categories of ownership¹⁰

<i>Statistics</i>	<i>Categories of firm</i>		
	<i>State-owned</i>	<i>Private-owned</i>	<i>Other</i>
<i>Number of firms</i>	982	619	12
<i>Number of firm-years</i>	5,843	2750	100
<i>Average age of firms</i>	13.55	13.52	16.29
<i>Percentage of years with positive dividend</i>	56.88%	51.25%	62.50%
<i>Average retention ratio[1]</i>	82.06%	83.21%	96.47%
<i>Average real sales growth</i>	35.80%	161.60%	19.11%
<i>Average investment-total assets ratio</i>	0.073	0.07	0.06
<i>Average cash flow-total assets ratio</i>	0.0396	0.0413	0.0003
<i>Average correlation of cash flow with investment</i>	-0.037	0.0562	0.4432
<i>Average total assets (2008) in bn RMB</i>	45.1	3.84	76.3
<i>Median total assets (2008) in bn RMB</i>	2.59	1.16	3.68

Summary statistics for firms in each category are presented in table 1. The state-owned category, which we hypothesize, is the least affected by financial constraints, retained on average 82.06% of their income and paid dividends in 56.88% of the years¹¹. Surprisingly, private-owned firms share similar statistics and retained about 83% of their income and paid out dividends in more than 51% of all years. In all

¹⁰[1] The retention ratio is the percentage of earnings credited to retained earnings. In other words, the proportion of net income that is not paid out as dividends.

¹¹ Here denominator does not equal to all years in the dataset (i.e. 19 years per firm) but rather the years where dividend payable information is available.

three categories, the firms within the “other enterprise” category retain almost all of their earnings (96.47%) and paid out positive dividends in most of the years (62.50%).

In terms of real sale growth, privately-owned firms experienced much more rapid growth compared to the other two categories. Many studies on Chinese firm performance have reported similar results (for example Lu et al. 2001; Shirai, 2002) as presented in the first chapter and argued that privately owned firms generally outperformed state-owned firms in terms of return on assets/return on equity (Kato & Long, 2004; Sun, et al., 2002; Z. Wei & Varela, 2003; X. N. Xu & Y. Wang, 1999). Thus the higher growth rate is not unexpected taken into consideration that most private-owned firms in China are still smaller in size and relatively younger in comparison to their state owned counterparts. Similarly, the low growth rate of firms in “other enterprise” category represents a more mature portion of all listed companies as foreign ownership often allows better managerial and financial practice being transferred from home country to firms in the host country.

The investment to total assets ratio is similar across all three categories while the cash flow to total assets ratio is exceptionally low for foreign firms compared to the other two categories, especially considering how they seem to retain almost all of their income. However, foreign firms show the highest correlation between cash flow and investment by investing almost half of the cash (0.4432) made in the previous year. This result shows consistency with the empirical study by Fazzari, Hubbard and Petersen (1988) as they suggest that the firms which retained most of their income tend to have a higher sensitivity between cash flow and investment. State-owned firms showed a negative correlation between cash flow and investment made in the subsequent years (-0.037) which will be tested and discussed fully later in this chapter.

Table 2.2: New Share Issues, Tobin's q, and Debt Statistics of firms

<i>Item</i>	<i>State-owned</i>	<i>Private-owned</i>	<i>Other</i>
<i>Average percentage of years with new share issues</i>	44.30%	52.66%	48.81%
<i>Average annual q values</i>	0.799	5.087	1.355
<i>Median q values</i>	0.694	0.726	0.815
<i>Average ratio of debt to total assets</i>	0.064	0.045	0.088
<i>Average ratio of interest payments to sum of interest payments plus cash flows</i>	0.0003	0.033	0.033
<i>Correlation of the return on assets ratio and the change in total debt-to-total assets ratio (averaged over firms)</i>	0.0081	-0.0093	0.067

Table 2.2 summarizes information on new share issues, Tobin's q and other debt related statistics. Other things constant, one would expect privately-owned firms to rely more heavily on new share issues than firms from the other two categories as we hypothesize that such firms are more financially constrained. Consistent with their rapid growth, firms from the second category issue shares more frequently – approximately every second year – compared to other firms.

Table 2.2 also reports Tobin's q measures for all three categories of firms. In China, conventional Tobin's q values are not readily available because there is rarely information on firms' market or book value. Therefore we adopt an approach adopted by most researchers dealing with firms in China, and calculate the q as (Market value

of outstanding shares + total liabilities)/(book value of total assets) which equals to (outstanding shares x year end share prices + total liabilities)/(book value of total assets) (Chung and Pruitt, 1994; Demsetz and Villalonga , 2001; La Porta et al., 2002). The average q for private and foreign-owned firms is found in Table 2.2 to be significantly greater than the average for state-owned firms, even though foreign-owned firms have shown a relatively smaller growth rate. As shown in table 2.2, privately-owned firms have the highest growth rate and one might argue that the high q values observed in this category is associated with high expected growth rates. However, the high q value raises the question of why those firms have not invested more.

2.3.2 Explanatory and control variables

In Table 2.3 we report the explanatory variables used in the estimation models, together with brief descriptions of how they are calculated or selected. The dependent variable is investment, which, based on accounting practice, is defined as the residual value of total assets after subtracting total current assets and total fixed assets.

Table 2.3: Explanatory Variables and Descriptions

<i>Name of variable</i>	<i>Description</i>
<i>Cash stock</i>	cash and cash equivalent at time t
<i>Cash flow</i>	the flow of cash at time t, estimated by calculating the difference in cash stock between two time periods
<i>Tobin's q</i>	Tobin's q, calculated using method presented in the data section
<i>Age</i>	firm's age, calculated as 2008 – year of establishment
<i>Number of employees</i>	the total number of employees in each firm, controlling for firm size
<i>Return on assets</i>	measure of firm's profitability/performance, calculated as the ratio of net profit over total assets
<i>State</i>	dummy variable, equals one if firm is state-owned or collective-owned
<i>Private</i>	dummy variable, equals one if firm is private-owned
<i>Foreign</i>	dummy variable, equals one if firm is neither state or private owned, normally foreign-owned, joint ventures, or fully or partially financed by firms in Hong Kong, Taiwan or Macaw

We also use a number of control variables in our estimating equations as listed below.

Dividend payable is calculated as total dividend paid for by each firm in time t and it controls for whether the firm is cash-poor or financially constrained by identifying low dividend pay-outs. *Tax payable* is measured as total tax paid for by each firm in time t, which controls for sales. *Total assets* of each firm at time t-1 is used as control for firm size. *Share dummy* indicates whether the firm issues A share or B share on stock exchange, and *Region dummy* is a dummy variable which divides the dataset into various geographical regions (i.e. inland, costal) Similarly, *Industry dummy* controls for industry effects and *Year dummy* controls for time effects.

Table 2.4 demonstrates our theoretical predictions on the signs of explanatory variable coefficients

Table 2.4. Hypothetical predictions

<i>Hypothesis</i>	<i>Variable being tested</i>	<i>Data sample</i>	<i>Predicted sign</i>
<i>H1</i>	Cash flow	Whole	+
<i>H2</i>	Cash flow, cash stock	Split sample	+ stronger coefficient for private firms
<i>H3</i>	Size (number of employees)	Split sample	+
<i>H4</i>	Profitability (Tobin's Q, RoA)	Split sample	+
<i>H5</i>	Age	Split sample	+

2.3.3 Estimation strategy

To address the limitations of Tobin's q as a sole measure, Fazzari, Hubbard and Petersen (1988, 2000) and subsequent studies have shown that the predictive power of cash flow is higher for financially constrained firms, where such a firm is identified by using a priori information such as size, dividend behaviour and capital structure. Therefore we will divide the sample into two, for state owned firms and privately owned firms respectively.

The estimation model is;

$$I_{it} = f(X)_{it} + g(CF)_{it} + \text{dummyOWNERSHIP} + u_{it}$$

where I_{it} presents investment in plant and equipment for firm i during period t ; X presents a vector of variables, possibly including lagged values, that have been emphasized as determinants of investment from a variety of theoretical perspectives; and u is an error term. The function g depends on the firm's internal cash flow (CF); it represents the potential sensitivity of investment to fluctuations in available internal finance – after investment opportunities are controlled for through the variables in X . DummyOWNERSHIP is a dummy variable which divides the dataset into three categories: state-owned, private-owned and other enterprises which are mostly foreign owned or with finance from foreign countries or Hong Kong, Taiwan and Macaw. So we expect to see a greater coefficient for firms who are perceived as financially constrained, as well as a negative coefficient for the dummy which represents the private-owned firms with state-owned firms as benchmark.

We then study differences in financing and investment in categories of firms with different characteristics, specifically, different ownership status. Our classification scheme divides firms by institutional ownership and examines the effect of each explanatory variable on investment to cash flow sensitivity. We did not group them

according to dividend pay-outs like the pioneering study by FHP and many follow-up papers, as a result of China's underdeveloped capital market as well as firms' immaturity in terms of share issue/dividend pay-out practice. Dividend pay-out is used as one of the control variables nevertheless as, one reason being that firms might pay low dividend because they require investment finance that exceeds their internal cash flow and retain all of the low-cost internal funds they can generate. A second reason is that they have little or no income to distribute.

The study by Sun and Yamori (2009) finds that capital markets in China respond rationally to the potential impact of regional disparities on a firm's performance and suggest that firms in inland regions rely more on their internal funds in terms of their investment activities than those in coastal regions and that the sensitivity gap between inland and coastal firms widened in the recent contractionary monetary policy period, it is also of our interest to look at regional disparities between firms i.e. whether firms rely more on internal funds in inland regions compared to coastal regions.

When testing for impact of different explanatory variables on investment to cash flow sensitivity in sub samples of data based on ownership status, we adopt panel regression method with random effects, with region, industry and year controls.¹²

2.4 Results and Discussion

We use the data sample both as a whole and as split samples due to the high level of correlation between individual institutional measures. The correlation matrix is reported in table 2.5.

¹² We originally plan to use interactive terms of cash flow and other explanatory variables in order to test what drives the cash flow sensitivity in firms. The results returned are not stable therefore interactive terms are dropped.

Table 2.5: Correlation Matrix for All Institutional Measures Used in the Data Analysis

	<i>NERI</i>	<i>propertyri~n</i>	<i>contra~t</i>	<i>go~ption</i>	<i>Enter~t</i>	<i>Burea~n</i>	<i>Dayst~s</i>	<i>Confi~s</i>	<i>Priva~n</i>	<i>Expec~s</i>	<i>Privat~n</i>	<i>Age</i>	<i>Number~</i>	<i>Unemp~t</i>	<i>QUnemp~t</i>
<i>NERI</i>	1														
<i>propertyri~n</i>	0.0179	1													
<i>contracten~t</i>	-0.0003	-0.0742	1												
<i>govern~ption</i>	0.008	-0.273	0.0109	1											
<i>Entertain~t</i>	0.0019	-0.2597	0.0267	0.1876	1										
<i>Bureaucra~n</i>	0.0151	0.015	-0.017	0.2299	0.2529	1									
<i>Daystocle~s</i>	-0.0049	-0.7166	-0.11	0.161	0.5494	0.2343	1								
<i>Confidenc~s</i>	-0.014	-0.2346	-0.0285	0.0729	-0.6904	-0.521	-0.2522	1							
<i>PrivateSM~n</i>	0.0032	-0.2983	0.1572	0.1648	-0.4077	0.0117	0.1857	0.5223	1						
<i>Expectedi~s</i>	-0.0106	-0.5082	-0.0057	0.3741	0.3182	0.1592	0.5354	0.033	0.3543	1					
<i>Private_fo~n</i>	-0.0063	0.0066	0.0495	-0.0105	-0.0028	-0.1291	-0.0604	0.066	0.0078	-0.0097	1				
<i>Age</i>	-0.0146	0.0208	-0.009	-0.0761	-0.0107	-0.0897	-0.0856	0.0622	-0.1421	-0.0984	-0.0061	1			
<i>Numberofem~s</i>	-0.002	0.0889	-0.0136	0.0301	-0.002	0.0789	-0.0261	-0.069	0.0013	-0.0092	-0.0541	-0.0669	1		
<i>Unemploy~t</i>	-0.0238	-0.3897	0.0114	-0.2855	0.3866	-0.2027	0.39	-0.1312	-0.3397	-0.1444	0.0212	0.1816	-0.108	1	
<i>QUnemploy~t</i>	-0.0168	-0.2596	-0.0131	-0.3467	0.3342	-0.0918	0.3207	-0.1404	-0.2448	-0.0945	-0.0083	0.132	-0.0768	0.7448	1

To test for H1, we have run the entire data sample on all explanatory and control variables except for the firm specific ones (ownership, industry and year dummies) using fixed effect panel estimation methods. The test result is significant with an R-sq value of 0.6779, indicating considerable explanatory power. Detailed results are reported in Table 2.6.

Cash flow, as predicted in H1, is significant at 1% level with a positive coefficient, which confirms that, despite the availability of external financing options, internal finance does have a positive and significant impact on firms' investment behaviour, most likely due to its cost advantage. We discuss the correlation between cash holdings and investment fully later on in this section.

We also look at the impact of other explanatory variables on investment on their aggregated sample level.

The size variable estimated by using number of employees' shows a strong negative correlation with investment, which contradicts our prediction. Neither the return on assets nor age shows any significant impact on investment; such effects will be discussed more in details later on in this section. Tobin's q also shows no significance at all, a result which might be puzzling and surprising if found in the Western context. However as discussed before, such a result might be expected in China for several reasons. Firstly, Tobin's q was not estimated based on the traditional market approach due to the lack of information available on market value of firms in China. Secondly, though we adopted alternative estimating method used by various studies, (Chung and Pruitt, 1994; (Demsetz & Villalonga, 2001; La porta, Lopez-De-Silanes, Shleifer, & Vishny, 2002), nonetheless the variable deviates from the real q and does not explain investment in this estimation, thus resulting in insignificant coefficient. Most importantly, it is argued that Tobin's q, albeit used commonly in estimating investment functions, does not have high explanatory power and that it yields implausibly high estimates of the adjustment parameters (Carpenter, et al., 1994; Fazzari, Hubbard, & Petersen, 2000).

In order to provide a better understanding of the results, we proceed to the next step of our estimation. We run panel regressions of the data using random effects estimation¹³, with inclusion of all listed variables, on three sub samples of the dataset which are divided based on firms' ownership status.

The results improved massively in terms of number of significant variables as well as the level of significance once the data sample was divided into different groups¹⁴. This indicates the differences in the effect of explanatory variables on cash flow sensitivity of investment in firms with different institutional ownerships. The entire regression analysis also appears to be very consistent and robust throughout. Detailed results are illustrated in Table 2.6.

For state owned firms, cash flow unconventionally shows a negative coefficient at 1% significance level, which contradicts our first hypothesis that cash flow has a positive impact on firms' investment decisions. This indicates that the higher the level of cash flow within the firm, the lower the level of investment is being made. For private firms, however, the result is more conventional and cash flow showed a strong positive coefficient with significance at the 1% level. For firms under the "other enterprises" category, the results are insignificant, probably due to the low number of observations (with only 77 observations) and therefore we focus on results from the first two categories of data samples henceforth.

One explanation for the negative coefficient shown in the sample representing state owned firms is the application of agency problem theory. Agency problem costs arise from the limited liability feature of debt contract that creates incentives for firms managers to act counter to the interests of creditors under some circumstances. Debt financing, in particular long term debt, creates agency problems. In the Chinese context, this is particularly true as the majority of loans granted by state owned banks are long term. Managers might forego investment

¹³ We use random effect estimation method here to control for firms' ownership, industry, and time effects.

¹⁴ Such improvement could also be a result of changing estimation method from fixed to random effect.

opportunities with positive net present values and favour the ones with negative net present values. They also have an incentive to issue new debt that raises the riskiness and lowers the value of existing debt without utilizing the internal funds first that are available to them. In these theories, firms' managers are assumed to have full information about the value of the firm's existing assets and the returns from new investment project and thus to the extent that managers control sufficient internal funds to finance all profitable investment projects, investment demand models based on a representative firms in a perfect capital market apply. In China, managers in state owned firms are mostly state officials who are well connected to the state owned banks, and due to the common ownership of banks and the firms, these managers can find themselves in a position where debt financing is readily available whenever needed. On the other hand, asymmetric information can also cause problems in the market for debt. It may increase the cost of new debt, or even result in credit rationing (Stiglitz and Weiss, 1981). Stiglitz and Weiss (1981) suggest that equilibrium credit rationing can arise from adverse selection. Bonds, bank loans and lines of credit, the typical source of finance for smaller industrial firms, restrict operating flexibility and require particular levels for certain financial operating ratios. When lenders cannot distinguish borrower quality, the market interest rate must rise, and loan size may be limited. When the cost is high and the availability is scarce, banks naturally prefer state owned firms in their lending practice either as directed by the local government to support employment in such firms or to take advantage of the guaranteed repayment by state owned firms as the government will bail them out should they face the possibility of bankruptcy. Also the low cost in maintaining long-term relationship is also attractive to banks who are seeking to reduce costs.

Allayannis and Mozumdar (2004) have argued also that when firms are particularly distressed and have negative cash flows, they cannot cut back investment beyond some point, and this may drive an estimated negative relationship between investment and cash flow. This would be true for Chinese state owned firms, as they have to make investments in the social-political interest that are inconsistent with their cash flows.

The negative coefficient on cash flow in the sample of state owned firms can also be a result of the high leverage level in these firms and higher repayment of debt will impact cash flow negatively.

Therefore, as external financing will unlikely to be costly for state owned firms, managers' rent seeking behaviour will cause investment to be low even when both external and internal funds are of abundance.

Similarly, as privately owned firms do not enjoy the same easy access to bank loans as their state owned counterparts and equity financing also comes with its own cost disadvantage, the level of investment made by these firms are much more closely related to retained earnings/cash flow. This is consistent with the results of coefficients on cash flow for private firms.

Table 2.6. Results on cash flow and cash stock with lagged period effects

<i>Explanatory</i>	<i>Whole sample</i>	<i>Split sample 1</i>		<i>Split sample 2</i>		<i>Split sample 3</i>		<i>Split sample 4</i>		<i>Split sample 5</i>		<i>Split sample 6</i>	
<i>Variables</i>		<i>state</i>	<i>private</i>	<i>state</i>	<i>private</i>	<i>state</i>	<i>private</i>	<i>state</i>	<i>private</i>	<i>state</i>	<i>private</i>	<i>state</i>	<i>private</i>
<i>Cash flow</i>	0.19406*** (7.32)	-0.24100*** (-10.45)	0.14039*** (3.21)										
<i>Cash flow lag1</i>										-0.01400 (-0.44)	0.03700 (0.61)		
<i>Cash flow lag2</i>												0.30291*** (7.44)	0.09614 (1.23)
<i>Cash stock</i>				-0.04819*** (-3.00)	0.25664*** (6.90)								
<i>Cash stock lag1</i>						0.10074*** (5.12)	0.24216*** (5.16)						
<i>Cash stock lag2</i>								-0.00691 (-0.24)	0.29560*** (5.13)				
<i>size</i>	-13688.77* (-1.91)	67062.34*** (-16.82)	22365.58*** (6.17)	71367.75*** (-17.75)	22704.35*** (6.32)	74043.24*** (-18.61)	23542.83*** (6.52)	47553.33*** (-16.53)	22604.89*** (6.00)	47827.06*** (-16.50)	23384.9*** (6.16)	44153.29*** (-13.30)	23546.91*** (6.00)
<i>Tobin's Q</i>	-4777.064 (-0.16)	-1.99e+07* (-1.70)	-8631.239 (-0.70)	-2.02e+07* (-1.71)	-7805.061 (-0.64)	-2.10e+07* (-1.78)	-7824.215 (-0.64)	1.43e+07* (-1.67)	-7950.076 (-0.62)	-1.44e+07* (-1.67)	-8527.23 (-0.67)	-1.40e+07 (-1.61)	-8538.561 (-0.65)
<i>RoA</i>	2011.045 (0.00)	-1.36e+07 (-0.09)	46379.72 (0.19)	-3.02e+07 (-0.20)	53884.65 (0.22)	-5.29e+07 (-0.35)	59359.7 (0.25)	5.71E+07 (0.47)	59577.27 (0.24)	5.76e+07 (0.48)	55533.37 (0.22)	5412130 (0.04)	54123.49 (0.21)
<i>Age</i>	-3.27e+07 (-0.14)	3.07e+07*** (2.93)	-2048970 (-0.74)	3.35e+07*** (3.16)	1174048 (0.42)	4.26e+07*** (4.04)	769709.5 (0.27)	7357855 (1.40)	322743.2 (0.10)	7511208 (1.43)	-2584243 (0.82)	5525762 (1.00)	-3001573 (-0.87)
<i>R-sq</i>	0.6779	0.7539	0.0332	0.7423	0.0487	0.7493	0.04	0.4831	0.0425	0.4831	0.0307	0.4865	0.0318
<i>N</i>	7694	5320	2297	5320	2297	5320	2297	5091	2134	5091	2134	4851	2005

The results on cash flow confirms H2 that predicts a higher investment to cash flow sensitivity for privately owned firms due to the fact that these firms are more financially constrained compared to state owned firms. This also confirms that financially constrained firms do exhibit a higher cash flow sensitivity compared to less constrained firms and the findings are consistent with the study of Fazzari, Hubbard and Petersen (1988) in this sense. However, we have also found that cash flow influences investment behaviour in a different way in state owned and privately owned firms, which was not discovered by previous literature.

As we have discussed in the first chapter, bank lending to state owned firms are often policy lending directed by the government which is associated with political agenda such as fixed investment plans or promise of employment. As a result, despite making little profit or even a loss, many state owned firms still invest heavily, which explains why cash flow can sometimes show little or negative correlation with investment. Also as discussed by Allayannis and Mozumdar (2002), when firms are in extremely bad financial shape, the firm no longer show high sensitivity to the fluctuation of internal funds but only makes the absolute amount of investment that is necessary, which also contributes to the non-positive correlation between cash flow and investment.

To test for H2a the effect of cash stock on investment behaviour and essentially, whether investment to cash stock sensitivity is in accordance with cash flow sensitivity for firms with different level of financial constraints, we look at the results generated by regressing cash stock in replacement of cash flow in the previous model. We find that cash stock at the time of investment shows a negative and significant correlation with investment, at 1% significance level, for state owned firms. For privately owned firms, the result is also consistent and shows a positive and significant coefficient. This confirms H2a that investment to cash stock sensitivity is higher for privately owned firms.

Cash provides a low-cost source of investment finance for firms that must pay a premium for external funds. The motivation for the next test takes into consideration precautionary saving. If managers know that they will have to pay a

premium for external funds, they should accumulate a stock of liquid assets when cash flow is high and that stock of liquid assets will help smooth investment over downturns and spare firms the need to obtain potentially costly capital from external sources. It might also provide the necessary collateral to obtain new debt as suggested by some of the models considered earlier.

Based on the study by Molnar and Tanaka (2007), some investment opportunities can be reviewed by firms now but undertaken in a few years' time. Under these circumstances, firms with cost disadvantage to external financing will then make a conscious decision to retain as much earnings as possible in preparation for the future investment project. Therefore, cash stock in lagged period can also be of explanatory power on whether a firm depends heavily on internal finance.

Thus we then generated two more cash stock variables based on their lagged value at t-1 and t-2. Interestingly for state owned firms, lagged cash stock at t-1 showed positive and significant impact on investment at 1% level, and no significant result is found for lagged cash stock at t-2. For privately owned firms, the results are consistent and all positive and significant at 1% level.

Next we test for hypothesis H3 by looking at the size effect on investment to cash flow sensitivity. As discussed previously in this chapter, many studies find that size is an important determinant. Empirically, firm size has been regarded as an important determinant of financial constraints in studies of the credit channels within countries (Gertler and Gilchrist, 1994; Oliner and Rudebusch, 1996; Vermeulen 2002). Evidence also suggests that large firms are less sensitive to monetary policy tightening than smaller firms (Gertler and Gilchrist, 1994).

The size of the firm is proxied by the number of employees (we use total assets as a control variable for the correlation between firms' level of investment and assets). For state owned firms, we find the size variable to be largely significant (at 1% significance level) and negative, whilst for privately owned firms, the effect is the opposite (largely significant and positive at 1% level). This result is not puzzling in the Chinese context. State owned firms in China are notoriously known for their over hiring practice and overstaffed reality. These firms are

ultimately owned by the state and behave based on guidance given by the government. The government often asks state owned firms to either absorb some local unemployment or hire people with good personal relationships in exchange for other benefits such as the promise of more government investment or writing off existing bank loan repayment. Consequently, state owned firms often have more employees compared to privately owned firms of similar sizes. Therefore the result estimated in the sample of privately owned firms are more accurate. As in this data sample size variable shows a positive coefficient, it supports H3 in confirming that investment to cash flow sensitivity is higher for smaller firms.

Here we move on to hypothesis H4 and examine whether profitability affects investment to cash flow sensitivity differently in different ownership samples of data. Here the return on assets estimates the actual profitability of the firm while as previously Tobin's q proxies the expected future profits.

Tobin's q displays a consistent negative coefficient at 10% significant level for state owned firms, whilst it shows no significance in most regressions estimated on the sample of privately owned firms (with one negative exception being when regressed together with lagged cash stock at t-1). As pointed out before, Tobin's q in China is of low explanatory power both due to the way q is estimated as well as that it has low explanatory power (Gilchrist and Himmelberg, 1995). Precisely, Tobin's q is not accurately measured in all contexts, and because capital markets are not always informationally efficient, the financing constraint literature also takes into account sales (or growth of sales) of firms (Bhaumik et al., 2012). This regression result therefore may be augmented, especially because the negative (and often insignificant) impact of Tobin's q in table 2.6.

Return on assets variable shows no significant results at all for either sample. Therefore we reject hypothesis H4 and find that in Chinese firms, profitability does not influence investment to cash flow sensitivity.

Lastly, we examine the effect of age has on investment to cash flow sensitivity in different ownership categories. For the state owned firms, age showed a significantly positive coefficient at 1% significant level. No significant result was

derived from the private side of the estimations. It is easy to understand the reason behind this result. State owned firms enjoy banks' favourable lending practice and easy access to external financing. However, older state owned firms still enjoy preferential treatment in comparison to the younger ones as they have many more years of established relationship with banks. On the other hand, the majority of privately owned firms, regardless of age, face difficulty in obtaining bank loans and therefore show no significant age effect.

We have also tested regional and industrial effects on investment. Two types of regional dummies are created; one divides the sample into municipalities¹⁵ and non-municipalities, while the other one divides the sample into inland and coastal region. The inland/coastal dummy showed no significance in any regressions whilst the municipalities dummy is persistently positive and significant for the state-owned category, indicating state-owned firms which are located in these four cities invested more heavily compared to state-owned firms located in other regions.

This results, however, almost certainly understates the true effect because large, mature firms constitute a great proportion of our listed company data from GTA than they do of the aggregate economy, indicating the high probability that a large proportion of firms in China, particular privately owned firms, are deprived of external finance.

Table 2.7 illustrates the comparison between hypothetical predictions and actual results.

¹⁵ Which are Beijing, Shanghai, Tianjin, and Chongqing, and are directly under central government.

Table 2.7. Hypothetic prediction and estimation results

<i>Hypothesis</i>	<i>Variable being tested</i>	<i>Data sample</i>	<i>Predicted sign</i>	<i>Actual sign</i>	<i>Confirmation of Hypothesis</i>
H1	Cash flow	Whole	+	+	yes
H2	Cash flow, cash stock	Split sample	+	+ for private firms - for state owned firms stronger effect on private firms	yes
H3	Size (number of employees)	Split sample	+	- for state owned firms + for private firms	yes for private firms no for state owned firms
H4	Profitability (Tobin's Q, RoA)	Split sample	+	Tobin's Q: - for state owned firms insignificant for private firms RoA: insignificant	no
H5	Age	Split sample	+	+ for state owned firms insignificant for private firms	yes

2.5 Conclusion and Limitations

This chapter investigates in details the relationship between cash flow and firms' investment behaviour, with a particular focus on factors influencing the sensitivity of cash flow to investment in order to pin down what characterizes a firm that is financially constrained.

Our results indicate that, although cash flow has an overall positive impact on Chinese firms' implementation of investment projects, it affects privately owned firms and state owned firms in different ways. Such a finding has not been proposed by earlier studies. Results show that in the state sector, cash flow either has a negative impact on firm level investment, or the correlation is of no significance. This probably indicates the existence of an agency problem in state owned firms, which is further exacerbated by the role of debt (also reference to first chapter for details and empirical evidence). In contrast, private firms' investment is positively correlated with cash flow with strong significance, implying the availability and level of internal finance is a major determinant in firms' investment decision. This indicates that these firms are more financially constrained compared to their state owned counterparts and is consistent with the conclusion of lending bias from the first chapter. The positive correlation between cash stock at time t and lagged time $t-1$ and $t-2$ indicate that firms in the private sector stock up cash in preparation for future investment needs in order to overcome the financial hurdle.

We also find the profitability, size and age of firm all affect the cash flow sensitivity of investment. For state owned firms, both size (measured by number of employees) and profitability (measured by Tobin's q) shows a significant negative impact on cash flow sensitivity, contradicting the theoretical predictions. This is largely due to the unique nature of state owned firms in China, as they are mostly overstaffed, with high growth rate and low efficiency. The difficulty of measuring Tobin's q in emerging markets also contributed to the counter-intuitive results. For privately owned firms, only size shows a positive effect on the sensitivity of investment to cash flow, indicating that in the private sector, larger firms are less

financially constrained. However, neither profitability nor age has a significant impact on such sensitivity.

This chapter finds that privately owned firms exhibit significantly greater sensitivities of cash flow to investment than state owned firms. These higher sensitivities can probably be interpreted as evidence that firms are more financially constrained. The results also provide empirical evidence concerning the theories on investment behaviour and cash flow, and further extend the test for financial constraints to the Chinese context.

Our findings highlight the urgent need for deeper banking reform in China to further commercialize the state owned banks as well as to reduce state intervention and direction in the form of policy lending. The results of this chapter supports the findings of the first chapter showing empirical evidence that privately owned firms in China face lending bias and are financially constrained. The limitation on data (consists of only listed firms in China) and measures for Tobin's q , arguably reduces the explanatory power of our model, which can be of interest for future researchers.

Chapter 3

Provincial Institutions and Business Performance: Why does Institutional Development Matter in China?

*Abstract*¹⁶

Institutional development in the sense of enhancement of the effectiveness of markets as primary coordination mechanisms is widely viewed as the core to economic reform in transition economies. The expectation is that the more effective the market mechanism, the more productive will be the firms participating in the market. However, institutional frameworks are multifaceted, and how various aspects support or hinder the ability of businesses to operate efficiently is not well understood.

By studying institutions at the provincial level, we are able to develop a more fine-grained understanding of the effects of institutions. In particular, institutional change over the past two decades has varied across provinces in China, and this variation explains why firms in different provinces have reformed at different pace. Our base proposition is that institutional development enhances businesses' total factor productivity (TFP), an indicator of how efficiently and intensively firms utilize input in production.

Our empirical analysis confirms this proposition for aggregate indices, and we provide detailed analysis of various specific aspects of institutions. Moreover, we find private ownership to enhance firms effectiveness (an effect moderated by size and age of the firm), while unemployment reduces firm effectiveness.

Keywords: sub-national institutions, institutional development, firm performance, total factor productivity, economic transition, China.

¹⁶ Acknowledgements: We thank Xiaojing Li (St Andrews) for her help in procuring province level indices.

3.1 Introduction

Institutional development is widely held to be essential to induce Chinese businesses to improve their economic efficiency. Institutions, defined as formal and informal rules of doing business as well as market intermediaries, shape many cost factors, in particular costs of using the market, but also the costs of interacting with government authorities, labour markets, financial service intermediaries and courts (North, 1990, 2005; Ingram and Silverman, 2002, Meyer and Peng, 2005). Moreover, institutions shape the opportunities for knowledge creation and sharing, and thus for raising the level of technology in use in firms (Lundvall, Johnson, Andersen and Dalum, 2002; Mudambi, 2008). By impacting on both the value added created by firms, and the costs they incur in the process, they indirectly impact on corporate performance and economic growth.

Research on institutions has traditionally focused on cross-national variations. However, the cross-national variations are often very large and correlated with other aspects of the respective economies (e.g. Easton and Walker, 1997; Bevan, Estrin and Meyer, 2004; Berggren and Jordahl, 2005). Therefore, researchers have recently began to exploit the intra-country variation in emerging economies such as China, Russia and Vietnam to study how institutions affect the strategies and performance of foreign investment firms (Meyer and Nguyen, 2005; Du, Lu and Tao, 2007) and of local firms (Johnson, McMillan and Woodruff, 2002; Cull and Xu, 2005; Hallward-Driemeier, Wallstein and Xu, 2006; Bruno, Bychkova and Estrin, 2010). This approach allows us to conduct a more fine-grained analysis of the impact of institutions on firm performance.

The concept of firm performance is the core of many economic studies and several theories focus on the economic efficiency of firms. Pareto (1896) defines allocative efficiency as a situation where no one could be made better off without someone at least as worse off. Allocative efficiency is achieved when resources are allocated to the “right” decision unit and the price of output equals the cost of resources used to

produce the goods (price = marginal costs). Leibenstein argues that (1975) most empirical studies have illustrated results showing that by improving allocative efficiency or Pareto efficiency, output can only be increased by a very small fraction. The concept of X-efficiency is related to yet in contrast with allocative efficiency with respect to labour and management; essentially X-inefficiency refers to the difference between maximal effectiveness of resource utilization and actual utilization of such resources in firms (Leibenstein, 1978). In the previous two chapters of the thesis, we mostly looked at how to improve firm performance by reallocating available resources, for instance, by making available funds more accessible to privately owned and more profitable firms rather than firms with state ownership but poor profitability. In this chapter, we look into how to improve firm performance from another perspective, which is the effectiveness (or X-efficiency) of firms, which can be measured by total factor productivity (TFP).

We focus on TFP as a measure of corporate performance. TFP is the proportion of firms' output that is not explained by the quantity of inputs in a production process (Comin et al., 2006; Mahadevan, 2004). It thus is a measure of how effectively a firm exploits its inputs of capital, labour and materials, hence in this chapter we at times refer to TFP as the firm effectiveness. Earlier studies identify TFP as a critical mediating variable that influences both corporate performance and economic growth (Bosworth and Collins, 2003; Felipe, 1999; Rodrik, 1998). In this study, we investigate the impact of institutional development on TFP with the dual aims to advance theory and generate policy advice. In particular, we put forward a more fine-grained analysis of institutions to analyse the prevailing question, which institutions really matter to firms?

For our empirical analysis, we utilize the fact that some aspects of the institutions vary considerably across provinces in China to measure institutions at the level of provinces. Traditionally, many Chinese firms were adapted to the state-dominated economy, and were thus operating with relatively low efficiency, including most notably overstaffing. Market reforms since the 1980s have created new opportunities and incentives schemes, that have induced many, but not all, firms to substantially reform their operations, and to improve their productivity (Dollar, 1990). In this study we aim to shed more light on the question how variations in

institutional change, in particular their variations across Chinese provinces, affect firm performance.

Our analysis proceeds in three steps: First, we use an aggregate index of institutions that has been established in the literature (Fan, Wang and Zhu, 2007; Yue, 2010) to test the general effect of institutional development. Second, we separate different aspects of the institutional environment such as property rights protection, the degree of government intervention, and the capability of the state to implement regulation and intervention to test the impact of specific aspects of the institutional framework. Third, we test the proposition that compared to state-owned firms, foreign and privately owned firms react more positively to at least some aspects of institutional improvements because they have appropriate incentive structures and more flexible organizations. Finally, we investigate the effect of local unemployment and hence labour market supply, considering both linear and non-linear effects.

This chapter offers the following contributions. First, we provide more fine-grained understanding of institutional variations by examining the impact of institutional quality across regions within the same country. Many previous papers failed to identify statistically significant effects of institutional variables on firm performance, mostly using cross country datasets. We suggest that, in most cases, the differences in institutions across region within the same country may not be large enough to generate effects that can be found in cross-sectional analysis. In particular, variation across units of analysis (provinces in our study, countries in earlier studies) may be caused not by differences in institutions alone but also other factors specific to the province/country. Thus most cross sectional studies of country-level institutions and performance overlook causes of difference in firm performance that are country-specific other than institutions (e.g. population, culture, market size). By measuring institutions at the province level across regions in China while controlling for other province-level effects, we can exploit variations across a large number of distinct entities, and hence able to compare the impact of institutional differences, which provide more accurate results. Very few earlier studies have provided analysis on data with such a low level of aggregation. Second, we test for a rich variety of institutional measures, thus providing a more fine-grained understanding which institutional arrangements matter for firm

effectiveness. Third, we investigate how state-ownership, an important institutional arrangement in transition economies, interacts with other characteristics of the firm and its institutional environment. Specifically, we found it to have a direct negative effect that is moderated by the firm's age and size. However, it is not moderated by other province level institutional influences that we have tested. Fourth, we have constructed a unique firm level dataset that incorporates province level institutions that enables investigation of intra-country variations on firms' strategies and performance.

This chapter is structured as follows. The next section reviews the literature and introduces the key theoretical arguments as to why we expect institutions to positively influence firm performance in a transition environment. On this basis, section three develops our hypotheses, which stipulate why specific aspects of the institutional framework would impact on firm effectiveness, and why this impact may vary for firm in different forms of ownership. Section four introduces our dataset, the estimation technique, and the measures of the explanatory variables. Section five reports and discusses the results, and section six concludes findings and provides outlook for future policy implications.

3.2 Literature and Theoretical Foundations

3.2.1 Institutional perspectives on economic performance

Institutions have been defined by Douglass North (1990) as “the humanly devised constraints that structure political, economic and social interaction [and hence] create order and reduce uncertainty in exchange”. Also known as “rules of the game”, they define the available options for economic activity, and shape the costs of alternative transactions and production arrangements. Institutions thus play a critical role in facilitating or hindering economic performance of individuals, firms and nations.

The effects of institutions on transaction cost have been observed throughout economic history. The need for impersonal contract enforcement surfaced along with increasing labour diversification. Innovations of institutions that lowered transaction costs consisted of legal changes, instruments, and specific techniques and enforcement characteristics that lowered the costs of engaging in long distance exchange. Company laws enable a wide range of organizational forms and complex governance structures that limit the problems of agency in hierarchical organizations. In capital markets, secure property rights, which entail a polity and judicial system, lower the costs of contracting. In the integrated societies of the 21st century, specialization increases the number of inter-firm interfaces, and thus transactions between economic agents, making institutions particularly critical (North, 1990, 2005; Peng and Heath, 1996; Commander and Svejnar, 2007).

Institutional development has come to the forefront of discourses in economics with the economic transition of formerly central plan economies (North, 2005, World Bank, 1996). Market economies allocate goods and services efficiently if the markets are working effectively. Such efficient market do however not evolve spontaneously, as assumed by classic economic theory, but they depend on market supporting institutions (North, 1991). This need for market-supporting institutions has become particular evident in transition economies in Central and Eastern Europe: after the collapse of the 'old' institutional system organized around the central plan, firms experienced widespread coordination failures rather than spontaneous and efficient markets (Blanchard and Kremer, 1997). Hence, after initial reforms focused on stabilization and liberalization, transition economies in Central and Eastern Europe focused on building institutions such as stock markets, corporate governance, accounting and auditing standards (Estrin, 2002).

The nature of institutions shapes the strategies that firms pursue, and their performance, as explored in the strategic management and international business literatures. In consequence, institutions have been shown to explain how business strategies and operations vary across countries, and how they adapt to the changing institutions over time (Luo, 2003; Oliver 1997; Peng, 2003, Peng, Wang and Jiang, 2008; Tan and Peng, 2003), and how multinational enterprises adapt their strategies to local context (Henisz, 2002, Meyer, 2001; Meyer, Estrin, Bhaumik and Peng 2009, Meyer and Peng, 2005). For example, Tan and Tan (2005) show the mutual

interactions of institutional reform in China with the strategic changes in Chinese State-owned Enterprises (SOEs).

A key concept in the strategic management literature on emerging economies is “institutional voids”, the idea that the lack of specific market-supporting institutions creates additional costs for business in such countries (Khanna and Palepu, 2000). Business responds to institutional voids by avoiding the particular markets, i.e. by investing less, by adopting practices such as networking that enable to bypass institutional voids, or by developing intermediary businesses that are specifically designed to reduce the costs of transacting in a particular context, for example private credit or identity check services. Such strategies, however, raise the costs of operating, and can be expected to lead to less efficient factor utilization, and hence lower TFP.

3.2.2 Institutional theory and provinces as level of analysis

Institutional theory has been developed mainly by two types of work: First, longitudinal or historical studies explore in great detail how institutional frameworks and businesses evolve over time. This type of work leads to thick descriptions of economic systems that provide a comprehensive understanding on why a certain economy functions in a certain way (Carney & Gedajlovic, 2009; Hall & Soskice, 2002; Morgan, Whitley and Moen, 2006). However, this approach does not allow pinpointing the exact aspects of institutions that are critical for firms to enhance their performance.

Second, cross-sectional work has mostly exploited the fact the nation states vary in their institutional make-up, and explored how cross-national variations of institutions impact on the strategies of foreign investors (Bevan, Estrin and Meyer, 2004; Globermann & Shapiro, 2003; Meyer, Estrin, Bhaumik and Peng, 2009; Zhou, Delios and Yang, 2002), and entrepreneurial start-ups (Bruno, Bychkova and Estrin 2008), on business performance (Scarpetta, Hemmings, Tressel and Woo, 2002), as well as economic variables such as economic growth (North, 1990; Rodrik 1998). However, such an approach is relatively crude in that variations

across countries tend to be large and correlated with many other features of the pertinent countries.

A new opportunity to advance institutional theory has emerged with the opening up of emerging economies that are both large and internally diverse in their institutional set-up. Such studies proxy institutions at subnational units of analysis, such as provinces and cities. This allows for a more detailed analysis of the role of institutions in an economy because national characteristics are held constant in the study. In particular, institutional frameworks vary across regions or provinces within large transition economies, such as China, Russia and Vietnam, that have a federal structure of governance (Hallward-Driemeier, Wallstein and Xu, 2006; Johnson, McMillan and Woodruff, 2002; Li, Yue and Zhao, 2009). In these economies, market-oriented reforms have often been rolled out by central government authorities, yet their implementation in each province varies considerably. While formal changes may be initiated centrally, local implementation often depends on local informal institutions such as traditions and attitudes (Meyer and Nguyen, 2005).

This variation of local institutions leads to variations in business strategies. Scholars have used such institutional variations across provinces in large but administratively fragmented countries to investigate the impact of institutions on a range of different aspects of firm activity and performance (see Appendix Table 1): 1) The TFP of local firms (Bruno, Bychkova and Estrin, 2010, Hallward-Driemeier et al., 2006); 2) Firms' reinvestment (Johnson et al., 2002; Cull and Cu, 2005); 3) State-owned firms' capital structure (Li et al., 2007); 4) The export performance of local firms (Shinkle and Kriauciunas, 2008).

Of these studies, most relevant for our research are the studies by Bruno, Bychkova and Estrin (2010) and Hallward-Driemeier, Wallsten and Xu (2006). Bruno and collaborators (2010) investigate the effects of institutional development on TFP of domestic and foreign firms across Russian provinces. The paper analysed a micro-panel data set to investigate the effect of regional institutional environment on Russian TFP levels for foreign and domestic firms across time, industries and regions. They confirm the existence of a significant gap between TFP in domestic and foreign firms in Russia of 80% in the 2005 – 2006 period.

They conclude that foreign owned firms tend not to invest in areas in which the institutional quality is low, as it significantly negatively affects their performance in those regions.

Hallward-Driemeier and collaborators (2006) investigate the impact of business climate on four aspects of firm performance in five Chinese cities. They measure investment climate based on data from the World Bank survey using city-industry averages (i.e. aggregating firms that were in the same industry and the same city). Their institutional measures included bank access, regulatory burden, corruption, non-permanent labour, transport/power disruption. None of these was significant when performance was measured by TFP; however regulatory burden was found to affect sales growth and employment growth, while corruption affects sales growth. Firms under private ownership performed better in terms of both TFP and investment rate. In addition, human capital measures significantly enhanced TFP. We reinvestigate their propositions, though with better measures of institutions that are both more detailed and archival, and as we detail below we find (contrary to their study) support for the direct impact of institutions on TFP.

Institutional perspectives have also been applied extensively in the study of foreign investors in transition economies such as China. Foreign investors' locational choice is driven by the economic attractiveness of local markets and resource endowments as well as various types of agglomeration effects (Head, Ries and Swenson, 1999; McCann and Folta, 2008; Tan and Meyer, 2011). These primary effects however are complemented by the conduciveness of the institutional environment for doing business in the locations. Early studies of these effects in China used simple dummies for provinces offering special economic zones of open coastal cities (Head and Ries, 1996; Wei et al., 1999; Cheung and Kwan, 2000; Zhou et al., 2002). More recently, in a study in Vietnam, Meyer and Nguyen (2005) show that the relative strength of state-owned firms in the province has a negative effect, while Du, Lu and Tao (2007) test for multiple institutional characteristics of provincial institutions in China and find that Intellectual Property Rights and contract enforcement have a positive effect, while government intervention and corruption have a negative effect. Only one study, to our knowledge, has looked at the performance impact of regional institutions on foreign invested firms (Chan, Makino and Isobe, 2010).

One obstacle to institutional research exploiting intra-country variation has been the availability of suitable measures. Scholars have so far struggled with the development of appropriate measures of institutions as well as control variables at the province level. In this study, we have collected suitable indices from a variety of studies and papers (Fan et al, 2007, Du, Lu and Tao, 2007, World Bank, 2006) to overcome the limitations of earlier research.

3.2.3 Institutions and institutional change in China

Chinese economic reform since the late 1970s has transformed a centrally coordinated economy into a dynamic capitalist economy (Lin, 2011). The economic reforms have taken a gradual approach with series of small steps involving liberalization of markets (in the sense of removing restrictions and direct interventions by governments) and development of new institutions that enhance the efficiency of markets, e.g. improving property rights protection and contract enforcement (Child and Yuan 1996; Nee, 1992; Boisot and Child 1996). The success of these reforms is usually attributed to the adoption of an export-oriented industrialisation strategy, as well as certain policies favouring the liberalisation and deregulation of foreign trade and investment.

While these reforms have introduced elements of a market economy, and in many ways may be moving toward a Western-style market economy, various entities of the Chinese government continue to play an active role in the economy. These activities not only involve rule-setting and monitoring of regulatory agencies, but active engagement, for instance by providing guidance and selective support (Lin, 2011; Luo et al., 2010). As tested and discussed in the previous chapters, despite the relative poor performance compared to private firms, state owned firms still enjoy many advantages ranging from policy lending, tax benefits, to industry protection. The critical question for institutional analysis in China thus is “not whether the government will remain involved, but, rather, what form the new ‘regulatory state’ will take” (Pearson, 2005). In our study, we thus aim to push beyond measuring the degree to which the institutional framework resembles a market economy, and investigate the effects of different aspects of this “regulatory state” and the efficiency of its interactions with the business sector. In this we pay

particular attention to the role of ownership types. In contrast to Central and Eastern Europe (CEE), in China state entities continue to hold substantial equity stakes in many firms, even if their shares are traded on the stock exchange. There continues to be concerns regarding the performance of these partially or fully state-owned firms, with some studies finding significant underperformance in terms of TFP (Kong, Marks and Wan, 1999). In this study, we view the ownership of firms as institutional arrangements due to its unique Chinese nature as well as the way and extent to which it affects firm performance (refer to the first two chapters of this thesis).

The varying pace as well as different regional focuses of reforms in China have led to considerable variation within China with respect to the actual institutional framework at the level of provinces (Bai, Du, Tao and Tong, 2004; Cao, Qian and Weinstein, 1999; Fan et al. 2007; Yueh 2010). For example, the Chinese authorities often authorized specific regions to conduct experiments with market reforms under special policy and regulations – such as the industrial zone in the 1990s (Cartier, 2002). Even though the evolving formal institutional framework may be fairly similar across China, its implementation varies across provinces, such considerable variations could be observed in aspects such as corruption, contract enforcement, and intellectual property rights protection (Du et al., 2007). In contrast to Russia, China was never a fully centralised country, yet neither has it ever been quite decentralised (in terms of New China after 1945). The market economy has taken over the planned economy since the 1980s and the short period of government centralization in the 1960s/70s left very little impact on the country's economic activities (Hu and Khan, 1997; Chai, 1998; Kambur and Zhang, 2005). Furthermore, with the combination of loose specification and weak implementation of certain policy and regulations, provincial and local authorities in China have considerably higher degree of influence over economic activity than, for example, local authorities in the UK. This creates ideal conditions to examine institutional variations at the province level.

In conclusion, institutions are generally considered as an important determinant of economic growth, with firms' TFP acting as a key mediating variable. In China, institutions have changed over the past two decades, and this change is widely considered as a precondition for the spectacular economic growth the country has

experienced. However, both institutional change and economic prosperity have been unequal across the country. Moreover, China is not converging with the Western model of “free” market economy, but is developing its own version of capitalism in which government retains an important role. Therefore, we explore in the next section how and why specific aspects of the institutional framework that are varying across Chinese provinces can be expected to influence firms’ TFP across provinces.

3.3 Hypothesis Development

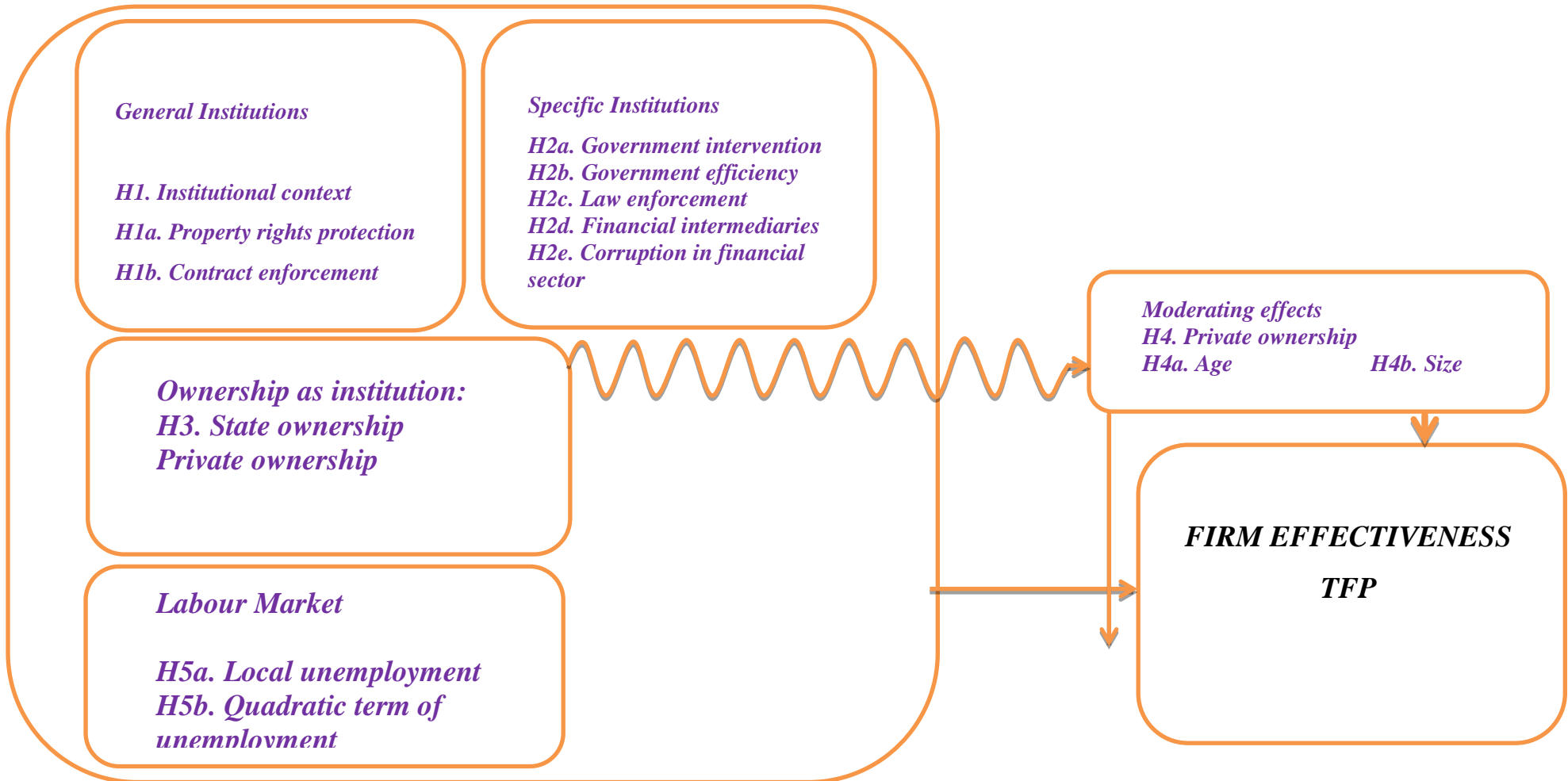
The more effective firms are in this transformation process, the more competitive they become, and the better they become in converting scarce inputs into outputs thus reducing X-inefficiency and increase firm effectiveness. This productivity is sometimes approximated by labour productivity, or the ration of output over labour input, but this is a rather crude measure. Therefore, we focus on total factor productivity (TFP), a well-established measure that captures the portion of output that is not explained by the amount of input used in the production (Comin et al., 2006). Comin and collaborators (2006) define it as the ratio between real product and real factor inputs, and has been found to be an important determinant of economic growth, and this argument is supported by many empirical studies (Chen, 1997; Rodrick 1997).

As we are interested in the environmental conditions that help firms enhance their effectiveness of factor utilization, we follow three lines of argument to develop hypotheses. First we explore the impact of different institutions on firm effectiveness or TFP (hypothesis 1 and its sub hypotheses), along with specific elements of the province-level institutional environment (hypothesis 2 and its sub hypotheses). Then we explore the effect of state-ownership on firm effectiveness (hypothesis 3), along with arguments on how this ownership effect may vary across

institutional environments (hypothesis 4) and for different firm characteristics (hypotheses 4a and 4b). Finally, we explore the effects of unemployment at the province-level which may take a linear or curvilinear form (hypotheses 5 and 5a).

Figure 3.1 provides a roadmap illustrating how hypotheses are developed as well as how institutions interact with each other and impact on firm effectiveness.

Figure 3.1. Roadmap of hypotheses development



3.3.1 Provincial Institutions

As we have argued above, institutions are essential for markets to function efficiently and effectively; the higher the quality of institutions the more efficient are the markets governed by these institutions. If firms are operating in markets that are more efficient, they are able to increase the effectiveness of the resources utilization because: first, more efficient markets enable buying factor of production to more precise specifications, and at lower costs; second, more efficient markets reduce the need to hoard resources as they can be bought if and when needed, thus reducing the warehousing and inventory costs; and third, more efficient markets reduce the resources to be spend for implementing transactions, for example monitoring and enforcing contracts.

A good example of how higher quality of institutions results in benefits of an efficient market is the booming of small to medium sized businesses using internet as their exchange platform. Due to government's decision to further decentralize and liberalize (to a certain extent) information on media, information asymmetry is reduced and thus provides firms and consumers with better knowledge of prices of goods and the ways of obtaining them (Zhao, Cai and Zhang, 2005). Fast and efficient supply and production chain also lessen the need to store inventories.

As a consequence of these direct effects, firms can moreover enhance their operational flexibility, which further enables them to increase the effectiveness of their operations. This argument has received indicative support in cross-national studies. For example, Rodrik (1998) shows that institutional quality significantly explains variations between countries in East Asia in terms of total factor productivity growth, growth of output per worker, and capital accumulation. We extend this analysis to suggest that similar effects arise with the more subtle variations across provinces within a single country. Hence, we expect that under higher quality institutions, resources are to a larger extent used for a firm's core activities rather than peripheral activities, which leads to more effective resource utilization:

H1: Firm effectiveness will be greater in a context in which institutions are stronger.

Institutional quality, as we have defined it, is a very broad concept encompassing a number of different arrangements that enhance the effectiveness of markets. To provide less abstract explanations of institutional impact, and to develop specific suggestions regarding policy changes that might improve firms effectiveness, we need to disentangle the impact of institutions. Hence, we proceed to discuss a number of specific aspects of institutions.

The foremost aspects of institutions discussed in the literature are property rights (Barzel 1997; Posner, 2003). A property right is the exclusive authority to determine how a resource is used, and whether that resource is owned by government or by individuals. All economic goods, including for example intellectual property, have property rights attributes, such as the right to use it, the right to rent it for use by others, or the right to sell it. Property rights depend on a clearly defined title, and mechanisms such as courts to enforce them.

Clearly defined property rights are the basic preconditions for efficient functioning of markets (Coase, 1937), which in turn enhance the allocation of goods and services through markets rather than other organizational forms such as hierarchy (Williamson, 1985). Clearly defined property rights reduce transaction costs such as contract negotiation and enforcement costs, which directly reduce resources needed to implement transactions. Moreover, they enable firms to enhance their operations by increasing flexibility or making long-term commitments in the knowledge that others will respect their rights in an investment project. Hence, we predict that:

H1a: Firm effectiveness will be greater when property rights are defined better.

A key condition for firms to be able to engage in market transactions that are more complex than simple spot market transaction is the ability to draw up contracts, and expect that contracting partners actually fulfil the obligations that they have agreed upon in the contract. If courts work efficiently and unbiased and legal costs are reasonable, then businesses know that they have a fall-back option of taking a contract partner to court should the partner default on a contract. Even businesses

that do not take their business partners to court benefit from the knowledge that such action is feasible at reasonable costs because it reduces the efforts they need for designing and writing contracts that are self-enforceable, or in fact they may not feel comfortable to sign contracts that without enforcement options would not be feasible at all. However, courts are only one example of contract enforcement; some business partners agree on arbitration proceedings under designated authorities, some societies have developed informal mechanisms such as peer pressure to ensure that members stick to what they have committed to in a contract. If on the other hand, legal enforcement is weak, firms rely more on relational contracting and less on formal contracts, it however leads to less efficient allocation of resources (Zhou and Poppo 2010).

Effective contract enforcement mechanisms directly reduce some of the costs that firms incur when engaging in transactions with others, especially for transactions that are complex or have a long-term nature. For example, legal costs or monitoring costs are reduced, which means that resources that otherwise are dedicated to legal or monitoring tasks can be allocated to a firm's core activities, which enhances the effectiveness of their resource usage. Therefore we suggest:

H1b: Firm effectiveness will be greater when contracts are more enforceable.

China is often known for its high level of corruption and is placed at 78 of 179 countries in the Corruption Perceptions Index (Transparency International Organization Report, 2010). This is hardly surprising consider news report arise in 2012 with information on the huge sum (\$77m) embezzled on the Beijing-Shanghai high-speed railway project alone (ChinaDaily, March 2012), with no clear figure on the direct or indirect damage to the market economy as a whole.

Chongqing is the fourth direct-controlled municipalities in China and the first city to launch a thorough anti-corruption and “dahei” (combat triads) campaign¹⁷. In the year 2009, “the campaign has put the spotlight on organized crime and how it

¹⁷ Recently scandal has arisen regarding to the Committee Secretary of Chongqing, Bo Xilai, who initiated the anti-corruption campaign as well as a series of pro-growth institutional changes. Despite the incidence, the impact of such institutional improvement in terms of reduced corruption has remained positive on the performance of local firms.

has infested local bureaucracy and businesses through bribery, extortion, blackmail and violence” (CNN, 2009). This indicates reduced firm effectiveness on aggregated level when the level of government corruption is high. The police operation started in June 2009 and led to the arrest of nearly 5,000 gangsters and related officials. The campaign has rebuilt public trust and reliance on central governance and also promoted healthier, faster growth of the city’s economy. In year 2011, Chongqing was the fastest growing city in terms of economic growth (11% annual GDP growth) in China (National Bureau of Statistics of China, 2012).

It is noted that major challenge for many emerging economy firms (and not only them) is the extent of corruption, which causes addition costs and uncertainty to businesses (Rodriguez, Uhlenbruck and Eden, 2005; Cuervo-Cazurra, 2006; Smarzynska and Wei, 2000). Corruption cause direct costs as resources are re-directed to appeasing those requesting favours or under-the-table payments, which reduces the effectiveness of resource usage in economic terms.

Such corruption distorts economic activity in many indirect ways. For example, it may cause unfairness in competition, causing firms to lose out even when they are under an efficient management system and produces in-demand products that are reasonably priced. Moreover, firms may redesign their operation strategies in such a way that it reduces the exposure to corrupt practices, even though this implies a less effective resource usage. The pattern of corruption tend to be highly idiosyncratic to each context, and firms that are well embedded within a local context may have developed appropriate coping strategies – either paying but knowing when and who to pay to get most effective returns, or knowing how to bypass requests for corrupt payments. However, such adaptations would come at the expense of less effective resource usage:

H1c: Firm effectiveness will be greater when the level of government corruption is lower.

Neoclassical economics suggests that economies function most effectively if the rules of the game are clearly defined, but the state stays out of any direct intervention into the economy (Friedman, 1962). If governmental agencies direct

interfere in economic activity, they create costs to businesses, such as top management time spent dealing with regulatory issues, negotiating with government officials, paying higher taxes, or even paying off requests from government officials (as discussed under corruption above).

Moreover, the objectives of the firms may be shifted away from optimizing resource usage and profitability to pleasing secondary objectives imposed by government intervention, such as provision of services to the local community, or securing high levels of employment (i.e. lowering the government's costs arising with unemployment.). This distraction from the core objectives of the firm reduces the effectiveness of resource usage in economic terms. Hence:

H2a: Firm effectiveness will be greater when government agencies interfere less in the economy.

While the degree of government involvement is a distinguishing feature of economic systems (Hall and Soskice, 2001), not all economists would agree that government intervention necessarily harms the resource allocation, especially when the government does its interventions and regulatory activity effectively. Thus, Tipton (2009) argues that the appropriate way to classify economies is not only by the degree of state intervention but to add a second (almost) orthogonal dimension, namely the capability of the state to manage regulation and interventions. In a comparative study in South East Asian economies, he points to Singapore as an example of an economy that performed well because state interventions were managed by a competent administration, whereas other countries in the region suffer from less well qualified state bureaucracies intervening in the economy. Similar, he points to differences between Northern and Southern continental Europe that may be explained by this state capability rather than the extent of state intervention.

China has chosen a path of institutional development that has been called 'state-led capitalism' (Fligstein and Zhang, 2011; Lin, 2011), where government entities at multiple levels play an active role in supporting or discouraging different type of economic activity. The model of Singapore has influenced policy makers in China as they advanced their reform agenda. The effectiveness of this approach,

however, depends on the effectiveness of the government entities to such an active role (Tipton, 2009). Hence, in the Chinese context it is particularly important to test for the effectiveness (rather than just the extend) of governmental activities as a key aspect of the institutional framework:

H2b: Firm effectiveness will be greater when governments are more effective in their regulatory activities.

A critical aspect of the institutional framework for business is the legal system which encompasses both the legal code and the procedures of its enforcement (Armour, Deakin, Sarkar, Siems and Singh, 2009, Zweigert and Kötz, 1999). Clearly defined legal codes and their enforcement are important for both businesses obeying of the law of the country, and for the settlement of disputes between businesses. When legal codes are unclear, businesses may incur additional legal costs for example for obtaining advice on how to interpret new regulations, or for settling penalties imposed because they unwittingly broke the law.

Legal codes however are not enough; businesses have to have confidence in the law enforcement, which is the degree to which firms have confidence that their legal and property rights will be protected. The effectiveness of law enforcement has been identified as a critical aspect of the business environment: For example, Bevan, Estrin and Meyer (2004) found that legal effectiveness (or law enforcement) has a detrimental effect on the attraction of foreign investment in Central and Eastern Europe, whereas the existence of appropriate laws as such had not effect. The lack of effective law enforcement directly raises transaction costs, and indirectly forces firms to adapt their strategies such to avoid activities or contract forms that depend on legal activity. Both the direct and the indirect effect reduce the effectiveness of resource allocation, such that we suggest

H2c: Firm effectiveness will be greater when the law enforcement system is more effective.

A pivotal aspect of the institutional framework is the presence of market intermediaries (Khanna and Palepu, 2000; Peng, 2003). They are particularly important in markets characterized by high asymmetry of information or by the

need to aggregate or rebundle products and services, such as financial markets. However, access to financial markets is essential for virtually all businesses as they need to finance their operations. Where firms lack access to finance, in particular bank loans, this can inhibit their operations and their growth.

In emerging economies this access to finance is often difficult for small firms because banks prefer to lend to large firms that a) represent lower risk, b) benefit from implicit government guarantees. Moreover, banks may lack the skills required to assess credit worthiness of small businesses. These biases can become a major obstacle to investment and growth in private firms (Johnson et al., 2002; Li et al., 2007). As results show in the previous chapters, in China, private firms are often deprived of outside financing as most bank loans are allocated to state-owned firms, despite their often lower performance level in comparison to private firms. In addition, a large proportion of firms (regardless of ownership type) in China still operate in a traditional way and use retained earnings as sources of new investment and thus engage less with capital markets. However, these practices vary across Chinese provinces.

The consequence of reduced access to financial markets is that firms cannot optimize their resource portfolio, and may have to operate at sub-optimal combinations of resources. This reduces the effectiveness of their resource usage, and thus we hypothesize:

H2d: Firm effectiveness will be greater when financial intermediaries are more effective.

The effectiveness of the banking system can be undermined if banks themselves are subject to corrupt practices. We have discussed above the detrimental effects of government corruption on the efficiency of markets, and hence on the effectiveness of resource utilization. If corruption affects the banking sector in form of side-payments to be paid by firms to bank managers in charge of their loan application, this not only generates an additional cost to firms applying for a bank loan, but also undermines the effectiveness of the allocation of loans and can, potentially, undermine the risk profile of banks themselves (notably if loans are given to projects that do not generate sufficient returns to repay the loan). Both

the increased transaction cost for firms, and the additional risks in the financial sector itself, reduce firm effectiveness:

H2e: Firm effectiveness is greater when the level of corruption in the financial sector lower.

To sum up, our core argument regarding institutions is that increases in the quality of institutions enhance the effectiveness of markets, and therefore enable firms to increase their effectiveness. We proposed a general hypothesis (H1), to be tested on an aggregate index of institutional quality, and three sub-hypotheses that state corresponding relationships for different aspects of the institutional framework (H1a to H1c). We also developed H2a to H2e in order to shed more light on the impact of specific elements of institutions on firm effectiveness.

3.3.2 Ownership type as institution

A key institution affecting firms is their own ownership structure, and in consequence their governance structure and the degree to which stakeholders such as government authorities can influence the strategies and operations of a firm (Boisot and Child, 1996; Chen 2007; Dollar and Wei, 2007; Nee, Opper and Wong, 2007; Xu and Wang, 1999). In particular, private firms face more powerful incentives to engage in profit maximization strategies, and thus to prioritize economic performance (Djankov and Murrell 2002; Estrin, Hanousek, Kocenda and Svejnar, 2008; La Porta, Lopez-de-Silvanes and Shleifer, 1999; World Bank 1996). State-owned firms, on the other hand, are likely to be inhibited by political objectives interfering with economic objectives – for example securing high employment levels, and they are likely to have more complex and less transparent governance structures. These dual objectives and potentially less effective mechanisms of corporate governance inhibit the ability of state-owned firms to enhance their productivity. Moreover, state-owned firms tend to have better access to capital in form of loans from state-controlled banks or (implicit) government guarantees (see results from chapter one), which reduces the pressures to increase capital productivity (Li, Yue and Zhao, 2009).

There is ample evidence that state-owned firms underperform relative to private firms. For example, Kong Marks and Wan (1999) found that after ten years of reform, Chinese SOEs still performed unsatisfactorily in terms of TFP. They also conducted a test on the impact of technological innovation and efficiency on TFP level in SOEs and found very little evidence indicating a positive, if any, relationship. Hallward-Driemeier and collaborators (2005) included in their study of determinants of TFP in China an ownership variable and found it to be significant, suggesting the state-owned firms are less effective in their resource usage.

We propose:

H3: Firm effectiveness will be greater when firms are privately owned.

The advantages of private firms over state firms, however, vary across contexts and with the firm's own characteristics. Specifically, the effect of institutional development on firm performance is likely to vary as firms to different degrees experience misfit between the changing institutional environment and their own business strategies and structures. In particular, firms to varying degrees recognize business opportunities arising from institutional change, take risks, and reorganize themselves to take advantage of such opportunities.

Some institutional environments may be more conducive to the operations of state-firms, while others are more conducive to the growth of private firms. Following up on our earlier arguments, we suggest that the quality of institutions, which we have defined in terms of their support for market mechanisms, is of particular importance to private firms. Private firms seek to optimize their economic performance in pursuing their owners' interests, and they rely on efficient markets in this pursuit. On the other hand, state-owned firms tend to have a close association with numerous governmental authorities, and hence are more effective at dealing with non-market interfaces. They are better adjusted to interact with government authorities and network-based markets, which implies that they are less well positioned to enhance their performance in response to market incentives.

Moreover, state-owned firms in general operate under a preferential system that facilitate access to resources such as outside financing through state banks, yet at the same time they are often overstaffed due to over-hiring to reduce local unemployment rate per government's request. As a result, state-owned firms tend to be less efficient and profitable compared to most privately owned firms. Some aspects of institutional change may, at least in the short run, have a negative effect on the productivity of state-owned firms because of a crowding out effect: they are slower to react to new opportunities and thus lose market share but cannot downsize their operations accordingly. On the other hand, government interference often comes with implicit guarantees, preferential supply of cheap materials, and easier access to key customers in the state sector. This, potentially, results in lower pressures to increase economic efficiency and effectiveness than the same institutional framework would create for private firms.

Finally, state-owned firms often operate in a near monopolistic markets, for examples utilities, or have secure demand for their manufactured goods due to support from government. As a result they may be less capable to respond strategically to sudden increase of competition once the level of government interference drops, which explains the short run negative impact on their productivity should the government interferes less. All these arguments suggest that the impact of enhancing quality of institutions is stronger for private firms than for state-owned firms:

H4: The effect of stronger institutional context on firm effectiveness is stronger for private firms.

The ownership effect is also likely to vary with the organizations' own characteristics. Organizations develop internal practices and routines that optimize their operations under the conditions of their external environment. Organization scholars thus speak of the fit between strategy and environment. These internal practices and routines over time become "institutionalized" as they become part of the fabric of the organization that helps to perform under given circumstances, but also become a source of inertia (Leonhard-Barton 1992).

During the period of central control, companies have evolved organizational structures that fitted the institutional environment at the time, which is they were subservient to the organs of the state and the Party. As economic reform progressed, firms had to change their organizational structure to cope with the new realities of a competitive market economy. This process is however subject to considerable inertial tendencies (Newman, 2000), because firms have to develop new sets of capabilities and transform their inherited ones (Uhlenbruck, Meyer and Hitt, 2003; Dixon, Meyer and Day, 2010). Therefore we suggest that companies that have been established for long carry more of a burden of inheritance than new firms that have been able to establish from dynamic organizational structures to form the outset.

State-owned firms have in particular evolved organizational routines that “fit” not only the emergent market economy but the firm-government relationship. These routines are likely to emphasize economic efficiency to a lesser degree as they also have to accommodate possible political objectives of the organization, such as retention of higher levels of employment. Moreover, state owned firms likely have less flexible governance structure as private firms, leading to stronger inertial effects. Thus, while we expect that all firms potentially suffer from inertia, we expect this effect to be stronger for state owned firms.

The older a firm is, the more it carries inherited routines from earlier economic regimes, and those routines have become ‘institutionalized’ within the organization (Nelson and Winter, 1982). However, the more routines are institutionalized, the more likely the firm’s adaptability to the volatilities of a market economy is inhibited by organizational rigidities. Hence, we propose:

H4a: The effect of stronger institutional context on firm effectiveness is stronger for younger firms, more so for private firms.

One of the most important means for firms to increase their effectiveness is to exploit economies of scale. Hence, larger firms generally are better able to exploit the factors of production at their disposal.

However, the exploitation of scale economies requires effective management and focus on economic objectives rather than secondary objectives such as protection

of the workforce. In particular, private firms are able to implement cost saving measures such as reducing slack, laying off people, and performance-oriented pay more effectively than state-owned enterprises. Hence we suggest that:

H4b: The effect of stronger institutional context on firm effectiveness is stronger for firms that are large in size, more so for private firms.

3.3.3 Labour Markets

Unemployment is a major social and economic challenge for policy makers (Blinder, 1988). Unemployment in China is dangerous and considered unhealthy even if the level is above a small percentage, as the base number is larger than those of most countries. one of the ways government can address (at least in the short term) the challenges of unemployment is to create informal pressures or financial incentives for firms to take on additional employees (Yin, 2001; Dong and Putterman, 2003) and such practice is not uncommon within the Chinese context in order to pump up the official employment figure. Such pressure is unlikely to be effective for private firms, but state-owned firms are likely to react to such pressures by aligning their strategies with the (local) government's policy agenda. The wages for this type of imposed labour are usually low and thus very affordable for state-owned firms which enjoy quite loose budget constraint. They thus are likely to take on additional employees that do not add much to their productivity, and take advantages of the benefits (usually economically beneficial to individuals in higher management) and other conveniences in business perspective returned by the government. Hence:

H5a: Higher unemployment in a province is associated with lower firm effectiveness.

The ability to take on additional employees is however limited even for state-owned forms as they have to deliver profits too. Therefore we expect a saturation effect and thus a curvilinear relationship between unemployment and TFP. Therefore we propose:

H5b: The relationship between unemployment and firm effectiveness is curvilinear in form of a u-shaped relationship.

3.4 Methodology

To our knowledge, our study is one of the first attempting to measure effect of institutions on firm performance – measured by TFP – in China. Although Hallward-Driemeier et al. (2006) did a similar study on 5 cities in China, our research covers a wider geographical area (all of 31 provinces and over 120 cities) as well as a richer range of variables. Moreover, our hypotheses are more specifically defined.

3.4.1 Data

We have obtained a panel dataset from GTA, a global provider of China financial markets data as well as industry and economic data. This is the same set of data we have utilized in testing for the relationship between capital structure and investment in Chinese firms in chapter two. As it is hard to get disaggregated unpublished data from the National Bureau of Statistics in China, we have chosen data provided by GTA as it is one of the few reliable large commercial data service companies in China.

The GTA panel dataset includes information on all firms listed in the Chinese stock exchanges, namely the Shanghai Stock Exchange and Shenzhen Stock Exchange.¹⁸ The dataset thus provides information on over 1,000 Chinese listed firms. The variables cover the firms' financial data as well as other information such as the location of firm, year of establishment, shareholder information etc.

¹⁸thus excluding Chinese firms that are exclusively listed in the Hong Kong Stock Exchange or any other foreign exchange such as the NYSE.

for the period of year 1990 to year 2008. Chinese financial markets are still relatively young due to the late start of westernized marketization of economy; its stock markets have only started to develop at the beginning of the 1990's. As a result, the data set adopted in this paper is an unbalanced panel dataset with only a handful of firms registering in the stock market at the start of the 19 year span. We choose to use the unbalanced panel data because when we tried to balance the data we lose too many observations, thus the change in performance of many firms throughout the years are overlooked. Additionally, regression results using balanced panel data are not massively different from testing the sample as a whole.

However this dataset does have its limitations as there are a number of calculative errors. We have corrected the detectable mistakes to our best knowledge but there might still be slight inaccuracy caused by undetectable data errors.

3.4.2 Institutional measures

We employ a number of indices to measure the quality of institutions at the level of Chinese provinces, an aggregate index available over time, and two sets of survey-based indices that are available for a particular point in time. We measure the strength of institutions (Hypothesis 1) by the 'marketization index' developed and published by the National Economic Research Institute (NERI) (Fan et al., 2007). The index, henceforth called NERI, is an assessment system for relative progress in marketization for China's provinces using a comparative method (Fan et al., 2007; Wang et al., 2007). Marketization is assessed in five fields by a total of 23 basic indicators and the index is available for years from 1997 to 2005. The five fields of which data the index is constructed based upon are government and market relations, development of the non-state enterprise sector, development of the commodity market, development of factor market, and market intermediaries and the legal environment for the market.

The marketization index has been extensively used in prior scholarly research. Li, Yue and Zhao's (2009) studies firms' capital structure and research by (C. Lin, Lin, & Zou, 2012) examines the effect of property rights security on corporate risk

management decisions. Nee and Opper (2010) show that political capital is more relevant to firms in areas where governments are more interventionist. (G. Chen, Firth, Gao, & Rui, 2006) examines whether ownership structure and boardroom characteristics have an effect on corporate financial fraud in China.

Although the *NERI* index is constructed to measure the level of marketization in different regions (provinces) in China, the index itself is actually a measure of regional institutional policy/quality for local market and hence indicating the level of marketization, therefore here we adopt it as a measure of institutions.

There are five components contributing to the final construction of the *NERI* index. Each of the indicators was normalised into a basic index with a zero-10 relative score system at the base year. The best and worst performing province then receive scores of 1- and zero, respectively, in each indicator.

Government and Market Relations: the paper measures the level of resource allocation by governments and the market by looking at the share of government budgetary expenses in GDP.¹⁹

Development of the Non-State Enterprise Sector: the non-state enterprise sector consists of private/foreign-funded/share-holding companies as well as collectively-owned enterprises.²⁰

Development of the Commodity Market: the *NERI* index uses enterprise survey data to measure the level of reduction in local trade protection.

Development of the Factor Market: data from a few sectors was measured to construct this sub index: i) Labour market development²¹ ii) Financial market iii) Development in technology market.

¹⁹Although such measures are not accurately related to marketisation – especially after the transition period the share of government budgetary expenses will tend to stabilize – but for now, it is nevertheless still a good indicator for market oriented institutional reforms based on previous trend.

²⁰ In our paper, specifically in data regression, the sub-category of collectively owned firms are grouped under state ownership rather than non-state ownership as traditionally they are under state guidance and control. As a result, there could be slight inaccuracy in reported results relevant to this institutional measure.

²¹ Data from this sector shows that there is an increase in labour mobility and reduction in institutional barriers in the labour market. This result could be understated due to incomplete data.

Market Intermediaries and the Legal Environment for the Market: The share of independent accountants and lawyers in the total population reflects current market development and was taken into consideration while measuring this indicator.²²

We employ two different sources to obtain more differentiated indicators of institutional development to test respectively Hypotheses H1a to H1d and H2a to H2e. The first set has been developed by Du et al. (2007) for a study of FDI location choice, and covers intellectual property rights protection, contract enforcement and government corruption. These institutional measures were designed to measure the impact of institutions on FDI location choice using evidence from US multinationals in China.

The first of these indices measures property right protection (Hypothesis 1a) by measuring the logarithm of the number of approved patents per capita (available in China statistical Yearbook, various issues) for, the year 1992 to 2000. Although patents approved per capita is generally treated as a measure of technology and the number of patents could be an outcome of technology as well as human capital endowment and other factors in various regions, property rights protection provided by regional government no doubt plays an important role.

From the “Survey of China’s Private Enterprises”, the indicator of *government corruption* (Hypothesis 1b) is constructed by measuring the proportion of private enterprises answering “yes” to the question “is it necessary to have stricter policies against government corruption in your region?”. As a result, this is a highly subjective survey-based index on entrepreneurs’ perception of the severity of corruption.

Contract enforcement (Hypothesis 1c) hinges on legal institutions and law enforcement. From the “Survey of Private Enterprises”, the variable contract enforcement was constructed by measuring the proportion of private entrepreneurs

²² The number of consultants, chambers of commerce, and other professionals was not available. The legal environment is measured by using data on 4000 company leaders’ judgement collected from enterprises surveys and the protection of intellectual property rights was measured by using the only available information of patent applications and grants per technical personnel.

answering affirmatively to the question “will you use courts to resolve business disputes?”.

A number of Institutional Measures developed by the World Bank are adopted to test hypotheses 2a to 2e. The World Bank (2006) reports the competitiveness enhancements for 120 cities in China. The paper shows that city-level investment climate varies widely across regions by examining the data from a survey of 120 cities (and 12,400 firms) in China. Apart from regional level data on city environment, policies etc, 200 firms were selected from each of the four mega-cities (Beijing, Shanghai, Tianjin, Chongqing) and 100 firms from each of the rest of the cities to participate in the survey (Tibet region was not included in this survey). Of these, 8% are registered as majority state-owned, 28% as foreign-invested, and 64% as domestic non-state.

The 120 cities account for 70-80% of the total GDP and can represent China well on most of the institutional measures included in the documentation. The data was collected on a city level and then was divided into 5 regions in the World Bank report. In this chapter we examine the impact of institutional measures on a provincial level, therefore we have divided the 120 cities into 30 groups, each group with cities from the same province (Tibet not included so 30 provinces instead of 31). The average value of the data from each city within the same province was taken as the measure for this province. The data was only available for one single year, therefore here we use it as a cross-sectional measure without any time variance.

3.4.3 Explanatory Variables

The ownership in the data set is categorised into three ownership dummies, state-owned, private-owned, as well as foreign-owned (inclusive of firms with owners from Hong Kong, Macau and Taiwan). Due to the small number in foreign ownership, we grouped foreign and privately-owned firms together, and compared them to state-owned firms. We also adopted the following variables from the report.

Entertainment costs: measured by the proportion of output used on business entertainment. It measures the level of government interference together with Bureaucratic Intervention variable. The data report states that such costs are higher where local government provides poorer service or where the tax burden is higher. Cai, Fung and Xu (2005) find that higher entertainment and travel expenditure tend to be associated with poorer firm performance due to extra financial burden and that the quality of such costs is correlated with corporate governance.

Bureaucratic interaction: measures the hours spent dealing with government officials and is one of the two variables testing for government interference. Out of all regions, state owned firms face the highest demands for bureaucratic interaction.

Days to clear import/export: measured by the number of days required for import/export clearance and is an indicator of government effectiveness in regulatory activities.

Confidence in court/law enforcement: the survey asks about the likelihood that the responding firms' property and contract rights would be protected and enforced. And the variable confidence in law enforcement is measured by taking the average of these answers in the same province. This measures how effective is the law enforcement system in the economy.

Private SMEs with bank loans: measured by the share of private SMEs with bank loans in all private SMEs and proxies for the effectiveness of financial intermediaries.

Expected informal payment for loans: measured by the percentage of firms responding affirmatively to the question "is there a need for informal payments to bank staff in order to obtain loans". Among all surveyed firms, about 5-10% answered "yes". This variable is utilized to test for the level of corruption in the financial industry.

Unemployment: measured by the share of unemployed individuals in the workforce. This variable was entered in the analysis both in a linear and in a quadratic form, in order to test for the labour market effect on firms' TFP.

3.4.4 Moderating Variables

Two variables enter the analysis as moderating variables to examine under which conditions the difference between state and private ownership matters more (Hypotheses 4a and 4b). First, firm age has been calculated by subtracting the firms' years of establishment from the current year. It measures how long the firm has been established rather than how long it has been listed. Second, we measure size by the number of employees in the firm. There could be certain bias in using number of employees as size control as state-owned firms in China are often over-staffed. We chose not to use assets as a proxy as it is often correlated with other explanatory variables; moreover, state-owned firms normally have higher level of assets.

3.4.5 Control Variables

We also employ a number of control variables. First we have Size of Local Market which is the log of city population is used here as a measure for size instead of the level of city population due to the log distribution of data points. Then we use Level of Local Income, which is the annual average wage of the province of which the firm is located, as a control variable. Rodrik (1998) found that institutional quality increases with income and education and decreases with ethno-linguistic fragmentation, which indicates the importance of including average of city wage etc as control variable in the econometric analysis. We also introduce Industry, a dummy variable to control for different features in various industries. There are over 100 different industry categories in the dataset. A dummy variable is generated for each category then further grouped into more

aggregated industry dummies. The final industry dummies²³ used in the regressions are namely primary industry (includes agriculture, fishing, forestry, mining etc), light industry (includes food and beverage production, light manufacturing, processing etc) , heavy industry (includes energy and utility, machinery and equipment manufacturing etc) , and service industry (includes rail and air transportation support service, computer and telecommunication, hospitality etc). The two control variables adopted in the regression analysis are Log of City Population and Average Annual Wage, which measures the local market size and standard of living respectively.

3.4.6 Estimation Strategy

Our dependent variable is total factor productivity (TFP), which is the portion of output not explained by the amount of inputs used in production (Comin, 2006; Mahadevan 2004). The level of TFP is therefore determined by how efficiently and intensely the inputs are utilized in production.

There are several established methods in the past literature used for estimation of productivity of firms, notably the Olley and Pakes method (1996), Levinsohn and Petrin method (2004), and the Cobb-Douglas production function. We have neglected the first two methods as they both assume investment to be constantly positive. The widely used Cobb-Douglas production function is frequently estimated in percentage changes, with the growth in output regressed directly on the percentage growth in labor and capital and with the rate of growth of TFP obtained from the intercept term (Martin and Mitra, 2001). This specification is undesirable given our interest in the long-run structural relationship between TFP and other variables rather than the response of output to changes in inputs. Thus, we preferred to write the Cobb-Douglas production function for manufacturing as a log-linear function in the levels as follows. We start by estimating the TFP for

²³ The industry codes are of China's own practice according to the National Bureau of Statistics of China.

each firm as a residual in a value-added production function, where the value added is:

$$\text{Log}[Y_{it} - M_{it}] = \text{Log}(\text{VA})_{it}$$

$$\text{Log}[Y_{it} - M_{it}] = \beta_1 \text{Log}(\text{K})_{it} + \beta_2 \text{Log}(\text{L})_{it} + \ell_{it}$$

$$\text{Log}(\text{VA})_{it} = \beta_1 \text{Log}(\text{K})_{it} + \beta_2 \text{Log}(\text{L})_{it} + \ell_{it}$$

$$\text{TFP}_{it} = \text{Log}(\text{VA})_{it} - \hat{\beta}_1 \text{Log}(\text{K})_{it} - \hat{\beta}_2 \text{Log}(\text{L})_{it}$$

$\hat{\beta}_1$ and $\hat{\beta}_2$ are the estimated factor elasticities. By conducting econometric regressions using available panel data on above mentioned variables, the value of α and β can be easily obtained and thus TFP can then be calculated based on the function.

Results of TFP specification show that in China, labour was only explaining 20% of the changes in dependent variable, as opposed to the standard level for transition economies of about 60%, which means that the curve is not taken out of the $\ln\text{VA}$ and the linearity is not taken out of the residual/error term.²⁴ Such result also indicates the low wages in China in contrast to high level of capital investment.

Hypotheses H4a and H4c are stipulating differences of effect size between state-owned and private firms, and thus require an additional test. According to Paternoster et al (1998), the test statistic is

²⁴ Therefore we also attempted to construct TFP with translog approach. The translog production function is a generalization of the Cobb–Douglas production function. The name translog stands for 'transcendental logarithmic'.

The three factor translog production function is:

$$\ln(q) = \ln(A) + \alpha_L \ln(L) + \alpha_K \ln(K) + \alpha_M \ln(M) + \beta_{LL} \ln(L) \ln(L) + \beta_{KK} \ln(K) \ln(K) + \beta_{MM} \ln(M) \ln(M) + \beta_{LK} \ln(L) \ln(K) + \beta_{LM} \ln(L) \ln(M) + \beta_{KM} \ln(K) \ln(M) = f(L, K, M)$$

And $\ln\text{VA}$ can be written in a function as follows:

$$\ln\text{VA} = \alpha_0 + \alpha_1 \ln L + \alpha_2 \ln K + \alpha_3 (\ln L)^2 + \alpha_4 (\ln K)^2 + \alpha_5 (\ln L \ln K) + e$$

where L = labor, K = capital, M = materials and supplies, and q = product, VA = value added.

However, regressing TFP values estimated using this approach returned worse-off results in comparison to the TFP estimated using the standard Cobb-Douglas approach, and therefore we adopt the former TFP, albeit limitations.

$$z = (\beta_{\text{SOE}} - \beta_{\text{PE}}) / \sqrt{(\text{SE}\beta_{\text{SOE}})^2 - (\text{SE}\beta_{\text{PE}})^2}$$

where according to β_{SOE} and β_{PE} are the coefficient estimates for the pertinent variable in the regression on the subsamples of respectively SOE and PE, and $\text{SE}\beta_{\text{SOE}}$ and $\text{SE}\beta_{\text{PE}}$ are the respective standard errors).

The data are then regressed in whole using GLS method with random effects in order to examine the impact of independent variables on TFP in all firms. The sample is then split into subsamples according to firms' ownership type to further investigate how variables affected TFP differently in state owned and privately owned firms. Table 3.1 shows the explanatory variables estimated for each hypothesis test and the predicted sign of variable coefficients.

Table 3.1: Hypothetic predictions

	<i>Variable being tested</i>	<i>Predictive sign of coefficient</i>
<i>H1</i>	NERI index	+
<i>H1a</i>	Property rights	+
<i>H1b</i>	Contract enforcement	+
<i>H1c</i>	Corruption	-
<i>H2a</i>	Entertainment costs	-
	Bureaucratic interaction	-
<i>H2b</i>	Days to clear import/export	-
<i>H2c</i>	Confidence in court	+
<i>H2d</i>	Private SMEs with bank loans	+
<i>H2e</i>	Expected informal payment for loan	-
<i>H3</i>	Private_foreign ownership	+
<i>H4a</i>	Age	-
<i>H4b</i>	Number of employees	+
<i>H5a</i>	Local unemployment	-
<i>H5b</i>	Squared term of local unemployment	+
		for U-shaped upward curve

3.5 Results and Discussion

We utilize firm level data from over 1,000 listed companies in China together with data on regional institutions to test for the impact of institutions on firms' TFP, which measures firms' effectiveness in utilizing allocated resources. We regress the variables on the data sample as a whole to test for effect of general and specific institutions on effectiveness of all firms, before moving onto testing institutional impact on firms with different ownership by splitting the sample into two sub-samples covering state owned firms and non-state owned firms (privately and foreign owned).

Overall, our empirical analysis supports the widely held view that market supporting institutions are important for firm performance, here proxied by effectiveness measured as TFP. The results can be found in Table 3.2, 3.3 and 3.4.

The support for our main hypothesis H1 may not be that surprising in light of the literature. The *NERI* variable is positive and significant at 10% significance level. However, we find important support for some of the key underpinning arguments in institutional theory.

In testing hypothesis H1a to H1c we add a set of four measures of institutions that has been proposed by Du et al. (2008). Out of the four institutional measures, we found Government Intervention in Business Operations highly correlated with a few other explanatory variables. On the other hand, government intervention can be explained by two other variables, Entertainment Costs and Bureaucratic Intervention. Therefore we drop this variable in testing the hypotheses also aiming to get stronger results from the other three explanatory variables developed by the same study. They are regressed as a group and these variables allow us to simultaneously test for hypotheses H1a to H1c.

The results clearly indicate the pivotal role of property rights (H1a) which is positive at 5% significance level, in contrast, we did not find support for either government corruption (H1b) or contract enforcement (H1c) after controlling for the effects of property rights.

This is surprising as China's development did not come without a rampant corruption over the past three decades. State control and extensive intervention, lack of democracy and freedom of media, together with weak rule of law and enforcement all lead to severe corruption problems in modern China. However the regression results do not suggest significant impact of corruption on firms' TFP level. The other variable Contract Enforcement is not significant either in the full sample. This result is interesting in view that according to the World Bank –IFC study on “Doing Business” China ranks 79th for the ease of doing business – an average score across many indices – but ranks 15th on the item on contract enforcement. In other words, while businesses report considerable problems to doing business in China, contract enforcement does not seem to be one of them. Our results however indicate that the variation on this issue still is of concern, and perhaps the World Bank study covered primarily areas that have opened up to foreign investment, and in other areas of China issues of enforcement of contracts and property rights is still a major issue.

However, it is understood that in China, contracts are often not enforced by legally binding terms but rather by the informal social structure and norms. As such norms or the Chinese culture of *guanxi* (relationship) makes up a big part of institutional environment in which the firms operate, it can be problematic for firms with little of insufficient local knowledge and hence making the market more opaque in nature as well as reducing the attractiveness of local market.

The significant and positive effect of Property Rights Protection in the aggregate model suggests that property rights take a central role in theorizing in economics. In contrast, recent work on institutional theory literature in the management literature (e.g. Kostova et al., 2008) has paid only scant attention to property rights. This suggests that, perhaps, management scholars may want to incorporate work on the economics of property rights, and the various aspects of their definitions and enforcement, in their theories. Until fairly recently, China maintained the level of private properties by implementing various regulations and rules due to a lack of formal property rights protection. Therefore the measure of property rights protection in this chapter intensely reflects the *de facto* property rights protection across all the regions.

Table 3.2. Regression results on hypothesis H1, H1a, H1b, H1c, H2a, H2b, H2c, H2d and H2e

	<i>H1</i>	<i>H1a,b,c</i>	<i>H2a</i>	<i>H2b</i>	<i>H2c</i>	<i>H2d,e</i>
<i>NERI</i>	0.01803* (1.93)					
<i>PropertyRightsProtection</i>		0.14491** (2.15)				
<i>GovernmentCurrection</i>		0.00239 (0.01)				
<i>ContractEnforcement</i>		-0.14073 (-0.31)				
<i>EntertainmentCosts</i>			-0.27203*** (-3.57)			
<i>BureaucraticInteraction</i>			0.00268 (1.44)			
<i>DaysToClearImport/Export</i>				-0.02245*** (-3.22)		
<i>FinancialIntermediaries</i>						0.00252 (1.38)
<i>FinancialCorruption</i>						-0.00087 (-0.09)
<i>ConfidenceInCourt</i>					0.00649*** (2.98)	
<i>Private_Foreign</i>	-0.07691 (-1.40)	0.06211 (1.42)	0.08571** (2.07)	0.07715* (1.87)	0.07421* (1.79)	0.08406** (2.03)
<i>Age</i>	-0.05806*** (-7.69)	-0.06064*** (-9.80)	-0.05831*** (-9.94)	-0.05973*** (-10.18)	-0.05814*** (-9.90)	-0.05753*** (-9.65)
<i>NumberOfEmployees</i>	0.00001*** (5.45)	0.00001*** (12.71)	0.00001*** (12.88)	0.00001*** (13.12)	0.00001*** (13.05)	0.00001*** (12.86)
<i>Number of Observations</i>	7151	11062	11845	11845	11845	11845
<i>Wald chi2</i>	131.91	382.56	409.28	406.74	405.01	396.42
<i>R² (overall)</i>	0.0559	0.0786	0.0788	0.0787	0.0782	0.0738

Table 3.3. Regression results on hypothesis H3, H4a and H4b

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	<i>state</i>	<i>private</i>	<i>state</i>	<i>private</i>	<i>state</i>	<i>private</i>	<i>state</i>	<i>private</i>	<i>state</i>	<i>private</i>	<i>state</i>	<i>private</i>
NERI	0.01827*	0.02088										
	(1.70)	(1.07)										
PropertyRightsProtection			0.15492*	0.19404*								
			(1.81)	(1.72)								
GovernmentCorruption			-0.13729	0.21702								
			(-0.46)	(0.54)								
ContractEnforcement			-0.21872	0.34542								
			(-0.39)	(0.43)								
EntertainmentCosts					-0.2803***	-0.2700**						
					(-2.73)	(-2.28)						
BureaucraticInteraction					0.00125	0.00255						
					(0.55)	(0.76)						
DaysToClearImportExport							-0.0249***	-0.02713**				
							(-2.83)	(-2.24)				
FinancialIntermediaries									0.00142	0.00460*		
									(0.58)	(1.67)		
FinancialCorruption									-0.00169	-0.00804		
									(-0.14)	(-0.48)		
ConfidenceInCourt											0.00673**	0.00877**
											(2.36)	(2.49)
Age	-0.063***	-0.040***	-0.0702***	-0.046***	-0.0673***	-0.0459***	-0.0687***	-0.0466***	-0.0652***	-0.0449***	-0.0671***	-0.0444***
	(-6.74)	(-3.07)	(-8.00)	(-5.08)	(-8.04)	(-5.42)	(-8.19)	(-5.56)	(-7.72)	(-5.22)	(-8.04)	(-5.23)
NumberOfEmployees	0.00001***	3.73E-06	0.00001***	0.00003***	0.00001***	0.00003***	0.00001***	0.00003***	0.00001***	0.00003***	0.00001***	0.00003***
	(5.30)	(0.36)	(11.06)	(4.30)	(11.23)	(4.20)	(11.42)	(4.22)	(11.23)	(4.23)	(11.33)	(4.27)
Number of Observations	5432	1695	8046	2968	8554	3243	8554	3243	8554	3243	8554	3243
Wald chi2	112.19	17.80	303.26	59.33	314.51	68.70	315.44	68.59	305.93	66.24	312.42	69.82
R² (overall)	0.0643	0.0237	0.0962	0.0400	0.0956	0.0447	0.0956	0.0445	0.0920	0.0417	0.0942	0.0472

Table 3.4. Regression results for hypothesis H5a and H5b

	<i>H5a</i>	<i>H5b</i>
<i>Unemployment</i>	-0.09911*** (-3.33)	-0.45701** (-2.30)
<i>QuadraticUnemployment</i>		0.04962* (1.82)
<i>Age</i>	-0.05588*** (-9.42)	-0.05550** (-9.35)
<i>NumberOfEmployees</i>	0.00001*** (12.69)	0.00001*** (12.56)
<i>Private_Foreign</i>	0.08186** (1.98)	0.08362** (2.02)
<i>Number of Observations</i>	11845	11845
<i>Wald chi2</i>	416.30	419.90
<i>R² (overall)</i>	0.0798	0.0813

We here made a distinction of between property rights and private ownership, which is a unique practice, as in the view of most literatures they are synonymous, but they may not be so in China. Our results confirm that there are indeed differences between these two measures.

In table 3.2, when we include both property rights and a private ownership dummy in the specification, only the property rights variable has a significant coefficient. Once this variable is dropped from the specification and other measures of institutional quality are added, the coefficient of the private ownership dummy becomes significant. In Table 3.3, the coefficient of the property rights variable is significant for the private firms. In other words, it is the property rights aspect of private ownership that matters more than other aspects of private ownership that are captured by the dummy. Property rights aspect also shows higher impact on privately owned firms compared to state owned firms. The employment factor could also contribute to this difference as the quality of employment in the private sector is higher than in the state sector due to the common problem such as overstaffing and policy employment in the state owned firms.

In testing H2a to H2e we adopt institutional measures developed by the World Bank (2006). Data from a survey of 120 cities (and 12,400 firms) in China was examined. As we aim to examine provincial level impact of institutions, we further group the 120 cities into 30 provinces and take the average value as the provincial institutional measure. As Tibet was not included in the survey, we only generate institutional measures for 30 provinces instead of 31 and hence some missing values are present in the dataset. On another note, most of the selected firms in the survey are non-state owned (only 8% registered as majority state-owned), which does not coincide with base data (66.25%), hence the regressions are likely to generate weaker results.

Moving on to hypothesis 2a, which is tested by explanatory variables Entertainment Costs and Bureaucratic Interaction. Entertainment costs variable is measured by the proportion of output used on business entertainment. We found that Entertainment Costs have a strong negative effect at 1% significance level, suggesting substantive side effect of businesses having to allocate top

management time and other resources to building networks. However, it is not specified whether this cost is only for bureaucratic agencies or also inclusive of costs on entertaining other businesses hence cannot be concluded that government intervention is the major obstacle for firm efficiency. Bureaucratic Interaction variable shows no significant impact on TFP.

We also found that Days to Clear Imports/Exports has a significant and negative effect on TFP at 1% significance level, indicating that delays and costs that are associated with authority inefficiencies are major problems for companies in China.

We have also tested for the impact on supporting institutions in terms of the legal systems (H2c) and the financial system (H2d and H2e). We found significant support for the effect of the legal system, which reinforces our theme of property rights, because a pivotal role of the legal system is to ensure the protection of property rights. With respect to the legal system, which was measured by the variable Confidence in Courts, we find that it indeed has a highly significant positive effect on TFP at 1% significance level. This highly significant effect applies to both state and privately owned firms in the whole sample and supports our hypothesis H1c.

With respect to the financial system, Private SMEs with Bank Loans variable reflects the effectiveness of financial intermediaries as well as the accessibility of loans to private firms. The variable Expected Informal Payment for Loans measures the expected amount of payment needed to guarantee a loan from banks, which indicates the level of corruption in the financial sector. Financial intermediaries can affect firms' effectiveness by determining the accessibility of external finance. When the costs of obtaining external finance is high, firms resort to their internal cash reserve for investment implementation, thus are constrained of liquidity. Such constraints lower the spending on technology and labour efficiency improvement such as new accounting software or staff training programs. Such limitation on improvement then leads to lower effectiveness of the utilization of allocated resources, causing x-inefficiency. When the financial sector is highly corrupted, informal payment or other forms of benefits are often given to bank managers by firms applying for funding; the extra costs of both

money and labour will then lower firms' effectiveness. Both variables show no signs of significance, hence H2d and H2e are not supported by our regression results. Our additional test on private firms only shows that indeed the financial system accessibility has more of an effect on private sector development, but state-owned firms are less affected, which coincides with our findings in previous chapters, which argues state-owned firms have preferential treatment in terms of bank lending.

Our third hypothesis proposes that the institutional impact on private firms' effectiveness in the form of TFP is greater compared to state owned firms when the institutional context is stronger. Before testing for hypothesis 3, we run a baseline regression without any explanatory variables to highlight the impact of ownership dummies on firms' TFP level. We found that, consistent with majority of results obtained from other regressions while other explanatory variables were present in the model, the result shows a strong positive correlation between *private_foreign* ownership and firms' TFP level (at 5% significance level), consistent with our argument in the previous chapters that state owned firms are poorer performers compared to private firms.

However, the evidence on hypothesis H3 is mixed in the sense that coefficients are not always pointing at the right direction. For instance the *NERI* variable shows that state owned firms benefits more in term of TFP when quality of such institution increases. But for more specific institutional measures such as *Property Rights Protection*, private firms show a stronger improvement in TFP in comparison with the state owned firms. This suggests that private firms in domestic or foreign ownership are not necessarily more effective in utilising factors, under the same institutional conditions at all times. The results hence cannot confirm that privately owned firms achieve higher firm effectiveness than state-owned firms (H3) when the institutional context is stronger.

As for hypothesis 4a, after some mathematical exercises, we found the moderating effect is present on this moderating variable. The results show strong negative coefficient for Age variable at 1% significance level, and the Z-stats is also significant for the difference in Age coefficients between private and state owned firms at 10% significance level and hence supports H4a. This shows the

institutionalization of routines and the embeddedness in the old system are a greater obstacle to effectiveness in state owned firms than privately owned firms. However even private firms do experience an inertia as they age, that is that they are less flexible in reacting to new opportunities in a rapid changing environment.

In terms of hypothesis 4b, apparently economy of scale and better network relationships of larger firms increase TFP, and larger firms are more efficient in utilising the inputs of the production (i.e. labour and capital). The positive coefficient also indicates that the firms are not operating at diminishing rate of return on scale i.e. double input \neq double output. The coefficients for the Size variable is also statistically different for private and state owned firms, at 1% significance level.

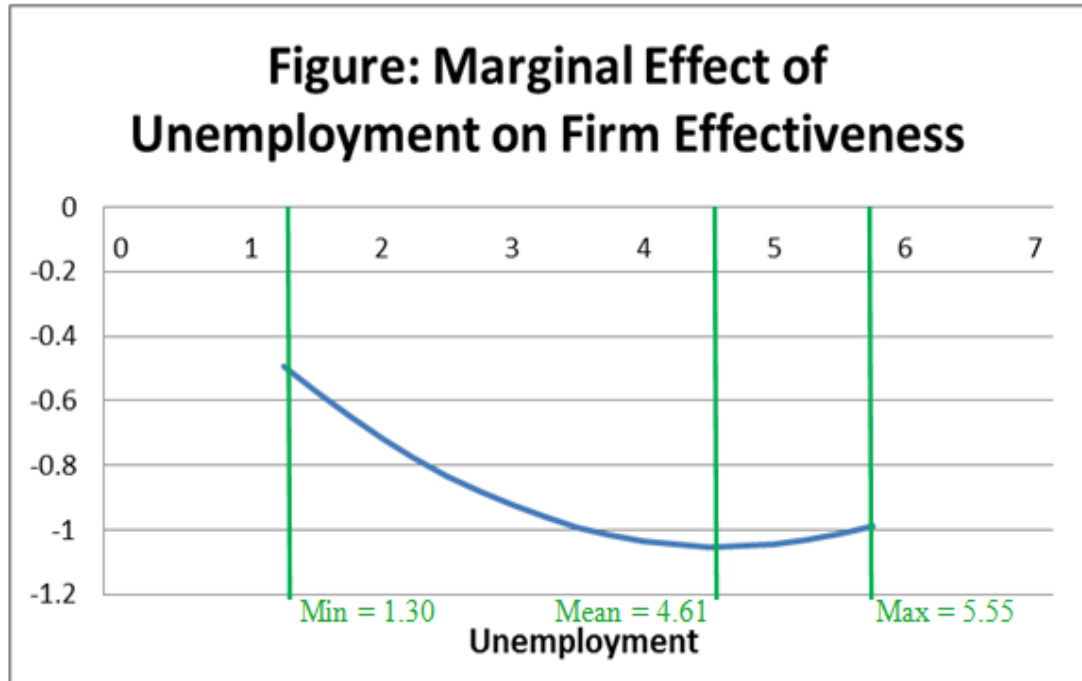
The results indicate that some larger firms in China have higher productivity and firm effectiveness. Higher TFP (which isn't explained by factors such as labour or capital) means that (together with the size being very significant) larger firms are more inefficient in utilising the factors (due to overstaffing of state owned firms, for example) but more efficient in other aspects i.e. organisational structure etc. This could also be because those bigger firms have better connections, more exports, better price from suppliers etc.

We did not find any other variables with strong enough coefficient difference between state owned and private firms. One reason behind this could be the small sample size on private firms.

With respect to the labour market, Unemployment in the province has a negative effect on TFP. The quadratic effect is also significant, suggesting a U shaped relationship. Together these results indicate that there is a negative effect for most of range of the variable, and a positive effect for very high level of unemployment. The fact that we have significance without the quadratic term indicates that most likely the upward curve falls outside the range of the unemployment. Figure 3.2 illustrates the asymmetrical nature of the U-shaped marginal effects of unemployment on TFP.

Figure 3.2: Marginal Effect of Unemployment on Firm Effectiveness

(The turning point for the curve is when unemployment is at 4.52%)



Unemployment measures the level of unemployment of the region at a given time, and indicates the level of movement in workforce. Unemployment rate can affect firms' TFP in different ways. The higher unemployment rate, the higher the bargaining power of companies as there is excess supply of labour. On the other hand, higher unemployment puts pressure on state owned firms as overstaffing issue can become prominent.

Chinese firms operate under a political system, which means that when unemployment in a region is high, government tends to intervene in various ways. In region where unemployment rate is high, there could be more support/incentive from government to encourage local firms to hire more people, which leads to rent seeking behaviour of firms rather than profit and efficiency maximization, which reduces TFP level. On the other hand, high unemployment in a region could also be caused by the low level of education or skills possessed by local workforce, therefore local firms have lower TFP due to the largely unskilled workers. There could also be a threshold effect. With all regions government might adopt an equal policy on unemployment and therefore the negative impact of state

intervention on TFP is at a constant level, therefore places with higher unemployment would have crowded out the effect.

3.5.1 Limitations

One of the main determinants of TFP identified in the literature is the firms' endowment with technology. For example, Comin (2006) argues that change in TFP is largely related to technology and innovation thus the importance of R&D was highlighted. He also points out that cross-country difference in TFP can be due to differences in the physical technology used by those countries or in the efficiency with which technologies are used. Many papers attempted to measure the technological impact on TFP change but seldom linked TFP to institutional measures on the regional level. In our study, there is a lack of appropriate control for technology endowment at the level of province. However, we argue that technology is endogenous to institutional development because more market oriented institutions also enhance firms' ability to create, transfer and accumulate technology based assets.

TFP, by definition, can be accurately measured by Solow residual only if three conditions are satisfied: 1) a neoclassical production function 2) there is perfect competition in the capital markets 3) the growth rates of the inputs are measured accurately. Another limitation of the study also links to measurement issues. The variable "*Intellectual Rights Protection*" that we adopted and tested (results not shown) from Du et al. 2008 is measured by the "number of approved patents per capita". One could argue that this variable captures the intensity of research activity, rather than the institutional framework governing such activity. While these two variables are closely associated, there is a possibility of a measurement error here, which may explain why this variable remains insignificant in our regression analysis.

Future researches and studies could focus on a wider range of firms with more diversity in characteristics (i.e. small to medium sized firms that are not listed in the stock market). By including more firms with private ownership in the study

could also test more accurately whether there is a significant difference between the impact of institutions on state-owned firms and private-owned firms.

The summary of regression analysis are reported in three panels in table 6 (panel A to E), summarizing the actual effects on firm TFP or effectiveness in comparison to the hypothetic predictions. Panel A to Panel D are all tested based on full size sample of the data as well as sub samples divided according to institutional ownership category. Panel E represents results tested from the aggregated sample only. We tested all variables to rule out high correlation, and a sample bias test was also done to ensure the selected sample represents the whole population to the best.

Table 3.5. Hypothetic predictions and actual results

<i>Panel A</i>		<i>Variable being tested</i>		<i>Predictive sign of coefficient</i>	<i>Actual sign of efficient</i>	<i>Hypothesis being supported</i>
<i>H1</i>		NERI index		+	+*	yes
<i>H1a</i>		Property rights		+	+**	yes
<i>H1b</i>		Contract enforcement		+	not significant	no
<i>H1c</i>		Corruption		-	not significant	no
<i>Panel B</i>		<i>Variable being tested</i>		<i>Predictive sign of coefficient</i>	<i>Actual sign of efficient</i>	<i>Hypothesis being supported</i>
<i>H2a</i>		Entertainment costs		-	_-***	yes
		Bureaucratic interaction		-	not significant	
<i>H2b</i>		Days to clear import/export		-	_-***	yes
<i>H2c</i>		Confidence in court		+	+***	yes
<i>H2d</i>		Private SMEs with bank loans		+	not significant	no
<i>H2e</i>		Expected informal payment for loan		-	not significant	no

Table 3.5 (continued). Hypothetic predictions and actual results

Panel C	Variable being tested	Predictive sign of coefficient	Actual sign of efficient	Hypothesis being supported
H3	Private_foreign ownership	+	mixed	no
Panel D	Variable being tested	Predictive sign of coefficient	Actual sign of efficient	Hypothesis being supported
H4a	Age	-	-.***	yes
H4b	Number of employees	+	+***	yes
Panel E	Variable being tested	Predictive sign of coefficient	Actual sign of efficient	Hypothesis being supported
H5a	Local unemployment	-	-.**	yes
H5b	Squared term of local unemployment	+	+*	yes

3.6 Conclusion

Institutional development is widely viewed as the core to economic reform in transition economies. And in the Chinese context, it is also considered as crucial to improving firms' efficiency. By studying local institutional impact on firm performance, measured by TFP, we are able to have a clearer picture on how such market mechanism can affect firms' effectiveness in China and which aspects of institutions should we draw particular attention to.

The chapter provides more accurate findings compared to similar studies for a number of reasons. First, we constructed a unique data set which comprises of three sets of provincial level institutional data, which has been widely adopted and used separately. We then modelled them with a rich variety of carefully selected control variables.

Secondly, most studies on institutional impacts usually focus on inter-country variation of institutional change and how such differences affect local businesses. However, the difference in firms' performance these studies witness could largely be caused by difference in other factors unrelated to institutions, for instance, local market size, population and purchasing power. Due to the unique nature of China, we are able to compare across region within the same country, thus controlling for a lot of country specific and region specific effects, which avoids the misinterpretation of results and improves accuracy.

The findings of this study suggest that institutions quality indeed has an impact on business performance, measured by TFP here, and that improving institutions to facilitate business operations is crucial for firms to achieve higher efficiency and sustainable growth. Property rights protection and law enforcement both enhances firms' TFP while corruption, government inefficiency as well as financial sector collusion all hinders the firms' effectiveness. Such results indicate the great need for further reform in the institution context in China. Particularly, the improvement of financial intermediaries, as discussed in the previous chapters, will reduce costs for firms needing external finance and facilitate the implementation of profitable investment projects, thus reducing transaction costs and increasing firm effectiveness. Regulations and policies need to be strengthened and tightened encourage transparency in doing business as well as government activities to reduce

the chance of collusion as well as corruption. The results also state that both the size and age of firm has a moderating effect on firms' TFP and such effects differ by the firm's institutional ownership. Finally, we find negative correlation between regional unemployment and firm's TFP level, which implies the overstaffing practice of local government reduces firm effectiveness. In order for firm to achieve higher level of TFP, government needs to promote a free market economy where firms are less restricted and interfered by the political agenda.

Conclusion

The thesis consists of three standalone essays which are interlinked within the Chinese economic context. The privatization of state owned firms and banks as well as economic reform in the sense of institutional changes enables us to test for the determinants of an array of corporate finance related variables on large variety of firm specific explanatory variables, with institutional ownership as our focus.

In the first chapter on bank financing, we utilize data on financial information of over 6,000 firms in Hubei province and find that state ownership is highly correlated with banks' lending decision. The results suggest that despite three decades of reform, ownership of firms still matters for bank lending. The results support the research hypothesis of discrimination towards privately owned firms in banks' lending process in China. Banks lend heavily to state owned firms for reasons including a better guarantee of repayment, higher information transparency, local employment benefit, personal gain, as well as collusion and corruption between management of local banks and state owned firms.

We also find that, regardless of firms' ownership, profitability is negatively correlated with firms' accessibility to loans, indicating what might be considered irrational behaviour on the lender side if the Chinese economy were a conventional market one. As privately owned firms are generally better performers in term of profitability in China (Kato & Long, 2004; Sun, et al., 2002; Z. Wei & Varela, 2003; X. Xu & Y. Wang, 1999), such a finding confirms the existence of the banks' soft budget constraint. Studies by Tian and Estrin (2007) and Roland, Kornai and Maskin (2003) point out the facilitating role of soft budget constraints plays in the collapse of the banking sector of East Asian economies in the 1990s.

In addition, our results indicate that firm size, growth rate, and the ability to secure debt against collateral all have significant positive impact on firms' likelihood of obtaining bank loans. The exception is credit history, which is negatively correlated with the level of debt, indicating that banks view past borrowing as a risk on loan repayment and a sign of financial distress. We also note the facilitating role of debt on managerial exploitation, in comparison to a governance role in the Western economy.

Our results are robust with respect to alternative performance measures, lagged time periods and also sample periods. Our empirical results confirm that banks display favouritism in their lending behaviour towards state owned firms, perhaps as a result of guaranteed loan repayment and low default risk, disregarding the profitability and growth outlook of other firms.

The presence of such lending bias could be caused by several factors. Firstly, due to the long standing relationship between state owned banks and state owned firms, it is relatively easy for banks to lend to previous borrowers as both the costs of transaction and information asymmetry is low. It is expected that State-owned firms use established past relationship to gain easy access to loans from State-owned banks. Relationship (guanxi) lending can also be a major factor explaining banks' behaviour. In the Chinese banking market, state owned banks either assume the role to minimize market failure, or respond to political pressure by lending to firms with long established relationship, which are mostly state owned. When banks do not have easy access to transparent "soft" information on firms, they prefer allocating credit to firms with established borrowing history and repayment record. As the banks in China are still in the middle of the stage to convert themselves from lending heavily to state owned firms under government guidance to market oriented, profit maximizing agents, the level of knowledge in certain industries which are made up by mainly privately owned firms is low, which promotes relationship lending to state owned firms by banks due to the lack of information on these firms. It is then of state owned firms' incentive to focus on maintaining a good relationship with the banks to ensure future flow of external finance, thus productivity can be overlooked.

Secondly, the risk associated with lending to private firms are much higher in comparison, as when state owned firms are making losses and repayment cannot be guaranteed, the government steps in and writes it off or simply order the bank to lend more to the struggling firm. There is hardly any default risk involving state owned firms as the government will always bail them out financially.

Thirdly, it is common for Chinese government to require banks to provide "policy loans" to state owned firms that are not profitable, either due to their own political

agenda of consolidating political powers, or because personal favours have been promised. Banks often face considerable pressure from (local) government to lend on a non-commercial basis. Bank managers usually have to compromise with the local government as the managers need local support, or they could benefit from some sort of personal gain from it. Therefore, collusion and corruption are major causes for such lending bias too. It is also of the government's interest to protect the state owned firms as most of them are large in size and over-stuffed. If a large state owned firm goes bankrupt, it will cause a heavy burden on local unemployment and thus costs for the government. The networks between State owned banks and State owned firms means that it is almost a historical "tradition" to lend more to State-owned firms.

Lastly, it is not uncommon that bank managers authorise a loan to privately owned firms at a higher interest rate, but register it under policy lending to state owned firms to profit from the difference in interest rate. The double counting problem means that the lending bias could be exaggerated in our model.

The results show signs indicating the Chinese banks are more prudent in lending practice than they might seem to most of the Western opinions. The banks prefer firms with established credit history with good (or guaranteed) record of loan repayment, thus minimizing their risks of default loans.

However these findings are not indicators of good practice as such behaviour does not promote healthy market competition and firms have no incentives to improve performance or efficiency. When banks tend to lend to a typical type of firms only, it could lead to a lower productivity of investment and a greater concentration of risk, leading to a greater risk of financial crisis (Perotti, 1993). It also does not promote sustainable growth and correct management style.

The banks also lack in expertise in certain industrial sectors that many privately owned firms belong to, or the technology these firms adopt, which in turn results in higher rate of loan refusals for privately owned firms. Profitable privately owned firms face the risk of being crowded out of the market due to difficulty and high costs of external financing, and eventually may result in weaker and unstable economy. Studies by Tian and Estrin (2007) and Roland, Kornai and Maskin(2003)

point out the facilitating role of soft budget constraints plays in the collapse of the banking sector of East Asian economies in the 1990s.

Direct state ownership of the banks also mean that the loans granted are often associated with political purposes. State owned firms are notoriously known for their overstaffing and low productivity as a partial result. The government can guarantee an unprofitable firm of low cost of bank loans in return for promises of employment to either ease local unemployment figure or for personal favours. Profitable privately owned firms may be reluctant in applying for bank financing and opt for internal cash reserves when the need arises, in order to avoid taking on political agendas.

Therefore such bank practice does not promote healthy market competition and firms have no incentives to improve performance or efficiency. Also when banks have a tendency to lend to a typical type of firms only, it could lead to a lower productivity of investment and a greater concentration of risk, leading to a greater risk of financial crisis (Perotti, 1993). Profitable privately owned firms face the risk of being crowded out of the market due to the difficulty and high costs of external financing, and this eventually may result in a weaker and more unstable economy.

Highly concentrated risks mean that a deeper and more thorough reform will be needed for the Chinese banking sector, mainly through the privatization and commercialization of state owned banks. Diversification of loans to profitable firms with sustainable growth would permit greater financial stability. The government needs to change the policy towards lending and promote more efficient, mature, and transparent bank management.

The relationship between firm financing constraints and investment – cash flow sensitivity has been an important topic of academic debate in recent years. Both FHP and KZ/Cleary studies show weakness in explanatory power in certain areas and the second chapter aims to pin down the relationship by using a large sample in a unique transitional economy like China.

The second chapter finds that privately owned firms exhibits significantly greater sensitivity to their financial status than state owned firms. It employs data on over

1,700 listed firms in China. Higher sensitivities can be interpreted as evidence that firms are more financially constrained and that there is no strong theoretical reason to expect a monotonic relationship. Our results reconcile with the findings from earlier studies by FHP and KZ/Cleary. However the findings indicate that, although cash flow has an overall positive impact on firms' implementation of investment projects, it affects privately owned firms and state owned firms in drastically different ways. Such a finding has not been proposed by earlier studies. The results show that in the state sector, cash flow either has a negative impact on firm level investment, or the correlation is of no significance. This indicates the agency problem in state owned firms, which is further facilitated by the role of debt (also reference to first chapter for details and empirical evidence). Furthermore, as we have discussed in the first chapter, bank lending to state owned firms is often associated with political agenda of the local government, and compulsory investment can be a major purpose for credit allocation. As a result, many state owned firms may still make investment of high monetary value even though they are making very low level of profit or even a loss. Allayannis and Mozumdar (2002) also argue that, when in extremely bad financial shape, the firm no longer responds greatly to the fluctuation of internal funds but only makes the essential investment, hence resulting in insignificant or even negative correlation between investment and cash flow.

In contrast, private firms' investment is positively correlated with cash flow with strong significance, implying the availability and level of internal finance is a major determinant in firms' investment decision. This confirms that such firms are more financially constrained compared to their state owned counterparts and supports the conclusion of a presence of lending bias in the first chapter. The positive correlation between cash stock at time t and lagged time $t-1$ and $t-2$ indicate that firms in the private sector stock up cash in preparation for future investment needs in order to overcome the financial hurdle.

As we have discussed in the first chapter, bank lending to state owned firms are often policy lending directed by the government which is associated with political agenda such as fixed investment plans or promise of employment. As a result, despite making little profit or even a loss, many state owned firms still invest heavily, which explains why cash flow can sometimes show little or negative

correlation with investment. Also as discussed by Allayannis and Mozumdar (2002), when firms are in extremely bad financial shape, the firm no longer show high sensitivity to the fluctuation of internal funds but only makes the absolute amount of investment that is necessary, which also contributes to the non-positive correlation between cash flow and investment.

We also find that the profitability, size and age of firms affect the cash flow sensitivity of investment. For state owned firms, both size (measured by number of employees) and profitability (measured by Tobin's q) shows a significant negative impact on cash flow sensitivity, contradicting the predictions from economic theory. This can be attributed to the unique nature of state owned firms in China, as they are mostly overstaffed, with high growth rate and low efficiency. The inaccurate measurement of Tobin's q in the Chinese context (where valuations are not necessarily free market determined) also contributed to the puzzling results. For privately owned firms, only size shows a positive effect on the sensitivity of investment to cash flow, indicating that in the private sector, larger firms are less financially constrained. However, neither profitability nor age has a significant impact on such sensitivity. As discussed in the previous paragraph, very profitable privately owned firms will choose internal finance over bank loans even when they are easily obtainable to avoid taking on unnecessary employment or making undesirable investment.

The chapter therefore finds that privately owned firms exhibits significantly greater sensitivities than state owned firms. Thus the results suggest that higher sensitivities can be interpreted as evidence that firms are more financially constrained and that there is no strong theoretical reason to expect a monotonic relationship. The results also provide empirical evidence in favour of our theories on investment behaviour and cash flow, and further extend the existing tests in the literature for financial constraints in firms to the Chinese context. This highlights the urgent needs for deeper banking reform to further commercialize the state owned banks as well as to reduce state intervention and direction in the form of policy lending. The results of this chapter are also consistent with the findings of the first chapter showing that privately owned firms in China face lending bias and are indeed financially constrained. The limitation on data (consists of only listed firms in China) and

measures for Tobin's q arguably reduce the explanatory power of our model, which can be of interest for future researchers.

Institutional development is widely viewed as the core to economic reform in transition economies. And in the Chinese context, it is also considered as crucial to improving firms' efficiency. Such development is closely tied to economic growth, development of financial market and legal environment, improvement of business process, and attraction of foreign direct investment. By studying local institutional impact on firm performance, measured by TFP, we are able to have a clearer picture on how such market mechanism can affect firms' effectiveness in China and which to aspects of institutions should particular attention be drawn.

Our research in the third chapter provides more accurate findings compared to similar studies for a number of reasons. First, we constructed a unique data set which comprises of three sets of provincial level institutional data, which has been widely adopted and used separately. We then modelled them with a rich variety of carefully selected control variables.

Secondly, most studies on institutional impacts usually focus on inter-country variation of institutional change and how such differences affect local businesses. However, the difference in firms' performance these studies witness could largely be caused by difference in other factors unrelated to institutions, for instance, local market size, population and purchasing power. Due to the unique nature of China, we are able to compare across region within the same country, thus controlling for a lot of country specific and region specific effects, which avoids the misinterpretation of results and improves accuracy.

The findings of this chapter suggest that institutions quality indeed has an impact on business performance, measured by TFP, and that improving institutions to facilitate business operations is crucial for firms to achieve higher efficiency and sustainable growth. Overall, our empirical analysis supports the widely held view that market supporting institutions are important for firm performance, here proxied by effectiveness measured as TFP. We also find important support for some of the key underpinning arguments in institutional theory.

We found Government Intervention in Business Operations highly correlated with a few other explanatory variables. On the other hand, government intervention can be explained by two other variables, Entertainment Costs and Bureaucratic Intervention. The results clearly indicate the pivotal role of property rights, in contrast, we did not find support for either government corruption or contract enforcement after controlling for the effects of property rights.

This is surprising as China's development did not come without a rampant corruption over the past three decades. State control and extensive intervention, lack of democracy and freedom of media, together with weak rule of law and enforcement all lead to severe corruption problems in modern China. However the regression results do not suggest significant impact of corruption on firms' TFP level. The other variable Contract Enforcement is not significant either in the full sample. This result is interesting in view that according to the World Bank –IFC study on “Doing Business” China ranks 79th for the ease of doing business – an average score across many indices – but ranks 15th on the item on contract enforcement. In other words, while businesses report considerable problems to doing business in China, contract enforcement does not seem to be one of them. Our results however indicate that the variation on this issue still is of concern, and perhaps the World Bank study covered primarily areas that have opened up to foreign investment, and in other areas of China issues of enforcement of contracts and property rights is still a major issue.

However, it is understood that in China, contracts are often not enforced by legally binding terms but rather by the informal social structure and norms. As such norms or the Chinese culture of *guanxi* (relationship) makes up a big part of institutional environment in which the firms operate, it can be problematic for firms with little of insufficient local knowledge and hence making the market more opaque in nature as well as reducing the attractiveness of local market.

The significant and positive effect of Property Rights Protection in the aggregate model suggests that property rights take a central role in theorizing in economics. In contrast, recent work on institutional theory literature in the management literature (e.g. Kostova et al., 2008) has paid only scant attention to property rights. This suggests that, perhaps, management scholars may want to incorporate work on the economics of property rights, and the various aspects of their definitions and enforcement, in their theories. Until fairly recently, China maintained the level of

private properties by implementing various regulations and rules due to a lack of formal property rights protection. Therefore the measure of property rights protection in this chapter intensely reflects the de facto property rights protection across all the regions.

We also made a distinction of between property rights and private ownership, which is a unique practice, as in the view of most literatures they are synonymous, but they may not be so in China. Our results confirm that there are indeed differences between these two measures. It is also indicated that the property rights aspect of private ownership that matters more than other aspects of private ownership that are captured by the dummy. Property rights aspect also shows higher impact on privately owned firms compared to state owned firms. The employment factor could also contribute to this difference as the quality of employment in the private sector is higher than in the state sector due to the common problem such as overstaffing and policy employment in the state owned firms.

The thesis aims to shed light on the Chinese economic reform and implications of mutual state ownership of banks and firms as well as the recent development in institutional environment on firm productivity. The state owned banks, as predicted, heavily lend to state owned firms for reasons including established long term relationship, loan repayment guarantee, and implementation of tasks initiated by the government for various political purposes. As a result, bank finance is often given to firms which are unprofitable, unproductive and require possible further funding to sustain. Profitable firms either have difficult access to external finance or prefer to fund their investment project with cash reserves to avoid political agenda pushing associated with the loan, thus limiting their choice of investment level and increasing transaction costs. When external financing is necessary, both state owned firms and privately owned firms need to allocate resources on bureaucratic interaction in order to ensure the loan, therefore reducing productivity level.

Reform in the state sector is urgently required in order to break the pattern of paternalistic behaviour of state owned banks and their bailout act whenever the state owned firms are in financial trouble. The state owned firms need to adopt more structured organization and management instead of relying on old fashioned

bureaucratic managerial style. The role of state/government needs to be minimized in standard business procedures to allow for efficient resource allocation for all firms. Banks should also improve their knowledge on all industries, particularly the ones within the private sector, to enable more thorough and accurate appraisal of loan applications from new and technology driven industries.

Institutional environment in China varies across different regions, which facilitates our research of the intra country variation in productivity of firms caused by such difference in institutions. We find that institutional framework to influence firms' productivity greatly and improvement in institutional environment can impact positively on firm effectiveness in terms of TFP. We find that contract enforcement, surprisingly, does not impact firm TFP in a significant way. However, given the Chinese culture of *guanxi* (relationship) and the importance of informal social structure and norms, it is understood that contracts are often constructed and enforced in the socially acceptable way rather than by legal binding terms. As such informal social norms make up a big part of institutional environment where firms have to operate in, it can be problematic for firms with insufficient local knowledge, which affect the local market attractiveness negatively.

In conclusion, all the chapters in this thesis confirms the need for future banking reform to be deepened in terms of commercialization and privatization of the banks, facilitation of external finance availability for high quality firms, introduction of more sophisticated procedure and guidance for assessment of loan applicants and more qualified personnel with specific skills required in the relevant field. In recent years, the state owned banks in China have indeed made more effort moving towards more commercialized and westernized practices in terms of both firm level lending as well as management. The entry to WTO has also marked the transition of the banks into a new era, with the immediate lift of ban on foreign financial institutions to provide currency and other commercial services to Chinese enterprises and individuals. People's Bank of China also released statement on further banking deregulation aiming to strengthen reform and management transparency. Such practice has seen improvement in balance sheets of banks and reduction in NPLs, and is also believed to have eased the financing problems of the private sector, especially for small and medium sized enterprises (People's Bank of China, 2012).

Special attention also needs to be paid to further improve institutional quality in China in order to reduce transaction costs and information asymmetry problems for firms. The authorities should also aim to reduce the regional disparities in institutions across provinces to promote growth in all areas in China.

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