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Introduction

In 1750, the standards of living in the Qing dynasty were comparable to those in North America. Two hundreds years later, the average US citizen had an income 22 times greater than its Chinese counterpart. A large body of literature studies the causes of this divergence between the West and China. The quality of institutions that emerged in Europe through the hazards of history has been seen as a powerful factor behind the industrial revolution that spread in Europe (Acemoglu and Robinson, 2012). Resource-based factors could also have helped European countries development to takeoff: Europe benefited from coalfields near convenient locations for industrial development and imperialism led to the development of military instruments or mechanisms that proved useful for the industry. Moreover, the conquest of Caribbean Islands secured the supply of primary goods, facilitating the move from agriculture to industry (Pomeranz, 2000). Culture-based theories also argue that the excessive control of the Chinese state over its citizen since the Ming dynasty and the resistance of Chinese elites to incorporate new inventions from the West have played a large part in the divergence (Landes, 2006).

In addition to these theories, Ferguson (2008, chapter 6) evokes the lack of development of the Chinese financial system as another possible explanation of the *Great Divergence*. Financial innovation was a direct consequence of fiscal competition in *Middle Ages* and *Renaissance* Europe. In contrast, the unitary kingdom of the Yuan dynasty (1279-1378) did not require it and wars during the Song dynasty (960-1127) – which triggered the need for new sources of finance – led to the creation of paper money but not to state borrowing and deficit finance. It was in Venice in the 13th century that the bond market was invented – an invention that spread in Italian city-states and Northern Europe and led to active securities trading and the birth of a *rentier* class. It was in Europe that mathematics and finance met to solve problems of currency conversion of traders, allowing sophisticated financial contracts to be invented (Goetzmann, 2004). And it was in the Netherlands that a joint-stock company issued for the first time publicly tradable shares in the stock market in 1602.

When the Western countries forced the commercial opening of China in the 19th Century, the Chinese system – with a long tradition of family and clan-based finance – could not be more distant from the financial system of the West, able to raise public

financing through bond or equity issuances. The introduction of modern finance at that time in China only appeared, however, as one of the tools of Western imperialism. Never really implemented in China, it was totally dismantled when the Communist party took power in 1949. Consequently, the development of the country never relied on its financial system.

The Chinese financial system and long-term development of the country

Lack of financial development did not, however, impede China's growth to spectacularly take off 30 years ago. China is today the second economic power in the world and should become the first in the next decade (OECD, 2013). The *Special Economic Zones* led to massive foreign direct investment in the country's coastal areas. In parallel, internal reforms such as price of goods liberalization, land contracting reforms and entry of new rural business also contributed to boost output (Huang, 2012). This strategy was based on experimental, gradual and decentralized economic reforms.

As a result, with an average GDP real growth around 10% for more than 30 years, one of the former poorest nations in the world managed to lift out of poverty over 600 million people according to Robert Zoellick[1]. The real GDP per capita went from being one-fortieth United States' one to one-fifth in 2010 (Zhu, 2012).

Allen, Qian and Qian (2005) show that despite having poorly performing legal institutions and an underdeveloped financial system, the private sector has been able to provide most of the economic growth in China. In contradiction with the common view that sound institutions, legal protection of investors and finance promote growth, China's success appears as a significant counter-example of the finance-growth nexus.

Still, this apparent contradiction should not minor the potential detrimental effect of the financial system underdevelopment on long-term growth. First, the idea that the private sector is the only driver of growth has been challenged (Ayyagari, Dermirgüç-Kunt and Maksimovic, 2010). Secondly, corporations in a producer-biased country like China with an underdeveloped financial system have little option except financing their investment with their own profits. In the short run, this capital allocation avoids using the inefficient financial system by investing directly in profitable firms. In the long run, however, this strategy leads to building overcapacity if profits are always reinvested in

[1] Opening Remarks at the High-Level Conference on: "Development for a Modern, Harmonious, and Creative Society: International Experiences and China's Strategic Choices", Beijing, February 27, 2012.

the same firms (Rajan, 2010). Only an efficient financial system will be able to allocate capital where it is required in the economy.

The broad consensus thus remains that China's lack of financial development could jeopardize growth in the long run (Allen et al., 2012). The state is able to control financing of firms through the banks it owns, which inefficiently divert resources from fast-growing small and medium enterprises that lack political connections. If financially favored firms lack the incentives to innovate and compete, growth will be altered. Credit rationing also leads to the growth of shadow banking, which increases financial risk. This weakness of the Chinese economy explains why the financial system has been continuously reformed since thirty years.

The evolution of the Chinese financial system since 1978

The first major reform of the financial system happened in 1978 when the country phased out the mono-banking system to create four large state-owned banks: the 'Big 4' banks. Each of the banks was dedicated to serve a segment of the economy with quotas allocated by the People's Bank of China (PBOC). Bank of China (BOC) served the export sector, China Construction Bank (CCB) financed fixed investment, Agricultural Bank of China (ABC) was dedicated to banking in rural areas, and Industrial and Commercial Bank of China (ICBC) took all remaining sectors of the economy. During the 1980s, the creation of a vast number of financial intermediaries followed: networks of Rural Credit Cooperatives and Urban Credit Cooperatives were set up and twelve joint-stock commercial banks were also created. At the country level, SOEs stopped receiving their funds by the Government budget and started being granted loans by Government-owned banks.

A second wave of reforms was implemented in the 1990s after Deng Xiaoping famous 'Southern tour' call for new reforms. In the banking sector, local financial institutions such as city commercial banks and rural commercial banks emerged. There number grew respectively to 143 and 43 establishments in 2009, representing approximately 10% of the sector total assets.

To discharge large state-owned commercial banks from policy lending duty, three policy-banks were created in 1994 with the purpose to finance economic development through state-invested projects. Moreover, large state-owned banks were officially designated as 'commercial' banks with the *Commercial Bank Law* in 1995.

The law purposively removed official policy-lending obligations of these banks. In the same year, the *Central Bank Law* officially confirmed the PBOC as the central bank of China, which reduced the ability of local government to influence credit allocation. The PBOC began using more actively interest rates and reserves to conduct its monetary policy (instead of lending quotas). Despite these reforms, banking asset quality severely deteriorated during this decade, triggering a first recapitalization of the 'Big 4' banks from the Ministry of Finance in 1998. In parallel, four asset-management companies bought around 20% of their loans to clean up their balance sheet.

One of the major reforms of the decade happened outside the banking system with the creation of two stock exchanges in Shanghai and Shenzhen in 1990. These markets grew quickly reaching a peak in 2000 before it went through a major correction in the following years. The state, however, retains the major share in most listed firms.

Since the beginning of the 2000, the Chinese government promoted ambitious reforms of its banking system. They included a recapitalization and transfer of non-performing loans toward asset management companies. Foreign investors were encouraged to acquire a minority share in Chinese banks to transfer skills and good practices. Major state-owned banks were also partially privatized through IPOs in order to encourage external monitoring. From 2005 to 2010, Bank of Communications (BoCom), China Construction Bank, Bank of China, Industrial and Commercial Bank of China and Agricultural Bank of China have been successively listed on mainland China. Some banks have chosen to cross-list their share outside the country.

The monitoring of banks was also reinforced with the creation of the China Banking Regulatory Commission (CBRC) in 2003. Similar authorities were created for other financial sectors. The China Securities Regulatory Commission was instituted in 1992 and covers financial market activities and the China Insurance Regulatory Commission (CIRC), founded in 1998, deals with insurance and product market services.

Characteristics of the Chinese financial system

Despite being often qualified as underdeveloped, the Chinese financial system is sizeable. The banking sector largely dominates the rest of the financial system. Banks benefit from the high saving rates from the country's residents. The average gross saving rate over GDP for the period 2001-2011 was 48.3%, meanwhile it only reached

22.8% in Germany and 13.7% in the United States (World Bank Development Indicators). This figure is also unusually high compared to other emerging countries. This ratio was on average 16.8% for Brazil, 32.2% for India (over the period 2001-2010), and 29.7% for Russia.

The ratio of domestic credit provided by the banking sector over GDP was 145% in 2011 (with an average of 137% over the period 2001-2011) according to the World Bank Development Indicators. In comparison, the same ratio reached 125% in Germany, and 232% in the United States. Banks provide the largest share of external funds to the non-financial sector. Bank loans accounted for 75.2% of external funding sources to household, corporate and public sector in 2010, meanwhile bonds and equities financing accounted respectively to 10.5% and 5.5% (PBC China Monetary Policy Report, Quarter Four, 2010).

The composition of the banking sector also exhibits strong differences with other transitional economies (Fungáčová and Korhonen, 2011). The 'Big 4' banks and the Bank of Communications dominate the sector. Despite a progressive erosion of their market share since the last decade, they still accounted for 50.1% of the banking sector total assets in 2009 (China Banking Regulatory Commission Annual Report, 2009). These banks provide nationwide wholesale and retail services. Together with twelve joint-stock commercial banks – which are also controlled by the state except for China Minsheng Bank – they represent almost two-third of the banking sector in terms of assets. There has been little penetration of foreign or domestic private banks in China. They were originally only authorized to open branches in *Special Economic Zones* and to operate restricted activities. Restrictions were progressively relaxed, in particular after the WTO accession in 2001. With a market share of only 1.7% of total assets in 2009, the 35 locally incorporated foreign banks continue to appear unable to compete with domestic state-owned banks.

Content of the dissertation

This dissertation contributes to a better understanding of the Chinese financial system by analyzing the extent of progress towards an efficient system. A large part of China's future development will rest on its financial system ability to efficiently provide financing to the economy. The dissertation studies the different components of the

financial system: banks, bonds and the stock markets. It has a particular focus on the role of the state in the financial system.

The contributions to the economic literature are threefold. First, the dissertation provides perspective for the future development of the financial system in China, one of the largest transitional economies. As described above, development in the long run has to be supported by an efficient financial system. Second, it contributes to the economic literature by analyzing how the state can influence outcomes in a financial system. The central characteristic of this financial system is the government strong control exerted on banks, financial markets and firms. The banking sector has notably been plagued by problems of nonperforming loans and low efficiency (Berger, Hasan and Zhou, 2009). These issues involved mainly a biased allocation of credit in favor of SOEs, a lack of independence towards the political power, and a lack of skills and expertise in risk-management (Cousin, 2011). This influence of the state is a characteristic of emerging countries' financial systems. Even in developed countries, the last financial crisis forced many governments to take stakes in their financial system. Thus, research on the role of governments in the functioning of financial systems has implications going beyond China. Third, it contributes to the economic literature on several topics where no consensus has previously emerged: determinants of debt markets for firms, the effectiveness of change in CEOs, the links between banking efficiency and competition and the effectiveness of capital regulation.

The first chapter[2] assesses the development of the corporate bond market. A well-functioning corporate bond market creates an alternative way for capital allocation. It also puts pressure on banks to reform by attracting large borrowers initially captured by the banking system. This chapter analyzes the extent to which the nascent bond market competes with the banking sector in allocating capital to borrowers. The empirical analysis is built on theories and empirical evidence explaining the choice of debt market in developed countries. The purpose of the study is to test if financial or political motivations explain the choice of debt. Despite an official support in favor of the development of the bond market, historical evidence suggests that the government has been conservative in allowing firms to issue bonds. We thus assess whether ownership of the firm has an effect on the debt market chosen. Specifically, we test if the central government ownership, flotation costs, asymmetries of information, and

[2] This chapter refers to the article published in *China Economic Review*, v. 26, September 2013 (lead article) with Laurent Weill.

renegotiation and liquidation costs influence the choice of debt. We rely on a logit model with random effects at the borrower level to assess borrowers' characteristics that increase the probability to prefer the bond market rather than borrowing from banks. The sample is composed of bonds and syndicated loans issued by listed firms.

In a first step, we analyze the choice of debt for firms only relying on one debt market over the period of study. The choice of debt for Chinese firms does not appear to rely much on financial characteristics. The government influence seems to remain strong as Central state-owned firms have a higher probability to rely on the corporate bond market. Moreover, central state-owned firms geographically closer to the regulator have a higher probability to issue bonds among all central state-owned firms. This gives support to the view arguing that the government allows firms with less asymmetric information to issue bonds in order to promote a smooth development of the bond market.

In a second step, we also include firms that rely on both debt markets in the analysis. Previous findings are confirmed except concerning the effect of distance between central state-owned firms and the regulator on the probability to issue a bond.

In a third step, we determine what drives the choice between relying only on one debt market or two debt markets. We find that central state-owned firms are more likely to rely only on the bond market rather than relying on both debt markets. This result indicates that the state also encourages central state-owned firms to rely exclusively on the bond market in order to promote its smooth development. Overall, this analysis has pessimistic implications for the development of the corporate bond market: it appears unlikely that it will strongly compete with the banking system.

The second chapter[3] reviews the effectiveness of internal corporate governance in the listed sector by studying the effects of a change in CEO. The causes of changes in CEO have been studied in China (e.g. Kato and Long, 2006). One main conclusion is that the link between past performance and CEO turnover only exists in loss-making state-owned firms. However, no evidence exists on the effectiveness of CEO turnover decisions. Theoretically, changing the firm's CEO should be one the most powerful mechanism of internal corporate governance. Our proposition is that state ownership in China may affect stock market reaction to CEO replacement because state-owned firms often pursue multiple, potentially contradictory, objectives, i.e. economic performance

[3] This chapter refers to the article in press in the *Journal of Economics and Business* with Laurent Weill.

and social objectives. In line with the literature on state-ownership, we argue that a CEO change in a state-owned firm indicates that the state shareholder refocus on the objective of profit maximization at the expense of other objectives.

To test this hypothesis, this chapter employs an event-study methodology on a sample of CEO turnovers for listed companies and examines the stock market reaction after a change. We find that a change of CEO triggers significant positive abnormal returns. This result is driven by central state-owned firms: when we separate the sample of firms depending on their ownership type, we find that only central state-owned firms actually experience these positive abnormal returns. The multivariate analysis confirm that central state-owned firms have a positive effect on abnormal returns even after controlling for traditional characteristics affecting the effectiveness of CEO turnovers. Market participants thus expect an increase in performance after a change only when firms are controlled by the state. The market reaction can be interpreted as a firm refocusing on financial performance rather than social objectives.

This evidence is backed by the improvement we observe in accounting performance after a change in CEO. These results draw concerns on the lack of independence of listed state-owned firms. They suggest that state-owned firms objectives remain broader than only profit maximization.

The last two chapters focus on the banking sector. The third chapter[4] studies the causal relationship between competition and efficiency. The general view in the literature is that bank competition promotes economic growth (e.g. Claessens and Laeven, 2005). In China, large state-owned firms dominate the banking system, which raises concerns about the degree of competition among them. Bank competition also relates to efficiency. Three hypotheses cover the potential causality between competition and efficiency. The "quiet life" hypothesis predicts that increased competition enhances cost efficiency because competition reduces managers' possibility to extract monopoly rents. The "efficient-structure" hypothesis predicts on the contrary that cost efficiency reduces competition: efficient firms capture larger market shares, which reduces competition. Finally, the "banking specificities" hypothesis finally suggests that competition has a detrimental impact on cost efficiency. Bank efficiency derives from economies of scale and long-term relationships with their borrower, which tend to be reduced when competition increases. Using a representative sample of the

[4] This chapter refers to the article in press in the *China Economic Review* with Laurent Weill and Zuzana Fungáčová.

Chinese banking system, we compute Lerner index and cost efficiency for all banks over the period 2002-2011.

Lerner index measures the relative difference between price and marginal costs of banks. A high index indicates that banks have a higher market power. We compute marginal costs using a translog cost function with one output (total assets) and three input prices (price of labor, price of fixed assets and price of borrowed funds). We find that competition does not show any pattern of improvement over the decade. Foreign banks have the lower Lerner index on average; meanwhile city commercial banks and large state-owned banks have the higher market power.

Cost efficiency measures how close a bank's cost is to its optimal cost when producing the same bundle of outputs. We rely on the widely used stochastic frontier approach to compute efficiency scores. We use a translog cost function and disentangle the inefficiency term from a random error term. We show that cost efficiency increased for all banks in China over the last decade. Government controlled banks remain however less efficient than foreign banks.

To analyze the causal link between competition and efficiency, we perform Granger-causality tests in a dynamic GMM framework. The GMM estimators for dynamic panel avoid the potential endogeneity between the dependent and independent variables (Arellano and Bover, 1995; Blundell and Bond, 1998). We find no significant relationship between competition and efficiency in the Chinese banking sector. This conclusion suggests that greater competitive pressures may not contribute to foster bank efficiency in China.

The fourth chapter analyses the effect of the new capital requirement regulation in China on the banking sector performance. It contributes to the literature on the effect of banking regulation by analyzing the effect of capital ratios on bank efficiency. We take advantage of the exogenous change in capital in the Chinese banking sector from 2004 to 2008. Before 2004, capital requirements did not exist in China and its banking sector was chronically under-capitalized. In 2008, four years after the introduction of capital requirements, almost all commercial banks in China were above the minimum required. This allows estimating the effect of an exogenous change in capital ratios over this period.

There is no consensus in the literature on the effect of capital ratio on bank performance. This chapter brings evidence from an emerging market relying on the

unique characteristic of the Chinese case where banks had to adapt in a short time span to the new prudential regulation.

We rely on Battese and Coelli (1995) one-step approach to simultaneously estimate the cost frontier and the effect of capital ratios on the inefficiency term. This chapter shows that the increase in capital requirements led to an improvement in terms of cost efficiency in the banking sector for all banks. We use different estimations methods to check the robustness of this result. This result holds for all sort of domestic banks but higher levels of capital might be detrimental for foreign banks' efficiency. Overall, we show that capital requirement regulation can improve bank efficiency.

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CHAPTER 1

Choice of Corporate Debt in China: The Role of State Ownership

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Abstract

We analyze the factors affecting the decisions of Chinese firms to take on debt in the form of either bonds or syndicated loans over the period of 2006–2010. The chapter reveals the extent to which corporate debt choices are politically or economically driven. We test if central government ownership, flotation costs, asymmetries of information, and renegotiation and liquidation costs influence the choice of debt. We find evidence in favor of the influence of central government ownership on the financing choices of firms because Central state-owned firms are more likely to issue bonds and to borrow uniquely on the bond market, rather than tapping both debt markets. Overall, our findings show that financial factors play a much more minor role in corporate debt choices compared to other countries, whereas central government ownership is a key determinant of preference for the bond market.

JEL Codes: G21, P34.
Keywords: corporate bonds, syndicated loans, debt choice, China, state ownership.

1. Introduction

The Chinese financial system is characterized by a weak, albeit fast-growing, corporate bond market and an over-dominant banking industry[5]. As Chinese banks have proven to be poorly efficient (Berger, Hasan and Zhou, 2009) – mainly because of a lack of experience in risk management and severe political influence in lending decisions (Yeung, 2009) – capital allocation remains biased towards inefficient state-owned companies in China. In the long run, this misallocation of capital threatens the development of the country.

A competitive corporate bond market should alleviate such concerns by providing benchmarks in risk pricing and putting pressure on banks to attract other types of borrowers, such as small and medium enterprises, which are currently rationed on the credit market (Herring and Chatusripitak, 2006).

To determine whether this capital allocation problem can be solved through the corporate bond market development, one needs to understand whether the banking system and the corporate bond market truly compete in China. This chapter provides evidence on this issue by analyzing the determinants affecting firms' choice of debt market. Thus, our aim is to investigate the determinants of the choice for a Chinese firm to issue a bond, rather than borrowing from banks.

The Chinese Communist Party has recognized the usefulness of capital markets and the importance of developing the corporate bond market in its *Opinions of the State Council on Promoting the Reform, Opening and Steady Growth of Capital Markets* in 2004. The Governor of the People's Bank of China (PBOC) stated that "China's underdeveloped corporate bond market has distorted the financing structure in the economy which poses a threat to financial stability, as well as to social and economic development" (Zhou, 2005).

However, since the market turmoil in the early 1990s, during which an important proportion of issued bonds ended up in default, China's corporate bond market development has been impeded by tight regulation on bond issuance approval. The regulator notoriously favored large state-owned enterprises to avoid financial instability

[5] In 2006, the corporate bond market provided only 1.4% of the financing needs of Chinese firms (Hale, 2007). Its growth reached 24.13% on average during the period 1990–2006 (People's Bank of China and China Statistical Yearbooks, cited by Allen et al., 2009). In 2010, bank loans accounted for 75% of non-financial sector's external funding sources (People's Bank of China, China Monetary Policy Report, 2010).

in the corporate bond market. The situation evolved in 2007 when the China Securities Regulatory Commission (CSRC) published new issuance rules.

It is, however, not clear whether corporate bond issuance is free from political intervention in China. On the one hand, Central state-owned enterprises have historically been favored in their access to the corporate bond market. On the other hand, there has been an official move since 2004 to recognize the usefulness of the corporate bond market development. We employ a set of hypotheses to analyze whether the choice of corporate debt is politically or economically driven in China.

Firstly, we consider a central government ownership hypothesis that can influence the approval required to issue a corporate bond. We investigate whether state ownership at the central level plays a role on the choice of debt financing with recent data on listed firms' debt choices. Moreover, as favoritism towards Central state enterprises has been driven by the will to avoid corporate bond defaults in the market, we expect Central state-owned enterprises that present less asymmetries of information for the regulators to be particularly favored in the approval process.

Secondly, three financial theories have been provided to explain the choice between public and private debt issuance in the literature: flotation costs (Blackwell and Kidwell, 1988), asymmetries of information (Diamond, 1991; Rajan, 1992), and costs of debt liquidation and renegotiation (Berlin and Loeys, 1988). We analyze the relevance of these theories in China.

We test these four theories of corporate financing choices on a dataset of 220 Chinese listed firms during the period of 2006–2010. In line with the method of Esho, Lam and Sharpe (2001), we employ an incremental approach, rather than focusing on balance sheet ratios. This method allows us to identify factors related to a particular issuance type. Therefore, we study which factors increase the probability for a firm to issue a bond, rather than a syndicated loan[6]. We also examine which factors explain a firm's choice to select only one of these markets, rather than borrow on both markets during the sample period.

We find that ownership influences the choice of corporate debt in China because Central state-owned firms are more likely to issue a bond, rather than a syndicated loan. We also observe limited support for the premise that this influence is stronger for

[6] The main alternative financial instrument to a bond is indeed a syndicated loan, as a bond issuance is associated with a large amount more commonly provided by a syndicate of banks than by one single bank (see section 2.3).

Central state-owned firms located closer to the regulator. Moreover, we find that these companies tend to borrow uniquely on the bond market, rather than tapping both debt markets. We provide evidence in favor of the flotation costs hypothesis but provide weak evidence for the renegotiation and liquidation hypothesis and reject the information asymmetry hypothesis. These results show that financial factors do not play a strong role in debt choices, whereas ownership matters. Consequently, the corporate bond market and the banking industry do not appear to truly compete on a financial basis to attract borrowers.

This chapter's contribution to the literature of debt choice is twofold. Firstly, we take into account a key characteristic of China: the influence of the state on the economy. Secondly, we analyze the relevance of the three financial theories that explain choices of debt in the literature for China. The study provides evidence on the lack of perspective for the future development of the corporate bond market in China. To the best of our knowledge, this study is the first to examine the choice of debt in China[7].

Next, we extend two empirical works, which have similarly investigated the choice of large debt financing between bonds and syndicated loans based on these three theories. Esho, Lam and Sharpe (2001) perform this analysis on a sample of debt financings in Asian countries, which are widely dominated by financings of Japanese companies. China is included in the sample, but only for 6 syndicated loans, whereas no Chinese bonds are considered. Esho, Lam and Sharpe (2001) test the influence of several financial variables to investigate the relevance of the three theories. These researchers find empirical support for the three theories, notably with bond issuances related positively to firm size and negatively to the probability of financial distress of the issuer. Altunbas, Kara and Marques-Ibanez (2010) focus on determinants of financing choices between corporate bond and syndicated loan markets in European countries. These authors also find support for the three theories of corporate financing choices. In particular, larger firms with more financial leverage, higher fixed assets to total assets, but fewer growth opportunities are more likely to borrow from the syndicated loan market, rather than the corporate bond market.

The rest of the chapter is organized as follows. Section 2 presents an overview of the large debt markets in China. Section 3 reviews the determinants of financing choices.

[7] Some studies have explored the determinants of capital structure, i.e., the choice between debt and equity in China (see e.g. Huang and Song, 2006; Qian, Tian, Wirjanto, 2009; Tse and Rodgers, 2011; Li, Yue and Zhao, 2009).

Section 4 describes the data and methodology. Section 5 develops the results. Section 6 concludes.

2. Overview of large debt financing markets in China

2.1. The corporate bond market

The bond market still remains notably small, although its annual growth was sustained at 26.9%, on average, during the period of 1995–2005 (OECD, 2010). The total outstanding bonds reaches 45% of GDP by mid-2009, a comparable figure to that of other emerging countries, but the corporate segment accounts only for one tenth of the total. The lack of current development of the corporate bond market is a direct consequence of the tight regulation over issuance approvals. During the 1980s and 1990s, a large number of bond issuances ended up in default. The central government had to intervene to bail out companies. This episode mostly explains why the government has remained cautious in pushing bond market development: according to National Development Reform Commission (NDRC) officials, a repetition of the financial instability created by the bond market in the 1990s would have caused political grief for the NDRC (Reuters News, 2006). In 1998, the NDRC[8] tightly modified the approval process for corporate bond issuance, *de facto* allowing almost exclusively large Central state-owned firms to enter the market. Issuances were subject to an annual quotas system, which required a one-hundred-percent guarantee from a bank and were at the discretion of the regulatory body. Consequently, the market nearly collapsed. In the early 1990s, issuances amounted to RMB 68 Billion, whereas in the early 2000s, issuances had fallen to only RMB 8.3 Billion (The Banker, 2004).

Informal evidence suggests that the state agency played a key role in favoring the access of state enterprises to the bond market. The *Financial Times* wrote in 2007 that "[c]orporate bonds are virtually non-existent in China, mostly because they are regulated by the state's conservative central planning agency, the National Development and Reform Commission. The commission allows only a handful of giant state-owned

[8] In 1998, the NDRC was named State Development Planning Commission. Among its official assignment, the NDRC is supposed to maintain the balance of economic development and to guide restructuring of China's economic system (NDRC website).

enterprises to issue bonds through an extremely opaque quota system." (Financial Times, June 2007). Apart from the fear of a new episode of corporate debt defaults, favoritism was also a consequence of the government objective to employ the corporate bond market as a tool to finance pillar SOEs and infrastructure projects, such as the "Three Gorges Dam" (Business Weekly, 2002).

As a consequence, even the rare, approved privately owned firms had difficulties in issuing bonds because of the necessity to find a bank as guarantor.[9] Even though the proportion of state-owned companies among corporate bond issuers has declined in recent years – from 70 % in 2007 to 48% in 2009 (Chen et al., 2011) – it remains unclear whether favoritism in accessing the bond market has stopped.

The official recognition of the necessity to develop the corporate bond market came in 2004 in the *Opinions of the State Council on Promoting the Reform, Opening and Steady Growth of Capital Markets*. The corporate bond amount issued in 2005 was 204.65 RMB billion, which was up from 32.70 in 2004. However, the major regulatory change in the market came in 2007 with the decision to share the approval decision between the NDRC and the CSRC. The reform was presented as a major step in the market development. Since the reform, the CSRC has been responsible for the approval of issuances to all companies with a corporate structure and has not applied a quota system over yearly issuances. The regulatory body issued new rules of issuance with immediate effect in mid-August 2007. Under the CSRC rules, corporations are no longer supposed to receive a bank guarantee. Bonds can amount to 40% of the company's net assets in the end of the last accounting year, and interest rates have to be less than the annual net profit during the three previous years. Every issuance has to be rated by a CSRC-approved credit agency. Moreover, the PBOC no longer controls the coupon rate of the corporate bond. Finally, corporations can issue bonds not only for fixed asset investment purposes, as was previously the case under the NDRC, but for all purposes.

2.2. The syndicated loans market

[9] Hongdou Group was the first private company to receive quota from the NDRC in end 2005, but it never sold bonds because it could not find a bank as guarantor (South China Morning Post, 2007).

The syndicated loans market grew markedly in China over the last decade, with the outstanding amount of syndicated loans being multiplied by four between 2005 and 2008 (CSRC). The market accounted for 7.11% of the total corporate loans in 2009 (China Banking Association).

A syndicated loan involves a group of lenders that jointly grant a loan to a single borrower. The process of syndication starts with a lead bank mandated by the borrower to design the main characteristics of the financial contract. The lead bank (or arranger) of the loan promotes the loan to other banks or financial institutions, which may participate in the deal. Every participant funds and is responsible for a part of the loan. The monitoring role of the borrower usually falls to the arranger of the loan.

The syndicated loan market is an international debt market in which foreign bank participation can be notably high, especially in emerging markets. In China, half of the participants were domestic banks during the period of 1999–2002 (McCauley, Fung and Gadanecz, 2002). Further evidence suggests that foreign banks tends to be either the only participants or totally absent in Chinese syndicated loans (Pessarossi, Godlewski and Weill, 2012). However, foreign presence in the syndicated loan market seems to have significantly decreased since the financial crisis (Gadanecz, 2004). Firstly, the domination of foreign banks in playing the role of arranger has ceased: the number of domestic banks as lead managers in loan issuances has increased markedly since 2007 and now largely dominates the number of syndicates with foreign lead manager. Secondly, the increased importance of domestic banks in the Chinese syndicated loan market has also been reflected in the currency used. In 2006, almost 80% of syndicated loans were issued in foreign currency (mainly USD). In 2009, foreign currency loans accounted for less than 5% of the market (Chui et al., 2010). Thirdly, despite the withdrawal of foreign banks usually involved in the market, the syndicated loan market experienced growth of issuances, an uncommon phenomenon during the period of the financial crisis.

2.3. The alternative between a bond and a syndicated loan in China

Given the underdevelopment of the Chinese financial system, one can argue that contrary to more mature markets, syndicated loans are not the main alternative to corporate bonds in China.

The main reason to consider both debt instruments as competitors is their ability to meet the requirements for the debt financing of large amounts with long maturities. The *Guidelines on Syndicated Loan Business*, released by the China Banking Regulatory Commission (CBRC) in 2007, presents syndicated loans as a way of "[f]inancing a large business group or project, or the working capital with a large amount." As in other countries, the principal features of a syndicated loan is that "[i]t can meet borrowers' demand of long term and large amount" (Bank of China website).The rationale for a bank to syndicate a loan lies in the fact that it shares risk with other participants, which help meet capital adequacy ratios (Altunbas et al., 2006). Thus, for large financing needs comparable to public debt, banks tend to prefer sharing risk with other lenders, rather than supporting the whole credit risk. Reforms over the last ten years in the banking sector have promoted tighter risk management procedures in Chinese banks. In particular, Chinese banks have started to implement the Basel I regulatory framework since 2004 and are moving toward an application of Basel II rules (Cousin, 2011). In October 2008, the CBRC issued the first notice on implementing Basel II in China. Moreover, the *Guidelines on Syndicated Loan Business* states that loan syndication should be pursued when "the fund demanded by one single enterprise or project exceeds 10 percent of the lender capital." Wang Huaqing, Disciplinary Commissioner of the CBRC, stated that "[b]anks should strictly comply with the loan concentration limit and if the funding requirement exceeds the limit, they ought to fund the project through syndication."[10] Consequently, Chinese managers are obliged to syndicate loans to share credit risks when their sizes become large, as in other countries. This obligation explains why a Chinese firm facing a large need of funding will most likely rely either on a corporate bond or a syndicated loan, rather than a bilateral loan.

3. Determinants of debt choice

Our aim is to explain the choice of debt financing for Chinese companies. The dependent variable is a dummy variable equal to one if the firm issues a bond and zero if the firm issues a syndicated loan. We consider four hypotheses for the choice of debt

[10] Speech at the Syndicated Loan Awarding Cermony. Available at http://www.cbrc.gov.cn/chinese/home/docView/2009070924F35CC8FA9D260FFF0AF8E9C9C15700.html

financing in China: central government ownership, flotation costs, asymmetries of information, and renegotiation and liquidation.

The hypothesis of *central government ownership* considers that firms owned[11] by the central government should issue more bonds than others, as regulators have historically favored firms owned by the central government. This first factor checks whether choices of debt are politically driven.

We test this hypothesis by including the variable *Central state-owned*, which is a dummy variable equal to one if the central government is directly or indirectly the controlling shareholder of the firm. We expect Central state-owned firms to have a greater probability to choose bonds for two main reasons. First, these firms have a higher probability to receive an approval to issue a bond. Second, because central authorities pursue a goal of smooth development of the corporate bond market, the central government could induce these firms to favor the corporate debt market, rather than borrowing from banks[12].

However the ownership ties between regulatory authorities and Central state-owned firms might depend on the degree of information asymmetries between the market regulators and the firms. One way to specifically catch these asymmetries of information is to measure the physical distance between Central state-owned firms' headquarters and the regulators. Distance is associated with greater information asymmetries in the literature (e.g., Petersen and Rajan, 2002). If regulators favor firms that appear to them less likely to default, they will choose those that present less asymmetries of information for them among Central state-owned firms.

Thus, we complement our investigation by adding the variable *Distance*, which is defined as the crow-fly distance in miles of the firm's headquarters from Beijing – the headquarters of the NDRC and CSRC – and an interaction term between *Central state-Owned* and *Distance*. We expect this interaction term to be negatively related to the probability to issue a bond because greater distance implies more information asymmetries between Central state-owned firms and the regulators.

The *flotation costs* hypothesis considers that the issuer takes into account the fixed costs associated with public issuance. Because these costs can be large, public issuance is more likely to take place when firms are large and need to borrow large

[11] In this instance, ownership of the firm refers to the nature of the controlling shareholder. A firm is considered State-owned when the controlling shareholder is the State, even if minority shareholders include private investors.

[12] We will address the question of the influence coming from the central authorities' side in section 5.2.

amounts to make economies of scale (Blackwell and Kidwell, 1988; Smith, 1986). We test the flotation costs hypothesis with the variable *Firm Size*, which is defined as the log of total assets. We expect a positive impact of this variable on the probability of issuing a bond.

The *information asymmetry* hypothesis builds on the special role played by banks in financing the economy (Fama, 1985). Because banks act as delegated monitors, they usually are cost-efficient when screening and monitoring the borrower (Diamond, 1984). However, when information asymmetries decline between the borrower and investors, the borrower can avoid these monitoring costs by issuing debt directly on the public market (Diamond, 1991).

Thus, reputation plays a central role in the choice of debt framework because well-known firms can lower financing costs by directly tapping the bond market. Denis and Mihov (2003) show how credit quality affects the choice of debt market and that highest-credit-quality borrowers choose to issue debt on the public market.

In line with the approach of Esho, Lam and Sharpe (2001) and Altunbas, Kara and Marques-Ibanez (2010), we test the information asymmetry hypothesis with three potential determinants of the choice of debt financing.

The ratio of long-term debt to total debt (*Long-Term Debt*) serves as a proxy for reputation. Firms with higher ratios have succeeded to raise long-term debt in the past. These firms should benefit from better reputations on the market and be more likely to issue public debt. Profitability can be a visible signal of a firm's ability to repay its debt. Consequently, the return on assets (*ROA*) should have a positive influence on bond issuance. Finally, the market-to-book ratio (*Market to Book*) serves as a proxy of growth opportunities. A higher market-to-book ratio indicates that a firm has good investment or growth opportunities. Greater investment opportunities enhance the possibility of asset substitution (Jensen and Meckling, 1976) or underinvestment (Myers, 1977). From this point of view, a high market-to-book ratio indicates potential moral hazard problems (Krishnaswami, Spindt, and Subramaniam, 1999). We predict a negative impact on bond issuance for this variable.

The *renegotiation and liquidation* hypothesis refers to the difficulty a firm encounters when it needs to renegotiate its debt with numerous lenders. A problem of coordination can arise between lenders, which can lead to the survival of negative NPV projects or to the too-early liquidation of positive NPV projects (for instance, because of overly lenient or overly harsh covenants). In contrast, a bank can determine whether it is

more efficient to continue or prematurely liquidate a project because it monitors borrowers more closely (Berlin and Loeys, 1988, Chemmanur and Fulghieri, 1994). Thus, firms with a high probability of financial distress or with a high liquidation value project benefit more from this special expertise. These firms may consider reliance on banks for their financing needs to be beneficial.

The ratio of fixed assets to total assets (*Fixed Assets*) measures liquidation value following Johnson (1997) and Esho, Lam and Sharpe (2001) because a larger share of fixed assets in total assets is associated with a higher collateral value. We expect this ratio to have a negative effect on the probability to issue a bond.

In line with Esho, Lam and Sharpe (2001) and Altunbas, Kara and Marques-Ibanez (2010), two variables serve as proxies for financial distress: the ratio of total debt to total assets (*Leverage*), and the ratio of current assets to current liabilities (*Current Ratio*). More leveraged firms are associated with a greater probability to rely on syndicated loans because the probability of financial distress increases. Reciprocally, a lower ratio of current assets to current liabilities enhances the likelihood of financial distress in the short term; public issuances should be inversely related to this ratio.

We also include some control variables in our analysis. The model includes a dummy variable equal to one when a private investor controls the firm (*Privately Owned)*. Dummy variables for the industry of the firm and for the year of debt issuance are also included in the estimations to control for industry and year effects. Finally, we control for the economic development of the province of the firm with the average GDP growth of the province over the period (*GDP Growth*).

4. Data and methodology

The Bloomberg database provides information on syndicated loans and corporate bonds issued by non-financial listed Chinese firms. We obtain 447 syndicated loans and 213 corporate bonds issued during the period of 2006–2010 by 220 firms. The Bloomberg database is also used to collect financial information on these borrowers. We match financial data of the end of the year preceding firm issuance of debt.

Information on ownership is collected on the download center of China Security Index Co. website[13]. The download center provides us with constituent lists of Central state-owned, Local state-owned and privately owned enterprises indexes. The "CSI Central state-owned Enterprises Composite Index" includes all firms directly controlled by the central government and traded on Shanghai and Shenzhen securities markets, the "CSI Local state-owned Enterprises Composite Index" consists of all enterprises directly controlled by a local government (Province or Municipalities) and traded at the Shanghai and Shenzhen stock exchanges; all companies under control of private shareholders in these stock markets constitute the "CSI Private-owned Enterprises Composite Index". Because there has been no transfer of ownership from the state to the private sector within the period of the study (Allen and Shen, 2011), this ownership information is consistent with our sample. We accordingly use the equity ticker symbol to match the ownership information with our dataset.

Table 1 displays the descriptive statistics by borrower categories for the variables used in the estimations. We divide borrowers into three categories. Category 1 includes firms that only borrowed from the syndicated loan market during the sample period. Category 2 is composed of firms that only issued bonds during the sample period. Category 3 includes firms that had access to both markets during the sample period. This classification allows us to distinguish the factors that cause a borrower to rely on only one debt market. Moreover, borrowers that can tap both debt markets may differ from other firms. In developed countries, this difference can reflect a difference in size: very large firms have larger financing needs and thus rely on both markets (Altunbas, Kara and Marques-Ibanez, 2010). This framework might also apply to China. Nevertheless, firms could also choose to rely on only one market because of the political ties between Central state-owned firms and the central government. It is thus important to study distinctively what factors drive each borrower type choice of debt market.

Interestingly, we observe that ownership types are not equivalently represented in each borrower category. Namely, Central state-owned companies represent a larger share of borrowers relying on only the bond market or both markets. This finding suggests that Central state-owned companies use more bonds than syndicated loans for

[13] http://www.csindex.com.cn/sseportal_en/csiportal/indexquery.do

their financing needs. The same observation does not stand for Local state-owned companies, which rely more on syndicated loans or for privately owned companies.

Firm size greatly differs across borrower categories. Firms participating in both debt markets are, on average, larger than those using only the syndicated loan market with an average of 26,604 Million USD in total assets against 14,854 Million USD. More surprisingly, firms that only access the bond market are much larger than those accessing both debt markets (with an average of 123,472 Million USD in total assets). This finding is in sharp contrast with the observation from Altunbas, Kara and Marques-Ibanez (2010) concerning European countries. This discrepancy might suggest the role of ownership for the use of public debt in China because larger companies are Central state-owned. In summary, the analysis of the descriptive statistics suggests a possible role of ownership on the use of public debt. In complement, Table 2 provides descriptive statistics of the same sample divided by ownership type. We distinguish between privately owned enterprises, Local state-owned enterprises and Central state-owned enterprises. We identify Central state-owned enterprises as having a strong preference for bonds (44% of issuances were bonds on the period) compared to Local state-owned enterprises (29%) and privately owned enterprises (21%). These descriptive statistics show that overall, discrimination in the approval process is not all-encompassing, as privately owned and Local state-owned enterprises have access to the corporate bond market. Also, privately owned enterprises are smaller, are much more profitable, have less fixed assets and have higher current ratios than Local state-owned and Central state-owned enterprises.

We perform logistic regressions with random effects at the firm level to estimate the determinants of the choice of debt financing. Because we have different categories of firms based on their use of syndicated loan and bond markets, we perform two sets of estimations. First, we analyze the determinants of the choice between syndicated loans and corporate bonds to determine the extent to which they depend on political or financial factors, and we compare these results with those of developed countries. Second, we compare the financing choices of firms using one debt market relative to those using both debt markets to determine the reason a firm in China would have the desire to diversify the source of debt funding. The main empirical framework is as follows:

$$P(Bond = 1|CGO, FC, IA, RL, GDPg, I_i, Y_t) = G\left(\beta_0 + CGO.\beta_1 + FC.\beta_2 + IA.\beta_3 + RL.\beta_4 + GDPg.\beta_5 + \sum_{i=1}^{6} I_i.\gamma_i + \sum_{t=2007}^{2010} Y_t.\delta_t\right),$$

Bond is the dependent variable and equals 1 when a firm issues a corporate bond and 0 when a firm issues a syndicated loan. *CGO* represents a vector of *Central Government Ownership* variables, *FC*, *IA* and *RL* represents vectors of control variables respectively for the *Flotation Costs*, the *Information Asymmetry* and the *Renegotiation and Liquidation* hypotheses. *GDPg* represents average growth in the province of the firm over the period. Industry dummies ($\sum_{i=1}^{6} I_i$) are included following the BICS classification provided by the Bloomberg database. Year dummies ($\sum_{t=2007}^{2010} Y_t$) are also included. *G* is the logistic function.

5. Results

5.1. The determinants of the choice between corporate bonds and syndicated loans

The investigation starts with the analysis of the financing choices of firms having only used the same debt market on the sample period. In this first stage, borrowers having used both debt markets are excluded from the sample. The sample is restricted to firms from categories 1 (borrowing only from the syndicated loan market) and 2 (issuing only corporate bonds). This exclusion allows us to properly analyze the choices of debt with firms that do not diversify their sources of debt funding. Table 4 reports the results for this model with two different specifications, depending on the inclusion of *Distance* and the interaction term between *Distance* and *Central state-owned*.

The first finding is the role of Central state ownership on the choice of corporate debt. The coefficient of *Central state-owned* is significantly positive, meaning that firms owned by the central government are more likely to issue bonds than other companies. This result comes as a half-surprise, given the historical favoritism of large state-owned firms in accessing the corporate bond market. Thus, we find support that political ties

play an important role in the choice of debt markets. Contrary to developed countries, the corporate debt market has not yet matured enough to remove political interferences. This lack of maturity could potentially damage the market's ability to guarantee a better allocation of capital.

We scrutinize this result by analyzing the interaction term between *Distance* and *Central state-owned* to determine if the effect of ownership evolves with the distance from Beijing. How can we interpret the interaction term between *Central state-owned* and *Distance*? In a logit regression, the interaction term and the interaction effect can differ in sign and statistical significance. We follow Ai and Norton (2003) to compute the interaction effect of our model. Formulas are reported in Appendix A. Graphic 1 in appendix B represents the interaction effect with confidence intervals of 10% and 1% for all possible values of *Distance* and mean values of other model variables.

The interaction effect is significantly negative. The probability of a Central state-owned firm to issue public debt seems to decrease as distance from Beijing increases. At some point – i.e., when the Central state-owned firm is very far from the central government – distance stops influencing the probability to prefer bond issuance rather than borrow from the syndicated loan market. *Ceteris paribus*, a Central state-owned firm located in Beijing has a higher probability to issue a bond compared to a Central state-owned firm located 200 miles away from the capital city. However, the difference in probability of issuing a bond for two Central state-owned firms located 1200 and 1400 miles from Beijing is not statistically different from zero.

This finding shall reflect the degree of information asymmetries between the Central state-owned borrowers and the regulators. Regulators might have a preference for firms with less asymmetries of information to limit the probability of default on the bond market. To this end, they could favor Central state-owned firms closer to them.

It is of interest to observe that only Central state ownership influences the choice of debt because the variable *Privately owned* is not significant, meaning that local state-owned and privately owned companies do not show significant differences in the choice of debt financing.

Apart from political interferences, we now turn to the financial factors that should influence the choice between debt markets. The flotation costs hypothesis is supported by our results, as there is a positive and significant relation between firm size and bond issuance. As issuance of public debt involves higher costs, economies of scale are only possible for larger firms with important financing needs. This result is in line

with the findings of Esho, Lam and Sharpe (2001) and Altunbas, Kara and Marques-Ibanez (2010).

The information asymmetry hypothesis receives little support from our estimations. We observe a positive coefficient for *Long-Term Debt*, which accords with the view that firms with greater reputation are more likely to issue bonds. However this variable is only significant in the first specification. Furthermore, *ROA* and *Market to Book* are not significant, which is at odds with the hypothesis that profitability and growth opportunities influence the choice of debt. Thus, contrary to evidence found in other countries, reputation does not play an important role in accessing the bond market. This condition might be a direct consequence of state interventionism in the choice of debt market.

Finally, we find mixed evidence regarding the renegotiation and liquidation hypothesis. *Fixed Assets* and *Current Ratio* are not significant. Nevertheless, *Leverage*, which also measures financial distress, is significantly negative, as expected, which means that greater leverage reduces the ability to issue bonds. This latter finding is in conformity with those of Esho, Lam and Sharpe (2001) and Altunbas, Kara and Marques-Ibanez (2010). This result reflects the ability and skills of banks to achieve a better renegotiation in case of financial stress as in other countries. This finding might also be a consequence of links between state-owned banks and borrowers that allow the latter to easily obtain favorable debt renegotiations that they would not ordinarily be able achieve in the market in the face of financial distress.

We now turn to the second model in which we also consider firms that have issued both bonds and syndicated loans over the period but on different years. We thus extend our sample considerably. We do not, however, take all firm-year observations into account because those from category 3, which have issued a bond and a syndicated loan during the same year, are still excluded. Table 5 displays the estimations of this model. As above, we adopt two specifications that depend on the inclusion of *Distance* and the interaction term between *Distance* and *Central state-owned*.

Several conclusions emerge. First, our main finding regarding the role of Central state ownership on corporate debt choice is confirmed. The coefficient of *Central state-owned* is still significantly positive in both specifications. However, *Distance* does not seem to play the same role on the choice of debt by Central State owned companies. Indeed, the interaction term between *Distance* and *Central state-owned* is still negative

but is not statistically significant, as reported in Graphic 2 in Appendix B. In this estimation, the sample now includes firms that have issued both bonds and syndicated loans over the period. This finding indicates that these firms present fewer asymmetries of information for central regulators. Because these firms indifferently tap both debt markets on the sample period, they are more likely to be well-established companies with a strong reputation. This finding can explain why the addition of these borrowers in the sample weakens the interaction between *Distance* and *Central state-owned*.

Second, the conclusions regarding the three other hypotheses are notably similar. The flotation costs hypothesis is still supported with the significant and positive influence of *Firm Size* on debt choice. The renegotiation and liquidation hypothesis still obtains mixed support with the significantly positive coefficient for *Leverage* but no significant sign for *Fixed Assets* and *Current Ratio*. The only slight exception concerns the information asymmetry hypothesis, which is now totally contradicted by the findings. Namely, among the three variables used to test this hypothesis, all are non-significant in both specifications.

In summary, our estimations have shown that Central state-owned firms have a greater probability to issue a bond, rather than a syndicated loan. We find limited evidence concerning the role of distance from the regulators to weaken this ownership influence. In the model, Local state-owned firms serve as a benchmark as we include the variables *Central state-owned* and *Privately owned* in the regressions. Local state-owned firms are notoriously favored for bank loans. One can thus wonder whether the results are influenced by this fact. It could be that Local state-owned firms are particularly favored for the syndicated loan market, rather than Central state-owned firms that are favored for the bond market. We argue that this interpretation, albeit possible, is less likely to hold compared to our interpretation. Firstly, no evidence exists to sustain that Central state-owned firms are less favored to obtain bank loans compared to Local state-owned firms. Secondly, there is no significant difference in the probability to issue a bond for Local state-owned firms and privately owned firms, suggesting that Local state-owned firms' preferential access to bank loans do not drive the results here. Thirdly, Local state-owned firms should particularly be favored by local banks whereas the syndicated loan market is an international debt market.

Finally, we find limited support for the three traditional hypotheses on the choice of debt financing of Chinese companies. Thus, the choice of debt market appears

severely influenced by state intervention in China. Financial factors do not play a strong role in determining firms' choices of debt.

5.2. The determinants of the choice between one and two debt instruments

To this point, we have only considered firms issuing one debt instrument for a given year. In this subsection, the analysis extends to the determinants of the choice to use two debt instruments rather than only one. The sample now also includes observations of joint debt issuance in a given year.

We rely on a multinomial logit model to identify the factors increasing the probability to borrow exclusively from the corporate bond market and those increasing the probability to borrow exclusively from the syndicated loan market, rather than both debt markets. The dependent variable in this specification differs from the former one and represents three alternatives. The first alternative is set as the base outcome of the model. This option encompasses all the firms that issue in a given year a syndicated loan or a bond (or a joint issuance of both debt instruments) and tap both debt markets over the sample period. The second alternative includes all firms that issue a bond in a given year and tap only the bond market over the sample period. The third alternative includes all firms that issue a syndicated loan in a given year and tap only the syndicated loan market over the sample period. Table 6 reports the results of these estimations.

These estimations are of the utmost interest for our analysis. Up to this point, we have argued that Central state-owned enterprises benefit from their close ties with central authorities to access the corporate bond market. However, the political interference in the choice of debt might be more complex. The development of the corporate bond market is one central government policy goal and a part of the strategy to reform the financial system by promoting capital markets. To insure the smooth development of this debt market, the central government might also exert an influence on Central state-owned enterprises to favor the issuance of bonds, rather than borrowing from banks. Thus, the influence could come not only from Central state-owned firms to regulators but also from central authorities to firms' decisions. By comparing firms borrowing only in the corporate bond market to those borrowing from both debt markets, we empirically address this question. Access to both markets indicates that a firm does

not strongly suffer from discrimination in entering the corporate bond market. Thus, if Central state-owned companies prefer to issue debt only in the corporate bond market, this preference should also partly reflect influence coming from the central government toward them.

The first column shows a significantly positive coefficient for *Central state-Owned*, i.e., Central state-owned companies have a higher probability to rely only on the corporate bond market than to borrow on both debt markets. The second column indicates that government ownership does not influence the choice between the syndicated loan market and both debt markets. Central state-owned companies subsequently appear to neglect the syndicated loan market and rely mostly on the corporate bond market. Thus, these results are in favor of the central government will to secure the development of the corporate bond market through issuances of firms it controls.

We again compute the marginal effect of the interaction term between *Central state-owned* and *Distance*. The result is negative but not significant (results are not reported). Thus, we do not find further proof on the role played by physical distance of Central state-owned firms and the probability to issue a bond. As a consequence, the findings of the model comparing the use of one debt instrument relative to the joint use of both debt instruments confirm that ownership ties with the Central government play a significant role on financing choices of Chinese listed firms. This result allows us to paint a more complex picture of these relations by showing that the choice of issuing a bond can also partly come from central authorities to firms and does not only happen in the reverse.

Only two financial variables are significant: *Firm Size* (in column 2) and *Long-Term Debt*. It is of interest to observe that firm size favors the use of both debt markets, rather than relying only on the syndicated loan market, which is again in line with the flotation costs hypothesis. We do not, however, point out some roles of firm size on the choice of using only bonds, rather than both debt instruments. Furthermore, a greater ratio of long-term debt to total debt influences positively the choice of borrowing on both debt markets in both specifications.

5.3. Robustness checks

The main results indicate that government ownership influences debt choices and that the flotation costs hypothesis holds in China. Evidence remains weak for the information asymmetry and the renegotiation and liquidation hypotheses. To determine more precisely to what extent these two last hypotheses explain debt choice in China, we add two additional variables: *Altman Z Score* and *Top Share*. This addition leads to a reduction of the number of observations in our sample, which explains why we do not include them in our main estimations. Nonetheless their inclusion is of interest to have conclusions on the relevance of the different hypotheses.

Altman Z Score indicates the likelihood of a company's financial distress. A higher value indicates a lower probability of financial distress. As borrowers with a high probability of default benefit more from the bank's ability to renegotiate and liquidate a project efficiently, we expect a positive coefficient for this variable.

Top Share represents the percentage of shares held by the largest shareholder of the firm. Ownership concentration reduces two types of agency conflicts: first, managers' monitoring is increased (Shleifer and Vishny, 1997). Secondly, this concentration reduces incentives of the controlling shareholder to extract private benefits from the firm: asset tunneling is a frequent corporate abuse in the Chinese listed sector (Jiang, Lee and Yue, 2010). We argue that firms with potentially higher agency costs suffer more from information asymmetries, as uninformed investors require higher premiums (Chen, Mazumdar and Surana, 2011). Consequently firms with higher potential agency conflicts should benefit more from the banking sector expertise in monitoring borrowers in conformity with the information asymmetry hypothesis. We expect a positive coefficient for the variable *Top Share*.

Table 7 reports the results of the regressions. Columns 1 and 2 report the results for firms that borrowed only on one debt market over the period, as in model 1. Columns 3 and 4 include firms that tapped both debt markets over the period, as in model 2. *Altman Z Score* is positive and significant in all the regressions. This finding indicates that firms with a lower probability of default rely more on the bond market than the syndicated loan market. This result is consistent with the renegotiation and liquidation hypothesis. *Top Share* is positive but non-significant in all of the regressions. Thus, we do not find more support for the information asymmetry hypothesis.

The other results are similar with one interesting exception: *Current Ratio*, while not significant in former estimations, is now significant. The negative sign of the

coefficient is however not in line with the predicted sign of the renegotiation and liquidation hypothesis.

We conduct another robustness check on a sub-period of our sample. As indicated in section 2.1, an important reform of the approval process was implemented in mid-august 2007. To determine whether our findings on government influence are driven by issuances prior to the reform, we ran the regressions of models 1 and 2 on a subsample that excludes issuances prior to mid-August 2007.

Table 8 reports the results of the regressions. Columns 1 and 2 report the results for firms that borrowed only on one debt market over the period, as in model 1. Columns 3 and 4 include firms that tapped both debt markets over the period, as in model 2. Despite the reform, this result shows that government influence on choice of debt prevailed after mid-August 2007. The coefficient for the variable *Central state-owned* is, however, not significant when we include firms that tapped both markets over the period and control for the interaction between *Distance* and *Central state-owned* (column 4). This finding might indicate a decrease of government influence in the post-reform era. *Current Ratio* is significantly negative, which was not observed when considering the full sample.

We have also tested the inclusion in the sample of all listed firms that had no issuance on the sample period. We estimate two binomial logit models following Begg and Gray's (1984) methodology. In the first binomial logit model, the dependent variable has a value of 0 when a firm has no issuance on a given year and 1 when a firm issues a bond a given year. In the second binomial logit model, the dependent variable has a value of 0 when a firm has no issuance a given year and 1 when a firm issues a syndicated loan for a given year. These estimations help compare the choice between bonds and syndicated loans compared to other types of financing[14]. These estimations cannot, however, test the theories on the choice of debt between bonds and syndicated loans, which is the reason why we do not report these results (available upon request). However, these estimations show that firms relying on bonds and syndicated loans are larger, have greater leverage and have a higher ratio of long term debt to total debt and are more profitable than firms with no issuances. In other words, these results show that firms issuing bonds or syndicated loans are alike compared to firms with no issuances

[14] These types of financing include self-financing, bilateral bank loans or equity issuance. Unfortunately, it is not possible to differentiate between these types of financing in our sample.

over the period, which supports the view that syndicated loans and bonds can be considered to be alternative modes of financing.

6. Conclusion

One of the main challenges of modernizing China's financial system is the development of the corporate bond market. A well-functioning market can provide a better allocation of capital in the economy, reduce credit risk in the banking system and force financial intermediaries to expand credit to new categories of borrowers, due to increased competition. However, the development of the bond market remains strikingly weak in spite of its recent expansion, due to continual political intervention in the issuance approval process. To determine the extent of competition between intermediation and public financing, we have analyzed the determinants of choice of debt markets for a sample of Chinese listed firms during the period of 2006–2010.

Our main finding is that central authorities continue to severely influence firms' choices of debt. Namely, Central state-owned firms are more likely to issue bonds than syndicated loans in comparison to either Local state-owned or privately owned companies. Furthermore, we find limited support in favor of the fact that this influence is stronger for Central state-owned firms located closer to the central government. Regulators prove to be cautious in the development of the market by favoring Central state-owned corporations for which they share less information asymmetries. We also identify that Central state-owned companies tend to borrow uniquely on the bond market, rather than tapping both debt markets. This result indicates that political interference in the market is a complex process with Central state-owned companies enjoying preferential access to the bond market but also probably being pressured into preferring bonds, rather than syndicated loans, as regulatory authorities promote the smooth development of the market.

Contrary to developed countries and other Asian countries, debt choice weakly depends on financial factors in China. We mainly provide evidence in favor of the flotation costs hypothesis because larger firms tend to prefer bond issuance, rather than borrowing on the syndicated loan market. Our findings provide mixed evidence in favor of the renegotiation and liquidation hypothesis and contradict the information asymmetry hypothesis. These latter results are in opposition to those observed in the

studies from Esho, Lam and Sharpe (2001) regarding Asian countries and Altunbas, Kara and Marques-Ibanez (2010) regarding European countries, which support all the three standard hypotheses.

The implications of our results may appear pessimistic for the development of the bond market in China and the modernization of the financial system. To promote the development of the capital markets, the Central state should restrain its intervention in the issuance process. A better allocation of capital in the economy through a competitive corporate bond market can only be achieved if firms are free to choose their debt markets on financial grounds. However, the recent reform of the approval process in 2007 should mitigate political intervention in the future. In case of success, the reform shall promote the corporate bond market as a real alternative to bank debt financing.

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Appendix A

In a nonlinear model, the interaction effect between *CSOE* (dummy variable for Central state ownership) and *Distance* can be of an opposite sign and differ in terms of statistical significance from the coefficient $\hat{\beta}_{CSOE*Distance}$ of the interaction term obtained from the regression.

Consequently, it is not enough to examine the coefficient $\hat{\beta}_{CSOE*Distance}$ on the interaction term *CSOE*Distance* to interpret the effect of the interaction on the probability to issue a bond.

The interaction effect corresponds to the change in the predicted probability that a firm will issue a bond for a change of both variables *CSOE* and *Distance*. This relationship gives the effect on the probability to issue a bond, rather than a syndicated loan, for a Central state-owned firm for which physical distance from Beijing increases.

The formulas to compute the interaction effect between a dummy variable (*CSOE*) and a continuous variable (*Distance*), as well as its statistical significance in a logit model, are as follows[15]:

$\mathrm{F(u)}$ is the logistic cumulative distribution function with

$$\mathrm{F(u)} = \frac{1}{1 + \mathrm{e}^{-(\beta_{\mathrm{CSOE}}\mathrm{CSOE} + \beta_{\mathrm{Distance}}\mathrm{Distance} + \beta_{\mathrm{CSOE*Distance}}\mathrm{CSOE*Distance} + \mathrm{X}\beta_{\mathrm{k}})}},$$

where $X\beta_k$ is the vector including all independent variables times their coefficients obtained from the regression.

The interaction effect is estimated by

$$\Delta\frac{\partial \mathrm{F(u)}}{\partial \mathrm{Distance}}{\Delta \mathrm{CSOE}}$$

$$= (\hat{\beta}_{\mathrm{Distance}} + \hat{\beta}_{\mathrm{CSOE*Distance}})[\mathrm{F}\{\hat{\beta}_{\mathrm{CSOE}} + (\hat{\beta}_{\mathrm{Distance}} + \hat{\beta}_{\mathrm{CSOE*Distance}})\mathrm{Distance} + \mathrm{X}\hat{\beta}_{\mathrm{k}}\}$$
$$\times (1 - \mathrm{F}\{\hat{\beta}_{\mathrm{CSOE}} + (\hat{\beta}_{\mathrm{Distance}} + \hat{\beta}_{\mathrm{CSOE*Distance}})\mathrm{Distance} + \mathrm{X}\hat{\beta}_{\mathrm{k}}\})]$$
$$- \hat{\beta}_{\mathrm{Distance}}[\mathrm{F}(\hat{\beta}_{\mathrm{Distance}}\mathrm{Distance} + \mathrm{X}\hat{\beta}_{\mathrm{k}}) \times \{1 - \mathrm{F}(\hat{\beta}_{\mathrm{Distance}}\mathrm{Distance} + \mathrm{X}\hat{\beta}_{\mathrm{k}})\}]$$

[15] For details, see Ai and Norton (2003, 2004).

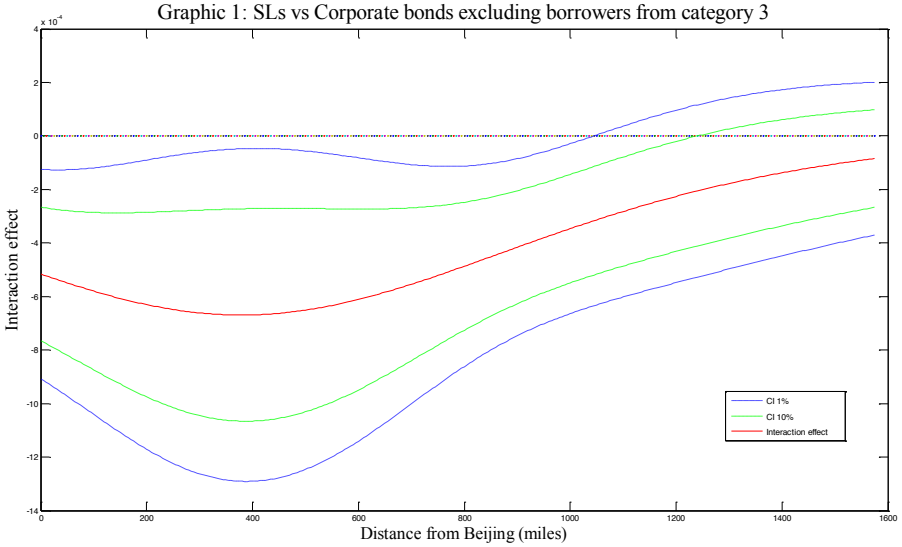
The asymptotic variance of the interaction effect is estimated consistently by the following formula:

$$\widehat{\sigma}_{\mathrm{CSOE*Distance}} = \frac{\partial\left[\Delta\frac{\partial \mathrm{F(u)}}{\partial \mathrm{Distance}}\right]}{\partial \beta'}\widehat{\Omega}_{\beta}\frac{\partial\left[\Delta\frac{\partial \mathrm{F(u)}}{\partial \mathrm{Distance}}\right]}{\partial \beta},$$

where $\widehat{\Omega}_{\beta}$ is a consistent covariance matrix estimator of the coefficients estimates $\hat{\beta}$ obtained from the regression.
The magnitude, sign and statistical significance of the interaction effect can thus be obtained for different values of the variable *Distance* using the above formulas (see Appendix B).

Appendix B

Graphic 1: SLs vs Corporate bonds excluding borrowers from category 3



Graphic 2: SLs vs Corporate bonds with all borrower categories

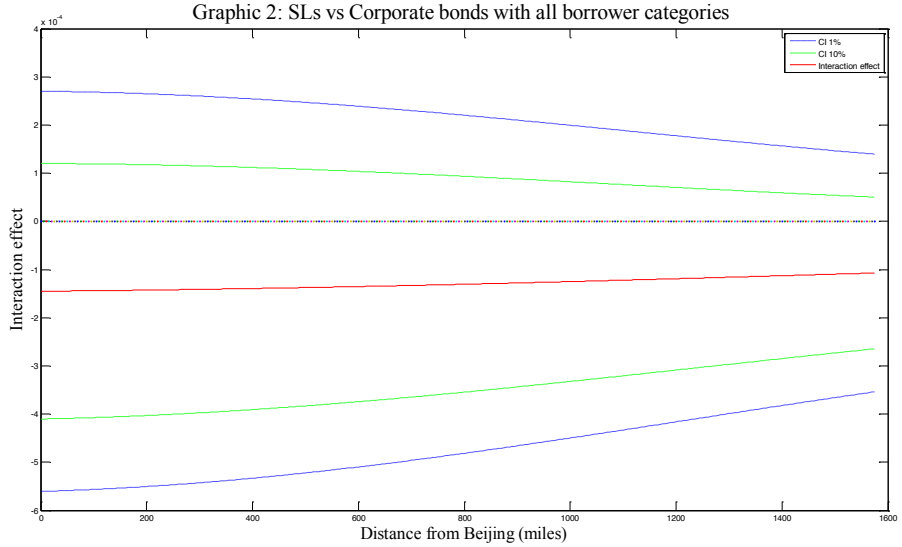


Table 1
Descriptive statistics by borrower type

The table below provides the mean values with standard deviations in brackets for the independent variables used in the estimations.

Variable	Description	Category 1: Synd. loans	Category 2: Bonds	Category 3: Both markets
Central State-owned	Dummy variable equal to 1 if the borrower is controlled by the central government; 0 otherwise (%).	18.88 (39.20)	41.67 (49.45)	36.89 (48.37)
Local State-owned	Dummy variable equal to 1 if the borrower is controlled by a local province; 0 otherwise (%).	63.29 (48.29)	47.02 (50.06)	42.72 (49.59)
Privately Owned	Dummy variable equal to 1 if the borrower is controlled by private shareholders; 0 otherwise (%).	17.83 (38.35)	11.31 (31.77)	20.39 (40.39)
Distance	"Crow fly" physical distance between Beijing and the borrower headquarter in miles.	715.72 (402.48)	506.40 (433.89)	579.86 (421.82)
Firm Size	Logarithm of total assets in million USD.	9.26 (0.83)	10.04 (1.78)	9.66 (0.98)
Long-Term Debt	Long term debt to total debt (%).	28.73 (22.27)	37.27 (28.06)	45.94 (22.86)
ROA	Profit after tax to total assets (%).	5.14 (9.15)	4.51 (4.57)	5.69 (4.62)
Market To Book	Market value of equity to balance sheet value of equity (%).	2.18 (2.19)	2.15 (1.83)	2.20 (1.78)
Top Share	Percentage of shares held by the main shareholder (%).	41.76 (17.25)	44.62 (18.52)	45.79 (16.56)
Leverage	Total debt to total assets (%).	36.39 (14.76)	33.13 (17.08)	37.36 (12.14)
Fixed Assets	Fixed assets to total assets (%).	47.59 (20.52)	51.24 (24.53)	48.81 (22.86)
Current Ratio	Current assets to current liabilities (%).	103.31 (54.34)	90.04 (43.76)	123.12 (70.24)
Altman Z Score	Weighted average of financial ratios compounded by the Bloomberg database.	3.06 (2.40)	2.93 (2.35)	3.33 (2.62)
GDP Growth	Average real growth of GDP per province on the sample period (%).	13.61 (1.96)	14.51 (2.72)	13.70 (2.53)
Number of observations[16]		286	168	206
Number of firms		66	106	48

[16] For *Top Share* and *Altman Z Score*, (see section 5.3. devoted to robustness checks) the number of observations for *Category 1*, *2* and *3* is reduced to, respectively 277, 161 and 186 observations due to the lack of data availability.

Table 2
Descriptive statistics by ownership type

The table below provides the mean values with standard deviations in brackets for the dependent and independent variables used in the estimations.

Variable	Description	Privately Owned	Local State-owned	Central State-owned
Bond	Dummy variable equal to 1 if the firm issued a bond in year t; 0 if it issued a syndicated loan (%).	21.43 (41.22)	29.02 (45.45)	44.00 (49.76)
Distance	"Crow fly distance" physical distance between Beijing and the borrower headquarter in miles.	865.21 (284.28)	671.86 (413.48)	392.57 (406.56)
Firm Size	Logarithm of total assets in million USD.	8.87 (0.75)	9.43 (0.77)	10.25 (1.68)
Long-Term Debt	Long term debt to total debt (%).	32.83 (22.33)	33.64 (25.18)	42.79 (25.36)
ROA	Profit after tax to total assets (%).	8.12 (10.15)	4.47 (5.74)	4.68 (6.26)
Market to Book	Market value of equity to balance sheet value of equity (%).	2.52 (1.94)	2.06 (1.89)	2.18 (2.12)
Top Share	Percentage of shares held by the main shareholder (%).	34.52 (16.49)	43.07 (17.71)	50.01 (15.60)
Leverage	Total debt to total assets (%).	31.99 (10.08)	35.34 (14.00)	38.95 (17.33)
Fixed Assets	Fixed assets to total assets (%).	30.05 (15.59)	51.39 (20.01)	55.12 (23.87)
Current Ratio	Current assets to current liabilities (%).	143.32 (53.77)	95.90 (48.48)	102.91 (69.04)
Altman Z Score	Weighted average of financial ratios compounded by the Bloomberg database.	3.70 (2.23)	3.05 (2.53)	2.86 (2.44)
GDP Growth	Average real growth of GDP per province on the sample period (%).	13.54 (1.90)	13.69 (2.06)	14.36 (03.00)
Number of observations[17]		112	348	200
Number of firms		39	117	64

[17] For *Top Share* and *Altman Z Score* used in robustness checks, the number of observations for *Privately Owned, Local State Owned and Central State Owned* is reduced to, respectively 111, 333 and 180 observations due to the lack of data availability.

Table 3
Correlation matrix

	Bond	Central State-owned	Local State-owned	Privately Owned	Distance	Firm Size	Long-term Debt	ROA	Market to Book	Top Share	Leverage	Fixed Assets	Current Ratio	Altman Z Score
Bond	1													
Central State-owned	0.17	1												
Local State-owned	-0.07	-0.70	1											
Privately Owned	-0.10	-0.30	-0.48	1										
Distance	-0.15	-0.35	0.13	0.26	1									
Firm Size	0.26	0.36	-0.13	-0.26	-0.34	1								
Long-term Debt	0.09	0.17	-0.11	-0.06	-0.13	0.28	1							
ROA	-0.04	-0.04	-0.10	0.19	-0.04	-0.18	-0.04	1						
Market to Book	-0.00	0.00	-0.06	0.08	0.07	-0.19	-0.15	0.47	1					
Top Share	0.06	0.23	-0.03	-0.24	-0.38	0.40	0.07	0.03	-0.10	1				
Leverage	-0.09	0.14	-0.04	-0.12	0.01	0.07	0.23	-0.47	-0.26	-0.14	1			
Fixed Assets	0.08	0.18	0.12	-0.38	-0.25	0.25	0.28	-0.12	-0.11	0.19	0.30	1		
Current Ratio	-0.15	-0.04	-0.18	0.29	0.13	-0.26	0.08	0.29	0.09	-0.07	-0.33	-0.50	1	
Altman Z Score	-0.03	-0.07	-0.02	0.11	0.08	-0.24	-0.17	0.65	0.77	-0.02	-0.48	-0.14	0.33	1
GDP Growth	0.17	0.14	-0.08	-0.06	-0.33	0.35	0.08	0.02	-0.05	0.04	-0.09	0.12	-0.09	-0.02

Table 4
Model 1: Borrowers using only one debt instrument over the period

Logit regressions with random effects at the firm level. The dependent variable is a dummy variable equal to one if the used instrument is a bond and zero if the used instrument is a syndicated loan. Definitions of variables appear in Table 1. This table reports coefficients with standard errors in brackets. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level. Dummy variables for industry and year are included in the regressions, but not reported.

Explanatory variables	(1)	(2)
Intercept	-4.648***	-2.422
	(1.92)	(2.10)
Central State-owned	0.676*	1.867***
	(0.39)	(0.65)
Privately Owned	0.128	0.088
	(0.48)	(0.48)
Distance	-	-0.001
		(0.01)
Central State-owned*Distance	-	-0.003***
		(0.01)
Firm Size	0.359**	0.265*
	(0.15)	(0.15)
Long-Term Debt	1.125*	1.092
	(0.67)	(0.68)
ROA	-0.008	-0.009
	(0.03)	(0.03)
Market to Book	0.075	0.030
	(0.09)	(0.09)
Leverage	-0.042***	-0.039***
	(0.01)	(0.01)
Fixed Assets	0.639	0.853
	(0.91)	(0.92)
Current Ratio	-0.748	-0.752
	(0.51)	(0.53)
GDP Growth	4.093	-4.587
	(7.11)	(7.71)
N	454	454
Log Likelihood	1196.40	1226.05
Prob > khi	<0.001	<0.001

Table 5
Model 2: Borrowers using only one debt instrument for a given year

Logit regressions with random effects at the firm level. The dependent variable is a dummy variable equal to one if the used instrument is a bond, and zero otherwise. Definitions of variables appear in Table 1. This table reports coefficients with standard errors in brackets. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level. Dummy variables for industry and year are included in the regressions, but not reported.

Explanatory variables	(1)	(2)
Intercept	-4.799***	-4.341***
	(1.61)	(1.70)
Central State-owned	0.570*	0.807*
	(0.31)	(0.47)
Privately Owned	-0.001	-0.020
	(0.38)	(0.38)
Distance		-0.010
		(0.04)
Central State-owned*Distance		-0.001
		(0.001)
Firm Size	0.437***	0.423***
	(0.12)	(0.12)
Long-Term Debt	0.125	0.094
	(0.55)	(0.55)
ROA	-0.011	-0.012
	(0.02)	(0.03)
Market to Book	0.101	0.099
	(0.076)	(0.08)
Leverage	-0.034***	-0.033***
	(0.01)	(0.01)
Fixed Assets	0.058	0.071
	(0.74)	(0.75)
Current Ratio	-0.521	-0.503
	(0.33)	(0.33)
GDP Growth	1.242	-0.750
	(5.44)	(5.77)
N	634	634
Log Likelihood	1632.06	1648.25
Prob > khi	<0.001	<0.001

Table 6
Model 3: Choice between one debt instrument and both types of debt instruments

Multinomial logistic regressions with random effects at the firm level. The dependent variable is defined as the three alternatives of issuing a bond or a syndicated loan and tapping both debt markets over the period (*both debt types*), issuing a bond and tapping only the bond market over the period (*bond*), and issuing a syndicated loan and tapping only the syndicated loan market over the period (*syndicated loan*). *Both debt types* is the base outcome. Definitions of variables appear in Table 1. This table reports coefficients with standard errors in brackets. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level. Dummy variables for industry and year are included in the regressions, but not reported.

	Alternative between bond and both debt types	Alternative between syndicated loan and both debt types
Explanatory variables	(1)	(2)
Intercept	7.369**	6.451
	(3.56)	(4.19)
Central State-owned	1.661*	-0.640
	(1.01)	(1.27)
Privately Owned	-0.569	-0.925
	(0.77)	(0.85)
Distance	-0.011	0.057
	(0.08)	(0.09)
Central State-owned*Distance	-0.003*	0.001
	(0.001)	(0.001)
Firm Size	-0.332	-0.754**
	(0.26)	(0.34)
Long-Term Debt	-1.877*	-3.634**
	(1.12)	(1.43)
ROA	-0.052	0.018
	(0.06)	(0.05)
Market to Book	0.013	0.012
	(0.18)	(0.15)
Leverage	-0.032	0.011
	(0.02)	(0.02)
Fixed Assets	0.923	0.907
	(1.43)	(1.85)
Current Ratio	-0.773	0.069
	(0.65)	(0.66)
GDP Growth	-9.152	-0.408
	(11.99)	(14.27)
N	660	
Log Likelihood	3291.20	
Prob > khi	<0.001	

Table 7
Choice of debt instrument with additional variables

Logit regressions with random effects at the firm level. The dependent variable is a dummy variable equal to one if the used instrument is a bond, and zero otherwise. Definitions of variables appear in Table 1. *Top Share* is equity share of the top shareholder in percent. *Altman Z Score* is a weighted average of financial ratios compounded by Bloomberg database. Column 1 and 2 report results for borrowers using only one debt instrument over the period. Column 3 and 4 report results for borrowers using one debt instrument a given year. This table reports coefficients with standard errors in brackets. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level. Dummy variables for industry and year are included in the regressions, but not reported.

	Borrowers using only one debt instrument over the period		Borrower using only one debt instrument for a given year	
Explanatory variables	(1)	(2)	(3)	(4)
Intercept	-5.040**	-2.901	-6.345***	-5.516***
	(2.13)	(2.30)	(1.83)	(1.93)
Central State-owned	0.802*	1.787**	0.664**	0.923*
	(0.42)	(0.69)	(0.32)	(0.50)
Privately Owned	0.088	0.067	0.060	0.053
	(0.51)	(0.50)	(0.39)	(0.40)
Distance		-0.007		-0.025
		(0.05)		(0.04)
Central State-owned*Distance		-0.210**		-0.062
		(0.10)		(0.07)
Firm Size	0.183	0.120	0.425***	0.420***
	(0.17)	(0.18)	(0.138)	(0.140)
Top share	0.016	0.012	0.006	0.004
	(0.01)	(0.01)	(0.01)	(0.01)
Long-Term Debt	1.902**	1.818**	0.888	0.883
	(0.75)	(0.75)	(0.62)	(0.62)
ROA	-0.041	-0.041	-0.040	-0.044
	(0.03)	(0.03)	(0.03)	(0.03)
Market to Book	-0.094	-0.112	-0.061	-0.062
	(0.12)	(0.12)	(0.10)	(0.10)
Altman Z Score	0.319**	0.290**	0.299***	0.301***
	(0.14)	(0.14)	(0.10)	(0.10)
Leverage	-0.025*	-0.026*	-0.018	-0.018
	(0.01)	(0.01)	(0.01)	(0.01)
Fixed Assets	0.296	0.481	0.026	0.029
	(0.96)	(0.97)	(0.80)	(0.80)
Current Ratio	-1.222**	-1.182**	-0.922**	-0.895**
	(0.57)	(0.58)	(0.39)	(0.38)
GDP Growth	4.191	-2.984	2.689	0.032
	(7.59)	(8.22)	(5.94)	(6.23)
N	438	438	600	600
Log Likelihood	1188.89	1207.6	1584.09	1600.60
Prob > khi	<0.001	<0.001	<0.001	<0.001

Table 8
Post 2007 reform subsample

Logit regressions with random effects at the firm level. The dependent variable is a dummy variable equal to one if the used instrument is a bond, and zero otherwise. Definitions of variables appear in Table 1. Column 1 and 2 report results for borrowers using only one debt instrument over the period. Column 3 and 4 report results for borrowers using one debt instrument a given year. This table reports coefficients with standard errors in brackets. *, ** and *** denote an estimate significantly different from 0 at the 10%, 5% or 1% level. Dummy variables for industry and year are included in the regressions, but not reported.

	Borrowers using only one debt instrument over the period		Borrower using only one debt instrument for a given year	
Explanatory variables	(1)	(2)	(3)	(4)
Intercept	-3.736*	-1.054	-4.572**	-4.015**
	(2.22)	(2.41)	(1.81)	(1.91)
Central State-owned	0.699*	1.391**	0.653**	0.589
	(0.42)	(0.69)	(0.33)	(0.51)
Privately Owned	0.193	0.162	0.070	0.104
	(0.51)	(0.49)	(0.39)	(0.39)
Distance		-0.058		-0.035
		(0.05)		(0.04)
Central State-owned*Distance		-0.190*		-0.003
		(0.11)		(0.07)
Firm Size	0.395**	0.286*	0.491***	0.479***
	(0.16)	(0.17)	(0.13)	(0.13)
Long-Term Debt	1.34*	1.372*	0.269	0.276
	(0.72)	(0.70)	(0.58)	(0.58)
ROA	-0.008	-0.013	-0.013	-0.015
	(0.03)	(0.03)	(0.03)	(0.03)
Market to Book	0.075	0.029	0.116	0.117
	(0.10)	(0.10)	(0.08)	(0.08)
Leverage	-0.038***	-0.038***	-0.032***	-0.032***
	(0.01)	(0.01)	(0.01)	(0.01)
Fixed Assets	0.721	0.834	0.164	0.130
	(0.96)	(0.94)	(0.77)	(0.77)
Current Ratio	-0.947*	-0.940*	-0.602*	-0.581*
	(0.57)	(0.57)	(0.36)	(0.35)
GDP Growth	5.312	-3.301	2.230	0.684
	(7.47)	(8.03)	(5.81)	(6.16)
N	410	410	569	569
Log Likelihood	1094.79	1110.17	1477.59	1491.13
Prob > khi	<0.001	<0.001	<0.001	<0.001

CHAPTER 2

Does CEO Turnover Matter in China? Evidence from the Stock Market

This chapter refers to the article in press in the *Journal of Economics and Business* with Laurent Weill.

Abstract

We study the consequences of CEO turnover announcements on the stock prices of firms in China, where most listed firms remain majority-owned by the state. Our proposition is that state ownership may affect stock market reaction to CEO replacement because state-owned firms often pursue multiple, potentially contradictory, objectives, i.e. economic performance and social objectives. Applying standard event study methodology to a sample of 1,155 announcements from 2002 to 2010, we find that CEO turnover typically produces a positive stock market reaction. The reaction is significantly positive, however, only for enterprises owned by the central government, and not significant for enterprises owned by local governments or privately owned enterprises. These results suggest that a CEO turnover in a central state-owned enterprise signals a renewed commitment to the economic performance objective by state officials. The small size of CEO labor market suggests that other shareholders have a relatively small pool of CEO talent to proceed to managerial improvement when a CEO turnover takes place.

JEL: G30, M51, P34, O16.
Keywords: CEO turnover, corporate governance, state ownership, China, event study

1. Introduction

This chapter considers the reaction of the Chinese stock market to announcements of a change in the chief executive officer (CEO) of a listed firm. The concern for stockholders is whether CEO replacement will influence the company's stock value. Market expectations provide clues about the effectiveness of one of the most important internal monitoring mechanism: the possibility to dismiss a poor performing CEO, which allows evaluating the maturity of corporate governance in China.

Most firms listed on China's stock exchanges are still majority-owned by the state. In Chinese state-owned firms, the board of directors typically rubber-stamps the decision by state authorities to replace the CEO (Kato and Long, 2006). The incoming manager is thus expected to act in line with the state controlling shareholder objectives. By implication, the impact of CEO turnover is likely to be different for a state-owned enterprise and a privately held enterprise to the extent the objectives of controlling shareholders diverge.

Does CEO turnover actually affect stock prices? While the immediate intuition is that CEO turnover should influence stock prices, the theoretical literature offers three distinct views on this issue.

The *scapegoat hypothesis* predicts no abnormal change in stock returns around CEO turnover announcements. Here, the market assumes CEOs are fungible. Dismissal in case of poor performance is only required as a threat to insure that CEOs exert efforts. The next manager is not expected to have a higher ability. The *information hypothesis*, in contrast, predicts negative abnormal stock returns around the time of the CEO turnover announcement as it reveals information about poor management choices. The *ability hypothesis* considers that abilities of CEOs vary, so boards seek out the best talent available. Thus, there should be a positive stock market reaction as the market expects the succeeding CEO to be a better manager.

The empirical literature attempting to disentangle these assumptions fails to provide clear conclusions about stock market reactions to such events. Some studies find a positive reaction (Adams and Mansi, 2009), others a negative reaction (Dedman and Lin, 2002), or no significant reaction (Warner, Watts, and Wruck, 1988). All studies

in this area deal with the stock market of developed countries. This research is thus the first to our best knowledge to investigate this issue in a developing country.

The existing literature shows that the probability of a CEO turnover in China increases when a firm performs poorly. Kato and Long (2006) point out the connection between CEO replacement and firm performance is generally more tenuous for state-owned enterprises, which, they postulate, tend to pursue mutually conflicting objectives. They might act in order to correct market failures by pursuing social goals such as high employment (Dixit, 1997). They might seek their own private benefits by tunneling resources from their listed subsidiary, as pointed out in China by Jiang et al. (2010). All these objectives come at the expense of economic performance. State-shareholders need, however, to maintain a minimum level of performance in order to pursue their multiple objectives. Indeed, Chang and Wong (2009) find that the link between CEO turnover and firm performance only exists in loss-making state-owned enterprises. If state-owned enterprises incur too many losses, state-shareholders face a high incentive to restore economic performance in order to pursue their multiples objectives in the future. Thus, CEO turnover in a state-owned enterprise may signal a recommitment on the part of the state shareholder to improve the firm's economic performance. We, thus, expect a positive market reaction to CEO turnover in a state-owned enterprise.

While the pool of available CEOs in China is increasing rapidly, there appears to be an insufficient supply on the CEO labor market (Fan et al., 2007). Party membership can be interpreted as an indicator of human capital for managers (Li et al., 2008). We expect central state-owned firms to be more able to attract managers with the highest party responsibilities. We therefore expect a greater positive market reaction when a CEO turnover announcement involves an enterprise owned mainly by the central government; CEOs of such state-owned enterprises are likely to be high-level party members themselves or have close ties with the party elite.

To assess the impact of CEO turnover announcements on stock prices, we apply standard event study methodology to a sample of 1,094 CEO turnover announcements from 2002 to 2010. Our overall finding is that market reactions to CEO turnover announcements are positive. Consistent with the hypothesis that these central state-owned enterprises have far greater opportunities to recruit the top CEO talent, we find this positive market reaction applies only to the sub-sample of central state-owned enterprises. Thus, the ability hypothesis applies to central state-owned enterprises in

China, while the scapegoat hypothesis applies to privately owned enterprises and enterprises owned by local administrations.

In the rest of the chapter, section 2 develops our hypotheses on stock market reaction to CEO turnover. Section 3 presents the data and methodology of the study. Section 4 presents the results. Section 5 concludes.

2. Hypotheses on stock market reaction to CEO turnover in China

The first subsection develops the hypotheses from the theoretical literature. The second subsection considers several special characteristics of the Chinese economy.

2.1. Stock market reaction to CEO turnover: theoretical literature hypotheses

The literature (e.g. Bonnier and Brunner, 1989; Huson et al., 2004) explores three hypotheses of stock market reaction to CEO turnover announcements in developed economies. These provide a framework for our discussion of stock returns surrounding CEO turnover announcements in China.

The *ability hypothesis* (a real effect) holds that managers have different abilities and skill-sets. As CEO talent is not directly observable, stakeholders and market participants infer CEO ability from realized performance. In the event of a CEO turnover, the incoming CEO is assumed to have greater ability than the departing CEO, whose poor performance is a matter of record. The market reacts positively as CEO turnover implies coming improvement in firm performance.

The *information hypothesis* (an informational effect) holds that CEO turnover indicates poor management choices yet to be revealed to the public. Asymmetry of information between insiders (the board of directors) and outsiders (investors) diminishes as soon as the CEO turnover is announced and the market reacts negatively as the revelation of information about the board's poor management choice.

The *scapegoat hypothesis* builds on an agency model frameworks developed by Mirrlees (1976), Holmström (1979), and Shavell (1979). Under the model developed by Kim (1996), all managers have equal ability. Firm performance therefore is the result of manager efforts and a random factor interpreted as luck. As this random factor is mean-reverting (mean zero), a manager's failure to deliver full effort leads to termination. The

controlling shareholder thus wields a credible threat of dismissal in the event of poor performance to insure that managers always strive to give their best performance. In the event of poor performance, the CEO is dismissed to maintain the credibility of the dismissal threat. Here, the market treats CEOs as fungible, so an incoming CEO is seen to possess similar abilities to other managers and the potential to give equivalent effort. CEO turnover does not signal an improvement in managerial quality, so the announcement of a CEO change provides no new information on a firm's prospects and raises no investor expectations about the firm's future performance. Thus, the scapegoat hypothesis predicts no abnormal returns in a firm's stock price on news of CEO turnover.

2.2 Stock market reaction to CEO turnover: hypotheses for China

Chinese capital markets are notable in that the government has retained control over a majority of state-owned enterprises after their listing. Only partial ownership of state-owned enterprises was sold to public investors. These state-owned enterprises tend to pursue multiple and often contradictory goals (Kato and Long, 2006). These objectives encompass two dimensions. State objectives take two forms. First, a state-owned enterprise might pursue a social objective such as boosting employment to correct a market failure (Dixit, 1997). Employment and other social concerns are well-established roles of state-owned enterprises (Bai et al., 2000). Second, managers of state-owned enterprises may pursue interests beneficial to private individuals (Shleifer and Vishny, 1994). Jiang et al. (2010) document the extent of tunneling of Chinese listed firms from their parent company. They show that controlling shareholders tend to use intercorporate loans to tunnel resources from listed companies. Both goals come at the expense of economic performance of Chinese listed firms.

In principle, external and internal governance mechanisms should prevent state-shareholders from pursuing goals other than profit maximization. However, ownership is highly concentrated in the hand of the controlling shareholder in China, which is a common characteristic in countries with weak protection of investor rights (La Porta et al., 2000). Until the start of the non-tradable share reform in August 2005, state-shares in listed companies were even non-tradable. As a result, hostile takeovers are almost

non-existent in the Chinese stock market, meaning that external governance mechanisms cannot play their disciplinary role.

With the promulgation of the Company Law in 1993, China established a formal internal corporate governance structure comparable to that of Western countries. The Company Law states that the decision to appoint or dismiss the CEO lies in the hands of the board of directors, and that the CEO is directly responsible to the board of directors. In state-owned enterprises, of course, the state actually makes the decisions on appointing or firing key personnel, including the CEO (Wong et al., 2004; Chang and Wong, 2009). The government of the corresponding level of authority over the firm appoints top management. For firms owned by the central government, the Organization Department of the Communist Party of China (CCP) picks the CEO. For state firms owned by a local administration, the provincial government's CCP Organization Department appoints the CEO.

This arrangement severely undermines a major internal corporate governance mechanism, i.e. the possibility of dismissing a poorly performing CEO. Previous literature observes that the link between CEO performance and turnover in China is weaker in state-owned enterprises than in privately held firms (Kato and Long, 2006; Chi and Wang, 2009; Chang and Wong, 2009).[18]

Using data on Chinese listed firms from 1998 to 2002, Kato and Long (2006) study the relationship between firm performance and CEO turnover. They find a modest relation between firm performance and CEO turnover, i.e. a poor-performing firm has a higher probability of changing its CEO in the following year. They also find substantial variation depending on whether the firm is ultimately owned by the state or private investors, and that a weaker performance-turnover link can be distinguished for state-owned enterprises.

Chi and Wang (2009) analyze how type of ownership and concentration of ownership affect CEO turnover for Chinese listed firms. They also find that the performance-turnover link is weaker for state-owned enterprises than privately owned enterprises.

Using a dataset of Chinese listed firms for the period 1995−2001, Chang and Wong (2009) study the performance-turnover link, accounting for the fact that most

[18] Fan et al. (2007) is an exception. They find that poor performance is associated with voluntary and involuntary CEO turnovers in Chinese listed firms, but identify no ownership characteristics (e.g. percentage of state shares) that might influence this link.

firms are state-owned and pursue multiple objectives. In their objective function, state shareholders are seen to attach greater weight to firm performance and less to social or private benefit when the firm performs poorly. When a firm incurs severe losses, it becomes a burden for the state shareholder and state-owned bank creditors. State-shareholders have an incentive to minimize losses in order to deliver sufficient ex-post financial performance to pursue their multiple objectives. As a consequence, state-owned enterprises incurring too much loss face pressure to improve performance. Chang and Wong (2009) find CEO turnover for loss-making state-owned enterprises, but no sign of a CEO performance-turnover link for profit-making state-owned enterprises. They suggest that the state shareholder only feels motivated to discipline the CEO when the firm's bad performance becomes a burden on state officials.

Chang and Wong (2009, p.233) observe that "the ability to improve performance will be an important consideration in the selection and appointment of a new CEO." Thus, CEO turnover signals a shift by the state shareholder away from its other objectives to economic performance. Signaling theory is concerned about reducing information asymmetries between two parties (Spence, 2002). By hiring a new CEO, a state-shareholder signals to the investors a new commitment towards economic performance. The underlying market reaction will then depend on the credibility of the signal, i.e. whether the new CEO has a higher expected ability than the departing one. If the change is credible to the investors, a real effect should be observed in line with the ability hypothesis. Following this line of reasoning, we propose the following hypothesis.

Hypothesis 1: The market reaction around a CEO turnover announcement for a state-owned enterprise will be positive.

As the state shareholder will appoint a new CEO based on ability to pursue the economic performance objective, expectations about firm performance improve. Consistent with the ability hypothesis, we expect a jump in the stock price (positive abnormal returns).

However, China is characterized by a relatively small pool of CEO talent (Fan et al., 2007). The credibility of the signal can be severely undermined if the state-owned firm is not able to attract the best CEO talents. It is therefore questionable whether a

CEO turnover announcement will impact the market due to the lack of depth in the CEO labor pool.

We expect central state-owned enterprises to be able to attract the CEO candidates. In China, party membership is an indicator of certain skill-sets and entrepreneurial abilities (Li et al., 2008). According to Lin and Bian (1991) and Walder (1995), candidates for party membership must attain a certain educational level and show their ability to outperform co-workers. Since the beginning of economic reforms, selection criteria for party membership have moved to favor candidates with high education rather than family class origin (Bian et al., 2001). Although we are unable to determine whether a succeeding CEO is a party member, it seems likely that most CEOs appointed to head up state enterprises controlled by the central government are high-level party members themselves or have close ties with party elite.[19] In any case, acting as CEO of a central state-owned enterprise inherently makes one part of China's elite. Any replacement CEO is likely to possess considerable educational background and skills. Consistent with the ability hypothesis, and complementary to the signal that the state shareholder prioritizes economic performance when it announces a change of CEO, the expected ability of the successor CEO should be higher than the expected ability of the departing CEO (based on past performance) in central state-owned enterprises.

Hypothesis 2: As the successor CEO of a central state-owned enterprise is expected to possess high education and skills, positive abnormal returns should be larger around CEO turnover announcements of central state-owned enterprises than for other types of enterprise.

A corollary of this hypothesis is that market reaction to a CEO turnover announcement for a local state-owned enterprise is uncertain and depends on the supply of CEO talent available to provincial or local administration shareholders. If local state-owned enterprises are not able to attract the best performing CEO, the signaling induced by a CEO turnover loses its credibility.

Finally, a CEO turnover in a privately held enterprise does not signal a recommitment to improved economic performance on the part of the controlling

[19] In the hypothesis where the appointed CEO is not a party member and lacks personal ties with high-level party members, superior skills relative to the available talent remains the sole explanation. This is consistent with the ability hypothesis.

shareholder. As the performance-turnover link is stronger in privately-owned firms, bad performing CEO should be quickly dismissed when performance starts to deteriorate. Expected improved performance for the firm should thus be smaller[20]. Given the small pool of CEO talent in China, which decreases the differences in ability among managers, the scapegoat hypothesis might well apply to this category of firms.

Hypothesis 3: There is no abnormal market reaction to CEO turnover announcement in the case of privately owned enterprises.

3. Data and methodology

3.1. Sample selection and summary statistics

Our study requires the construction of a large dataset including information on CEO turnover announcements, corporate governance, ownership concentration, financial information, and type of ownership for Chinese listed firms. The sample is built from three databases.

We obtain information on CEO turnover announcements, corporate governance, and ownership concentration from the China Listed Firm's Corporate Governance Research Database (*CCGRD*) developed by the GTA Information Technology Co.

The Bloomberg database provides financial information on Chinese listed firms. China Security Index (*CSI*) Co. website allows distinguishing between firms ultimately owned by the central government, local governments or non-state private investors.[21]

The *CSI* website provides lists of central state-owned, local state-owned, and privately-owned enterprises indices. The handbook of the *CSI Central State-owned Enterprises Composite Index* states: "The universe of CSI Central state-owned Enterprises Composite Index is comprised of all of the Central State-owned Enterprises listed at Shanghai and Shenzhen securities markets. […] The company is a Central State-owned Enterprise if realistically controlled by the State-owned Assets Supervision and Administration Commission of State Council (SASAC) and the Ministry of Finance." The *CSI Local State-owned Enterprises Composite Index* handbook states:

[21] http://www.csindex.com.cn/sseportal_en/csiportal/indexquery.do

"[T]he company is a local state-owned enterprise if finally controlled by local State-owned Assets Supervision and Administration Commission, local municipal government and local state-owned enterprises." The *CSI Private-owned Enterprises Composite Index* handbook states: "[T]he company is a private[ly]-owned enterprise[22] if finally controlled by domestic natural person (including HK, Macao and Taiwan)."

The *CSI* indices for central state-owned, local state-owned, and privately-owned enterprises has only existed since 2008. To check if an ownership occurred in the sample period 2002−2008, we compare the yearly ownership information from the *CCGRD* database with the *CSI* database. The *CCGRD* database gives the name and information about the nature of the controlling shareholder.[23] We first identify listed firms in our sample of CEO turnover announcements for which a change in controlling shareholder name happened between 2002 and 2008. We then distinguish between state-owned and privately owned firms in the *CCGRD* database and compare the result to the *CSI* data. We find 50 enterprises classified as privately owned in the *CSI* index that were state-owned in the year of the turnover announcement. Among these 50 enterprises, we identify all as being local-state owned enterprises in the year of their turnover announcement using company websites, annual reports, and internet-based research on the controlling shareholder.

Following e.g. Fan et al. (2007) and Chang and Wong (2009), we consider the post of General Manager (*zongjingli*) equivalent to CEO for Chinese listed firms. We start with 1,404 CEO turnover announcements. Two announcements are made in annual reports and 57 observations have missing values for the type of announcement. We exclude these observations as other news was potentially released to the market at the same time. We also exclude 157 observations if a turnover occurs within a 160-day period following the previous CEO turnover announcement to estimate properly the market model parameters on a 160-day estimation period. Finally, we exclude 33 announcements from the main sample where the departing CEO leaves because of illness or change in control rights. Our final sample consists of 1,155 CEO turnover announcements that occurred in 658 Chinese listed firms during the period 2002−2010.

[22] The term privately-owned enterprise refers to the nature of the controlling shareholder (i.e. a non-state shareholder). It should not be understood as opposed to publicly listed company. All companies in our sample are publicly listed, but some are controlled by a state shareholder and some are controlled by a non-state shareholder.

[23] The CCGRD database, however, does not distinguish between state enterprises owned by the central government and state enterprises owned by provincial or local administrations.

Table 1 presents summary statistics on ownership, source of succession, board and departing CEO characteristics and financial information about firms included in the sample dataset. We observe, as expected, that the majority of enterprises are state-owned (64.44%). A majority of state-owned enterprises are controlled by a local province (45.06%) than by the central government (19.38%). It is also of interest to stress that the succeeding CEO is more likely to be an insider (58.09% of cases) than an outsider.

Table 2 presents summary statistics by ownership type. We distinguish between central state-owned enterprises, local state-owned enterprises and privately-owned enterprises. It can be observed that firms with different ownership types significantly differ in terms of board and CEO characteristics, as well as in terms of size, performance and to a lesser extent risk. Central state-owned enterprises that change their CEO are bigger and better performing compared to local state-owned enterprises and privately-owned enterprises. They are also less prone to failure compared to privately-owned enterprises.

3.2. Methodology

To test the effect of CEO turnover announcements on stock prices in China, we examine the average cumulative abnormal return (CAR) around CEO turnover announcements using standard event study methodology (Brown and Warner, 1985). Abnormal returns are defined as the difference between actual and expected returns.

This methodology is commonly used in the literature. Notably, two studies on another topic calculate abnormal returns for Chinese listed firms to assess the impact of loan announcements on stock prices (Bailey et al., 2012; Huang et al., 2012).

The estimation period for computing the market model parameters is the time period [-160, -21], with day 0 being the announcement day.[24] We use daily closing prices to compute stocks and index returns. The proxy for the market return is either the Shanghai stock exchange composite index or the Shenzhen stock exchange composite index depending on the listing location of the firm. We test if the CAR is statistically

[24] Results are robust to a variety of estimation periods.

different from 0 using the standardized cross-sectional t-test proposed by Boehmer et al. (1991).[25]

4. Results

4.1. Abnormal returns around CEO turnover announcements

We present summary CAR statistics around CEO turnover announcements for a variety of event windows in Table 3 for 1,155 turnover announcements.

A large proportion of reported CARs are significantly positive, supporting the view that stock prices react positively to a CEO turnover announcement on average. For example, in the event windows [-2, 0] and [-5, 0], the CARs are 0.304% and 0.459%, respectively. The stock price increases on average between one-third and one-half percent several days before the turnover announcement.

The [-4, -1] CAR is significantly positive, indicating the existence of systematic information leakage in the days leading up to the official turnover announcement. CARs for event windows from the announcement day to one day after are not statistically significant. This does not come as a surprise given the information leakage observed in the days preceding turnover announcements.

Overall, the ability hypothesis appears to be the more suitable hypothesis as turnover provokes on average a positive reaction on stock prices. The market anticipates a future increase in firm performance after a CEO turnover.

These results from Table 3 show that on average a CEO turnover exerts an impact on stock prices in China. Positive consequences are anticipated for such an event.

4.2. Univariate analysis by ownership type

We now go deeper into the analysis by investigating whether stock price patterns around a CEO turnover are influenced by ownership of the firm. We showed earlier that

[25] If the variance of stock returns increases on the event date compared to the estimation period, the two-sided t-test rejects the null-hypothesis too often. Boehmer et al. (1991) propose the use of a cross-section of event date prediction errors (rather than the estimation period) to estimate CAR variance.

the stock market reaction is generally positive just prior a CEO turnover announcement. We focus here on six event windows around the CEO turnover announcement: [-2, 0], [-2, 1], [-1, 0], [-1, 1], [-1, 2] and [0, 1].

Table 4 presents summary statistics on the different CAR event windows for turnovers sorted by ownership characteristics. We first distinguish between listed firms owned by a state-shareholder and firms owned by a private entity or investor. We then distinguish between state-owned firms owned by the central government and firms owned by a local government.

Table 4 shows that market response to a CEO turnover announcement depends on whether the firm is state-owned. For the event windows [-2, 0], [-2, 1] and [-1, 0], a CEO turnover announcement in a state-owned firm triggers positive CAR, whereas no significant abnormal returns are observed for privately owned firms. For the event windows [-1, 1] and [0, 1], no significant result can be observed for both state-owned enterprises and privately-owned enterprises. For the event windows [-1, 1], [-1, 2] and [0, 1], we find a significantly negative reaction for privately-owned firms[26].

We next distinguish between state firms owned by the central government and state firms owned by provincial governments or local administrations. The CARs are always statistically significant for central state-owned firms – with the exception of one event window ([0, 1]) – and never significant for local state-owned firms. The t-test for CAR mean difference between central state-owned and local state-owned firms for the event windows [-1, 0], [-1, 1] and [-1, 2] show the difference are significant. These results suggest that positive CARs are triggered by the central state-owned firms. To sum up, local state-owned enterprises do not show evidence of positive significant abnormal returns. On the other hand, central state-owned enterprise stock prices seem to react positively to a CEO turnover. Only one event window, CAR[0, 1] is not significant. However, Table 3 evidenced that information leakage seems to be very common in the Chinese stock market. It is thus plausible that the information on CEO turnover in central state-owned enterprises has been already passed into stock prices on this event window. Mixed results can be observed for privately-owned enterprises: market reactions are either non-significant or negative depending on the event window.

These results are consistent with our hypotheses. As Chinese listed firms offer poor protections of investor rights and weak corporate governance, state-owned

[26] Only the t statistic is significant for the event windows [-1, 1] and [0, 1].

enterprises are free to pursue objectives other than profit maximization. A CEO turnover announcement in a state-owned firm signals market participants that economic performance has re-emerged as the state's (controlling shareholder) top priority. Market reaction is positive because the renewed emphasis on economic performance with a change of CEO increases the expected profits of the firm. Moreover, while the successor CEO of a central state-owned enterprise likely has superior ability relative to the overall pool of CEO talent, the small size of that pool means local state-owned and privately owned enterprises are unlikely to enjoy the same recruiting power and access to these top individuals.

4.3. Multivariate analysis

We now turn to multivariate analysis by regressing cumulative abnormal returns on a set of independent variables. We employ a large set of event windows to check the robustness of our results. The dependent variable is the cumulative abnormal return for [-1, 0], [-1, 1], [-1, 2] and [0, 1] event windows.

We want to assess the influence of ownership on stock price patterns around a CEO turnover. Ownership characteristics reflect our first hypothesis that a CEO turnover in a state-owned enterprise indicates a change in state shareholder's objectives toward more economic performance. *SOE* is a dummy variable equal to 1 if the firm is controlled, directly or indirectly, by the state, and 0 if it is controlled by a private investor. *CSOE* is a dummy variable equal to 1 if the firm is controlled, directly or indirectly, by the central government and 0 if it is controlled by a private investor or a local government. *POE* is a dummy variable equal to 1 if the firm is controlled by a private investor and 0 if it is controlled by the central government or a local government. These last two variables reflect our second hypothesis which states that enterprises owned by the central government are able to attract the best talents among the pool of available CEOs.

Other independent variables control for source of successor, board, general manager and firm financial characteristics. These characteristics have proven to influence stock prices around a CEO turnover in the literature. Table 2 evidenced that these characteristics strongly differ between central state-owned enterprises, local state-owned enterprises and privately-owned enterprises. The multivariate analysis allows

disentangling the effect of ownership on stock prices from the effect of other characteristics that can be correlated with firm ownership type.

To capture the influence of the succeeding CEO being an insider or an outsider on stock prices pattern, we include *Source of successor*; a dummy variable equal to 1 if the succeeding CEO is an outsider and 0 if it is an insider. Although there is no consensus on the effect of insider versus outsider succession,[27] the appointment of an outsider is generally assumed to have a weaker effect compared to the appointment of an insider. An outsider lacks firm-specific skills and experience, while the board of directors knows the insider and is in a better position to evaluate their ability. Moreover, going outside the firm could reduce the motivation of other insider managers. An alternative hypothesis, however, predicts that outsiders are not committed to past decisions and can implement new strategies and policies in the firm that leads to a stronger positive market reaction (Bonnier and Bruner, 1989).

We also take into account board characteristics with our variables *Dual BC and GM* and *Independent directors*. *Dual BC and GM* is a dummy variable equal to 1 if the succeeding CEO is also the chairman of the board of directors, and 0 otherwise. Fan et al. (2007) report evidence that when a general manager is also chairman of the board, the link between firm performance and CEO turnover is weaker. This duality could thus insulate a successor CEO from the disciplining function of the board. To control for board influence, the variable *Independent directors* is computed as the number of independent directors to the total number of board members. A more independent board should be more sensitive to remove a poor performing CEO.

The corporate governance literature shows that CEO personal characteristics influence investors' reaction (e.g. Malmendier and Tate, 2008). We take into account two characteristics of the departing CEO in the regressions: *Age* and *Years in office*.

We also include financial characteristics which are likely to influence the stock price pattern of the firm when a CEO turnover is announced: *Firm size*, *Lagged IROA* and *Altman Z-score*. *Firm size* is the natural logarithm of balance sheet total assets. Reinganum (1985) suggests the organizational structures of smaller firms are less complex than those of larger firms; a change in the top executive may have a larger impact on a small enterprise. Dedman and Lin (2002) provide a contrary hypothesis:

[27] For example, Huson et al. (2001) find a positive effect of outside succession and no effect of inside succession, Furtado and Rozeff (1987) observe the reverse, and Kang and Shivdasani (1996) see a positive effect for both forms of succession.

small firms have limited access to the pool of CEO talent, so they may encounter greater difficulties in recruiting suitable CEOs. Limited access to CEO talent makes CEO turnover less beneficial for them. Moreover, central state-owned firms are among the largest Chinese listed firms and most of the large listed firms are central state-owned firms. It is thus required to disentangle the firm size effect from the ownership effect on stock prices. *Lagged IROA* is the industry-adjusted return on assets the year prior the turnover. A poorly performing firm in the year preceding a CEO turnover could be interpreted as a proxy for a low quality manager. Here, we expect higher excess returns when a CEO from a poorly performing firm is replaced in line with the ability hypothesis or no excess return under the scapegoat hypothesis. *Altman Z-score* reflects the probability of default of the firm. Following Dedman and Lin (2002), we expect a positive reaction for CEOs leaving firms with a higher financial risk.

All regressions include time, province and industry fixed effects. As the pool of available CEOs might differ from one industrial sector to another and state-owned enterprises are more represented in certain industries, the industry sector has to be taken into account in the regressions. The industry classification comes from the *Industry Classifying Index* released by the China Securities Regulatory Commission (CSRC). As the development of Chinese provinces has followed an unequal path, it is arguable that objectives of state-owned enterprises differ depending on where they are located[28]. By including province dummies, we control for a potential geographical effect. A province dummy variable is equal to one when the firm's headquarter is located in the concerned province, and zero otherwise.

Table 5 reports the results of the OLS regressions with standard errors clustered at the firm level. In the first four columns, *SOE* is only positively significant once for the event window [-1, 1]. It suggests that being controlled by the state poorly explains different stock prices patterns compared to firm controlled by private investors. This first specification does not, however, distinguish the level of state control (i.e. central or local). In all other specifications, the variable *SOE* is replaced by *CSOE* and *POE*.

The second four columns only include *CSOE*, *POE* variables and industry province and time dummies in the regressions. This allows including the whole 1,155 observations from our sample. The last four columns include all the variables which causes the sample to reduce to 657 observations due to lack of data availability. We

[28] We thank an anonymous referee for pointing this out.

observe that the coefficient for *CSOE* is always positive and significant with the exception of one column (CAR[0, 1] in the eight column). The effect is estimated to be rather large: in the four last columns, being a central state-owned firm increases the cumulative abnormal returns in a range of 1.280% to 2.031% depending on the event window.

These results suggest that the effect on stock prices of a CEO turnover announcement is influenced by the nature of the shareholder. In accordance with our hypotheses, firms controlled by the central government experience on average a significantly positive abnormal return. This result holds even after controlling for other characteristics which might be strongly correlated with *CSOE* such as firm size and industry sector. On the other hand, we find weak evidence on the influence of privately-owned enterprises on stock prices in the regressions: the negative coefficient is significant only once when the dependent variable is CAR[-1, 1]. However, this is only the case when we do not control for other characteristics of the firm and CEO. Thus, the multivariate analysis suggests that privately-owned firms have rather no influence on stock prices than a negative effect. Finally it is striking to observe that no other variables than those reflecting ownership type influence stock price patterns.

4.4. Market prediction and accounting performance change after a CEO turnover

So far, our evidence of firm performance change after a CEO turnover is only based on market reaction. To check whether market reaction is in accordance with accounting performance change before and after a CEO turnover, we observe accounting performance change before and after the CEO turnover. Accounting performance is measured with the firm return on assets (ROA) on three different years: the year before, in and after the CEO turnover. Table 6 reports the tests on performance changes before and after the event by grouping firms in subsamples.

We first group firms having positive CAR on the event window [-1, 1]. These firms experience a significantly positive increase in accounting performance change before and after a CEO turnover announcement when performance change is measured between the year preceding the turnover and the year after the turnover, and no significant increase in performance change when it is measure between the year of the turnover and the year after. Second we test the accounting performance change for firms

experiencing negative CAR on the event window [-1, 1]. On both performance change measures, firms with negative CAR do not experience any significant increase in accounting performance.

Result remains qualitatively unchanged when we only select firms with positive CAR in the highest quartile and firms with negative CAR in the lowest quartile. Thus, these results are rather in line with market prediction.

We also group the firms by ownership type to further check whether ownership is relevant in performance change after a CEO turnover. State-owned enterprises do not experience an increase in accounting performance. Privately-owned enterprises do not show an increase in performance when performance change is measured between one year after and the year of CEO turnover. However, privately-owned enterprises experience an increase in performance when performance change is measured between the year preceding turnover and the year after the turnover occurred. This last result runs contrary to what market reactions predict. When we distinguish between central state-owned and local state-owned accounting performance changes, we find no increase in performance for local state-owned enterprises and a significant increase in performance for central state-owned firms on both performance change measures. These results are in total accordance with market prediction.

5. Conclusion

This chapter examined the stock market reaction around CEO turnover announcements in China. As there is no consensus on the stockholder wealth effect of a CEO turnover in the literature, our contribution adds a new perspective from an emerging country. We find that, in terms of cumulative abnormal returns), CEO turnover announcements in China induced a positive stock market reaction overall in our sample. This was driven largely by the positive reaction for state enterprises owned by the central government. The reaction is not significant for state enterprises owned by local administrations. Privately owned enterprises show mixed results in univariate analysis: either no reaction or a negative reaction after a CEO turnover announcement. When we control for other characteristics, only central state-owned firms experience a significant positive change on their stock price. This evidence is also backed by a significant change in accounting performance before and after the CEO turnover year in

central state-owned enterprises. Privately-owned enterprises do not appear to experience any particular change on their stock price.

These findings support the ability hypothesis for central state-owned enterprises, meaning that ability is taken into account for CEO turnovers in these enterprises. This conclusion is consistent with previous literature on CEO turnover on China, according to which CEO turnovers signal a recommitment to the objective of profitable economic performance.

Our findings also support the scapegoat hypothesis for local state-owned enterprises and privately held enterprises. In these cases, a CEO change is not associated with greater managerial performance, but rather as a show of board commitment to exercising its prerogative to hire and fire CEOs to get full performance out of them. Due to China's small pool of CEO talent, we only observe a positive reaction in central state-owned enterprises where the state shareholder may have access to managers with higher levels of ability. We interpret the absence of market reaction to CEO turnover announcements in privately owned and local state-owned enterprises as a consequence of the relatively small pool of available CEO talent.

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Table 1
Sample descriptive statistics

The sample consists of CEO turnover announcements from 2002 to 2010 in companies listed on the Shanghai or Shenzhen stock exchanges.

Variable	Description	Obs.	Mean	SD	Minimum	Maximum
SOE	Dummy variable equal to 1 if the controlling shareholder is the state; 0 otherwise	1155	63.38%	48.2%	0	1
CSOE	Dummy variable equal to 1 if the controlling shareholder is controlled by the central government; 0 otherwise	1155	18.79%	39.08%	0	1
LSOE	Dummy variable equal to 1 if the controlling shareholder is controlled by a local province; 0 otherwise	1155	44.59%	49.73%	0	1
POE	Dummy variable equal to 1 if the controlling shareholder is controlled by non-state shareholders; 0 otherwise	1155	36.62%	48.2%	0	1
Source of successor	Dummy variable equal to 1 if the succeeding CEO is an outsider; 0 if an insider	1088	41.91%	49.36%	0	1
Dual BC and GM	Dummy variable equal to 1 if the succeeding CEO is also the board chairman of the firm	1087	12.88%	33.51%	0	1
Board independence	Ratio of independent directors to the total number of directors in the board	914	35.92%	5.48%	0	66.67
Age	Age of departing CEO (years)	1148	45.70	6.71	28	68
Years in office	Departing CEO's term in office	1155	2.20	1.48	0.20	12.25
Firm size	Logarithm of total assets (USD million)	1142	7.37	1.26	2.89	14.17
Lagged IROA	Industry-adjusted profit after tax to total assets for year preceding turnover	1098	-3.81%	9.06%	-48.82%	13.23%
Altman Z-score	Weighted average of financial ratios compounded by Bloomberg database	947	2.73	3.24	-13.86	13.99

Table 2
Sample descriptive statistics by ownership type

The sample consists of CEO turnover announcements from 2002 to 2010 in companies listed on the Shanghai or Shenzhen stock exchanges.

Variable		Ownership	N	Mean	Mean difference	t statistic
Source of successor						
	(1)	CSOE	196	41.84	(1) – (2) = -2.15	-0.51
	(2)	LSOE	491	43.99	(2) – (3) = 4.59	1.38
	(3)	POE	401	39.40	(3) – (1) = -2.44	-0.57
Dual BC and GM						
	(1)	CSOE	196	8.16	(1) – (2) = -2.86	-1.18
	(2)	LSOE	490	11.02	(2) – (3) = -6.44	-2.72***
	(3)	POE	401	17.46	(3) – (1) = 9.3	3.41***
Board independence						
	(1)	CSOE	167	35.05	(1) – (2) = -0.43	-0.97
	(2)	LSOE	409	35.48	(2) – (3) = -1.41	-3.44***
	(3)	POE	338	36.89	(3) – (1) = 1.84	4.19***
Age						
	(1)	CSOE	217	47.18	(1) – (2) = 1.1	2.05**
	(2)	LSOE	513	46.08	(2) – (3) = 1.62	3.67***
	(3)	POE	418	44.46	(3) – (1) = -2.72	-5.04***
Years in office						
	(1)	CSOE	217	2.45	(1) – (2) = 0.17	1.30
	(2)	LSOE	515	2.28	(2) – (3) = 0.31	3.29***
	(3)	POE	423	1.97	(3) – (1) = -0.48	-3.94***
Firm size						
	(1)	CSOE	216	8.05	(1) – (2) = 0.58	5.28***
	(2)	LSOE	506	7.47	(2) – (3) = 0.57	7.67***
	(3)	POE	420	6.90	(3) – (1) = -1.15	-10.35***
Lagged IROA						
	(1)	CSOE	212	-2.63	(1) – (2) = 1.13	1.97**
	(2)	LSOE	488	-3.76	(2) – (3) = 0.75	1.14
	(3)	POE	398	-4.51	(3) – (1) = -1.88	-2.79***
Altman Z-score						
	(1)	CSOE	180	3.04	(1) – (2) = 0.27	1.12
	(2)	LSOE	426	2.77	(2) – (3) = 0.24	0.94
	(3)	POE	341	2.53	(3) – (1) = -0.51	-1.72*

Table 3
Cumulative abnormal returns (CAR) around CEO turnover announcements

The average cumulative abnormal return (CAR) is calculated using the market model and standard event study methodology. The estimation window for calculating market model parameters is [-160, -21]. CARs are tested for significance using a two-tail Boehmer's et al. (1991) t-test. ***, **, * denotes statistical significance at the 1, 5 and 10 percent levels respectively. The Wilcoxon Signed Rank Test has a null hypothesis of no difference in amplitude between negative and positive CAR. There are 1,155 observations in the sample.

Event day or window (0 : announcement day)	CAR (%)	Percentage of positive CAR	t-statistic	Boehmer's et al. (1991) t-statistic	Wilcoxon Signed Rank Test
[-5, 0]	0.459	50.65	1.78*	1.79*	-29.42***
[-5, 1]	0.210	50.56	0.71	0.74	-29.42***
[-4,-1]	0.390	50.74	1.85*	1.75*	-29.42***
[-4, 0]	0.465	51.60	1.94*	1.93*	-29.40***
[-4, 1]	0.216	51.08	0.77	0.79	-29.41***
[-3,-2]	0.242	47.10	1.62	1.65*	29.37***
[-3,-1]	0.368	50.91	2.08**	2.05**	-29.41***
[-3, 0]	0.443	50.04	2.12**	2.20**	-29.42***
[-3, 1]	0.194	50.56	0.77	0.83	-29.42***
[-2,-1]	0.229	49.35	1.75*	1.86*	29.42***
[-2, 0]	0.304	49.87	1.78*	1.99**	29.42***
[-2, 1]	0.055	49.44	0.25	0.43	29.42***
[-1, 0]	0.201	47.19	1.45	1.51	29.37***
[-1, 1]	-0.048	47.71	-0.23	-0.17	29.39***
[-1, 2]	-0.243	47.19	-1.00	-0.73	29.37***
[0, 1]	-0.174	47.62	-0.95	-0.79	29.39***

Table 4
Cumulative abnormal returns (CAR) by ownership type

This table reports cumulative abnormal returns (CAR) around CEO turnover announcements by ownership type. ***, **, * denote a difference from 0 significant at the 1, 5 and 10 percent levels respectively. POE, SOE, LSOE and CSOE have respectively 423, 732, 515 and 217 observations.

	CAR (%)	Percentage of positive CAR	t statistic	Boehmer's et al. (1991) t-statistic	CAR diff. (1st-2nd line)	t-test of mean difference
Event window [-2, 0]						
Ownership type						
POE	0.051	46.10	0.17	-0.06		
SOE	0.451	52.05	2.20**	2.63***	-0.400	-1.13
Ownership type among state-owned enterprises						
LSOE	0.297	50.68	1.23	1.60		
CSOE	0.817	55.30	2.09**	2.31**	-0.520	-1.16
Event window [-2, 1]						
Ownership type						
POE	-0.646	44.92	-1.53	-1.29		
SOE	0.461	52.05	1.77*	1.73*	-1.107	-2.36***
Ownership type among state-owned enterprises						
LSOE	0.307	50.49	0.99	1.00		
CSOE	0.826	55.76	1.75*	1.72*	-0.519	-0.91
Event window [-1, 0]						
Ownership type						
POE	0.004	46.34	0.02	-0.16		
SOE	0.314	47.68	1.91*	2.13**	-0.310	-1.08
Ownership type among state-owned enterprises						
LSOE	0.060	45.44	0.32	0.66		
CSOE	0.918	53.00	2.75***	2.68***	-0.858	-2.38***
Event window [-1, 1]						
Ownership type						
POE	-0.693	44.92	-1.79*	-1.47		
SOE	0.324	49.32	1.39	1.10	-1.017	-2.39***
Ownership type among state-owned enterprises						
LSOE	0.070	48.54	0.26	0.23		
CSOE	0.927	51.15	2.05**	1.71*	-0.857	-1.67*
Event window [-1, 2]						
Ownership type						
POE	-1.007	43.50	-2.16**	-1.76*		
SOE	0.199	49.32	0.73	0.62	-1.206	-2.39***
Ownership type among state-owned enterprises						
LSOE	-0.097	47.77	-0.31	-0.17		
CSOE	0.902	53.00	1.70*	1.47	-0.999	-1.68*
Event window [0, 1]						
Ownership type						
POE	-0.647	46.34	-1.81*	-1.33		
SOE	0.099	48.36	0.49	0.17	-0.746	-1.95*
Ownership type among state-owned enterprises						
LSOE	-0.033	47.77	-0.14	-0.18		
CSOE	0.414	49.77	1.09	0.63	-0.447	-1.00

Table 5

Regressions Explaining Cumulative Abnormal Returns around CEO Turnover Announcements

This table reports regressions of cumulative abnormal returns for CAR[-1, 0], CAR[-1, 1], CAR[-1, 2] and CAR[0, 1] on ownership, turnover and firm characteristics. Variables description appears in table 1. Time, industry sector and province dummies are included in all the regressions. Clustered standard errors at the firm level are reported in parentheses. ***, **, and * indicate significance respectively at the 1, 5 and 10 percent levels.

	[-1, 0]	[-1, 1]	[-1, 2]	[0, 1]	[-1, 0]	[-1, 1]	[-1, 2]	[0, 1]	[-1, 0]	[-1, 1]	[-1, 2]	[0, 1]
Intercept	-4.699	-4.592	-4.922	-0.087	-0.672	-1.979	-0.904	-0.911	-4.265	-3.692	-4.071	0.716
	(2.906)	(3.838)	(4.138)	(3.433)	(1.133)	(1.367)	(1.86)	(1.149)	(2.729)	(3.608)	(3.958)	(3.358)
SOE	0.575	1.096*	1.076	0.917								
	(0.452)	(0.656)	(0.765)	(0.603)								
CSOE					1.024**	1.074**	1.082*	0.484	1.280**	1.764**	2.031**	1.032*
					(0.418)	(0.547)	(0.659)	(0.446)	(0.567)	(0.777)	(0.936)	(0.634)
POE					-0.158	-0.855*	-0.866	-0.696	-0.325	-0.75	-0.678	-0.715
					(0.321)	(0.499)	(0.584)	(0.46)	(0.463)	(0.676)	(0.787)	(0.627)
Source of successor	-0.15	-0.25	-0.217	-0.037					-0.182	-0.293	-0.267	-0.063
	(0.401)	(0.586)	(0.713)	(0.524)					(0.401)	(0.584)	(0.708)	(0.521)
Dual BC and GM	0.383	0.267	-0.239	0.123					0.414	0.31	-0.19	0.148
	(0.639)	(1.059)	(1.197)	(0.947)					(0.638)	(1.06)	(1.192)	(0.949)
Independent directors	3.009	1.647	5.552	-3.934					3.661	2.545	6.586	-3.408
	(4.015)	(5.49)	(6.355)	(5.006)					(4.015)	(5.452)	(6.329)	(4.99)
Age	-0.038	-0.052	-0.049	-0.037					-0.04	-0.054	-0.051	-0.038
	(0.03)	(0.045)	(0.05)	(0.042)					(0.03)	(0.045)	(0.050)	(0.042)
Years in office	0.005	-0.026	-0.164	0.018					-0.007	-0.042	-0.183	0.009
	(0.173)	(0.25)	(0.299)	(0.23)					(0.172)	(0.249)	(0.297)	(0.23)
Firm size	0.341	0.421	0.529	0.201					0.278	0.334	0.429	0.15
	(0.228)	(0.36)	(0.391)	(0.369)					(0.220)	(0.363)	(0.399)	(0.372)
Lagged IROA	-0.005	-0.036	-0.039	-0.017					-0.003	-0.033	-0.036	-0.015
	(0.026)	(0.041)	(0.048)	(0.042)					(0.026)	(0.041)	(0.048)	(0.042)
Altman Z-score	-0.086	-0.054	-0.11	-0.048					-0.092	-0.063	-0.121	-0.053
	(0.075)	(0.111)	(0.132)	(0.101)					(0.075)	(0.111)	(0.133)	(0.102)
N. of obs.	657	657	657	657	1155	1155	1155	1155	657	657	657	657
R (in %)	5.62	7.91	8.23	7.68	3.33	4.96	4.95	4.39	6.35	8.57	8.87	7.96

Table 6
Accounting performance before and after the CEO turnover

The table reports percent changes in return on assets (ROA) for subsamples of firms. ROA_{t-1}, ROA_{t} and ROA_{t+1} are the ROA of a company in respectively the accounting year before, in and after the announcement year. ***, **, * indicate significance at respectively 1, 5 and 10 percent.

Subsample of firms	Mean ROA_{t-1} (%)	Mean ROA_{t} (%)	Mean ROA_{t+1} (%)	t-test on mean difference (ROA_{t+1} - ROA_{t-1})		t-test on mean difference (ROA_{t+1} - ROA_{t})	
Accounting performance change for firms with positive and negative CAR[-1, 1]							
Firms with positive CAR	-1.67	-1.27	0.68	(N = 433)	2.17**	(N = 453)	0.40
Firms with negative CAR	-0.99	-2.31	1.80	(N = 497)	1.20	(N = 500)	0.80
Accounting performance change for firms with positive and negative CAR[-1, 1] from, respectively, the highest and lowest quartiles							
Firms with positive CAR from the highest quartile	-1.90	-1.07	1.78	(N = 222)	2.92***	(N = 233)	1.15
Firms with negative CAR from the lowest quartile	-1.71	-1.57	0.95	(N = 236)	1.34	(N = 238)	0.56
Accounting performance change for SOE, CSOE, LSOE and POE							
SOE	-0.44	-0.42	0.21	(N = 605)	0.83	(N = 618)	0.31
CSOE	1.10	-0.09	2.05	(N = 192)	1.74*	(N = 193)	2.48***
LSOE	-1.10	-0.57	-0.58	(N = 413)	-0.11	(N = 425)	-1.09
POE	-2.80	-4.20	3.07	(N = 325)	2.76***	(N = 335)	1.02

CHAPTER 3

Is Bank Competition Detrimental to Efficiency? Evidence from China

This chapter refers to the article in press in the *China Economic Review* with Laurent Weill and Zuzana Fungàčova.

Abstract

This chapter addresses the relationship between bank competition and efficiency by computing Lerner indices and cost efficiency scores for a sample of Chinese banks over the period 2002-2011. Granger-causality tests are performed in a dynamic GMM panel estimator framework to evaluate the sign and direction of causality between them. We observe no increase in bank competition over the period, even as cost efficiency improves. In a departure from the empirical literature showing that competition negatively granger-causes cost efficiency for Western banks, we find no significant relation between competition and efficiency. This suggests that measures to increase bank competition in the Chinese context are not detrimental to efficiency.

JEL Codes: G21, D40.
Keywords: bank, competition, efficiency, China.

1. Introduction

The general view in the economic literature is that bank competition promotes economic growth (e.g. Claessens and Laeven, 2005). In China, however, the banking industry dominates the financial system (Allen et al., 2012). Just five state-owned banks held 47% of total banking sector assets at the end of 2011 (CBRC Annual Report, 2012).[29] The dominance of state banks presents obvious questions concerning competitiveness in the Chinese banking industry and the ability of the Chinese financial system to support economic growth of core industries over the long run. Yet academic assessments of bank competition in China remain impressively scarce. A rare exception is the study of Yuan (2006), who measures competition over the period 1996-2000. Competition, measured by a non-structural aggregate measure for the Chinese banking industry, is surprisingly shown to be perfect.

As competition often relates to banking system efficiency, the dominance of the five largest state-owned banks also raises the corollary issue of efficiency of the Chinese banking industry. Berger, Hasan, and Zhou (2009) note the lower efficiency of state-owned banks may reflect their dominant market position.

In this chapter, we provide new evidence on the relationship between competition and efficiency in the Chinese banking industry by considering recent data on a large sample of Chinese banks between 2002 and 2011. This work has three objectives.

Our first aim is to measure the level and the evolution of banking competition in China over the past decade. This is of particular interest for the analysis of the banking industry. First, it provides information on the degree of competition for Chinese banks relative to other countries. Second, it assembles evidence on the evolution of bank competition in China during a decade marked by profound reforms of the Chinese banking industry, especially concerning the large state-owned banks. These reforms include a transfer of non-performing loans to asset management companies, bank recapitalization, and the entry of

[29] The "Big Four" (Industrial and Commercial Bank of China, Agricultural Bank of China, China Construction Bank, and Bank of China), plus the Bank of Communications. We refer to these in our analysis as the "Big Five."

minority foreign strategic investors in several banks. China's accession to the WTO in 2001 allowed foreign banks access to the banking system, albeit market share held by foreigners remains very low. Our analysis helps assess the market power of banks over the decade. We check whether large state-owned banks differ in market power relative to other banks. This provides information about the effects on competition from the persistence of large state-owned banks and the entry of foreign banks.

Our second aim here is to investigate the efficiency of Chinese banks in recent years. Several studies analyze bank efficiency in China (e.g. Chen, Skully, and Brown, 2005; Fu and Heffernan, 2007; Ariff and Can, 2008; and Berger, Hasan, and Zhou, 2009) but they rely on datasets from the 1990s and early 2000s. We update the discussion of efficiency of Chinese banks by looking at the situation after reforms in the banking industry. One topic of particular interest is whether large state-owned banks still suffer from lower efficiency than their counterparts.

The third aim is to investigate the relationship and causality between competition and efficiency in the Chinese banking industry as these characteristics of market structure are seen as related in other contexts. The intuitive "quiet life" hypothesis suggests that competition promotes higher efficiency. The theoretical "efficient-structure" hypothesis (Demsetz, 1973), in contrast, predicts a negative impact of efficiency on competition, as more efficient banks would benefit from lower costs and thus gain higher market shares. Furthermore, the specific characteristics of bank competition may negatively influence efficiency as reduced competition lets banks benefit from economies of scale in monitoring borrowers and through longer-term customer relationships.

The sign and direction of causality of the relationship between competition and efficiency in the Chinese banking industry have normative implications for bank regulators. If we find evidence showing a positive impact of bank competition on efficiency, the policy conclusion would be that regulators should favor pro-competitive policies in the Chinese banking industry as it promotes economic gains through greater consumer welfare and efficiency of Chinese banks. On the other hand, a finding that efficiency negatively impacts bank competition in line with literature on other countries

(e.g. Casu and Girardone, 2009) would imply that bank regulators face a trade-off and should moderate their application of pro-competitive policies. In addition, the observation of a detrimental impact of efficiency on competition that accords with the "efficient-structure hypothesis" would imply pro-competitive policies have little relevance.

Fu and Heffernan (2009) analyze the interrelationships of profitability, cost efficiency, and market structure indicators (concentration indices and market share) for Chinese banks between 1985 and 2002. They find no relation between cost efficiency and market structure indicators. However, their study provides limited evidence relevant to our research question; market structure indicators are relatively crude measures of competition compared to measures based on the new empirical Industrial Organization (IO) approach such as the Lerner index. Furthermore, the relation is not analyzed within the dynamic panel framework and not tested for Granger-causality.

We analyze the relation and causality between competition and efficiency in the Chinese banking industry by computing Lerner indices to measure competition in line with recent studies on bank competition (e.g. Carbo et al., 2009; Turk-Ariss, 2010). We perform Granger-causality tests to check the direction of causality. Following Pruteanu-Podpiera, Schobert, and Weill (2007) and Casu and Girardone (2009), we embed Granger-causality estimations in Generalized Method of Moments (GMM) dynamic panel estimators designed to handle autoregressive properties in the dependent variable when lagged values are included as explanatory variables. Both papers analyze this issue for samples of European banks. They provide evidence in favor of a negative relation between competition and efficiency, which results from a detrimental impact of competition on efficiency. These results contradict the intuitive notion that competition is positively related to efficiency. We thus ask if a similar conclusion is warranted for the Chinese banking industry.

The rest of the chapter is structured as follows. Section 2 briefly describes the recent evolution of the Chinese banking industry and surveys the literature related to the relation between competition and efficiency, as well as banking in China. Section 3 discusses data and methodology. Section 4 discusses the results. Section 5 concludes.

2. Background

2.1 The evolution of the Chinese banking industry

The Chinese banking sector has gone through significant reforms in recent decades. Before 1978, the People's Bank of China (PBC) operated in a mono-banking environment. Today, all major Chinese banks measured by assets have staged successful initial public offerings and are listed. They all meet Basel I capital adequacy requirements and are moving to meet Basel II requirements. Four Chinese banks rank among the world's ten largest banks.[30] The banking sector constitutes the most important part of the financial system in China. Bank loans are the main source of external funding, accounting for 75% of all external funding sources at the end of 2010.[31]

China's banking sector reforms were part of the broader economic reforms and were implemented gradually. Initially, a two-tier banking system was introduced so that the PBC retained its central bank functions as commercial operations were transferred to four specialized state-owned banks.[32] These new state-owned banks started to perform the main financial intermediation functions in the mid-1980s after they were allowed to accept deposits and grant loans. At the same time, the establishment of several new banks was permitted.

During the second phase of reforms, which were launched in 1994, the Chinese government had to respond to growing asset quality deterioration of large state-owned banks. Three policy banks were established with the objective of separating policy lending from commercial lending. In 1995, the Commercial Bank Law of China officially granted the "Big Four" banks commercial bank status. In 1998, the first round of state-bank recapitalization to deal with the stock of non-performing loans (NPLs) took place. The following year, the first

[30] As of mid-September 2012, four of the world's ten largest banks in terms of market capitalization were Chinese (KPMG, 2012).
[31] People's Bank of China (2010), *The People's Bank of China Monetary Policy Report*.
[32] Agricultural Bank of China (ABC), the Bank of China (BoC), the People's Construction Bank of China (which changed its name in 1996 to China Construction Bank, or CCB), and the Industrial and Commercial Bank of China (ICBC).

transfer of NPLs to asset management companies occurred. New banks also entered the market during this period. For example, Minsheng Banking Corporation (China's largest private bank) was created in 1996. In December 2001, China entered WTO and committed to opening up its banking system to foreign banks over the next five years.

The third phase of reforms involved getting the large state-owned commercial banks in shape for initial public offerings and listing. The goal of the overhauls was to strengthen balance sheets by transferring NPLs off the books and then recapitalizing each bank. The listing of ABC in 2010 was the final IPO for the four commercial banks. ABC was listed on both the Shanghai and Hong Kong exchanges.

Despite the reforms and the entry of foreign investors, China's banking sector remains mostly in state hands. The large state-owned commercial banks are still the main providers of nationwide wholesale and retail banking services, even if their share of assets in the banking sector overall declined from 58% in 2003 to 47% in 2011. The second largest group of banks in China consists of 12 joint-stock commercial banks. Their share, measured in terms of banking sector assets, increased from about 11% to over 16% between 2003 and 2011 (mostly at the expense of the large state-owned banks).

The third tier of the banking sector is composed of city commercial banks. These traditionally operate in local markets within a particular administrative region, even if the regulation that once limited their regional scope has been abolished. Another group of banks operating in China are rural financial institutions. They include traditional institutions like rural commercial banks, rural cooperative banks, and rural credit cooperatives, as well as new rural financial institutions such as village or township banks, lending companies, and rural mutual cooperatives. Foreign banks do not account for a significant part of the banking sector assets. Their share has not changed significantly during the last decade as it stood at 1.5% in 2003 and was just below 2% at the end of 2011, when there were 40 locally incorporated foreign banks and 94 foreign bank branches in China. Foreign owners have also been allowed to hold minority stakes in certain state-owned banks since 1996.

2.2 The relation between competition and efficiency in banking

Despite the dearth of theoretical literature on the link between competition and efficiency, the sentiment of Caves (1980, p. 88) that economists have "a vague suspicion that competition is the enemy of sloth" is widespread. We identify three strands of thought on the relationship of competition and efficiency in the literature.

The "quiet life" hypothesis that increased competition enhances cost efficiency derives from the idea that monopoly power allows managers to grab a share of the monopoly rents through discretionary expenses or a reduction of their efforts. Hicks (1935) suggests that monopoly power allows firms to relax their efforts. Nonetheless, the existence of a monopoly rent does not explain its appropriation by managers. Owners of monopolistic firms can exert the same control of managerial effort than those of competitive firms, and might thus prevent this appropriation.

Leibenstein (1966) bolsters Hicks' argument by explaining why inefficiencies inside firms (X-inefficiencies) exist and why they are reduced by the degree of competition in product markets. He explains that X-inefficiencies come from imperfections in the internal organization of firms creating information asymmetries between owners and managers. Competition reduces these inefficiencies in two ways. First, it provides incentives for managers to exert more effort to avoid the personal costs of bankruptcy. Second, a greater degree of competition provides owners with better knowledge to assess the performance of their firm (and managers) relative to other firms. Following Leibenstein's work, some papers have proposed a formalization of his ideas (e.g. Hart, 1983; Scharfstein, 1988).

The "efficient-structure" hypothesis, proposed by Demsetz (1973), predicts that cost efficiency reduces competition. It contradicts the "quiet life" view in terms of both sign and direction of causality. Here, the best-managed firms have the lowest costs and consequently the largest market shares. This leads to a higher level of concentration. As concentration can be considered an inverse measure of the competition, a negative link between competition and efficiency is expected.

Finally, we have the "banking specificities" hypothesis, which suggests that competition has a detrimental impact on cost efficiency. While the first two views are not specific to banking markets, the theoretical literature suggests that the banking industry is unique in how it operates. Developed by Pruteanu-Podpiera, Weill, and Schobert (2008), the starting point of this hypothesis is the observation of the imperfect competition structure of banking markets, which is stressed in most studies analyzing bank competition (e.g. Carbo et al., 2009). The theoretical literature on banking suggests that this market structure may be the result of information asymmetries in the lending relationship. These asymmetries provide banks and regulators with the incentives to implement certain mechanisms to solve the resulting issues such as moral hazard. Banks gain useful information, for example, through establishing long-term relationships with their customers to gain information on them. However greater bank competition among banks may reduce the length of the customer relationships.

This hypothesis is complemented by Diamond (1984), who shows that banks, unlike investors, have a comparative advantage in the ex post monitoring of borrowers though economies of scale resulting from their monitoring role.

By increasing the number of competitors on a banking market, competition can increase costs to the lender seeking to maintain economies of scale in the face of customer relationships of shorter duration. As a consequence, competition hampers the cost efficiency of banks.

The empirical literature offers only a few studies on the relation between competition and efficiency in banking. The first wave of studies includes works investigating the link between cost efficiency and market structure indicators (market share or concentration indices). These papers analyze the relationships among profitability, cost efficiency, and market structure indicators to test hypotheses concerning the relation between cost efficiency and market structure indicators, as well as those that relate profitability to both characteristics. They do not analyze the relevance of the "quiet life" hypothesis, but check whether cost efficiency and market structure influence profitability. Most of these studies concern banking industries of Western countries. For example, Berger (1995) looks at US banks, while Goldberg and Rai (1996) examine European banks. These studies typically show a positive relation between cost efficiency

and market share (or cost efficiency and concentration). As higher concentration and greater market share are both associated with lower competition, they support the view of a negative relation between competition and cost efficiency.

The study by Fu and Heffernan (2009) is of particular interest for our discussion. In line with the above-mentioned studies, it analyzes the interrelationships between profitability, cost efficiency, and market structure indicators on China. The investigation is performed on a sample of 187 observations (14 banks) from 1985 to 2002. While cost efficiency is measured by employing the stochastic frontier approach, market structure is represented by the market share, the Herfindahl index, and the share of the four largest banks. The authors alternatively perform regressions of market structure indicators on cost-efficiency scores and cost-efficiency scores on market structure indicators. No relation between market structure indicators and cost efficiency is found in any of the estimated regressions.

These works provide the first empirical investigation of the relation. Nevertheless, they rely on structural measures of competition that suffer from limitations we describe below. Moreover, they do not use dynamic panel estimators to analyze this relation. Finally, causality is only considered by including variables as right-side and left-side variables in the regressions; no Granger-causality test is performed.

The second wave of empirical works includes studies that consider non-structural measures of competition. Weill (2004) analyzes the relation between cost efficiency and the H-statistic obtained with the Rosse-Panzar model to measure competition for Western European banks. He finds a negative relation between competition and efficiency. Maudos and Fernandez de Guevara (2007) employ the Lerner index to measure market power of European banks in their analysis of this relation. They support the view of a negative relation between competition and efficiency. Solis and Maudos (2008) perform a similar analysis for Mexican banks by considering separately the Lerner index for deposits and loans. While they observe a negative link between competition and efficiency on the deposit market, they find an opposite result for the loan market.

The third wave of empirical studies includes attempts to measure competition by employing non-structural measures and performing Granger-causality tests to check the sign and direction of causality between competition

and efficiency. Pruteanu-Podpiera, Schobert, and Weill (2007) analyze the relation between competition and efficiency for a sample of Czech banks. Competition is measured by the Lerner index. Granger-causality tests are performed to check the sign and type of causal relation between competition and efficiency. Granger-causality estimations are embedded in GMM dynamic panel estimators. Competition is found to negatively Granger-cause efficiency, but efficiency does not Granger-cause competition. Casu and Girardone (2009) perform a similar investigation for banks from the five largest EU countries. They observe limited support for a negative impact running from competition to efficiency, but find no evidence of reverse causality. Both works corroborate the results of earlier studies that show a negative relation between competition and efficiency. Moreover, as causality runs from competition to efficiency, they suggest that this relation is better explained by the "banking specificities" hypothesis than the "efficient-structure" hypothesis.

All in all, the theoretical literature provides conflicting arguments with respect to the sign and direction of causality between competition and efficiency. The empirical literature tends to support a negative relation.

2.3 Competition and efficiency in Chinese banking

Bank competition in China has received surprisingly little academic treatment. We are aware of only two publications that analyze this issue.[33]

Yuan (2006) measures competition with the non-structural H-statistic, relying on the sample of 15 banks covering the period from 1996 to 2000. His purpose was to establish the level of bank competition in China before it joined the WTO. Notably, he obtains measures of the H-statistic quite close to one, which he interprets as evidence the Chinese banking industry was near a state of perfect competition at that time. Comparing this study with other works using the H-statistic (e.g. Carbo et al., 2009), it appears these H-statistic values for

[33] Two papers concern different but still related issues. Ho (2010) analyzes the evolution of the welfare of consumers from the four largest state commercial banks over the period 1994-2001 and does not find a more competitive pricing of banking services over the period. Lee and Hsieh (2013) investigate the impact of competition on profitability and risk by using concentration measures to assess competition.

China are much higher than values generally found for other banking industries. However, Yuan's (2006) study was conducted on a limited sample of banks. Furthermore, the level of bank competition may well have changed after China joined the WTO.

Fu (2009) also analyzes bank competition in China with the non-structural H-statistic, but employs a larger sample of 76 banks and covers a more recent period (1997 to 2006). Her results indicate monopolistic competition in the Chinese banking industry and an increase in bank competition after China joined the WTO in 2001.

Beyond these studies, the recent Global Finance Development Database from the World Bank provides a large set of measures on financial systems for the period 1960-2010.[34] The GFDD includes a yearly mean Lerner index for Chinese banks from 1997 to 2010. The mean Lerner index falls from 0.39 to 0.26 between 1997 and 2001, suggesting enhanced bank competition between 1997 and 2001. The mean Lerner index falls from 0.39 to 0.26 and then rises from 0.26 to 0.38 between 2001 and 2010, suggesting a reduction in bank competition between 2001 and 2010. While these measures help assess bank competition in China, the GFDD methodological information on the computation of the Lerner index is limited as the database only mentions that "it compares output pricing and marginal cost." Moreover, the yearly mean Lerner index does not allow distinguishing between different types of banks in China, nor does it indicate how many Chinese banks are included in the calculation. Indeed, all we know is that Lerner indices of the GFDD were computed from Bankscope data.

Thus, despite the insights of the above studies, they provide limited information on comparison of market power across types of banks and the evolution of bank competition over time. The H-statistic only provides an aggregate measure of competition for the banking industry, i.e. the overall degree of bank competition in China. While it conceivably could provide specific measures of competition for groups of banks, this would be difficult in the case of China where the groups are small. Moreover, as pointed out by Shaffer (2004), the H-statistic is not a continuous measure of bank competition,

[34] For more details see http://data.worldbank.org/data-catalog/global-financial-development

but a diagnosis on the type of competition. As a consequence, it only indicates whether the banking market is in monopolistic competition, monopoly, or perfect competition. It is unsuited to assessing the evolution of bank competition over time.

In contrast, bank efficiency in China has been tackled in several studies.[35] Chen, Skully, and Brown (2005) study the impact of the 1995 bank deregulation on cost efficiency of Chinese banks. Measuring the cost efficiency of 43 Chinese banks over the period 1993-2000 with nonparametric data envelopment analysis (DEA), they conclude that large state-owned banks and small joint-equity banks are more efficient than medium-sized joint-equity banks. The mean yearly cost efficiency scores range from 42.6% to 58.2%, suggesting large inefficiencies in the Chinese banking industry.

Fu and Heffernan (2007) measure cost efficiency of Chinese banks over the period 1985-2002 with the stochastic frontier approach. Their sample includes 14 banks (four state-owned banks and ten joint-stock commercial banks). They provide evidence that joint-stock commercial banks are more efficient than state-owned banks. The mean efficiency scores in this study range between 40 and 52%, depending on the distributional assumptions. These findings further support the view of strong inefficiencies in the Chinese banking industry.

Ariff and Can (2008) extend the analysis of efficiency of Chinese banks by analyzing profit efficiency. They estimate cost efficiency and profit efficiency of 28 Chinese commercial banks over the period 1995-2004 by employing DEA. They show that joint-stock banks are more cost efficient and profit efficient than state-owned banks. They also observe mean cost efficiency levels of 79.8%, i.e. significantly higher than profit efficiency levels ranging between 43.9% and 50.5% depending on the profit frontier specification.

Berger, Hasan, and Zhou (2009) focus on the impact of ownership on bank efficiency in China. They perform their analysis on 38 Chinese banks over the period 1995-2003 and estimate cost efficiency and profit efficiency using the stochastic frontier approach. Their main findings are that the Big Four state-owned banks are the least efficient and the foreign banks are most efficient.

[35] Matthews and Zhang (2010) also propose an analysis of productivity growth of Chinese banks over the period 1997-2007 with the use of Malmquist indices.

This result stands for both cost efficiency and profit efficiency. The mean efficiency scores are 89.7% for cost efficiency and of 47.6% for profit efficiency.

Finally, Zhang, Wang and Qu (2013) examine the influence of law enforcement on risk-taking and efficiency for a sample of 133 Chinese city commercial banks between 1999 and 2008. They apply Battese and Coelli (1995) approach to measure technical efficiency with the stochastic frontier and find that greater law enforcement fosters efficiency of banks.

The conclusions of studies on bank efficiency in China are consistent in two respects. First, they agree that ownership affects efficiency; in particular, large state-owned banks tend to be less efficient. Second, there is no consensus in estimations of inefficiencies in the Chinese banking industry; various mean cost efficiency levels are reported. This could be the result of different observation periods, or the size and composition of samples. In any case, our sample of Chinese banks is larger than any of these earlier studies, and hopefully provides a more comprehensive view on the efficiency of Chinese banks.

3. Data and methodology

3.1 Data

We use bank-level financial statement data for Chinese banks provided by Bankscope, a financial database maintained by Bureau Van Dijk. Whenever there are missing values or variables, we hand-collect the corresponding data from the annual reports of the bank from their websites. Our final sample comprises of 451 observations for 76 Chinese banks. The data includes all major commercial banks in China and covers almost 75% of the banking sector assets. We cover the period from 2002 to 2011. Naturally, the distribution of the

observations during the sample period reflects the availability of data influenced, for example, by the intentions of banks to list their shares.[36]

This relatively low availability of data, a common feature in Chinese banking studies, implies that the results must be interpreted with care. The Chinese banking sector has seen the transformation of a very large number of very small banks over the decade, which might have encountered large changes in efficiency and competition. As our sample only includes data available from the largest banks, it cannot capture the changes that occurred in the whole banking system but only in these banks. Thus, our result should mainly be interpreted as reflecting the changes in these major banks and not for all banking institutions in China. The banks in our sample can be divided into five categories. Following the development in the banking sector and the classification of banks by the Chinese Banking Regulatory Commission (CBRC),[37] we identify (1) the large state-owned commercial banks, i.e. the Big Four, plus Bank of Communications (the "Big Five"), (2) joint-stock commercial banks, (3) city commercial banks, (4) foreign banks, and (5) other banks. The descriptive statistics of the main variables are presented in Table 1.

3.2 Lerner indices

Tools used to measure bank competition can be divided into the traditional IO and the new empirical IO approaches. The traditional IO approach proposes tests of market structure to assess bank competition based on the Structure Conduct Performance (SCP) model. The SCP hypothesis argues that greater concentration causes less competitive bank behavior and leads to higher bank profitability. Thus, competition can be measured by concentration indices such as the market share of the largest banks, or by the Herfindahl-Hirschman index.

[36] The data for 2011 was not available for all the banks in June 2012 when our dataset was collected.
[37] Details concerning this classification are available in the 2011 CBRC Annual Report and at http://www.cbrc.gov.cn/chinese/jrjg/index.html.

The new empirical IO approach provides non-structural tests to circumvent the problems of competition measures based on the traditional IO approach. Non-structural measures do not infer the competitive conduct of banks from an analysis of market structure, but rather measure bank behavior directly.

Following the new empirical IO approach, we compute the Lerner index, an individual measure of competition for each bank and each year. The Lerner index has commonly been computed in recent studies on bank competition (e.g. Carbo et al., 2009; Fang, Hasan, and Marton, 2011). The Lerner index is defined as the difference between price and marginal cost, divided by price.

The price here is the average price of bank production (proxied by total assets), namely the ratio of total revenues to total assets, following e.g. Carbo et al. (2009). The marginal cost is estimated on the basis of a translog cost function with one output (total assets) and three input prices (price of labor, price of physical capital, and price of borrowed funds). Turk-Ariss (2010) applies the same specification of inputs when calculating the Lerner index for banks in developing countries. We estimate one cost function for all periods in which we include bank fixed effects. Symmetry and linear homogeneity restrictions in input prices are imposed. The cost function is specified as follows:

$$\ln TC = \alpha_0 + \alpha_1 \ln y + \frac{1}{2}\alpha_2 (\ln y)^2 + \sum_{j=1}^{3} \beta_j \ln w_j + \sum_{j=1}^{3}\sum_{k=1}^{3} \beta_{jk} \ln w_j \ln w_k + \sum_{j=1}^{3} \gamma_j \ln y \ln w_j + \varepsilon \quad (1)$$

where *TC* denotes total costs, *y* total assets, w_1 the price of labor (ratio of personnel expenses to total assets),[38] w_2 the price of physical capital (ratio of other non-interest expenses to fixed assets), w_3 the price of borrowed funds (ratio of interest paid to total funding). Total cost is the sum of personnel expenses, other non-interest expenses, and interest paid. The indices for each bank have been excluded from the presentation for the sake of simplicity. The

[38] As our dataset does not provide numbers of employees, we use this proxy variable for the price of labor, following Maudos and Fernandez de Guevara (2007).

estimated coefficients of the cost function are then used to compute the marginal cost (MC):

$$MC = \frac{TC}{y}\left(\alpha_1 + \alpha_2 \ln y + \sum_{j=1}^{3} \gamma_j \ln w_j\right) \quad (2)$$

Once marginal cost is estimated and price of output computed, we can calculate the Lerner index for each bank and obtain a direct measure of bank competition.

3.3 Efficiency scores

Cost efficiency measures how close a bank's cost is to its optimal cost when producing the same bundle of outputs. Several methods are used in the literature to measure cost efficiency with frontier approaches. Parametric approaches like stochastic frontier approach use econometric tools to apply the frontier, while nonparametric approaches like DEA (data envelopment analysis) apply linear programming techniques. Parametric approaches have the advantage to disentangle the distance from the frontier between an inefficiency term and a random error. DEA on the other hand considers that the whole distance from the frontier is inefficiency. Thus, parametric methods separate inefficiency from external random shocks or measurement errors and avoid overestimating inefficiency. Nonetheless, this advantage comes at a cost as parametric approaches require specifying the form of the cost frontier, while DEA does not require such assumption. Moreover the use of econometric techniques for parametric approaches makes these tools less appropriate for very small samples.

Among parametric approaches, stochastic frontier approach is the most commonly used technique. It can be applied to cross-section samples as well as panel data without requiring additional assumptions in comparison to other parametric techniques. For instance, an alternative parametric approach, the distribution-free approach, has been proposed by Berger (1993). However this technique is based on the use of panel data and the hypothesis of constant

efficiency over time. This is not appropriate for studies like ours in which the evolution of efficiency is examined.

We choose to adopt the stochastic frontier approach, as it has been widely used in the literature to estimate cost efficiency scores including some studies on Chinese banks (Berger, Hasan, and Zhou, 2009; Fu and Heffernan, 2009). Our choice is also motivated by the benefit to disentangle the distance from the efficiency frontier between inefficiency and random error which avoids overestimating inefficiencies of Chinese banks. A possible drawback that the stochastic frontier approach requires to specify the form of the cost frontier does not constitute a problem in our study as our aim to also estimate Lerner indices forces us to adopt a specification of a cost function to calculate marginal cost.

The stochastic frontier approach disentangles inefficiency from random error by assuming a normal distribution for the random error and a one-sided distribution for the inefficiency term. The basic model assumes that total cost deviates from the optimal cost by a random disturbance, v, and an inefficiency term, u. Thus, the cost function is $TC = f(Y, P) + e$ where TC represents total cost, Y is the vector of outputs, P the vector of input prices, and e the error term (the sum of u and v). u is a one-sided component representing cost inefficiencies, i.e. the degree of weakness of managerial performance. v is a two-sided component representing random disturbances, reflecting bad (good) luck or measurement errors. u and v are independently distributed. v is assumed to have a normal distribution. We assume a gamma distribution for the inefficiency term u following Greene (1990). Following Jondrow et al. (1982), bank-specific estimates of inefficiency terms are calculated using the distribution of the inefficiency term conditional to the estimate of the composite error term e. Greene (1990) provides the estimate of the cost inefficiency term with a gamma distribution.[39]

We estimate a system of equations composed of a translog cost function and its associated input cost share equations, derived using Shephard's lemma. The system of equations is estimated using the Iterative Seemingly Unrelated Regression (ITSUR) estimation technique. Standard symmetry constraints are

[39] See Kumbhakar and Lovell (2000) for further details on Stochastic Frontier Analysis.

imposed. Homogeneity conditions are imposed by normalizing total costs, price of labor, and price of physical capital, by the price of borrowed funds. Following Weill (2009) among others, we consider two outputs in the cost function: total loans and other earning assets. We follow the intermediation approach for the specification of inputs and outputs. This approach assumes that the bank collects deposits to transform them with labor and capital into loans. Thus, the complete model is the following:

$$\ln\left(\frac{TC}{w_3}\right) = \beta_0 + \sum_m \alpha_m \ln y_m + \sum_n \beta_n \ln\left(\frac{w_n}{w_3}\right) + \frac{1}{2}\sum_m \sum_j \alpha_{mj} \ln y_m \ln y_j + \frac{1}{2}\sum_n \sum_k \beta_{nk} \ln\left(\frac{w_n}{w_3}\right) \ln\left(\frac{w_k}{w_3}\right) + \sum_n \sum_m \gamma_m \ln\left(\frac{w_n}{w_3}\right) \ln y_m + \varepsilon \quad (3)$$

$$S_n = \partial \ln\left(\frac{TC}{w_3}\right) / \partial \ln w_n = \beta_n + \sum_k \beta_{nk} \ln\left(\frac{w_k}{w_3}\right) + \sum_m \gamma_{nm} \ln y_m + \eta_n \quad (4)$$

where TC is total costs, y_m m^{th} bank output (m=1,2), w_n n^{th} input price (n=1,2), w_3 the price of borrowed funds, S_n the input cost share[40] (n=1,2), and η_n an error term (η_n is independent from ε). For simplicity in presentation, the indices for each bank have been dropped. The model is estimated for all years so that we estimate one common cost frontier over the entire period. We include time dummy variables in the cost frontier.

3.4 The relation between competition and efficiency

A key issue of this chapter is to study the relation between competition and efficiency of Chinese banks. We aim at investigating the sign of the relation but also the direction of causality between competition and efficiency.

Building on the work of Pruteanu-Podpiera, Weill, and Schobert (2009) and Casu and Girardone (2009), we perform Granger-causality tests with GMM techniques. We estimate the following equations:

[40] S_n is equal to the expenses for the input n divided by total costs.

$$\text{Lerner Index}_{i,t} = \text{f}\left(\text{Lerner Index}_{i,lag}, \text{Efficiency}_{i,lag}\right) + \varepsilon_{i,t} \quad (5)$$

$$\text{Efficiency}_{i,t} = \text{f}\left(\text{Lerner Index}_{i,lag}, \text{Efficiency}_{i,lag}\right) + \varepsilon_{i,t} \quad (6)$$

Subscript *i* represents the bank, while subscript *t* denotes the year. *Efficiency* is the cost efficiency score. *Lerner Index* is the value of the Lerner Index, and $\varepsilon_{i,t}$ is the error term.

The first equation tests whether changes in efficiency temporally precede variations in market power, while the second equation evaluates whether changes in market power temporally precede variations in efficiency. We use two lags and estimate an AR(2) process for competition and efficiency variables. This number of lags is chosen according to the number of years available. Casu and Girardone (2009) also employ two lags in their study using yearly data.

Granger-causality is tested by a joint test in which the sum of the coefficients of the lagged explaining variable is tested to be significantly different from zero. The sum of these coefficients gives the overall measure of the effect of the explaining variable. The addition of the lagged dependent variables to the predicting variables creates econometric problems induced by unobserved bank-specific effects and joint endogeneity of the explanatory variables. To address these issues, we use GMM estimators for dynamic panel models developed by Arellano and Bover (1995) and Blundell and Bond (1998). We use the two-step system GMM estimator with Windmeijer's (2005) corrected standard error. We include dummy variables for years.

Following Pruteanu-Podpiera, Weill, and Schobert (2009) and Casu and Girardone (2009), we do not include control variables in our estimations. We stress, however, that we have performed our estimations also by including a variable for bank size, defined by the logarithm of total assets. This inclusion does not affect our findings.[41]

[41] The results of these additional estimations are available on request.

4. Results

This section presents the empirical results. We first display the estimates of Lerner indices and efficiency scores to provide insights on the evolution of competition and efficiency in the Chinese banking system. We then discuss the results concerning the relation between competition and efficiency for Chinese banks.

4.1 Lerner indices and efficiency scores

We first provide the estimates of competition and efficiency for Chinese banks over our period of study. These estimates indicate the level and evolution of both characteristics over time.

The development of the mean Lerner indices by years is displayed in Table 2. They are presented for all banks as well as for different types of banks by considering separately the "Big Five" banks, joint-stock commercial banks, city commercial banks, and foreign banks. Several trends can be identified. First, we observe that the average Lerner index over the period is 37.8%, with yearly mean Lerner indices between 27.7% and 42.1%. Comparison of these values with those obtained for other countries suggests that Chinese banks possess extremely high market power. Carbo-Valverde et al. (2009) observe mean Lerner indices ranging from 11% to 22% for EU countries with an EU mean of 16%. Berger, Klapper, and Turk-Ariss (2010) obtain a mean Lerner index of 22% for a sample of banks from 23 developed countries. When considering emerging markets, Fungáčová, Solanko, and Weill (2010) find Russian banks have a mean Lerner index of 21.4%. Our finding supports the view of a low degree of competition in the Chinese banking industry.

Second, we observe some discrepancies in bank competition between different types of banks. Over the period, the mean Lerner indices are 38.9% for the Big Five banks, 34.1% for joint-stock commercial banks, 40.9% for city commercial banks, and 29.9% for foreign banks. Thus, the ranking by type of banks in terms of market power shows that foreign banks have the lowest market power, followed by joint-stock commercial banks, and the Big Five

banks. City commercial banks have the highest market power. The relatively high market power of large state-owned banks is likely explained by competitive advantage from the absence of a formal deposit insurance scheme. The finding for foreign banks reflects the fact that these banks have only recently entered the Chinese market, as well as in line with the view that foreign banks are enhancing competition in China's banking markets.

Third, the evolution of the mean Lerner index over the period does not indicate increased competition in the Chinese banking industry. As the samples are smaller for the early years of our study, it is difficult to make general comments on the trend from 2002 to 2011. Indeed, the changes in the Lerner index may result from changes in the composition of our sample. Nonetheless, we stress that the yearly mean Lerner index ranges between 27.7% and 32.3% in the period 2002-2006, and between 37.5% and 42.1% during 2007-2011 when the number of observations is sufficient. Moreover, while the size of the sample remains comparable between 2007 and 2011, we see no reduction of the Lerner index over the period.

Thus, we do not observe generally enhanced competition in the last decade. Our findings comport with the observation of the OECD (2010, p.77) that "there has been limited change in the concentration of the banking sector." At first glance, it is somewhat remarkable that China's accession to WTO has not led to greater competition in the banking industry. However, this result is far less surprising if we consider the limits imposed on new competitors (OECD, 2010). Moreover, the share of foreign banks in the total assets of the Chinese banking sector has not significantly increased over time, oscillating around 2% over the past decade, hitting 1.5% in 2003 and 1.9% in 2011 (CBRC, 2012).

We turn to the analysis of the efficiency scores for Chinese banks. The mean efficiency scores are presented in Table 3. They are presented for all banks and for each type of bank. Several findings are fairly striking.

First, the average efficiency score over the period is 74.6%, with yearly mean efficiency scores between 67.2% and 78.2%. Thus, over the entire period banks were able on average to reduce their costs by a quarter for the given level of output. These cost efficiency levels are globally comparable to other countries, in particular emerging countries. Bonin, Hasan, and Wachtel (2005)

obtain a mean cost efficiency score of 70% for transition countries. Weill (2009) finds means of cost efficiency between 61% and 90% for EU countries.

Second, the comparison of mean efficiency scores across types of banks shows that Big Five banks are the least efficient banks with the mean score of 68.4% for the sample period. City commercial banks and joint-stock commercial banks have mean efficiency scores of 72.8% and 76.8%, respectively. Foreign banks are the most efficient banks with a mean efficiency score of 84.6%. These findings accord with former studies of Chinese banks conducted on smaller samples. Fu and Heffernan (2007) and Ariff and Can (2008) also find evidence for higher efficiency of joint-stock commercial banks in comparison to the large state-owned banks. Berger, Hasan, and Zhou (2009) similarly conclude to lower efficiency of large state-owned banks and greater efficiency of foreign banks. Our results thus confirm the persistence of the influence of bank ownership on efficiency in China in recent years. State ownership still exerts a detrimental impact and foreign ownership is still beneficial.

Third, the evolution of efficiency scores shows an upward trend. Again, one needs to be cautious about general statements on the evolution over the full period as the number of banks in the sample is much smaller in the first half of the period. Nevertheless, we observe an almost continuous improvement of efficiency over the years. The mean efficiency score rises from 67.2% in 2002 to 71.7% in 2006, and then further increases from 74.1% in 2007 to 78.2% in 2011. Our results indicate an improvement in cost efficiency of the Chinese banks over the years. This finding is in line with Herd, Hill, and Pigott (2010), who stress that performance of Chinese banks has considerably increased in the recent years thanks to closures of unnecessary branches, efforts to cut labor, and investments supporting more efficient banking operations.

4.3 The relation between competition and efficiency

We present the results on the relation between competition and efficiency for Chinese banks in Table 4. The results suggest that the total impact of the Lerner index on cost efficiency is not significant, i.e. that changes in

market power do not Granger-cause changes in cost efficiency. This finding is inconsistent with the "quiet life" hypothesis that market power has a negative impact on cost efficiency. It is also inconsistent with the "banking specificities" hypothesis, whereby the impact should be positive. This finding differs from that observed by Pruteanu-Podpiera, Weill, and Schobert (2008) and by Casu and Girardone (2009) for samples of European banks. It is also at odds with most literature on the link between market power and cost efficiency in the banking industry.

At the same time, we observe that the total impact of cost efficiency on the Lerner index is not significant. From a theoretical perspective, this does not accord with the "efficient-structure" hypothesis, which predicts a positive influence of cost efficiency on market power. Arellano and Bond AR(2) tests are not significant in both specifications indicating no presence of autocorrelation in level,[42] and rendering the GMM estimator inconsistent. Moreover, the Hansen J-test of over-identifying restrictions does not reject the null hypothesis of exogeneity of the instruments.

In other words, these results support the absence of *any* relation between market power and cost efficiency for Chinese banks. This finding differs from the results generally observed for other countries. On the other hand, Fu and Heffernan (2009) reach a quite similar conclusion when analyzing the link between efficiency and market structure characteristics (concentration, market share) in the Chinese banking industry.

The "banking specificities" hypothesis may hold a possible explanation for our result, which suggests that, unlike in other countries, bank competition is not detrimental to efficiency in China. This hypothesis, which explains why competition hampers efficiency in banking as observed in studies of Western countries, is based on the existence of information asymmetries in the relationship between the bank and the borrower that give banks an incentive to implement mechanisms for solving the problems stemming from this relationship. They must perform a monitoring of borrowers for which economies of scale exist, and they have to establish long-term relationships to obtain information on borrowers. Consequently, competition has a negative

[42] We do not even find autocorrelation for the AR(1) process.

influence on cost efficiency of banks by increasing costs of the lending activity, owing to the need to pursue economies of scale in the face of shorter customer relationships.

This hypothesis may play a lesser role in China in comparison to the developed countries as it relates to the importance of information asymmetries in the relationship between bank and borrower. Unlike Western banks, Chinese banks are likely to suffer less from such information asymmetries. One reason is that the structure of loans of Chinese banks is biased toward loans to large state-owned companies (Herd, Hill, and Pigott, 2010). For such big borrowers, information asymmetries are much lower than for small and medium-sized enterprises (SMEs). SMEs are particularly rationed in terms of credit in China, while they belong to the companies for which opaqueness plays a key role in the lending relationship.

4.4 Robustness checks

We conduct robustness checks to confirm the validity of our empirical results on the relation between competition and efficiency.

First, we use an alternative technique to measure efficiency. We have adopted the stochastic frontier approach to estimate the cost efficiency frontier as it is standard in the literature. Nonetheless, a few researchers investigate the robustness of efficiency scores with different techniques (e.g. Bauer et al., 1998). Their main conclusion is that the choice of the technique can influence the distribution of efficiency scores. Thus, we adopt an alternative technique to calculate efficiency scores: the time-varying WITHIN model proposed by Cornwell, Schmidt, and Sickles (1990). This technique has been rarely applied in works on bank efficiency (e.g. Esho, 2001; Weill, 2009). Nevertheless, as this model relies on the panel data, it is of particular interest for our research. By using panel data, the WITHIN model does not require distributional assumptions on the inefficiency term and the random disturbance. The term φ_{it} is modeled as follows:

$$\varphi_{it} = \theta_{1i} + \theta_{2i}\, t + \theta_{3i}\, t^2, \qquad (7)$$

where $\varphi_{it} = \varphi - u_{it}$, i indexes bank, t represents time, φ the intercept in the cost function, and the θs are cross-section bank-specific parameters.

We compute the coefficient of correlation between efficiency scores obtained by the stochastic frontier approach and those calculated using the WITHIN model: it is significantly positive and equals 0.51. This confirms that, even if the efficiency scores obtained by relying on these two techniques are not fully correlated, there is a high positive relation between them.

We report the results of estimations including efficiency scores computed with the WITHIN model in Table 5. We again observe no relation between the Lerner index and cost efficiency in any direction. The total impact of the Lerner index on cost efficiency is not significant, as well as is the case for the total impact of cost efficiency on the Lerner index. Hence, these results corroborate those obtained with the efficiency scores based on the stochastic frontier approach.

We next employ the difference GMM estimator, which considers instruments as lags of the levels of the explanatory and dependent variables (Hansen, 1982; Arellano and Bond, 1991). Two studies in the banking literature compare the results of the difference GMM estimator and the system GMM estimator (e.g. De Haas and Lelyveld, 2010). In their analysis of the relation between competition and efficiency, Casu and Girardone (2010) report results for both estimators. We report the results of estimations with the difference GMM estimator in Table 6. Our conclusion does not change: there is no significant impact of cost efficiency on market power, or of market power on cost efficiency.

Third, we compute four more robustness checks.[43] As our estimation results could be influenced by the choice of the lag length on the dependent and independent variable, we include a three-year lag on the dependent and independent variables. We further check the possibility of an instantaneous Granger causality by including the independent variable at time t in the regression.[44] We also divide the sample in two sub-samples for the period before and after the financial crisis. One might argue that the relationship

[43] These results, available upon request, are not reported here for the sake of brevity.

[44] The test has the following form: $Y_{,t} = f(Y_{i,lag}, X_{i,t,} X_{i,lag}) + \varepsilon_{i,t}$

between competition and efficiency was temporarily disrupted by the financial crisis and the drastic increases in lending observed in the Chinese banking sector. The first sub-sample includes observations from 2002 to 2007; the second includes observations from 2008 to 2011. In all of these three robustness tests, we are unable to find evidence of a causal relationship between competition and efficiency or the reverse.

Finally, to check whether the chosen GMM dynamic panel methodology influences our results, we perform simple regressions of efficiency scores on Lerner indices using bank and year fixed effects with and without controlling for bank size. The Lerner index is never significant, whereas bank size is statistically significant when included.

Similar to the baseline results, the AR2 test is not significant in any of the robustness test specifications, which indicates no evidence of autocorrelation in level. The Hansen J-test does not reject the null hypothesis of exogeneity of instruments.

All in all, our results and the robustness checks support the absence of any relation between market power and cost efficiency for Chinese banks.

5. Conclusion

In this chapter we analyze the relationship between competition and efficiency for Chinese banks, computing Lerner indices to measure competition and estimate cost efficiency scores for 76 Chinese banks over the period 2002-2011. This issue has a particular importance in China where the market structure of the banking industry remains dominated by five state-owned banks, which are characterized by low efficiency.

Our main findings on bank behavior can be summarized as follows. First, bank competition did not increase during that period under review. Second, competition differs depending on the type of banks. Foreign banks have on average the lowest Lerner index. Third, Chinese banks have improved their efficiency in the recent years. Fourth, differences in efficiency across types of banks persist with the lowest efficiency scores going to the Big Five state-

owned banks and the highest to foreign banks. This finding agrees with the observations of Berger, Hasan and Zhou (2009) for 1994-2003.

Our investigation to identify a link between competition and efficiency showed no significant relation. Neither the effect of the Lerner index on cost efficiency, nor the effect of cost efficiency on the Lerner index is significant. This finding rejects the intuitive "quiet life" hypothesis that competition favors efficiency. It also differs from the earlier literature that found a negative relation between competition and efficiency. Thus, it appears that banking competition is not detrimental to efficiency in China.

One caveat however concerns the availability of data as our sample focuses on the largest and most representative banks in China. Thus, our results should mainly apply to these institutions. Future research on this issue might be able to cope with this issue when more observations covering also small banks will be available.

From a normative perspective, our findings suggest that pro-competitive policies in the Chinese banking industry do not affect the cost efficiency of banks. On the one hand, this means that policies favoring cost efficiency of banks should be separately designed. On the other hand, Chinese authorities might not suffer from the trade-off resulting from a negative impact of competition on efficiency. Indeed, the observation of such detrimental impact as found in other countries would have led to a trade-off between the benefits from lower banking prices and losses from lower efficiency due to tighter competition.

Our research is an initial step toward understanding of the effects of bank competition in China. Taking into account the implications for financial stability, further work is needed to investigate the influence of bank competition on financial stability in this country.

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Table 1
Descriptive statistics

	Obs.	Mean	Median	SD	Min.	Max.
Total assets (RMB million)	451	884 700	89 798	2 229 502	3 819	15 500 000
Price of funds (interest expenses/total funding)	451	0.014	0.013	0.006	0.001	0.048
Price of labor (personnel expenses/total assets)	451	0.005	0.005	0.002	0.001	0.014
Price of physical capital (other noninterest expenses/fixed assets)	451	0.910	0.604	1.122	0.055	12.867
Total costs (RMB million)	451	20 260	1 892	50 483	50	329 388

Table 2
Development of Lerner index

This table displays the main statistics for Lerner indices.

	All banks			Big Five			Joint-stock commercial banks			City commercial banks			Foreign banks		
Year	**Obs.**	**Mean**	**SD**	**Obs.**	**Mean**	**SD**	**Obs.**	**Mean**	**SD**	**Obs.**	**Mean**	**SD**	**Obs.**	**Mean**	**SD**
2002	10	0.277	0.086	2	0.230	0.154	7	0.282	0.075	1	0.343	-	0	-	-
2003	12	0.295	0.072	3	0.319	0.066	7	0.267	0.073	1	0.330	-	1	0.386	-
2004	17	0.323	0.094	5	0.323	0.114	9	0.289	0.072	2	0.434	0.094	1	0.399	-
2005	26	0.320	0.101	5	0.335	0.117	10	0.281	0.088	7	0.348	0.077	1	0.477	-
2006	37	0.338	0.102	5	0.346	0.116	11	0.302	0.093	16	0.360	0.090	1	0.463	-
2007	61	0.405	0.122	5	0.443	0.014	11	0.377	0.069	33	0.442	0.127	6	0.291	0.130
2008	76	0.376	0.114	5	0.401	0.061	11	0.338	0.101	43	0.396	0.102	8	0.330	0.180
2009	76	0.375	0.100	5	0.439	0.050	11	0.380	0.051	43	0.393	0.084	8	0.253	0.151
2010	75	0.421	0.098	5	0.482	0.035	11	0.418	0.043	42	0.447	0.078	8	0.251	0.097
2011	61	0.400	0.075	5	0.449	0.047	10	0.422	0.060	31	0.406	0.062	5	0.305	0.093
Total	451	0.378	0.107	45	0.389	0.099	98	0.341	0.090	219	0.409	0.095	39	0.299	0.135

Table 3
Development of efficiency scores

This table displays the main statistics for efficiency scores. Efficiency scores are estimated with stochastic frontier approach. All scores are in percent.

	All banks			Big Five			Joint-stock commercial banks			City commercial banks			Foreign banks		
Year	**Obs.**	**Mean**	**SD**	**Obs.**	**Mean**	**SD**	**Obs.**	**Mean**	**SD**	**Obs.**	**Mean**	**SD**	**Obs.**	**Mean**	**SD**
2002	10	67.23	6.90	2	65.06	6.76	7	67.16	7.64	1	72.06	-	0	-	-
2003	12	69.88	5.75	3	62.22	2.32	7	71.14	3.26	1	76.31	-	1	77.66	-
2004	17	69.17	6.17	5	66.24	4.95	9	70.26	5.28	2	67.25	12.23	1	77.93	-
2005	26	71.46	5.97	5	66.64	4.20	10	73.37	4.83	7	70.37	6.02	1	81.34	-
2006	37	71.73	8.70	5	57.15	13.49	11	76.07	3.54	16	72.12	4.82	1	75.96	-
2007	61	74.06	10.53	5	66.89	4.73	11	78.82	3.31	33	70.24	11.39	6	86.43	3.67
2008	76	73.57	10.91	5	67.88	5.45	11	79.00	3.60	43	70.10	11.49	8	86.81	4.69
2009	76	75.68	9.60	5	72.97	4.19	11	81.14	4.11	43	73.58	9.44	8	85.58	3.36
2010	75	77.28	8.21	5	76.47	3.36	11	81.82	3.86	42	74.88	8.76	8	85.51	3.36
2011	61	78.24	9.16	5	78.44	3.82	10	82.76	3.29	31	76.84	10.19	5	80.63	13.54
Total	451	74.56	9.54	45	68.45	8.38	98	76.81	6.38	219	72.84	10.00	39	84.56	6.16

Table 4
Main estimations

We use the two-step GMM estimator with Windmeijer (2005)'s corrected standard error (reported in brackets). Efficiency scores are estimated with stochastic frontier approach. *, **, *** denote a p-value below 10%, 5%, or 1%, respectively. Arellano-Bond tests for autocorrelation (AR1/AR2) have a null hypothesis of no autocorrelation and are applied to the differenced residuals. The Hansen J-test has a null hypothesis of "the instruments as a group are exogenous."

	Dependent variable	
	Efficiency	Lerner index
$Efficiency_{t-1}$	0.415	0.003
	(0.413)	(0.004)
$Efficiency_{t-2}$	0.208	-0.002
	(0.270)	(0.003)
$Efficiency_{t-1} = Efficiency_{t-2} = 0$	chi2(2) = 11.30***	chi2(2) = 0.83
	Pr > chi2 = 0.004	Pr > chi2 = 0.66
∑ Efficiency coefficients	0.624***	0.001
	(0.227)	(0.003)
$Lerner\ Index_{t-1}$	-17.82	0.470*
	(38.61)	(0.270)
$Lerner\ Index_{t-2}$	10.44	0.0568
	(15.00)	(0.148)
$Lerner\ Index_{t-1} = Lerner\ Index_{t-2} = 0$	chi2(2) = 0.50	chi2(2) = 4.83*
	Pr > chi2 = 0.78	Pr > chi2 = 0.09
∑ Lerner Index coefficients	-7.374	0.527**
	(33.007)	(0.240)
Constant	33.34	0.0974
	(23.52)	(0.273)
Observations	299	299
Number of banks	76	76
P-value AR1/AR2	0.708/0.474	0.182/0.987
P-value Hansen test	0.181	0.658

Table 5
Robustness check: Efficiency scores estimated with the WITHIN model

We use the two-step GMM estimator with Windmeijer (2005)'s corrected standard error (reported in brackets). *, **, *** denote a p-value below 10%, 5%, or 1%, respectively. Arellano-Bond tests for autocorrelation (AR1/AR2) have a null hypothesis of no autocorrelation and are applied to the differenced residuals. The Hansen J-test has a null hypothesis of "the instruments as a group are exogenous."

	Dependent variable	
	Efficiency	Lerner index
$Efficiency_{t-1}$	1.200***	0.0017
	(0.235)	(0.0017)
$Efficiency_{t-2}$	-0.575***	-0.0016
	(0.135)	(0.002)
$Efficiency_{t-1} = Efficiency_{t-2} = 0$	chi2(2) = 30.25***	chi2(2) = 1.06
	Pr > chi2 = 0.000	Pr > chi2 = 0.59
∑ Efficiency coefficients	0.625***	0.0002
	(0.207)	(0.002)
$Lerner\ Index_{t-1}$	22.08	0.669**
	(24.61)	(0.302)
$Lerner\ Index_{t-2}$	5.644	-0.114
	(9.506)	(0.175)
$Lerner\ Index_{t-1} = Lerner\ Index_{t-2} = 0$	chi2(2) = 2.55	chi2(2) = 5.70*
	Pr > chi2 = 0.28	Pr > chi2 = 0.06
∑ Lerner Index coefficients	27.728	0.554**
	(20.842)	(0.239)
Constant	19.32	0.141
	(12.67)	(0.199)
Observations	299	299
Number of banks	76	76
P-value AR1/AR2	0.210/0.649	0.185/0.782
P-value Hansen test	0.798	0.592

Table 6
Robustness check: Difference GMM estimator

We employ the difference GMM estimator. Robust standard errors are reported in brackets. Efficiency scores are estimated with stochastic frontier approach. *, **, *** denote a p-value below 10%, 5%, or 1%, respectively. Arellano-Bond tests for autocorrelation (AR1/AR2) have a null hypothesis of no autocorrelation and are applied to the differenced residuals. The Hansen J-test has a null hypothesis of "the instruments as a group are exogenous."

	Dependent variable	
	Efficiency	Lerner index
$Efficiency_{t-1}$	0.188	-0.00271
	(0.445)	(0.00265)
$Efficiency_{t-2}$	-0.342	0.000928
	(0.451)	(0.00222)
$Efficiency_{t-1} = Efficiency_{t-2} = 0$	chi2(2) = 4.06	chi2(2) = 2.62
	Pr > chi2 = 0.13	Pr > chi2 = 0.27
∑ Efficiency coefficients	-0.153	-0.002
	(0.857)	(0.004)
$Lerner\ Index_{t-1}$	-85.00	0.452
	(67.25)	(0.540)
$Lerner\ Index_{t-2}$	-95.61	0.00836
	(72.21)	(0.610)
$Lerner\ Index_{t-1} = Lerner\ Index_{t-2} = 0$	chi2(2) = 0.771.75	chi2(2) = 10.50***
	Pr > chi2 = 0.41	Pr > chi2 = 0.005
∑ Lerner Index coefficients	-180.613	0.461
	(138.153)	(1.140)
Observations	223	223
Number of banks	76	76
P-value AR1/AR2	0.134/0.857	0.098/0.706
P-value Hansen test	0.759	0.144

CHAPTER 4

Do capital requirements affect bank efficiency? Evidence from China

Abstract

This chapter contributes to the debate of the role of capital requirements on bank efficiency. We study the relation between capital ratio and bank efficiency for Chinese banks over the period 2004-2009. We take advantage of the profound regulatory changes in capital requirements during this period to measure the exogenous effect of capital ratio increase on cost efficiency of banks. We observe that an increase in capital ratio has a positive effect on cost efficiency. This effect depends to some extent on the ownership type of the bank. Our results then suggest that capital requirements can improve bank efficiency.

JEL Codes: G21, G28.
Keywords: bank, capital requirements, efficiency, China

1. Introduction

The recent financial crisis recalled that a well-performing banking system is essential to carry fundamental missions such as supply of credit and to contribute to economic stability. To promote a sound financial system, regulators require banks to hold sufficient levels of capital in order to absorb losses, and limit moral hazard behavior.

This prudential regulation might have downsides as well, which raises some concerns on its implementation. Higher capital ratios might impose trade-offs in terms of liquidity creation (Berger and Bouwman, 2009), lending and output growth (Angelini, 2011, BCBS, 2010).

A key implication of capital adequacy requirements is also their influence on bank efficiency, which has been shown to be one of the most direct contributors to financial stability through its effects on bank failures, future problem loans and risk-taking (Berger and DeYoung, 1997; Podpiera and Weill, 2008; Podpiera and Podpiera, 2008; Fiordelisi, Marques-Ibanez and Molyneux, 2011).

Theory provides opposing views on the effect of capital ratios on bank performance. A strand of literature suggests a positive effect of capital on bank performance. This might occur by lowering moral hazard between shareholders and debtholders. Due to the limited liability of shareholders, low capital ratios increase their incentives to take-on excessive risks. This behavior is reinforced by explicit or implicit government guarantees on deposits. A higher capital ratio thus reduces risk-shifting and increases shareholders' effort to control risk. Moreover, by increasing the surplus generated in the bank-borrower relationship and by improving monitoring incentives, capital ratios have a positive effect on bank's profitability (Holmstrom and Tirole, 1997; Allen, Carletti and Marquez, 2011; Mehran and Thakor, 2011).

Another strand of literature suggests on the contrary a negative effect of capital on bank performance. Agency costs between managers and shareholders tend to be exacerbated when capital ratios are higher due to the disciplinary role played by debt repayments on managers' behavior (Calomiris and Kahn, 1991).

Determining which effect dominates thus remains an empirical question. Literature has however presented mixed evidence on the subject. In a seminal paper, Berger and Bonaccorsi di Patti (2006) have analyzed the relation between bank capital

and efficiency in the US banking industry from 1990 to 1995. Fiordelisi, Marques-Ibanez and Molyneux (2011) also test the relationship between capital ratios and bank efficiency in the European banking industry over the period 1995-2007. These studies find contradictory results: Berger and Bonaccorsi di Patti (2006) find that lower capital ratios are associated with higher efficiency, whereas Fiordelisi, Marques-Ibanez and Molyneux (2011) find the opposite.

This study contributes to the literature by analyzing the effect of higher capital ratios on cost-efficiency in the Chinese banking industry. The Chinese case provides a unique framework to measure the direct effect of capital adequacy regulation on banks' behavior, due to the large transformation of the banking system during the last decade.

In 2004, the first regulation on capital adequacy requirements was implemented. From 2004 to 2008, the industry went from a situation were less than 10% of banks were meeting new capital adequacy requirements to a situation where nearly all of them comply with the regulation (CBRC, 2010). This adjustment of bank capital adequacy ratios under pressure of the regulator allows measuring precisely how banks' performance was affected by this change during this period.

Thus this chapter brings two contributions to the literature on the impact of capital on efficiency. First, a common problem to these former studies is the difficulty to assess the role played by prudential regulations as the majority of banks in the periods of study were above capital requirements (Berlin, 2011). As stated by Berger and Bonaccorsi di Patti (2006, p. 1068): 'Most banks are well above the regulatory capital minimums, and [the] results are based primarily on differences at the margin, rather than the effects of regulation.' Gropp and Heider (2010) indeed show for a sample of U.S. and European banks over the period 1991 to 2004 that capital regulation was of second order in determining the capital structure of banks. Second, another problem arising when studying the impact of capital ratios on efficiency is the potential reverse causality that can be observed from efficiency levels to capital.

By studying the effect of capital regulation in China, we answer both problems. China provides a natural experiment to test the effect of capital adequacy regulation, as banks have been put under pressure by the state to cope with a totally new prudential regulation since 2004. This characteristic provides a unique opportunity to directly measure the effect of new capital regulation on bank efficiency. Moreover, as banks were due to adapt to the new regulation in a very short time horizon, the changes in

capital ratios can be assumed to be exogenous[45] (i.e. the direct effect of change in prudential regulation).

To investigate this issue, we measure cost efficiency on a sample of Chinese banks including all major commercial banks with data from Bankscope completed with hand-collected information. We analyze the relation between capital and cost efficiency with the one-step stochastic frontier model proposed by Battese and Coelli (1995).

The rest of the chapter is organized as follows. Section 2 presents related literature. Section 3 reviews capital adequacy regulation in China. Section 4 presents data and methodology. Section 5 displays the main results. Robustness checks are performed in Section 6. Section 7 concludes.

2. Related literature

In this section, we review empirical papers dealing with the effect of capital regulation on bank performance, and summarize the literature on efficiency in the Chinese banking sector.

2.1. Capital adequacy requirements and bank performance

Capital adequacy requirements are one of the main regulatory tools in the banking system. They are expected to perform two main duties. First, their 'risk sharing function' acts as a buffer against losses, which protects depositors and limits the recourse to deposit insurance. Second, they limit a moral hazard issue in which shareholders have incentives to take-on excessive risks to maximize their share value.

A few studies measure the impact of capital ratio levels on bank efficiency.

Berger and Bonaccorsi di Patti (2006) study the relation between capital ratios and profit efficiency in the US banking industry over the period 1990-1995. Using the parametric distribution free approach, they find that higher capital ratios have a negative effect on efficiency

Fiordelisi, Marques-Ibanez and Molyneux (2011) study the relation between bank efficiency, risk and capital ratios. The aim of this paper is thus broader than assessing the impact of capital ratios on efficiency. They consider three dimensions of

[45] The validity of this assumption is tested in section 6 devoted to robustness checks.

efficiency: cost efficiency, revenue efficiency, and profit efficiency. They notably study the reverse causality from efficiency to capital and from capital to efficiency with Granger-causality tests in GMM dynamic panel framework. They find that less efficient banks tend to take-on more risks and that better capitalized bank perform better in terms of efficiency.

Both these papers provide relevant information for the analysis of the relation between capital and efficiency. However they provide limited evidence on the specific link between capital and cost efficiency as they also focus on profit efficiency. Namely, one should note that cost efficiency and profit efficiency (which is a broad concept taking into account cost efficiency and revenue efficiency) are two different concepts in spite of being seemingly close in appearance. Berger and Mester (1997) find no positive correlation between cost and profit efficiency. Profit efficiency does not only account for banks' manager performance but is also influenced by market power, which is not directly under control of the manager. Cost efficiency can thus be considered as a better proxy of managerial performance. Moreover, literature shows that degradation in cost efficiency has negative implications for financial stability, but no evidence exists on the effect of profit efficiency on financial stability.

In comparison, this chapter focuses on the link between capital and cost efficiency, and employs the unique situation of China banking regulation to directly measure the effect of regulation on bank performance. As previous literature has concentrated on the US or European banking system, these studies have focused on samples with most banks having capital ratios above regulatory requirements. The situation is the opposite in China on our period of study. The exogenous change in Chinese banks' capital ratios, due to new capital adequacy regulations, eliminates the concern of reverse causality from efficiency to capital ratio. It allows us to directly estimate the effect of capital regulation on efficiency.

Some other studies have also analyzed the relation between capital ratios and other measures of performance. A notable one is the recent paper from Berger and Bouwman (forthcoming) studies the impact of capital adequacy requirements on bank performance during financial crises by focusing on three dimensions of performance: survival, market share and profitability. Their sample is composed of all US banks from 1984 to 2009. They find that higher capital ratios help banks to survive, increase their market share and profitability.

Finally, another strand of literature has analyzed the effectiveness of supervisory practice and regulation (see Barth, Caprio and Levine, 2004, 2006; Beck, Demirgüc-Kunt and Levine, 2006). Barth et al. (2010) study whether bank supervision, regulation and monitoring enhance or impede banks' operating efficiency in 72 countries over the period 1999-2007. They notably find that greater capital requirement stringency (measured by an indicator variable) is positively associated with bank efficiency. Chortareas, Girardone and Ventouri (2012) use the same capital regulatory index to measure the effect of capital stringency on cost-efficiency in 22 EU countries over the period 2000-2008. They show that strengthening capital regulation improves bank efficiency.

2.2. Bank efficiency in China

A vast literature on bank efficiency in China has developed over the years. Using non-parametric DEA, Chen, Skully and Brown (2005) study the effect of the 1995 bank deregulation on cost efficiency of 43 Chinese banks over the period 1993-2000. They find that efficiency depends on ownership type as large state-owned banks and small joint-stock commercial banks are more efficient than medium-sized joint-stock commercial banks. Large inefficiencies are found in the Chinese banking sector: the mean yearly cost efficiency scores range from 42.6% to 58.2%.

Fu and Heffernan (2007) measure cost efficiency of Chinese banks over the period 1985-2002 with the stochastic frontier approach. Their sample includes 14 banks (four state-owned banks and ten joint-stock commercial banks). They provide evidence that joint-stock commercial banks are more efficient than state-owned banks. They also find large inefficiencies in the banking sector with mean efficiency scores ranging from 40% to 52%, depending on the distributional assumptions.

Berger, Hasan and Zhou (2009) perform their analysis on 38 Chinese banks over the period 1995- 2003 and estimate cost efficiency and profit efficiency using the stochastic frontier approach. The effect of ownership on bank efficiency in China is the main focus of their study. Large state-owned banks appear to be the least efficient group of banks, while foreign banks account for the most efficient banks. The mean efficiency scores are 89.7% for cost efficiency and of 47.6% for profit efficiency in their study.

Fungáčová, Pessarossi and Weill (2012) study the link between competition and cost efficiency over the period 2002-2011 with a sample of 76 Chinese banks. Applying the stochastic frontier approach, they find that efficiency improves over the period but that it is not influenced by the degree of competition in the banking system. Mean cost efficiency varies from 67.23% to 74.56% over the period.

In conclusion, the literature on banking efficiency in China shows that ownership affects efficiency; in particular, large state-owned banks tend to be less efficient, meanwhile foreign banks appear to be more efficient. Thus, our study also takes into account bank ownership as a determinant of inefficiency.

3. Capital adequacy requirements in China

In the end of 1990, a large portion of Chinese banking system was virtually bankrupt (Lardy, 1998). During the last decade, Chinese banks went through major reforms in terms of risk management, corporate governance and capital adequacy requirements. Most banks were recapitalized and cleaned from their non-performing loans, and the largest commercial banks went through IPOs. To finalize the modernization of its banking system, the Chinese regulator also moved to adapt its supervision and prudential regulation to international standards.

A dramatic step was taken in February 2004 when the China Banking Regulatory Commission (CBRC) issued the *Regulation governing capital adequacy of commercial banks*. Before this regulation, "the concepts of capital and capital adequacy were not on the mind of neither bank managers nor bank regulators and capital constraints were unheard of"[46] (Cousin, 2011, p.183). Banks have focused on attracting deposits in an environment where deposit growth was the sole solution to fund new assets. As a consequence, prudential regulation only relied on the loan-to-deposit ratio, which was set at 75%.

The 2004 capital adequacy regulation thus appears like a revolution in the Chinese banking industry. It was for the first time defining, with a precise method of calculus, capital adequacy requirements (Desombre and Chen, 2004). It required that

[46] Although the PBOC had previously published a minimum capital ratio of 8% in the *Commercial Banking Law*, no details on calculation, nor definition of its components, were given. Moreover, compliance was not enforced. As a consequence, this previous capital legislation was simply ignored by bank managers and regulators.

minimum ratios shall be no less than 8% for capital adequacy and 4% for core capital adequacy (article 7). Some of the Basel II rules were also included in the 2004 prudential regulation. Risk weighting was notably closer to the Basel II approach than Basel I, market risk was taken into account, and information disclosure did refer to Basel II requirements.

Moreover, the regulation defined precise actions that the CBRC could undertake to force banks to comply with it. Notably, the CBRC had the power to issue a supervisory letter to undercapitalized banks with a roadmap and timeframe to restore the level of capital. In case of non-compliance with the regulation, the CBRC could restrict the asset growth of the undercapitalized bank, force it to reduce the proportion of risky assets in its balance sheet, restrict the purchase of fixed assets, imped the payments of dividends to shareholders and restrict opening of new branches or starting of new products. As a consequence, pressure to comply with the new capital regulation has been high for commercial banks (Cousin, 2011).

This regulation had a direct consequence: at the end of 2003, only 8 commercial banks were compliant with Basel I capital requirements, whereas almost all commercial banks were compliant at the end of 2008, covering 99.9% of banking assets (CBRC, 2010). Thus, the implementation of the new regulation in 2004 led banks to cope with the new regulation in a short time-span. This exogenous increase in capital ratios over this period is a rather unique feature for a banking industry.

Since 2004, prudential regulation has continuously evolved in China with the objective to reach up-to-date international standard. The first notice concerning the implementation of Basel II in China was published in October 2008. Since then the CBRC has also taken steps to implement Basel III accords in the Chinese banking industry (Cousin, 2012).

Nevertheless, challenges remain to fully implement prudential regulation in China. They notably concern risk and capital management, data and information disclosure, availability of loss data, and the lack of independence of supervisors (Cousin, 2011).

4. Data and methodology

4.1. Data

We use bank-level financial statement data for Chinese commercial banks provided by Bankscope, a financial database maintained by Bureau Van Dijk. Whenever there are missing values or variables, we hand-collect the corresponding data from the annual reports of the bank from their websites. Our final sample comprises 294 observations accounting for 100 Chinese banks. The data includes all major commercial banks in China. The period covered for capital ratios is 2004-2008, as banks have experienced major changes in their capital ratios to comply with the capital requirement regulation. The capital ratio has been winsorized at the 2 and 98% to eliminate outliers[47]. As we expect capital ratio to affect efficiency over some time, we use one-year lag between capital ratio and efficiency[48]. Thus, our study estimates cost-inefficiencies over the period 2005-2009. The descriptive statistics of the main variables are presented in Table 1.

4.2. Methodology

4.2.1. Efficiency estimation

Distance from an efficient cost frontier can be measured using a non-parametric technique such as Data Envelopment Analysis (DEA) or a parametric technique such as stochastic frontier approach. In this chapter, we choose to rely mainly on stochastic frontier approach[49] to measure cost efficiency in the Chinese banking industry. A parametric measure relies on econometric tools to estimate the cost frontier of the industry. Its main advantage compared to a non-parametric approach is to disentangle inefficiencies from external random shocks or data measurement errors.

[47] We also checked that the results were robust after trimmering at the 2 and 98% the data for capital ratio. Results are available upon request.
[48] Results, available upon request, are robust when we do not use a one-year lag between capital ratio and inefficiency.
[49] We will however check the robustness of our results by employing DEA in Section 6.

Two approaches exist in the literature to study determinants of banking efficiency. The two-step approach considers first the estimation of the cost frontier and predicts efficiency by decomposing the error term between its random component and its inefficiency component. Then, in a second step, it regresses the efficiency scores on a set of explanatory variables.

However this approach presents econometric problems. First, it supposes in the first step that inefficiency terms are identically distributed, while the regression in the second step suggests that distribution of the inefficiency terms is conditional of a set of explanatory variables. Second, including explanatory variables in a second-step regression indicates that the first-step frontier estimation might suffer from omitted variables bias if these explanatory variables are correlated with variables of the cost frontier model.

We rather follow the 'one-step approach' proposed by Battese and Coelli (1995) for panel data which solves these issues by simultaneously estimating the cost frontier and modeling the inefficiency term as a function of several explanatory variables. The general framework can be written as follows:

$$\mathrm{TC_{it}} = \mathrm{f(Y_{it}, P_{it})} + \varepsilon_{\mathrm{it}} \quad (1)$$

Where TC_{it} represents total cost for bank i at time t, Y_{it} is the vector of outputs, P_{it} the vector of input prices, and ε_{it} the error term. The error term is the sum of a random error component v_{it} representing external shocks or data measurement errors and a positive cost-inefficiency term u_{it}. v_{it} are assumed to be i.i.d and have a normal distribution with mean 0 and standard deviation σ_v^2. u_{it} follows a truncated normal distribution (at zero) with mean $z_{it}\delta$ and standard deviation σ^2, where z_{it} is a vector of explanatory variables associated with bank inefficiency over time and δ is a vector of parameters to be estimated. Consequently, the u_{it} are independently, but not identically distributed, as they are expressed as a function of z_{it}:

$$\mathrm{u_{it}} = \mathrm{z_{it}}\delta + \mathrm{W_{it}} \quad (2)$$

Where W_{it} is a random variable defined by the truncation of the $N(0, \sigma^2)$ distribution, such that the point of truncation is $-z_{it}\delta$. The coefficients in equations (1) and (2) are then estimated simultaneously using the method of maximum likelihood.

We follow the intermediation approach for the specification of inputs and outputs. This approach assumes that the bank collects deposits to transform them with labor and capital into loans. Two outputs are included in the cost function, total loans and other earning assets. We employ three input prices: price of borrowed funds (interest expenses / total deposits), price of labor (personnel expenses / total assets) and price of physical capital (other operating expenses/ fixed assets). Following among others Berger, Hasan and Zhou (2009) and Fungáčová, Pessarossi and Weill (2012), we employ a translog form to model the cost function of banks. We impose homogeneity conditions by normalizing total costs, price of labor, and price of physical capital, by the price of borrowed funds.

The cost frontier is the following:

$$\begin{aligned} \ln\left(\frac{\mathrm{TC}}{\mathrm{w_3}}\right) = \beta_0 &+ \sum_{\mathrm{m}} \alpha_{\mathrm{m}} \mathrm{y_m} + \sum_{\mathrm{n}} \beta_{\mathrm{n}} \ln\left(\frac{\mathrm{w_n}}{\mathrm{w_3}}\right) \\ &+ \frac{1}{2}\sum_{\mathrm{m}}\sum_{\mathrm{j}} \alpha_{\mathrm{mj}} \ln \mathrm{y_m} \ln \mathrm{y_j} \\ &+ \frac{1}{2}\sum_{\mathrm{n}}\sum_{\mathrm{k}} \beta_{\mathrm{nk}} \ln\left(\frac{\mathrm{w_n}}{\mathrm{w_3}}\right) \ln\left(\frac{\mathrm{w_k}}{\mathrm{w_3}}\right) \\ &+ \sum_{\mathrm{n}}\sum_{\mathrm{m}} \gamma_{\mathrm{nm}} \ln\left(\frac{\mathrm{w_n}}{\mathrm{w_3}}\right) \ln \mathrm{y_m} + \sum_{\mathrm{t}} \theta_{\mathrm{t}} \mathrm{Year_t} + \epsilon \end{aligned} \tag{3}$$

Where TC is total costs (computed as the sum of interest expenses, personnel expenses, and other operating expenses), y_m is mth bank output (m=1,2), w_n is nth input price (n=1,2), w_3 is the price of borrowed funds. For simplicity in presentation, the indices for each bank have been dropped. The model estimates one common cost frontier over the period with time dummies included ($Year_t$).

4.2.2. Determinants of efficiency

We use the following equation in the one-step model to explain the inefficiency term u_{it} from equation (2):

$$\begin{aligned} \mathrm{u_{it}} = \ & \delta_0 + \delta_1 \mathrm{Capital\ ratio_{it-1}} + \delta_2 \mathrm{LSCB_i} + \delta_3 \mathrm{JSCB_i} + \delta_4 \mathrm{CCB_i} \\ & + \delta_5 \mathrm{FOR_i} + \delta_6 \mathrm{Bank\ size_{it}} + \ \mathrm{W_{it}} \end{aligned} \tag{4}$$

Where u_{it} is cost inefficiency of the bank i in year t, $Capital\ ratio$ is the capital ratio of bank i in the previous year, computed as the book value of equity over total assets, $LSCB$, $JSCB$, CCB and FOR are dummy variables taking into account the ownership type of the firm. $LSCB$ is equal to one when the bank is one of the 'Big Five' large state-owned banks[50] and zero otherwise. $JSCB$ is equal to one when the bank is one of the twelve joint-stock commercial banks, and zero otherwise. CCB is equal to one when the bank is a city commercial bank, and zero otherwise. FOR is equal to one when the bank is a foreign bank, and zero otherwise. Rural commercial banks are the omitted ownership category in the regression. $Bank\ size$ is computed as a the natural logarithm of total assets in RMB million.

5. Results

This section presents the main results of the chapter. First, we present the main estimations. Second, we provide additional estimations to check if the effect of capital on efficiency is dependent of ownership type and size.

5.1. Main estimations

Table 2 presents our main estimations on the effect of capital ratio on banks' cost-inefficiency. The dependent variable is cost inefficiency and the key explanatory variable is capital ratio. Estimation of inefficiency and coefficients of the determinants of inefficiency are obtained in a single step following Battese and Coelli (1995). We perform several estimations. The first model considers only the capital ratio as an independent variable (column 1). The second model adds in ownership variables

[50] Namely, Industrial Commercial Bank of China (ICBC), Agricultural Bank of China (ABC), China Construction Bank (CCB), Bank of China (BoC) and Bank of Communications (BoCom).

(column 2). The third considers only the capital ratio and size (column 3). Finally the fourth adds in ownership variables and size (column 4) to the initial model, so the fourth model can be considered as the key one that includes all tested explaining variables.

We observe that capital ratio negatively affects cost inefficiency, i.e. capital ratio has a positive effect on bank efficiency. The result is observed for all estimations, meaning that it remains unchanged after controlling separately and simultaneously for bank size and ownership type. We then show that banks with higher capital ratios have greater efficiency. They are in conformity with the hypothesis of lower moral hazard in the behavior of shareholders when their stake in the bank is higher.

As discussed by Berger and Bonaccorsi di Patti (2006), this result should not be interpreted as a rejection of the hypothesis of higher agency costs between managers and shareholders when capital ratio is higher. More accurately, it reflects that the decrease in moral hazard between shareholders and debtholders is stronger that the increase in agency costs between managers and shareholders. This is reflected in the net effect of capital ratio on bank performance, as we observe that a greater capital ratio has a positive effect on cost efficiency.

The results also show that larger banks perform better, as the variable *Bank size* is negatively associated with cost-inefficiency. This result is in conformity with previous studies on bank efficiency (e.g. Chen, Skully and Brown, 2005; Berger, Hasan and Zhou, 2009).

Moreover, we find that ownership also influences cost efficiency of Chinese banks in conformity with previous studies (e.g. Berger, Hasan and Zhou, 2009). Notably, joint-stock banks and foreign banks are more efficient than other banks in our sample.

5.2. Additional estimations

We now assess how the positive effect between capital ratio and cost efficiency depends on two bank characteristics: ownership and size. As was stated in the previous section, results should be interpreted as a net effect of capital ratio on bank performance, which encompass two opposing effects: an increase of agency costs between the managers and shareholders, as the disciplinary role of debt declines, and a decrease in moral hazard between shareholders and debtholders. The different forms of shareholders with their implications in terms of corporate governance let us assume that

agency costs and moral hazard can have a different degree depending on the ownership type. Consequently, the net effect of capital ratio on bank efficiency might differ depending on the ownership type of the firm. Regarding size, Berger and Bouwman (forthcoming) also argue that the effect of capital ratio on bank performance can differ depending on the size of the bank. They find that smaller banks benefit more from an increase in capital than larger banks. So we can wonder if size contributes to influence the link between capital and efficiency.

Table 3 presents results of interactions between ownership, size and capital ratio. Each of the five columns of the table considers one interaction term between capital ratio and one explaining variable (alternatively one of the four ownership dummy variables or *Bank size*).

We overall find that, despite controlling for the interaction between capital ratio and ownership, capital ratio still has a positive effect on cost efficiency for all bank categories. Nevertheless, the effect of capital ratio on efficiency differs for two ownership categories: city commercial banks and foreign banks. On the one hand, we find that being a city commercial bank has a positive effect on cost inefficiency but an increase in capital ratio for this category of bank decreases cost inefficiency. Thus, city commercial banks appear to be particularly less efficient with low levels of capital ratios but this effect diminishes when capital ratio increases. On the other hand, foreign banks appear more efficient with low levels of capital ratios but efficiency decreases when the capital ratio increases.

Thus the net effect of capital ratio on bank performance appears to depend to some extent on the ownership category of the bank. Why higher capital ratios foster efficiency for city commercial banks and hamper efficiency for foreign banks? We propose the following explanations.

Most city commercial banks have local government as their majority or whole shareholder. However, they might benefit as government-owned entities from an implicit guarantee from the central government in case of financial distress. This situation potentially increases moral hazard between shareholders and stakeholders as they do not directly share the costs of the bailout but earn the benefits of investment

choices[51]. In this situation, one can suspect that moral hazard issues are particularly more pregnant that agency costs between managers and shareholders. This could explain why the net effect of capital ratio on city commercial banks cost efficiency is positive.

Contrary to government-owned banks, foreign banks should not benefit from an implicit government guarantee in China. This feature should reduce moral hazard problems between shareholders and debtholders in foreign banks. Suspicions might exist that agency costs between managers and shareholders relatively to the moral hazard issue discussed above are more important in this category of banks. This could explain why the net effect of an increase of capital ratio has a negative effect on cost efficiency for foreign banks. It might reflect that the increase in agency costs between managers and shareholders is more important than the reduction in moral hazard between shareholders and debtholders.

Finally, when considering the impact of size on the relation between capital ratio and bank efficiency, we observe no significant coefficient for the interaction term between capital ratio and *Bank size*. Thus the net effect of capital on bank performance does not appear to depend on bank size.

6. Robustness checks

We perform two types of robustness checks.

First, we check whether our main result depends on the approach chosen to measure efficiency. Previous literature has shown that this choice influences efficiency scores (Berger and Humphrey, 1997; Weill, 2004). In particular the use of the non-parametric DEA can lead to very different efficiency scores than the parametric techniques like for instance stochastic frontier approach. We then rely on DEA to obtain an alternative measure of cost efficiency. It presents the main advantage of making no assumption on the form of the cost function. However, contrary to the stochastic frontier approach, it does not allow disentangling inefficiency from random shocks. As a consequence, the distance between the cost frontier and the bank's effective total cost is entirely considered as inefficiency. Furthermore, when analyzing the determinants of

[51] City commercial banks might for example favor inefficient firms in their lending decisions in order to promote local government political objectives such as low unemployment, which might be detrimental for bank efficiency.

cost efficiency scores obtained with DEA, we need to rely on the two-step approach where we compute efficiency scores in the first stage and then regress efficiency scores on independent variables.

We then estimate cost efficiency scores with DEA and then perform a second stage regression including bank random effects and time dummy variables. One should note that contrary to the one-step approach of Battese and Coelli (1995), the dependent variable in the second step is cost efficiency. The interpretation of the sign is thus opposite from the previous estimations as we now expect a positive sign for the coefficient of *Capital ratio*. Table 4 reports the results of the regression of DEA efficiency scores. We observe again that *Capital ratio* has a positive impact on efficiency. Then our main finding is robust to the use of an alternative technique to estimate efficiency. We also find again a positive role of bank size on cost efficiency, but we do not observe that ownership influences efficiency.

Our second robustness check concerns the possibility of endogeneity between capital ratio and cost efficiency. Previous studies on the link between capital and efficiency have employed various methodologies to tackle the potential endogeneity between capital and efficiency. In our study, capital ratio is considered exogenous due to the Chinese banking reforms implemented between 2004 and 2008. To check whether this assumption was reasonable, we re-run our model in a system Generalized Method of Moments (GMM) framework.

We use the system GMM estimators developed for dynamic panel models by Arellano and Bover (1995) and Blundell and Bond (1998). We use the two-step system GMM estimator with Windmeijer (2005)'s corrected standard error and include dummy variables for years.

Concerning cost efficiency measurement, we employ a two-step approach with two alternative measures of efficiency obtained with stochastic frontier approach and with DEA.

Table 5 shows that our results are robust to endogeneity concerns. It confirms that *Capital ratio* can be treated as exogenous in the Chinese banking sector over the period 2004-2008. We find the same main conclusion: *Capital ratio* has a positive effect on efficiency for both our measures of cost efficiency. Regarding the other variables, ownership only influences efficiency when measured with stochastic frontier approach but not when measured with DEA. In comparison with our main estimations, we still

find that foreign banks are more efficient than other banks, but we now observe that large state-owned banks are less efficient than other banks. This result remains nonetheless consistent with the literature on efficiency in the Chinese banking sector.

7. Conclusion

This study presents evidence on the debate of the effect of capital requirement regulation on bank efficiency. While theoretical literature has opposing views on the effect of stringer capital requirements on bank efficiency, we focus on the regulatory changes in capital requirements that affected all Chinese commercial banks over the period 2004-2008. This period coincides with the first implementation of bank capital adequacy requirements in China. It provides us with a natural experiment to test the effect of this regulation on bank efficiency.

We show that an increase in capital ratio improves cost efficiency on average. This effect depends to some extent on the ownership type of the bank, but not on its size.

Thus, our finding suggests that capital requirements not only strengthen financial stability by providing a higher capital buffer, but also improve bank efficiency by lowering moral hazard between shareholders and debtholders. Thus, the prudential regulation on capital requirements does not appear to suffer from a trade-off between bank performance and strengthening the soundness of the financial sector.

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Table 1
Descriptive statistics

	N	Mean	SD	Minimum	Maximum
Cost frontier variables					
Total costs (RMB Million)	294	16 547	44 277	2	252 823
Total loans (RMB Million)	294	358 653	925 924	31	5 728 626
Other earning assets (RMB Million)	294	320 299	905 379	18.5	5 920 271
Price of fund (interest expenses/ total deposits)	294	0.017	0.007	0.001	0.046
Price of labor (personnel expenses/ total assets)	294	0.006	0.002	0.001	0.021
Price of capital (other operating expenses / total assets)	294	1.110	1.686	0.055	17.086
Total assets (RMB Million)	294	695 674	1 852 926	90	11 785 053
Efficiency score (in percent)	294	83.330	12.978	30.225	97.738
Determinants of inefficiency					
Capital ratio (book value of equity/ total assets)	294	0.075	0.084	0.005	0.514
LSCB (large state-owned commercial bank)	294	0.085	0.279	0	1
JSCB (joint-stock commercial banks)	294	0.180	0.385	0	1
CCB (city commercial banks)	294	0.554	0.498	0	1
FOR (foreign banks)	294	0.112	0.316	0	1
RCB (rural commercial banks)	294	0.068	0.252	0	1
Bank size (logarithm of total assets in RMB million)	294	11.229	2.202	4.495	16.282

Table 2

Main estimation: The effect of capital ratio on cost-inefficiency

This table reports estimates of the determinants of cost-inefficiency following the Battese and Coelli (1995) one-step model. Capital ratio is computed as book value of equity divided by total assets, LSCB, JSCB, CCB and FOR are dummy variables representing the different bank ownership categories in China. Rural commercial bank is the omitted ownership category. Bank size is computed as the logarithm of total assets. Standard-errors are reported into brackets. '***', '**' and '*' denote statistical significance respectively at the 1, 5 and 10%.

	Cost inefficiency			
	(1)	(2)	(3)	(4)
Intercept	0.285**	0.290***	3.181***	2.308***
	(0.118)	(0.099)	(0.549)	(0.309)
Capital ratio	-2.838***	-2.674***	-3.661***	-2.964***
	(0.643)	(0.981)	(0.770)	(0.458)
LSCB		-0.268		0.031
		(0.293)		(0.268)
JSCB		-0.665**		-0.332***
		(0.274)		(0.131)
CCB		0.073		-0.070
		(0.081)		(0.085)
FOR		-0.263		-0.597***
		(0.223)		(0.194)
Bank size			-0.266***	-0.175***
			(0.055)	(0.025)
N	294	294	294	294
Log-likelihood	79.441	56.607	112.356	121.744

Table 3

Interactions between ownership, size and capital ratio

This table reports estimates of the determinants of cost-inefficiency following the Battese and Coelli (1995) one-step model. Capital ratio is computed as book value of equity divided by total assets, LSCB, JSCB, CCB and FOR are dummy variables representing the different bank ownership categories in China. Rural commercial bank is the omitted ownership category. Bank size is computed as the logarithm of total assets. Standard-errors are reported into brackets. '***', '**' and '*' denote statistical significance respectively at the 1, 5 and 10%.

	Cost inefficiency				
	(1)	(2)	(3)	(4)	(5)
Intercept	2.453***	2.308***	2.410***	2.459***	2.486***
	(0.403)	(0.315)	(0.291)	(0.310)	(0.410)
Capital ratio	-3.077***	-2.965***	1.160	-3.634***	-6.215**
	(0.456)	(0.461)	(0.747)	(0.588)	(3.194)
LSCB	-0.297	0.031	0.109	-0.010	-0.117
	(0.667)	(0.260)	(0.181)	(0.192)	(0.359)
Capital ratio × LSCB	-1.972				
	(3.551)				
JSCB	-0.417**	-0.337**	-0.282**	-0.329**	-0.324***
	(0.192)	(0.142)	(0.133)	(0.150)	(0.122)
Capital ratio × JSCB		0.118			
		(1.042)			
CCB	-0.083	-0.070	0.187**	-0.067	-0.077
	(0.084)	(0.085)	(0.093)	(0.083)	(0.078)
Capital ratio × CCB			-4.944***		
			(0.960)		
FOR	-0.646***	-0.596***	-1.473***	-1.579***	-0.653***
	(0.233)	(0.199)	(0.215)	(0.456)	(0.204)
Capital ratio × FOR				4.010***	
				(1.458)	
Bank size	-0.189***	-0.175***	-0.205***	-0.187***	-0.194***
	(0.037)	(0.026)	(0.025)	(0.025)	(0.038)
Capital ratio × Bank size					0.367
					(0.345)
N	294	294	294	294	294
Log-likelihood	122.002	121.744	126.467	124.141	121.920

Table 4

Robustness check: Alternative measure of cost efficiency DEA

This table reports estimates of the determinants of cost-inefficiency with random effects at the bank level. Cost efficiency is estimated using DEA. Time dummies are included. Other variables are similar to the main estimations in Table 2. Standard-errors are reported into brackets. '***', '**' and '*' denote statistical significance respectively at the 1, 5 and 10%.

	Cost efficiency
Intercept	-0.554***
	(0.180)
Capital ratio	0.756***
	(0.240)
LSCB	0.052
	(0.118)
JSCB	0.059
	(0.084)
CCB	-0.025
	(0.067)
FOR	-0.115
	(0.083)
Bank size	0.074***
	(0.015)
N	294
Log-likelihood	119.45

Table 5

Robustness check: Estimations with system GMM

This table reports estimations of determinants of cost efficiency computed with the stochastic frontier approach (SFA) and the DEA. We use the two-step GMM estimator with Windmeijer (2005)'s corrected standard error (reported in brackets) to control for potential endogeneity between capital ratio and efficiency. Arellano-Bond tests for autocorrelation (AR1/AR2) have a null hypothesis of no autocorrelation and are applied to the differenced residuals. The Hansen J-test has a null hypothesis of "the instruments as a group are exogenous." Time dummies are included. Other variables are similar to the main estimation in Table 2. Standard-errors are reported into brackets. '***', '**' and '*' denote statistical significance respectively at the 1, 5 and 10%.

	Cost efficiency SFA	Cost efficiency DEA
	(1)	(2)
Intercept	33.697*	-1.374**
	(15.374)	(0.563)
Capital ratio	62.470*	2.992**
	(34.822)	(1.286)
LSCB	-8.926*	-0.218
	(4.918)	(0.193)
JSCB	3.058	-0.012
	(2.802)	(0.084)
CCB	-0.201	0.052
	(3.081)	(0.066)
FOR	10.294**	-0.223
	(4.223)	(0.138)
Bank size	2.847***	0.142***
	(1.074)	(0.045)
N	294	294
P value AR1/AR2	0.162/0.69	0.496/0.102
P value Hansen	0.497	0.955

Concluding remarks

This dissertation has studied the development of the Chinese financial system from different perspectives. It has shed light on the recent advancements of the last decade. Overall, the findings reveal a contrasted picture of the progress achieved towards an efficient system.

Chapter 1 has shown that the corporate bond market is still impeded by government influence. Based on this evidence, it is thus very unlikely to expect the banking system to decrease its dominance on the financial system.

Chapter 2 also stressed that internal governance mechanisms remain imperfect. By analyzing the market price fluctuations at the time of the announcement of a CEO turnover, we find that ownership type plays a major influence on the expected consequences of such a decision.

Chapter 3 revealed that little progress has been made in terms of banking competition despite the increasing number of new entrants in the market. However, banks behaved more efficiently over the decade. No trade-off seems to exist for policy-makers between the benefits of lower banking prices and efficiency of the system.

Chapter 4 finally showed the beneficial effects of the capital requirement regulation on bank efficiency in China. Capital requirements, in supplement to provide higher capital buffers, appear to lower moral between banks' shareholders and debtholders.

Following this dissertation, there remains substantial scope for further research. Notably, the low degree of competition in the banking system, despite the reforms promoting new entrants, remains a puzzle. Moreover, future research should also focus on the shadow banking system and the lack of access to finance of SMEs in China.

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Résumé en français

Cette thèse contribue à une meilleure compréhension du système financier chinois en analysant les progrès réalisés vers un système efficient. Le futur développement de la Chine va dépendre en grande partie de la capacité de son système financier à servir de façon efficiente l'économie. Cette thèse étudie les différentes composantes du système financier : les banques, le marché obligataire et les marchés financiers. Elle se concentre en particulier sur le rôle de l'État au sein du système financier.

Les contributions à la littérature économiques sont au nombre de trois. Premièrement, cette thèse donne des perspectives sur le développement futur du système financier chinois, l'un des plus grands pays en transition. Le développement du pays sur le long terme doit être soutenu par un système financier efficient. Deuxièmement, cette thèse contribue à la littérature économique en analysant les conséquences de la présence forte d'un État au sein d'un système financier. La caractéristique centrale du système financier chinois est le fort contrôle exercé par l'État sur les banques, les marchés financiers et les entreprises. Le secteur bancaire a notamment souffert de problèmes de prêts non performants et d'une faible efficience (Berger, Hasan et Zhou, 2009). Ces problèmes impliquent principalement une allocation biaisée du crédit en faveur des entreprises d'État, un manque d'indépendance envers le pouvoir politique et un manque d'expertise en gestion du risque (Cousin, 2011). Cette influence de l'État est une caractéristique des systèmes financiers des économies émergentes. Même au sein des pays développés, la récente crise financière a forcé un nombre important de gouvernements à prendre part financièrement dans leurs systèmes financiers. Ainsi, la recherche sur le rôle des gouvernements dans le fonctionnement des systèmes financiers a des implications qui vont au-delà de la Chine. Troisièmement, cette thèse contribue à la littérature économique sur plusieurs points où un consensus n'avait pas précédemment émergé : les déterminants des choix de marché de dette pour les entreprises, l'efficacité de la gouvernance interne des entreprises, les liens entre efficience bancaire et concurrence et l'efficacité de la réglementation sur les exigences en capital.

Chapitre 1 : Le rôle de la propriété étatique dans les choix de dette des entreprises en Chine

Le système financier chinois est caractérisé par un marché obligataire de petite taille, dont la croissance est rapide, et un secteur bancaire dominant. En 2006, le marché obligataire des entreprises pourvoyait seulement 1,4% des besoins de financement des entreprises chinoises (Hale, 2007). Sa croissance annuelle a été de 24,13% en moyenne sur la période 1990-2006 (People's Bank of China et China Statistical Yearbooks, cités par Allen et al., 2009). En 2010, les prêts bancaires comptaient pour 75% du financement externe des entreprises non financières (People's Bank of China, China Monetary Policy Report, 2010).

Les Banques chinoises ayant démontré leur faible degré d'efficience (Berger, Hasan et Zhou, 2009) – principalement du fait de leur manque d'expérience en termes de gestion des risques et d'interférences politiques importantes dans leurs décisions de prêts – l'allocation du capital demeure biaisée en faveur d'entreprises d'état inefficientes en Chine. Sur le long terme, cette mauvaise allocation du capital menace le développement du pays.

Un marché obligataire concurrentiel devrait réduire ce problème en fournissant des étalons en termes de prix du risque, ainsi qu'en augmentant la pression sur les banques d'attirer d'autres types d'emprunteurs, tels les petites et moyennes entreprises, qui sont rationnées sur le marché du crédit (Herring et Chatusripitak, 2006).

Afin de déterminer si ce problème d'allocation du capital peut être résolu par l'intermédiaire du développement du marché obligataire, il est important de comprendre si la concurrence entre le marché obligataire et le système bancaire est réelle en Chine. Ce premier chapitre apporte des résultats sur cette question en analysant les déterminants qui affectent le choix de type (obligataire ou bancaire) des entreprises non financières. Ainsi, l'objectif est de déterminer les facteurs expliquant pour une entreprise chinoise le choix d'émettre une obligation plutôt que d'emprunter auprès de banques.

Le parti communiste chinois a reconnu l'utilité des marchés de capitaux et la nécessité de développer le marché obligataire des entreprises dans ses *Opinions du Conseil d'Etat sur la promotion de la réforme, l'ouverture et la croissance stable des marchés de capitaux* en 2004. Le Gouverneur de la Banque populaire de Chine (BPC)

a déclaré que « le sous-développement du marché obligataire des entreprises chinoises a déformé la structure de financement dans l'économie, ce qui crée une menace sur la stabilité financière, ainsi que le développement économique et social » (Zhou, 2005).

Cependant, depuis les agitations sur le marché obligataire dans les années 1990, durant lesquelles une proportion importante d'emprunteurs obligataires ont fait défaut, le développement du marché obligataire chinois a été freiné par une réglementation stricte sur l'autorisation à émettre de nouvelles obligations. De façon notoire, le superviseur a favorisé de grandes entreprises d'État à émettre afin d'éviter toute instabilité financière sur le marché obligataire des entreprises. La situation a cependant évoluée en 2007 quand la Commission de régulation des titres financiers chinoise (CSRC en anglais) a publié de nouvelles règles d'émission de titres obligataires.

Il est cependant peu clair si les interventions politiques ont stoppé lors de l'approbation des émissions obligataires. D'un côté, les entreprises publiques contrôlées par le gouvernement central ont été historiquement favorisées dans leur accès au marché obligataire. D'un autre côté, il y a eu des changements officiels à partir de 2004 reconnaissant l'importance du développement du marché obligataire chinois. Nous utilisons un ensemble d'hypothèses afin d'analyser si le choix de dette par les entreprises est le fait de considération économique ou politiques en Chine.

Tout d'abord, nous considérons une hypothèse liée à la propriété étatique des entreprises qui peut influencer l'autorisation requise pour émettre une obligation. Nous analysons si la propriété étatique au niveau du gouvernement central influence le choix de marché de dette à partir de données récentes sur les choix de dettes d'entreprises cotées. De plus, étant donné que le favoritisme envers les entreprises publiques a été la conséquence d'une volonté de limiter les défauts sur le marché obligataire, nous anticipons que les entreprises étatiques présentant le moins d'asymétries d'information peuvent être particulièrement favorisées dans le processus d'émission.

Deuxièmement, trois théories financières ont été mises en avant dans la littérature économique pour expliquer les choix de dette entre le marché obligataire et le marché bancaire : les coûts d'émission (Blackwell et Kidwell, 1988), les asymétries d'information (Diamond, 1991 ; Rajan, 1992) et les coûts de liquidation et de renégociation (Berlin et Loeys, 1988). Nous analysons la pertinence de ces théories dans le contexte chinois.

Nous testons ces quatre hypothèses de choix de financement des entreprises sur une base de données de 220 entreprises chinoises cotées sur la période 2006-2010. En conformité avec l'approche méthodologique de Esho, Lam et Sharpe (2001), nous utilisons une approche incrémentale, plutôt que nous concentrer sur les ratios de dette au bilan. Cette méthode nous permet d'identifier les facteurs pertinents derrière chaque type d'émission de dette. Ainsi, nous étudions les facteurs expliquant la probabilité d'émettre une obligation par rapport à un prêt syndiqué. La principale alternative à une obligation est en effet un prêt syndiqué car la taille d'une émission obligataire est généralement comparable aux montants obtenus auprès d'un syndicat de banques plutôt qu'une seule banque. Nous analysons également les facteurs expliquant le recours à un seul marché de dette plutôt que deux sur la période d'étude.

Nous trouvons que le type de propriété des entreprises influence le choix de dette en Chine car les entreprises contrôlées par le gouvernement central ont une probabilité plus forte d'émettre une obligation, plutôt qu'un prêt syndiqué. Nous trouvons également dans une certaine mesure que cette influence est plus forte pour les entreprises géographiquement proches du superviseur autorisant les émissions. De plus, nous trouvons que ces entreprises ont une plus forte probabilité de n'utiliser que le marché obligataire plutôt que les deux marchés de dette. Nous trouvons que l'hypothèse des coûts d'émission influence le choix de dette, mais uniquement de faibles preuves que l'hypothèse des coûts de renégociation et de liquidation joue un rôle dans le choix de dette. Enfin, nous rejetons l'hypothèse des asymétries d'information comme expliquant les choix de dette. Ces résultats montrent que les aspects financiers ne jouent pas un rôle majeur dans les choix de dette, tandis que les aspects de propriété jouent un rôle. En conséquence, le marché obligataire et l'industrie bancaire n'apparaissent pas comme étant en réelle compétition pour attirer les emprunteurs.

Ce chapitre apporte deux contributions à la littérature économique sur les choix de dette. Tout d'abord, nous prenons en compte une caractéristique essentielle de la Chine : l'influence de l'Etat au sein de l'économie. Deuxièmement, nous analysons la pertinence des théories financières du choix de dette en Chine. Cette étude apporte des éléments de réponse sur les perspectives de développement du marché obligataire chinois. Il s'agit de la première étude expliquant les choix de dette des entreprises dans ce pays. Les études précédentes se sont focalisées sur les choix de financement entre dette et fonds propres.

Deuxièmement, nous étendons deux travaux empiriques, qui de façon similaire ont étudié les choix de dette basés sur ces trois théories. Esho, Lam et Sharpe (2001) font cette analyse sur un échantillon de dettes d'entreprises en Asie. Leur échantillon est dominé par des financements à des entreprises japonaises. La Chine est incluse dans leur échantillon mais uniquement pour six prêts syndiqués et aucune obligation. Esho, Lam et Sharpe (2001) testent l'influence de plusieurs variables financières pour étudier la pertinence de ces trois théories. Ils trouvent des résultats empiriques favorables aux trois théories, notamment sur le fait que les émissions obligataires sont plus probables lorsque les entreprises sont de grande taille et ont une probabilité de faillite réduite. Altunbas, Kara et Marques-Ibanez (2010) se concentrent sur les déterminants des choix de dette entre obligations et prêts syndiqués au sein des pays européens. Ils trouvent également des résultats en faveur des trois hypothèses expliquant les choix de dettes. En particulier, les entreprises les plus grandes avec un levier financier plus important, plus d'actifs tangibles mais moins d'opportunité de croissance ont plus de chance d'emprunter sur le marché des prêts syndiqués plutôt que sur le marché obligataire.

Dans notre étude, les résultats indiquent que le gouvernement central continue d'influencer fortement les choix de dette. Ainsi, les entreprises contrôlées par le gouvernement central ont une probabilité plus grande d'émettre des obligations plutôt que d'emprunter sur le marché des prêts syndiqués en comparaison avec les entreprises contrôlées par les gouvernements locaux et les entreprises privées. De plus, nous trouvons que dans une certaine mesure ce favoritisme est plus marqué pour les entreprises étatiques localisées géographiquement proche du superviseur du marché obligataire. Le superviseur semble donc prudent dans le développement du marché obligataire en autorisant l'émission obligataire chez les entreprises présentant le moins d'asymétries d'information pour lui. Nous identifions aussi le fait que les entreprises contrôlées par le gouvernement central tendent à emprunter uniquement sur le marché obligataire plutôt que sur les deux marchés de dette. Ce résultat indique que les interférences politiques dans le choix de dette sont complexes puisque les entreprises étatiques bénéficient d'un accès privilégié au marché mais semblent également incitées à utiliser en priorité ce mode de financement par dette afin de permettre un développement stable du marché obligataire.

Contrairement aux pays développés et aux autres pays asiatiques, le choix de dette en Chine dépend peu de facteurs financiers. Nous trouvons principalement des

résultats en faveur de l'hypothèse des coûts d'émission car les entreprises de grande taille ont une probabilité plus grande d'émettre de la dette obligataire, plutôt que d'emprunter sur le marché des prêts syndiqués. Nous trouvons des résultats mitigés concernant l'hypothèse des coûts de renégociation et de liquidation et pas de résultat supportant l'hypothèse des asymétries d'information. Ces derniers résultats sont en opposition avec ce qui est trouvé par Esho, Lam et Sharpe (2001) à propos des pays asiatiques et Altunba, Kara et Marques-Ibanez (2010) concernant les pays européens.

Les implications de nos résultats apparaissent pessimistes pour le développement du marché obligataire chinois et la modernisation du système financier. Afin de promouvoir le développement des marchés de capitaux, le gouvernement central devrait restreindre ses interventions dans le processus d'émission. Une meilleure allocation du capital dans l'économie au travers d'un marché obligataire plus compétitifs peut seulement être achevé si les entreprises sont libres de choisir leurs marchés de financement sur des critères financiers. Cependant, la récente réforme de 2007 sur le processus d'autorisation à émettre de la dette obligataire devrait réduire les interventions politiques dans le futur. En cas de succès, cette réforme devrait permettre au marché obligataire d'apparaître comme alternative crédible aux banques pour le financement des entreprises.

Chapitre 2 : Les changements de dirigeants d'entreprise ont-ils de l'importance en Chine ? Des indications à partir du marché des actions

Ce chapitre s'intéresse à la réaction du marché des actions chinois à la suite de l'annonce d'un changement de dirigeant au sein des entreprises cotées. Pour les parties prenantes de l'entreprise, la question est de savoir si le changement de dirigeant va influencer la valeur de l'entreprise. Les anticipations de marché donnent des indications sur l'effectivité de l'un des canaux de gouvernance d'entreprise interne : la possibilité de remplacer un dirigeant n'agissant pas de façon satisfaisante pour l'entreprise, ce qui permet d'évaluer le degré de maturité de la gouvernance d'entreprise en Chine.

La plupart des entreprises cotées en Chine sont encore contrôlées par l'Etat. Dans les entreprises étatiques chinoises, le conseil d'administration généralement entérine automatiquement les décisions des autorités étatiques sur les changements de dirigeant (Kato et Long, 2006). Le nouveau dirigeant est ainsi supposé agir en

conformité avec la volonté de l'actionnaire étatique contrôlant l'entreprise. Cela implique que les conséquences d'un changement de dirigeant vont différer entre les entreprises étatiques et les entreprises privées dans la mesure où les objectifs des actionnaires étatiques et privés sont divergents.

Les changements de dirigeants sont-ils supposés influencer les prix des actions ? Bien que l'intuition immédiate soit qu'un changement de dirigeant ait une influence sur le prix des actions, la littérature économique propose trois théories divergentes sur les conséquences d'un tel changement.

L'hypothèse du « bouc-émissaire » prédit qu'un changement n'affectera pas les prix des actions. Sous cette théorie, le marché estime que les dirigeants sont fongibles. Le licenciement en cas de mauvaise performance sert uniquement à assurer les actionnaires de l'entreprise que le dirigeant fournira le niveau d'effort nécessaire. Le nouveau dirigeant n'est donc pas supposé avoir une habilité supérieure à son prédécesseur.

L'hypothèse d'information, en contraste, prévoit qu'un changement de dirigeant provoque des rendements négatifs au moment de l'annonce du changement car cela révèle des informations sur la mauvaise performance à venir de l'entreprise.

L'hypothèse d'habilité considère que les capacités des dirigeants varient et que les conseils d'administration sont à la recherche des meilleurs dirigeants. Dans ce cas de figure, la réaction du marché des actions à l'annonce d'un changement de dirigeant doit être positive du fait de l'anticipation d'une meilleure performance future de l'entreprise.

La littérature empirique, qui tente de distinguer quelle théorie s'applique, échoue à donner des conclusions claires sur cette question. Certaines études trouvent un effet positif (Adams et Mansi, 2009), d'autres une réaction négative (Dedman et Lin, 2002) ou bien aucune réaction significative (Warner, Wratt et Wrucks, 1988). Toutes les études dans ce domaine traitent de marchés dans des pays développés. Cette recherche est donc la première à s'intéresser à cette question dans un économie émergente.

La littérature montre que la probabilité d'un changement de dirigeant en Chine augmente lorsque l'entreprise a de mauvaises performances. Kato et Long (2006) montrent que le lien entre performance de l'entreprise et changement de dirigeant est plus ténu pour les entreprises étatiques qui, selon leur hypothèse, poursuivent des objectifs qui peuvent être mutuellement contradictoires. Elles peuvent agir pour

corriger des défaillances de marché en poursuivant des buts sociaux tels la maximisation de l'emploi (Dixit, 1997). Elles peuvent également chercher à augmenter leur rente personnelle en vampirisant les ressources de leurs filiales cotées, ainsi qu'il a été montré dans le contexte chinois par Jiang et al. (2010). Ces objectifs sont poursuivis au détriment de la performance économique. Les actionnaires étatiques ont besoin, cependant, de maintenir un certain niveau de performance afin de pouvoir poursuivre ces multiples objectifs. Ainsi, Chang et Wong (2009) trouvent que le lien entre changement de dirigeant et performance des entreprises existe uniquement dans les entreprises étatiques faisant des pertes.

Si les entreprises étatiques subissent trop de pertes, les actionnaires étatiques ont alors de fortes incitations à rétablir la performance économique de l'entreprise afin de pouvoir poursuivre leurs multiples objectifs dans le futur. Ainsi, les changements de dirigeant dans les entreprises d'Etat peuvent signaler un engagement de la part de l'actionnaire étatique d'améliorer la performance de l'entreprise. Nous anticipons ainsi une réaction positive à la suite d'un changement de dirigeant au sein d'une entreprise étatique.

Bien que le nombre de dirigeants augmente rapidement en Chine, il apparaît qu'il existe une offre insuffisante sur le marché du travail des dirigeants en Chine (Fan et al., 2007). Etre membre du parti communiste chinois peut-être interprété comme un indicateur de capital humain en Chine (Li et al., 2008). Nous anticipons que les entreprises étatiques contrôlées par le gouvernement central ont une plus forte capacité à attirer les dirigeants avec le plus de compétences. Nous anticipons ainsi une réaction positive plus forte lorsque le changement de dirigeant survient au sein d'une entreprise étatique contrôlée par le gouvernement central ; les dirigeants de ces entreprises sont vraisemblablement des membres de haut-niveau du parti communiste ou ont des liens forts avec l'élite du parti.

Afin d'étudier l'effet de l'annonce d'un changement de dirigeant sur le prix des actions, nous appliquons la méthodologie d'une étude d'événement sur un échantillon de 1094 changement de dirigeants de 2002 à 2010. Notre résultat principal montre que les annonces de changement de dirigeant provoquent des variations de prix positives du marché des actions. De façon consistante avec l'hypothèse selon laquelle les entreprises étatiques contrôlées par le gouvernement central ont une plus forte capacité à attirer les dirigeants les plus talentueux, nous trouvons que cette réaction positive du marché des actions s'applique uniquement au sous-échantillon d'entreprises contrôlées

par le gouvernement central. Ainsi, l'hypothèse d'habilité semble s'appliquer pour les entreprises contrôlées par le gouvernement central en Chine, tandis que l'hypothèse « bouc-émissaire » trouve un écho au sein des entreprises privées et publiques contrôlées par les gouvernement locaux.

Chapitre 3 : La concurrence bancaire est-elle nuisible à l'efficience ? Eléments de preuve à partir de la Chine

Il est généralement admis dans la littérature économique que la concurrence a un effet positif sur la croissance économique (par exemple, Claessens et Laeven, 2005). En Chine, cependant, l'industrie bancaire domine l'ensemble du système financier (Allen et al., 2012). Seul cinq banques étatiques détiennent 47% du total des actifs du secteur bancaire à la fin de l'année 2011 (Rapport annuel de la CBRC, 2012).

La domination des banques étatiques soulève des questions concernant le degré de concurrence au sein de l'industrie bancaire chinoise et sur la capacité du système financier chinois à soutenir la croissance économique sur le long terme. Cependant, les études académiques sur la concurrence bancaire en Chine restent très limitées. Une exception notable est l'étude de Yuan (2006), qui mesure la concurrence sur la période 1996-2000. La concurrence, mesurée par une mesure agrégée non structurelle pour l'industrie bancaire est de façon surprenante montrée comme étant parfaire.

Comme la concurrence est souvent liée à l'efficience du système bancaire, la domination des cinq plus grandes banques étatiques soulève également la question corollaire de l'efficience du système bancaire chinois. Berger, Hasan, et Zhou (2009) notent que la plus faible efficience des banques étatiques peut refléter leur position dominante sur le marché.

Dans ce chapitre, nous apportons de nouveaux éléments sur la relation entre la concurrence et l'efficience au sein de l'industrie bancaire chinoise en utilisant des données récentes sur un grand échantillon de banques chinoises entre 2002 et 2011. Ce travail a trois objectifs.

Le premier objectif est de mesurer le niveau et l'évolution de la concurrence en Chine sur la dernière décennie. Cette question est d'un intérêt tout particulier pour l'industrie bancaire. Tout d'abord, cela permet d'obtenir de l'information sur le degré de concurrence entre les banques chinoises relativement à d'autres pays. Deuxièmement, cela permet d'observer l'évolution de la concurrence en Chine sur une

décennie marquée par des changements profonds au sein de l'industrie bancaire, en particulier pour les banques étatiques.

Ces réformes incluent un transfert des prêts non performants vers des sociétés de gestion d'actifs de défaisance, une recapitalisation des banques, et l'entré d'investisseurs stratégiques étrangers minoritaires dans plusieurs banques. L'accession de la Chine à l'OMC en 2001 a permis aux banques étrangères de pénétrer le système bancaire, bien que la part de marché des banques étrangères demeure très faible. Notre analyse permet de mesurer les évolutions de pouvoir de marché entre les types de banques sur la décennie. Nous vérifions si les grandes banques étatiques ont un pouvoir de marché supérieur aux autres banques. Cela fournit des informations sur les effets de la persistance de grandes banques étatiques et de l'entrée de banques étrangères sur le niveau de concurrence.

Notre second objectif est d'examiner l'efficience des banques dans les années récentes. Plusieurs études analysent l'efficience des banques chinoises (par exemple, Chen, Skully et Brown, 2005 ; Fu et Heffernan, 2007 ; Ariff et Can, 2008 ; et Berger Hasan et Zhou, 2009) mais elles reposent sur des données des années 1990 et du début des années 2000. Nous mettons à jour la discussion sur l'efficience des banques Chinoises en analysant la situation après les principales réformes de l'industrie bancaire. Une question particulièrement intéressante est de savoir si les grandes banques étatiques continuent à souffrir d'un niveau d'efficience plus faible que les autres banques.

Le troisième objectif est d'étudier la relation et causalité entre la concurrence et l'efficience au sein de l'industrie bancaire Chinoise car ces concepts sont liés. L'hypothèse intuitive de « vie tranquille » suggère que la concurrence a un effet bénéfique sur l'efficience. L'hypothèse « efficience-structure » (Demsetz, 1973) en contraste, prédit un effet négatif de l'efficience sur la concurrence, car les banques les plus efficientes bénéficient de coûts plus faibles et ainsi peuvent gagner des parts de marché supplémentaires. De plus, les caractéristiques spécifiques de la concurrence bancaire peuvent influencer négativement l'efficience car une concurrence réduite permet aux banques de bénéficier d'économies d'échelle plus importantes pour contrôler leurs emprunteurs et leur permet d'augmenter la durée de leurs relations avec leurs clients.

Le signe et le sens de la causalité de la relation entre concurrence et efficience dans l'industrie bancaire chinoise ont des implications normatives pour le régulateur des

banques. Si nous trouvons des résultats indiquant un effet positif de la concurrence bancaire sur l'efficience, la conclusion en termes de mesures économiques serait que le régulateur devrait favoriser les mesures pro-concurrence au sein de l'industrie. Cela aurait un effet social positif au travers d'une plus grande efficience des banques chinoises. Si au contraire, nous trouvons que la concurrence se fait au détriment de l'efficience des banque en conformité avec la littérature sur d'autres pays (par exemple, Casu et Girardone, 2009), cela impliquerait que le régulateur fait face à un arbitrage et devrait modérer à un certain point l'application de politique pro-concurrence dans le secteur.

En supplément, l'observation selon laquelle l'efficience a un effet négatif sur la concurrence en accord avec l'hypothèse « efficience-structure » impliquerait que les politiques pro-concurrence ne peuvent qu'avoir un effet limité.

Fu et Heffernan (2009) analysent les relations entre profitabilité, efficience en coût, et des indicateurs de la structure du marché bancaire (indices de concentrations et parts de marché) pour les banques chinoises entre 1985 et 2002. Ils trouvent une absence de relation entre l'efficience en coût et les indicateurs de structure de marché. Cependant, leur étude n'apporte que des éléments de réponse limités par rapport à notre question de recherche ; les indicateurs de marché sont des mesures relativement grossières de la concurrence comparé à des mesures basées sur l'approche basée sur la nouvelle Organisation Industrielle (OI) empirique tel que l'indice de Lerner. De plus, la relation n'est pas analysée au sein d'un cadre de données de panel dynamique et ne prend pas en compte la causalité de Granger.

Nous analysons la relation et causalité entre la concurrence et l'efficience dans l'industrie bancaire chinoise en calculant les indices de Lerner pour mesurer la concurrence en conformité avec les études récentes sur la concurrence bancaire (par exemple, Carbo et al., 2009 ; Turk-Ariss, 2010). Nous employons des tests de causalité de Granger pour vérifier le sens de la causalité. En conformité avec Pruteanu-Podpiera, Schobert et Weill (2007) et Casu et Girardone (2009), nous estimons la causalité de Granger à l'aide d'estimateurs de panels dynamiques de la méthode généralisée des moments (MGM) pour tenir compte des propriétés autoregressives de la variable dépendante quand des valeurs retardées sont incluses en variables explicatives.

Les deux articles analysent cette question pour des banques européennes. Ils apportent des preuves en faveur d'une relation négative entre concurrence et efficience, qui est le résultat d'un effet négatif de la concurrence sur l'efficience. Ces

résultats contredisent l'intuition selon laquelle la concurrence est favorable à plus d'efficience. Nous testons si des résultats similaires s'appliquent à l'industrie bancaire chinoise.

Nos principaux résultats peuvent être résumés comme suit. Premièrement, la concurrence bancaire n'a pas augmenté sur la période considérée dans l'étude. Deuxièmement, la concurrence diffère en fonction du type de banque. Les banques étrangères ont en général un indice de Lerner plus faible, indiquant que leur pouvoir de marché est moins important relativement aux autres banques. Troisièmement, les banques chinoises ont amélioré leur efficience dans les années récentes. Quatrièmement, des différences en termes de scores d'efficience persistent entre les différents types de banques. Les cinq grandes banques étatiques demeurent les moins efficientes, tandis que les banques étrangères sont parmi les plus efficientes. Ces derniers résultats concordent avec ceux de Berger, Hasan et Zhou (2009) pour la période 1994-2003.

Notre investigation pour identifier un lien entre la concurrence et l'efficience ne révèle aucune relation significative. Ni l'effet de l'indice de Lerner sur l'efficience en coût, ni l'effet de l'efficience en coût sur l'indice de Lerner ne sont significatifs. Ce résultat rejette l'hypothèse intuitive de « vie calme » selon laquelle la concurrence favorise l'efficience. Elle diffère également de la littérature économique ayant trouvé une relation négative entre la concurrence et l'efficience. Ainsi, il apparaît que la concurrence bancaire ne se fait pas au détriment de l'efficience en Chine.

Chapitre 4 : Les exigences en capital affectent elles l'efficience bancaire ? Le cas de figure de la Chine

La crise financière récente a rappelé qu'un système bancaire fonctionnant de façon satisfaisante est essentiel à l'exercice de missions fondamentales telles l'offre de crédit, ainsi que pour maintenir la stabilité économique. Afin de promouvoir un système financier sain, les régulateurs imposent aux banques de détenir des niveaux de capital suffisants pour absorber les pertes, et limiter les incitations aux comportements d'aléa moral.

Cette régulation prudentielle peut également entraîner des coûts, ce qui soulève des questions sur sa mise en œuvre. Des ratios de capital élevés peuvent imposer des

arbitrages en termes de création de liquidité (Berger et Bouwman, 2009), et affecter l'offre de crédit et la croissance économique (Angelini et al., 2011 ; CBRB, 2010).

Une implication première des exigences en capital est également leur influence sur l'efficience des banques, qui a été montré comme étant un contributeur direct à la stabilité financière via ses effets sur les faillites bancaires, les futurs prêts non performants et la prise de risque (Berger et DeYoung, 1997 ; Podpiera et Weill, 2008 ; Podpiera et Podpiera, 2008 ; Fiordelisi, Marques-Ibanez et Molyneux, 2011).

Les théories ont des vues opposées sur les effets des ratios de capital sur la performance des banques. Une partie de la littérature suggère que le capital a un effet positif sur la performance. Cela survient par une baisse de l'aléa moral entre actionnaires et prêteurs. Du fait de la responsabilité limitée des actionnaires, des ratios de capital peu élevés augmentent leurs incitations à prendre des risques excessifs. Ce comportement est renforcé par des garanties gouvernementales explicites ou implicites sur les dépôts. Un ratio de capital plus élevé réduit ainsi les incitations à augmenter le risque de la banque. De plus, en augmentant le surplus généré dans la relation prêteur-emprunteur et en améliorant les incitations à contrôler les emprunteurs, les ratios de capital ont un effet positif sur la profitabilité de la banque (Holmstrom et Tirole, 1997 ; Allen, Carletti et Marquez, 2011 ; Mehran et Thakor, 2011).

Une autre partie de la littérature suggère au contraire que le capital a un effet négatif sur la performance des banques. Les coûts d'agence entre dirigeants et actionnaires ont tendance à s'exacerber quet les ratios de capital sont élevés du fait du rôle de discipline sur les dirigeants joué par les paiements réguliers des intérêts (Calomiris et Kahn, 1991).

Déterminer quel effet domine demeure ainsi une question empirique. La littérature a cependant trouvé des résultats contradictoires sur le sujet. Dans un papier séminal, Berger et Bonaccorsi di Patti (2006) ont analysé la relation entre capital bancaire et l'efficience au sein de l'industrie bancaire américaine de 1990 à 1995. Fiordelisi, Marques-Ibanez et Molyneux (2011) testent également la relation entre les ratios de capital et l'efficience des banques au sein de l'industrie bancaire européenne sur la période 1995-2007. Ces études trouvent des résultats contradictoires : Berger et Bonaccorsi di Patti (2006) trouvent que des ratios de capital plus faibles sont associés avec une efficience plus importante, tandis que Fiordelisi, Marques-Ibanez et Molyneux (2011) trouvent l'opposé.

Cette étude contribue à la littérature en analysant les effets d'une augmentation des ratios de capital sur l'efficience en coût au sein de l'industrie bancaire chinoise. Le cas de figure chinois permet d'exploiter un cadre unique pour mesurer l'effet direct de la régulation financière des exigences en capital sur le comportement des banques, du fait de l'importante transformation du système bancaire sur la dernière décennie.

En 2004, la première réglementation sur les exigences en capital a été mise en place. De 2004 à 2008, l'industrie bancaire est passée d'une situation où moins de 10% des banques respectaient les nouvelles exigences en capital à une situation où quasiment l'ensemble d'entre elles se conforme à la réglementation (CBRC, 2010).

Cet ajustement des exigences en capital sous la pression du régulateur permet de mesurer précisément comment la performance des banques a été affectée par ce changement durant cette période.

Ainsi, ce chapitre apporte deux contributions à la littérature sur les effets des exigences en capital sur l'efficience. Tout d'abord, un problème commun aux études antérieures est la difficulté à mesurer le rôle joué par la réglementation prudentielle du fait que la majorité des banques sont au dessus des minimums exigés sur la période d'étude (Berlin, 2011). Ainsi qu'en font état Berger et Bonnacorsi di Patti (2006,p. 1068) : 'La plupart des banques sont bien au-dessus des minimums de capital réglementaire, et [les] résultats sont basés principalement sur les différences à la marge, plutôt que les effets de la réglementation.'[1] Gropp et Heider (2010) montrent d'ailleurs que pour un échantillon de banques nord-américaines et européennes sur la période 1991 à 2004 que la réglementation en capital était de second ordre parmi les déterminants de la structure de capital des banques.

Deuxièmement, un autre problème survenant lorsqu'on étudie l'effet des ratios de capital sur l'efficience des banques est la potentielle causalité inverse qui peut-être observée de l'efficience vers le niveau de capital.

En étudiant l'effet de la réglementation en capital en Chine, nous répondons à ces deux problèmes. La Chine fournit une expérience naturelle pour tester l'effet de la réglementation sur les exigences en capital, puisque les banques ont été mises sous pression de l'état pour s'adapter à une réglementation prudentielle entièrement nouvelle depuis 2004.

[1] Traduction de l'auteur.

Cette caractéristique fournit une opportunité unique de mesurer directement l'effet des réglementations en capital sur l'efficience des banques. De plus, les banques ont dû s'adapter à la nouvelle réglementation sur un horizon temporel très court. Les changements en termes de ratios de capital peuvent être supposés exogènes (c'est-dire comme l'effet direct du changement de réglementation bancaire).

Pour analyser cette question, nous mesurons l'efficience en coût sur un échantillon de banques chinoises qui comprend toutes les principales banques commerciales avec des données de Bankscope complétées par des informations recueillies manuellement.

Nous analysons la relation entre capital et efficience en coût avec le modèle de frontière stochastique à une étape proposé par Battese et Coelli (1995). Nous montrons qu'une augmentation des ratios de capital améliore l'efficience en coût des banques en moyenne. Cet effet dépend dans une certaine mesure de la nature de la banque (étrangère ou domestique) mais pas de sa taille.

Ainsi, nos résultats suggèrent que les exigences en capital ne sont pas uniquement bénéfiques pour la stabilité financière en fournissant un coussin de capital plus élevé, mais également en améliorant l'efficience des banques par le biais d'un aléa moral plus réduit entre actionnaires et créanciers. Ainsi, la régulation prudentielle sur les exigences en capital n'apparaît pas souffrir d'un arbitrage entre performance des banques et renforcement de la sûreté du système financier.

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Essays on the Chinese financial system

Résumé

Cette thèse étudie le développement du système financier chinois. Elle dévoile des aspects nouveaux du développement du système financier sur la dernière décennie. Globalement, les résultats montrent que les progrès réalisés vers un système efficient demeurent contrastés.

Le premier chapitre montre que le marché obligataire des entreprises non financières est toujours sous influence du gouvernement. Sur la base de cet élément, il est peu probable d'espérer une baisse de la domination du secteur bancaire sur le système financier.

Le second chapitre montre que la gouvernance d'entreprise interne reste imparfaite. En analysant les fluctuations des prix des actions au moment de l'annonce d'un changement de P-DG, nous trouvons que le type de propriété de l'entreprise joue une influence majeure sur les conséquences d'une telle décision.

Le troisième chapitre révèle que peu de progrès ont été faits en termes de concurrence au sein du secteur bancaire malgré le nombre de nouveaux entrants sur le marché. Cependant, les banques se comportent de façon plus efficiente sur la décennie. Il ne semble pas exister d'arbitrage entre les bénéfices d'une plus grande concurrence et l'efficience du système bancaire en Chine.

Le quatrième chapitre montre les effets bénéfiques de la nouvelle réglementation sur les exigences en capital des banques chinoises en termes d'efficience bancaire. Les exigences en capital, en plus de fournir des coussins en capital supplémentaires, apparaissent réduire l'aléa moral entre les actionnaires des banques et leurs créanciers.

Mots clés : Chine – Système financier – Propriété étatique – Efficience bancaire

Résumé en anglais

This dissertation analyzes the development of the Chinese financial system from different perspectives. It has shed light on the recent advancements of the last decade. Overall, the findings reveal a contrasted picture of the progress achieved towards an efficient system.

Chapter 1 has shown that the corporate bond market is still impeded by government influence. Based on this evidence, it is thus very unlikely to expect the banking system to decrease its dominance on the financial system.

Chapter 2 also stressed that internal governance mechanisms remain imperfect. By analyzing the market price fluctuations at the time of the announcement of a CEO turnover, we find that ownership type plays a major influence on the expected consequences of such a decision.

Chapter 3 revealed that little progress has been made in terms of banking competition despite the increasing number of new entrants in the market. However, banks behaved more efficiently over the decade. No trade-off seems to exist for policy-makers between the benefits of lower banking prices and efficiency of the system.

Chapter 4 finally showed the beneficial effects of the capital requirement regulation on bank efficiency in China. Capital requirements, in supplement to provide higher capital buffers, appear to lower moral between banks' shareholders and debtholders.

Keywords : China – Financial system – State ownership – Bank efficiency