

THREE ESSAYS ON THE NEW CHINESE ECONOMY

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CHAPTER I

OVERVIEW AND SUMMARY OF FINDINGS

1. Introduction

Maddison (2004) shows that China became the world's fastest-growing economy since 1990, an achievement that *The Economist* refers to as the nation's "great leap forward".¹ Since 1994, its real GDP per capita grew at a startling average rate of 12.4 percent per year over this period, while real fixed investment per capita grew at 14.8 percent per year. From a real aggregate GDP of only 542.5 billion US dollars in 1994 to 2.61 trillion US dollars in 2005, China quickly ascended to the world's fourth largest economy in just 11 years, following only the U.S., Japan, and Germany. The Central Intelligence Agency (2006) reports that based on purchasing power parity, in 2005, with an aggregate GDP of 8.16 trillion US dollars, China has even exceeded Japan and ascended to become the world's third largest economy, trailing only the U.S. and the European Union. This represents a remarkable achievement given that, based on purchasing power parity, China only ranked No. 10 in the world in 1992.² Figure 1-1 and Figure 1-2 illustrate this growth without a pause during this period.

This rapid growth was accompanied by profound structural reforms. Two of the most important structural reforms have occurred in the financial sector and state-owned industrial sector. The reform of the financial sector is widely recognized as "a crucial element of a

¹ See "The Great Leap Forward", *The Economist*, Sep.30, 2004.

² The growth rates were calculated from data of *China Statistical Yearbook 2005*, and the aggregate GDP data as well as the rankings are from <http://www.cbc.ca/story/business/national/2006/01/25/china-060123.html>, <http://www.cia.gov/cia/publications/factbook/rankorder/2001rank.html> and http://www.theodora.com/wfb/1992/rankings/gdp_gnp_million_1.html.

long-term growth strategy”, while the reform of the state-owned industrial sector is widely recognized as one of the core issues in China’s economic reform.³

This dissertation thus focuses on two important issues in China’s economic development and reforms: (1) the relationship between its financial development and economic growth; (2) the impact of its share issue privatization on the state-owned industrial sector.

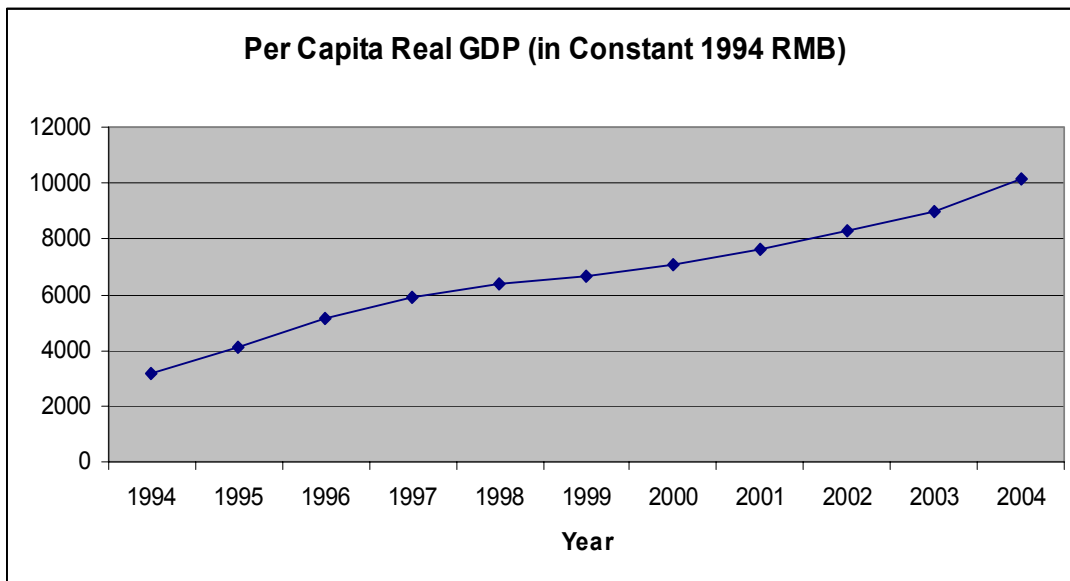


Figure 1-1: Per Capita Real GDP of China (1994-2004)

³ See, for example, E. S. Prasad’s recent essay “Next Steps for China” in the IMF’s *Finance and Development*, September 2005, and J. Y. Lin et al.’s essay “Competition, Policy Burdens, and State-Owned Enterprise Reform” in *American Economic Review*, May 1998.

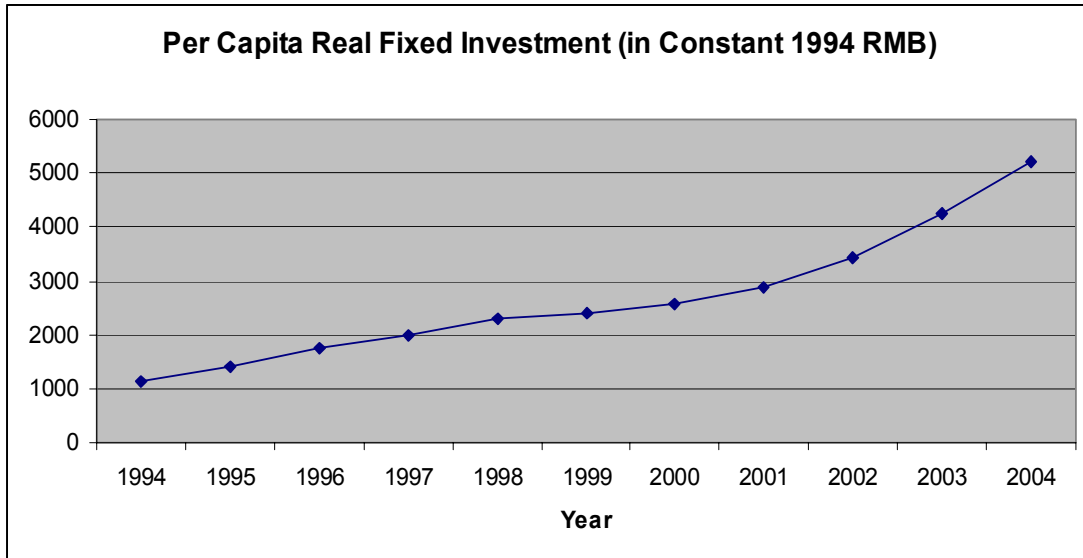


Figure 1-2: Per Capita Real Fixed Investment of China (1994-2004)

2. Financial Development and Economic Growth in China

Since 1995, China’s financial system developed rapidly, with improvements in both the quality and quantity of bank credit. In terms of quality, Chen et al. (2005) assert that “the major reform in the banking system came when a Western-style Central Bank Law and Commercial Bank Law were enacted in 1995 to establish the foundation of a competitive, modern banking system.” The OECD’s most recent *Economic Survey of China* (2005) points out that, “until 1995, banks paid considerable attention to national policies in determining the allocation of bank credit...[but] wide ranging reforms have been introduced since then. Banks have now started to modernize their lending and risk management practices.” With respect to quantity, two major measures of financial depth, the amount of real domestic credit per capita grew at an average rate of 19 percent per year from 1995 to 2005, while the ratio of domestic credit to GDP rose from 0.92 to 1.60.⁴

⁴ Calculated from data from *China Statistical Yearbook 2005* and International Financial

The financial sector also saw significant restructurings, the most important coinciding with the emergence of the Shanghai Stock Exchange in 1990 and the Shenzhen Stock Exchange in 1991. The enactments of the Companies Law in 1993 and the Securities Law in 1998 formally established “the legal framework for issuance of equity” (OECD 2002). The establishment of legal and market infrastructures created conditions conducive to stock market development, and the number of firms listed on the exchanges rose from 345 in 1995 to 1379 by the end of the first quarter of 2005. At the same time, real stock market capitalization per capita grew at an average rate of 19 percent per year, the ratio of market capitalization to GDP rose from 0.42 to 0.6, and trading volume increased more than 10-fold.⁵

Despite rapid growth in quantitative measures of China’s stock markets, however, there is widespread suspicion about the quality of these markets. For example, *Forbes Magazine* (2001) has called these markets “China’s \$600 billion casino”, *Time* (2005, Asian Edition) describes “China’s market maladies”, *The Economist* (2005) characterizes the stock markets as “marginalized”, *BusinessWeek* (2005) calls these stock markets “Rickety Bourses.”⁶

More formally, a battery of empirical tests of the efficient market hypothesis conducted by Mookerjee and Yu (1999) show that “there are significant inefficiencies present in both exchanges (Shanghai and Shenzhen).” Among these are price distortions resulting from the state’s holding of nearly two-thirds of all listed shares. Indeed, when the government attempts to sell off blocks of shares for some of their often low-profit or losing state-owned enterprises, as it did in May of 2005, the market seems unable to attract the foreign and domestic investors

Statistics Database.

⁵ Calculated from data from *China Statistical Yearbook 2005* and the official website of China Securities Regulatory Commission: <http://www.csrc.gov.cn>.

⁶ See “China’s \$600 billion casino”, *Forbes*, Oct. 1, 2001; “China’s Market Maladies”, *Time*, Feb. 7, 2005; “China’s Stock Market—A Marginalized Market”, *The Economist*, Feb. 24, 2005; “Raging Growth and Rickety Bourses”, *BusinessWeek*, Oct. 31, 2005.

needed to absorb them without dramatic downward price movements.⁷ Another problem involves the prevalence of insider trading and fraud. Du and Wei (2004) show, for example, that if insider trading in the United States were to increase to levels currently found in China, market volatility would rise by 250 basis points. *BusinessWeek* (2005) reports that, “originally designed to enrich the stakeholders of privatized state companies, the bourses have become littered with small local companies with suspect financial statements and shares that are sold by often-corrupt brokers who allegedly make their money by manipulating prices.”⁸

Since it is widely conjectured that, even in the face of these problems, financial sector reform is “crucial to China’s sustainable long-term growth”, it is important to sort out statistically where the most plausible links between banks, financial markets, and the real sector lie over this recent period of rapid change.

In order to figure out the *causal* relationship between banks, financial markets, and the real sector, I examine quarterly data from 1995-2005 and estimate tri-variate VAR systems including a bank credit measure, a stock market development measure and GDP or fixed investment for each system. Then I conduct Granger-causality tests. The Granger-causality analysis in the VAR systems in the first chapter is to my knowledge the first to explore these questions for China in a multivariate time series setting.

Granger-test results in the first chapter indicate that increases in the size and sophistication of China’s banking sector had positive and significant effects on both output and fixed investment, yet stock market development did not. The latter result is perhaps surprising given that the government intended to use the stock markets to mobilize household savings

⁷ Zhang et al. (2001), for example, describe the decline in profitability for China’s state-owned industrial enterprises between 1978 and 1996. Holz (2003) indicates that “between 1978 and 1997, losses in industrial SOEs rose twentyfold” (p.vii).

⁸ “Raging Growth and Rickety Bourses”, *BusinessWeek*, Oct. 31, 2005.

and channel it into capital accumulation, and to bring state-owned enterprises under presumably more efficient public monitoring and quasi-private control. On the other hand, using a similar empirical approach, Arestis et al. (2001) show that in *developed* economies (US, UK, Japan, Germany, and France), the positive effects of banking sector development on economic growth are much greater than those of stock market development. My results show that this is also the case for China, a *developing* country. My results are also consistent with the general sentiments of financial professionals in China. For example, Hong Liang, senior China economist at Goldman Sachs Group Inc., comments, “it’s not working...The share prices don’t tell us anything about China’s impressive macro-expansion.”⁹

3. Has Share Issue Privatization Worked for China’s State-Owned Industrial Sector?

The word “privatization” was coined by Peter Drucker and adopted by Margaret Thatcher in 1979 as an economic policy in the United Kingdom.¹⁰ Since then, over 100 countries around the world have implemented privatizations. Kikeri et al. (1992, p. iii) report “since 1980, more than 2000 state-owned enterprises (SOEs) have been privatized in developing countries, and 6800 worldwide.” Goodman and Loveman (1991) report that, by 1990, the value of worldwide sales of SOEs had exceeded \$185 billion. According to Gibbon (2000, p.1), the cumulative value of proceeds raised by privatizing governments exceeded \$1 trillion during the second half of 1999. As Megginson and Netter (2001, p. 321) remark, “Privatization is one of the most important elements of the continuing global phenomenon of the increasing use of markets to allocate resources.”

⁹ “Raging Growth and Ricketty Bourses”, *BusinessWeek*, Oct. 31, 2005.

¹⁰ The first public offering of shares in a state-owned enterprise (SOE) was the British Petroleum (a 5% stake) in November 1979. Later, the IPOs of the British Telecom (1984), the British Gas (1986), and the second public offering of shares of the British Petroleum (1987) attracted much attention.

Over the past decade, against the above background, one of the most important restructurings of the Chinese economy has been its share issue privatization, i.e., the gradual privatization of its inefficient SOEs by issuing equity shares.¹¹ This privatization has attracted widespread attention. For example, the *Economist* (2005) describes it as a “model of reform.”¹² The latest OECD *Economic Survey of China* (2005) estimates that, in 2003, private companies accounted for 63% of China’s business-sector output, while in the 1970s, there were almost no private companies in China. *BusinessWeek* (2005) quotes Chinese economist Gang Fan, “a 70% share of GDP is now in private hands.”¹³

The second and third chapters study the causes and effects of share issue privatization in China from 1994 to 2003. In order to model the dynamic interactions between the government and the SOEs, I construct a Stackleberg model in the second chapter. This model captures the main features of Chinese SOEs, and illustrates the “grabbing hand” and “helping hand” aspects of government intervention in SOEs. This model unambiguously predicts that, after the control rights change from the government to private owners, the former SOEs’ profitability and productivity should increase as redundant workers get laid off. These theoretical predictions are robust across a wide spectrum of parameter values. It appears that such a theoretical framework has yet to appear in the privatization literature.

In the third chapter, I conduct empirical tests for the theoretical predictions of the second chapter. Using two newly available datasets (China Stock Market and Accounting Research Database, 2005, and China Private Listed Companies Database, 2004), I conduct univariate

¹¹ Another means of privatization, “voucher privatization” (Boycko, Shleifer and Vishny 1994) has been used in former Soviet Union and Eastern Europe.

¹² The *Economist* (09/15/2005): “A model of reform.”

¹³ The *BusinessWeek* (08/22/2005):

http://www.businessweek.com/magazine/content/05_34/b3948478.htm

and multivariate tests for 116 privatized listed firms, and the results strongly support the hypothesis that “change-of-control matters”, i.e., what really matters is the *actual* transfer of control rights from the State to private owners rather than the IPO, which is used to signal privatization in other studies.

Specifically, I identify the change of the *largest* shareholder from the State to a private owner as “change of control”, the event that defines “privatization.” I find that the average time gap between the IPO and the change of control is around 5 years. Since IPOs may not transfer a controlling block of shares into private hands, I believe that my measure captures better the “defining aspect” of privatization and actually leads to more accurate estimation of its effects. As a result, the “profitability puzzle” (i.e., why did the profitability of China’s SOEs *deteriorate* while the profitability of SOEs in other countries generally *improve* after IPOs?) is solved. This identification strategy is new to empirical investigations in the privatization field, which usually use the IPO as the defining event and fail to find significant gains to privatization in China’s case. Using this new identification strategy thus sheds some light on the “profitability puzzle”: my time-series analysis shows that the privatized firms (i.e., those SOEs that have changed control) enjoy higher profitability and productivity after a change-of-control than before, the cross-sectional analysis shows that privatized firms enjoy higher profitability and productivity than SOEs in the majority of sample years, and the panel analysis with fixed effects or random effects reaches similar conclusions. Even after fixing the endogeneity problem by using two-stage-least-squares estimation technique, the same conclusions still hold. Robustness checks using the small sample of listed firms for which the private owners have gained a *majority* of shares confirm the results obtained from the sample of the listed firms for which the private owners become the largest shareholders. An event

study of the stock market return around the change-of-control shows that investors seem to have optimistic expectations for the change-of-control.

I then proceed to show that improvements in corporate governance, especially the management turnovers associated with changes of control, are significantly linked to better firm performance. Specifically, I show that when privatization also involves a new CEO from outside the firm, the firm performance is usually better than when the CEO is retained or a replacement is found from within the firm. These results regarding the relationship between management turnovers and firm performance are consistent with the results of Dyck (1997) in the context of Eastern Germany, Barberis et al. (1996) in the context of Russia, and Frydman et al. (1999) in the context of Central European transition economies. For example, Barberis et al. (1996) show that, “the presence of new owners and new managers raises the likelihood of restructuring...the evidence points to the critical role new human capital plays in economic transformation.” Frydman et al. (1999) show that, “privatization to outsider, but not insider, owners has significant performance effects.”

The results of this dissertation have important policy implications:

(1) To take full advantage of the under-utilized stock markets, China needs to carry out significant improvements of the infrastructure and operations of those markets;

(2) The share issue privatization has “worked” in China—it improves firm profitability and productivity while reducing excess labor. China should continue its privatization program to further improve firm performance.

CHAPTER II

FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN CHINA

1. Introduction

The passage of time and a steady inflow of more reliable data from China's financial sector now make it possible to examine possible links between financial factors and real activity for this transition economy using recent time-series techniques. The methodology is useful for evaluating questions of statistical causation within a single country, and offers an alternative to cross-country studies where the econometric identification comes primarily from between-country variation in the data (e.g., Levine and Zervos 1998; Rousseau and Wachtel 2000). Given that several recent studies (e.g., Rioja and Valev 2004; Kassimatis and Spyrous 2001; Demetriades and Hussein, 1996) have argued against a "one-size-fits-all" approach to understanding the nexus, turning to single country analyses may add usefully to the information set available to those charged with formulating policy.

This chapter is organized as follows: in part 2, I will briefly review the debate about the relationship between financial development and economic growth; in part 3, I will briefly review the conventional wisdom of the functions of stock markets in economic growth; in part 4, I will discuss China's financial structure and the purpose of stock market development; in part 5, I will discuss the data and the methodology; in part 6, I will discuss the empirical results of tri-variate VARs; in part 7, I conclude this chapter by summarizing the results and indicating future directions of China's stock market development.

2. Review of Literature: Finance and Growth

There are controversial views regarding the relationship between finance and growth in both theoretical and empirical studies. Some economists argue that finance leads to growth. They basically focus on the impact of financial development on capital accumulation and technological growth. For example, Bagehot (1873) argues that finance facilitated capital mobilization for British Industrial Revolution. Levine (2004) indicates that financial intermediaries may reduce the costs of acquiring and processing information and thereby improving resource allocation. Schumpeter (1912) argues that well-functioning banks promote technological innovation by identifying and funding the most promising entrepreneurs and projects. This idea has been pursued by Galetovic (1996), Blackburn and Hung (1998) and Morales (2003), etc. On the other hand, Joan Robinson (1952) argues that economic development creates demands for particular financial arrangements, and the financial system just responds automatically to these demands. So her argument is that finance follows economic growth. Greenwood and Jovanovic (1990) formally model the dynamic interactions between finance and growth. They find financial development and economic growth reinforce each other. On the other hand, Lucas (1988) argues that the relationship is “badly overstressed”, and Murphy et al. (1991) argue the financial sector is merely a rent-seeking sector. In order to empirically examine their arguments, King and Levine (1993) and Levine and Zervos (1998) estimate cross-country regressions of economic growth on financial development indicators, and find that initial financial development level is a good predictor of subsequent economic growth. So they conclude that the causality flows from finance to growth.

However, there are two main weaknesses associated with the cross-country regression techniques:

(1) “One size does not fit all.” As Demetriades and Hussein (1996) indicate, the cross-section nature of the technique cannot allow different countries to exhibit different patterns of causality, and the notion of the “representative country” in the context of causality testing is not sufficiently informative, especially in relation to policy analysis, because it is not clear which countries are “representative” and which are not. Therefore, time series analysis is needed in order to determine the causality. Demetriades and Hussein (1996) conduct Granger causality tests in 16 developing countries and find “little support to the view that finance is a leading sector in the process of economic development. There is considerable evidence of bi-directionality and some evidence of reverse causation. Causality patterns indeed vary across countries.” Kassimatis and Spyrou (2001) find that equity markets have a role to play only in relatively liberalized economies, like Chile and Mexico. In financially repressed economies, like India, the equity market does not affect real sector growth. While in regions where the nature of the stock market has been speculative, like Taiwan, a negative relationship is detected between equity market development and economic development. Rioja and Valev (2004) examine a panel of 74 countries and conclude that the relationship between finance and growth “varies according to the level of financial development (divided in three regions). In the low region (countries with very low levels of financial development), additional improvements in financial markets have an uncertain effect on growth. In the intermediate region, financial development has a large, positive effect on growth. Finally, in the high region, the effect is positive, but smaller.”

(2) The endogeneity problem. Harris (1997) shows that the endogeneity of variables in cross-country regressions regarding the relationship between stock market development and economic growth may make the results very misleading.

Therefore, as Bell and Rousseau (2001) point out, it is important to “study individual countries using a diverse set of financial variables for specific period of history to further our understanding of the finance-growth nexus.” The rapid growth of China’s real economy and its financial sector offers us a good opportunity to examine finance-growth relationship in a transition economy, which is characterized by the transition from a central-planned economy to a market-oriented economy. Previous studies of financial development in transition economies (e.g., Claessens et al. 2000) focus on transition economies in central and eastern Europe, while the relationship between China’s financial development and economic development, especially its stock market development and economic growth, has seldom been empirically examined before. This topic is highly controversial in China. Some economists (e.g. Wu, Jinglian (2001), Chief economist of the Development Research Center of the State Council) argue, “China’s stock market is a casino. Few participants are really concerned about investment. They are only concerned about speculation.”¹⁴ While some other economists (e.g. Li, Yining (1992), Dean of Business School, Peking University) argues that the stock markets will be very important for China’s State-Owned Enterprises reform, one of the most crucial reforms in China, and through the successful reform, China will enjoy rapid and sustainable economic growth. In view of the controversy in theory and previous empirical studies in other developing countries, as well as the controversy about China’s stock market development, this chapter is intended to find empirical evidence about the *causal* role of financial sector in

¹⁴ See also Forbes (10/01/01):”China’s \$600 billion casino”.

China's economic growth, especially the role of stock markets from 1995 to 2005. The findings of this chapter will be meaningful for researchers and policy-makers as well.

3. The Conventional Wisdom of the Functions of Stock Market in Economic Growth

Cho (1986) shows analytically that to achieve efficient resource allocation, credit markets need to be supplemented by a well-functioning equity market. This is because, unlike bank borrowing, equity finance is not subject to adverse selection and moral hazard in the presence of asymmetric information (the adverse selection and moral hazard involved in bank borrowing were analyzed by Stiglitz and Weiss (1981)). Boyd and Smith (1998) develops an endogenous growth model and shows that a typical pattern of development will be that increases in the level of per capita output are associated with a greater volume of equity market activity, because equity markets are *complements* to debt markets. As economies become more highly developed, debt and equity markets will become more complementary. The equity markets are complementary to debt market because equity markets have their unique functions. Rousseau and Wachtel (2000) summarize the important functions of stock markets. I think three of them are relevant for China:

(1) An equity market provides investors and entrepreneurs with a potential exit mechanism, so venture capital investments become more attractive, and technological innovations are more active;

(2) The provision of liquidity through organized exchanges encourages investors to transfer their surpluses from short-term assets to long-term capital market, where the funds can provide access to permanent capital to firms to finance large, indivisible projects that enjoy substantive scale economies;

(3) The existence of a stock market provides important information that improves the efficiency of financial intermediation generally. As Levine (2004) indicates, as stock markets become larger and more liquid, agents may have greater incentives to spend resources researching firms because it is easier to profit from this information by trading in big and liquid markets. Empirically, Levine and Zervos (1998) estimate a cross-country regression of real per capita GDP growth, capital stock growth, productivity growth, savings rate on the ratio of bank credit over GDP, the ratio of stock market capitalization over GDP (size) and/or the ratio of stock market trading volume over GDP (liquidity), together with some control variables. They show that “financial markets provide important services for growth and that stock markets provide different services from banks.” In particular, they find that stock market liquidity facilitates long-run growth. Rousseau and Wachtel (2000) use panel VAR technique to examine 47 countries from 1980 to 1995, and find that “increases in both the intensity of activity in traditional intermediaries and the market value of equity traded on organized exchanges have a strong effect on output, while the effects of market capitalization are weaker.”

On the other hand, some economists indicate some stock markets have their inherent weaknesses. For example, Singh (1997) argues that share prices in emerging markets may fluctuate more than those in well-developed markets, which has been empirically confirmed (e.g. Davis 1995). He argues that the high volatility is a negative feature of a stock market because it discourages risk-averse savers and investors, while encourages speculators. He also points out that the problem with developing countries’ stock market development is that stock market development is not “an evolutionary response to market forces” but is an expansion where “governments play a major proactive role”. Therefore, developing countries’ firms may

not follow the “pecking order” of corporate finance, which has been empirically confirmed by Singh (1995), and the evolution of debt and equity market may not be described by endogenous growth models such as Boyd and Smith (1998). Therefore, the research into the interaction between stock market development and economic growth in China, a transition economy in which government is very proactive in developing its stock market, can yield different insights into the relationship between financial development and economic growth.

4. China’s Financial Structure and the Purpose of Stock Market Development

China’s financial sector is made up of banks, nonbank financial institutions (e.g., People’s Insurance Company of China) and stock markets. At the end of 1990s, China’s banking system includes the central bank (People’s Bank of China), the four major state-owned commercial banks, three policy banks (State Development Bank, Export and Import Bank, Agricultural Development Bank), two commercial banks (Bank of Communications, the CITIC Industrial Bank), 12 joint stock banks and the city commercial banks (OECD 2002). The banking system used to be the main source of enterprise finance, especially for State-Owned Enterprises. But the central government tried to change this situation by developing stock markets from the 1980s. The stock markets experienced formative period in the late 1970s, and the emergence of more formal structures (e.g., stock exchanges, corporate laws, and regulatory structure) in the early 1990s, and additional reforms after the 1997 Asian crisis (OECD 2002). The initial main purposes of developing stock markets in China are:

(1) To mobilize savings, reduce risks and costs of large stocks of households’ savings in the banking system. As Tong (1999) indicates, household savings rise sharply in the 1990s,

which was partly caused by the limited choices of personal investments (and partly caused by the lack of an effective social security system). The problem with such a high savings rate is: a rising inflation may trigger a sudden withdrawal of bank deposits and lead to a liquidity crisis, as it happened in 1988, and this will cause a severe decline in long-term investment and will slow economic growth. As Lan (1997) indicates, these savings may put pressure on inflation, and a high inflation rate will diminish the positive effects of financial development on economic growth, as Rousseau and Wachtel (2002) emphasize. Inflation, a real threat to economic growth in China, has occurred many times since the start of the reform at the end of the 1970s. For example, the consumer price index rose by 18.5% in 1988, the highest for 3 decades, and it rose by 21.7% in 1994, a new peak. Therefore, the government wanted to find new outlets for savings to shift from potential consumption into investment. As a result, stock markets were developed so that households had a new type of financial instrument to invest in.

(2) As Mookerjee and Yu (1999) indicate, growth in Chinese stock market can be traced to the government's view that well-functioning stock exchanges are crucial if inefficient and money-losing medium- and large-scale state-owned enterprises (SOEs) are to be successfully restructured. Zhang and Zhang (2001) show, in 1996, total losses by industrial SOEs were 79 billion yuan (Chinese currency), while the losses in 1978 were only 4.2 billion yuan, with an annualized growth rate of 17.7%. These losses were absorbed mainly by government subsidies and loans from the state banks. An efficient stock market will attract both domestic and foreign sources of funds and technology and allow the government to wean money-losing SOEs off subsidized loans from the state sector and expose them to the discipline of the market. Chinese authorities are using equity markets to change the ownership structure, improve the corporate governance of SOEs and enhance their operational efficiency,

thus hoping that the stock markets would contribute to economic growth. For example, the need to prepare a prospectus introduced broadly accepted international accounting practices, and emphasized profitability performance. The Chinese authorities have also adopted a rigorous disclosure policy for information disclosure. In 1998, China promulgated *China Securities Law*¹⁵, which is an important component of the regulatory structure of the stock market, and is a way to discipline SOE's operations.

Despite the original good intention of the Chinese government to develop its stock markets, China's stock markets are plagued with serious problems. A battery of empirical tests of the efficient market hypothesis conducted by Mookerjee and Yu (1999) show that "there are significant inefficiencies present in both exchanges (Shanghai and Shenzhen)." Among these are price distortions resulting from the state's holding of nearly two-thirds of all listed shares. Indeed, when the government attempts to sell off blocks of shares for some of their often low-profit or losing state-owned enterprises, as it did in May of 2005, the market seems unable to attract the foreign and domestic investors needed to absorb them without dramatic downward price movements.¹⁶ Another problem involves the prevalence of insider trading and fraud. Du and Wei (2004) show, for example, that if insider trading in the United States were to increase to levels currently found in China, market volatility would rise by 250 basis points. Therefore, a formal econometric investigation is needed to determine whether the stock markets have contributed to economic growth in China during the past decade.

¹⁵ The law is available at: <http://www.csrc.gov.cn/CSRCSite/eng/elaws.htm>.

¹⁶ Zhang et al. (2001), for example, describe the decline in profitability for China's state-owned industrial enterprises between 1978 and 1996. Holz (2003) indicates that "between 1978 and 1997, losses in industrial SOEs rose twentyfold" (p.vii).

5. Data and Methodology

The variables that I consider are: 1) banking sector development as measured by the value of domestic credit; (2) stock market development as measured by size (total market value of outstanding shares or the number of listed firms) and activity (total market value of shares traded); (3) real economic performance as measured by the value of GDP or fixed investment. I use quarterly data from 1995:Q1 through 2005:Q1. Investment data are from *China Monthly Statistics*, GDP is from the *Economist Intelligence Unit Database*, domestic credit is from the IMF's *International Financial Statistics*, and population and the consumer price index are from the *China Statistical Yearbook 2005*. The quarterly stock market data for 1998-2005 are from the China Securities Regulatory Commission (www.csrc.gov.cn), and I join these with data for 1995-1997 from the *China Stock Market and Accounting Research (CSMAR)* database developed by Shenzhen GTA Information Technology Co. Ltd. I transform all variables into real per capita terms, take logs, and then adjust investment, GDP, and domestic credit for seasonality by regressing each on quarterly dummy variables.

To evaluate possible causal links between banks, stock markets, and real activity, I follow Rousseau and Wachtel (1998) and estimate a series of trivariate vector autoregressive (VAR) systems of the form:

$$x_{1,t} = a_{1,0} + \sum_{i=1}^k a_{1,i} x_{1,t-i} + \sum_{i=1}^k b_{1,i} x_{2,t-i} + \sum_{i=1}^k c_{1,i} x_{3,t-i} + u_{1,t} \quad (1a)$$

$$x_{2,t} = a_{2,0} + \sum_{i=1}^k a_{2,i} x_{1,t-i} + \sum_{i=1}^k b_{2,i} x_{2,t-i} + \sum_{i=1}^k c_{2,i} x_{3,t-i} + u_{2,t} \quad (1b)$$

$$x_{3,t} = a_{3,0} + \sum_{i=1}^k a_{3,i} x_{1,t-i} + \sum_{i=1}^k b_{3,i} x_{2,t-i} + \sum_{i=1}^k c_{3,i} x_{3,t-i} + u_{3,t} \quad (1c)$$

where x_1 is fixed investment or GDP, x_2 is domestic credit, and x_3 is one of my measures of stock market development.

Before proceeding with the estimation, however, it is important to ensure that test statistics for block exclusion (i.e., Granger-causality) in these systems conform to standard distributions. This amounts to determining whether the variables in the systems that I consider have unit roots, and if so, whether they are cointegrated. If there is a single cointegrating vector, Sims et al. (1990) show in the trivariate case that the asymptotic distribution of the Wald test for Granger-causality is chi-square, making levels VARs appropriate for inference. If there are possibly two cointegrating vectors, Toda and Yamamoto (1995) show that tests for block exclusion remain chi-square distributed when an additional lag is added to the VAR structure but not used when constructing the Granger causality test.

6. Econometric Findings

When I compute augmented Dickey-Fuller tests for all of our series using specifications with a constant, trend, and three lag differences, I cannot reject the null hypothesis of a unit root for any of the data in levels with the ADF test, but can easily reject it for the data in first differences with the ADF or PP test (see Table 2-1).¹⁷ I thus consider it reasonable to proceed under the assumption that all data series are integrated of order one.

Table 2-2 shows the trace and maximum eigenvalue test statistics from Johansen (1991) cointegration tests for each of the six VAR systems that I consider. A series of nested

¹⁷ The Akaike information criterion selects two lags in all cases. I use three lags in the test regressions, however, since Schwert (1989) has shown that ADF tests tend to overreject in small samples when the AIC is used and that the loss of power from the extra lag is generally small. Phillips and Perron (1988) tests for unit roots led to similar inferences regarding the non-stationarity of my data.

likelihood ratio tests select a lag order of three for each system, and trends in the data suggest the inclusion of an unrestricted intercept in the model. The tests are consistent with a single cointegrating relationship in the three systems that include GDP as the measure of real activity, while there is evidence of two cointegrating relationships in the three systems that replace GDP with fixed investment.

Table 2-1: ADF and PP statistics for macroeconomic indicators and measures of financial development

	ADF		PP	
	Level	1st difference	Level	1st difference
GDP	-2.74	-3.88**	-5.06***	-10.69***
INV	-2.45	-5.10***	-10.73***	-24.54***
Credit	-3.02	-2.82	-1.88	-5.47***
CAP	-2.03	-4.13**	-0.51	-6.03***
Firm	-3.02	-3.78**	-0.97	-3.56**
Trade	-2.58	-3.62**	-3.45*	-9.05***

Notes: (1) GDP, INV, Credit, CAP, Firm and Trade refer to GDP, fixed investment, domestic credit, stock market capitalization, the number of listed firms, and the stock market trading volume respectively. All variables except the number of firms are in log per capita real terms. The number of listed firms is normalized by using the number per billion persons. (2) *, ** and *** represent 10%, 5% and 1% significance levels, respectively.

Based on the Johansen tests, I proceed to estimate VARs in levels for the systems with GDP using three lags and compute tests for the Granger non-causality on each variable block. The results appear in Table 2-3. In all three systems (i.e., regardless of the stock market indicator chosen), my measure of banking development Granger-causes GDP at less than the five percent level with a positive sum of the regression coefficients, while GDP does not Granger-cause banking development. At the same time, the measures of stock market

Table 2-2: Johansen test statistics for cointegration

System (K=3)	Eigenvalue		Trace		
	r=0	r<=1	r=0	r<=1	r<=2
GDP, Credit, and					
Cap	23.14*	10.74	35.77*	12.63	1.89
Firm	25.00*	13.38	40.95*	15.96*	2.58
Trade	21.15*	7.94	31.65*	10.49	2.55
INV, Credit and					
Cap	19.97*	15.53*	35.54*	15.57*	0.04
Firm	22.86*	16.22*	39.73*	16.87*	0.65
Trade	21.05*	15.68*	37.87*	16.81*	1.13

Note: The columns labeled r=0 test a null of no cointegration, while the r<=1(r<=2) columns test a null of at least one (two) cointegrating vectors. * represents statistical significance at the 5 percent level, with critical values from Osterwald-Lenum (1992), Table 1.

development do not Granger-cause growth, though there is evidence of small positive effects of economic growth to stock market development.

I report results for the three VARs with fixed investment as the measure of real activity in Table 2-4. Since there are possibly two cointegrating vectors, I apply the Toda-Yamamoto (1995) technique and use four lags in the VARs. Similar to the systems with GDP, I find that domestic credit Granger-causes investment, and that there is no feedback from investment to domestic credit. At the same time, there is no apparent relationship from any of the stock market indicators to investment.

Table 2-3: VAR estimates for the systems with GDP, Credit and stock market indicators

Stock market indicator	Levels VAR Granger tests				
	Eq.	GDP	Credit	Stock	R ²
Cap	(1a)	0.466(0.012)	0.295(0.006)	0.036(0.264)	0.977
	(1b)	-0.113(0.867)	1.024(0.000)	0.011(0.465)	0.996
	(1c)	0.719(0.167)	0.341(0.409)	0.866(0.000)	0.968
Firm	(1a)	0.426(0.019)	0.361(0.002)	0.124(0.129)	0.979
	(1b)	-0.108(0.935)	1.030(0.000)	0.015(0.853)	0.995
	(1c)	0.030(0.104)	0.067(0.057)	0.881(0.000)	0.997
Trade	(1a)	0.485(0.011)	0.244(0.022)	0.008(0.931)	0.974
	(1b)	-0.073(0.910)	1.010(0.000)	0.013(0.737)	0.995
	(1c)	2.598(0.076)	1.054(0.721)	0.398(0.223)	0.552

Note: The VAR systems include GDP, domestic credit (Credit), and a stock market development indicator listed at the left, all in log real per capita terms. The equation numbers correspond to those in the text, with (1a), (1b) and (1c) employing investment, credit and stock market development indicators as the respective dependent variables. It reports the sum of the regression coefficients on GDP, Credit, and the stock market development indicator in levels VARs with the significance level of the F-test for Granger non-causality in parenthesis. Each panel also reports the R² statistics. The VARs use three (K) lags of each variable.

Some of the more interesting effects between domestic credit and real activity are traced out with the impulse responses in Figures 2-1, 2-2 and 2-3. Figure 2-1 indicates that a one percent shock to the orthogonalized innovation to domestic credit raises per capita output by nearly 0.6 percent after six quarters, with the lower two-standard-error band crossing the horizontal axis after one year. Figure 2-2 reports similar results. Panel (a) of Figure 2-3 shows that a one percent shock to credit raises per capita investment by about 1.4 percent after two quarters, and that these effects are persistent. Figure 2-1 also shows that one percent shock to

output does not generate responses in domestic credit for which the two-standard-error bands cross the horizontal axes.

Table 2-4: VAR estimates for the systems with Investment, domestic credit and stock market indicators

Stock market indicator	Levels tests	VAR	Granger	R ²	
K=3	Eq.	Investment	Credit	Stock	
Cap	(1a)	0.586(0.521)	0.600(0.012)	0.066(0.812)	0.957
	(1b)	0.084(0.805)	0.855(0.000)	0.005(0.514)	0.995
	(1c)	0.132(0.613)	0.210(0.870)	0.896(0.000)	0.971
Firm	(1a)	0.461(0.291)	0.768(0.007)	0.132(0.245)	0.959
	(1b)	0.084(0.830)	0.862(0.000)	0.003(0.847)	0.995
	(1c)	-0.006(0.635)	0.046(0.127)	0.908(0.000)	0.995
Trade	(1a)	0.591(0.375)	0.534(0.004)	0.047(0.239)	0.960
	(1b)	0.075(0.824)	0.884(0.000)	0.013(0.754)	0.995
	(1c)	-0.346(0.380)	0.541(0.748)	0.506(0.055)	0.408

Note: The VAR systems include fixed investment, domestic credit (Credit), and a stock market development indicator listed at the left, all in log real per capita terms. The equation numbers correspond to those in the text, with (1a), (1b) and (1c) employing investment, credit and stock market development indicators as the respective dependent variables. It reports the sum of the regression coefficients on GDP, Credit, and the stock market development indicator in levels VARs with the significance level of the F-test for Granger non-causality in parenthesis. Each panel also reports the R² statistics. The VARs use three (K) lags of each variable.

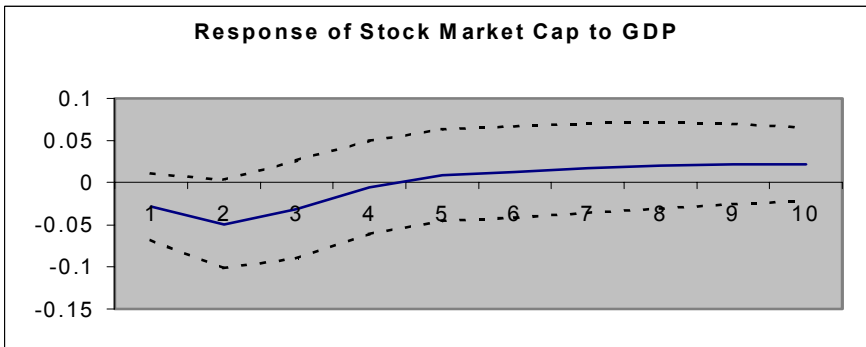
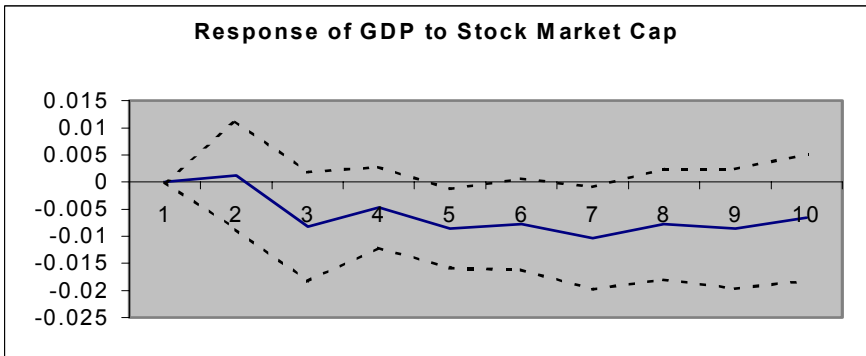
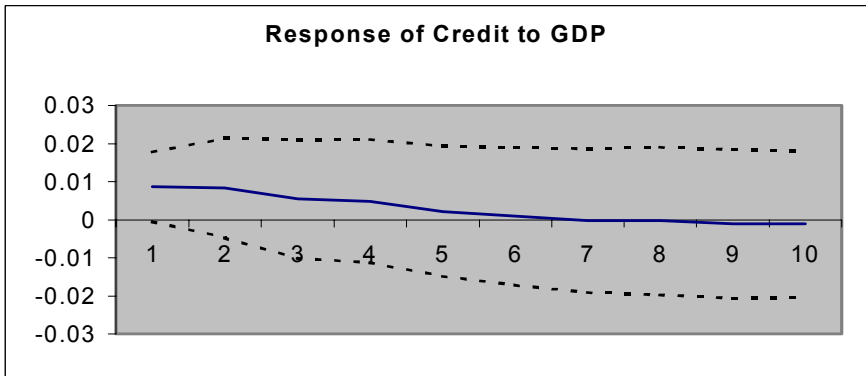
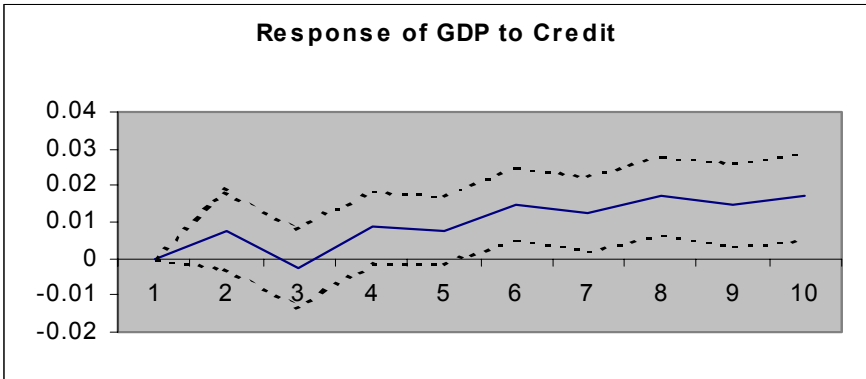
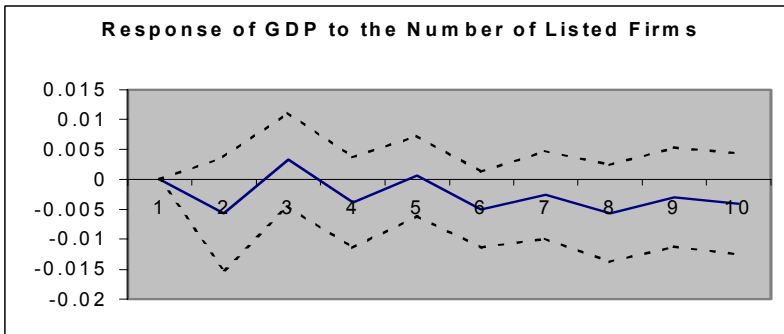
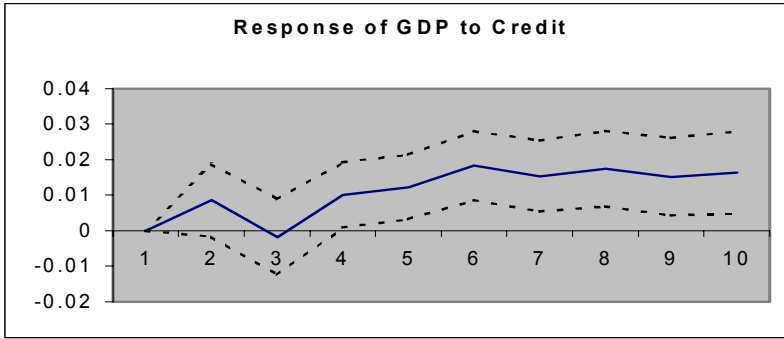
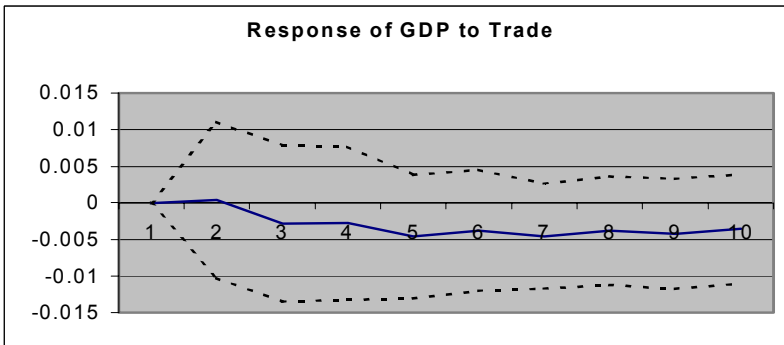
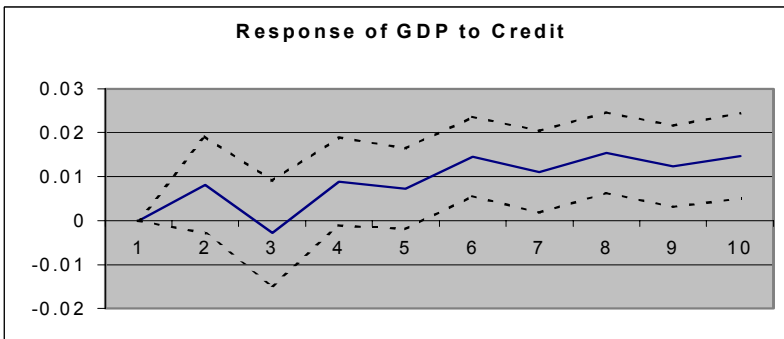


Figure 2-1: Impulse responses to one-standard-deviation shocks in the system (GDP, Credit, stock market capitalization); the dotted lines are the two-standard-error bands

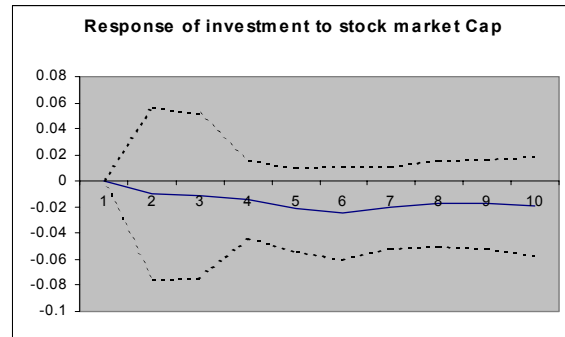
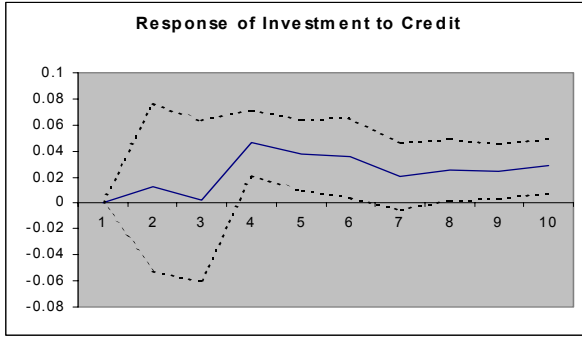


(a) The system (GDP, Credit, the number of listed firms)

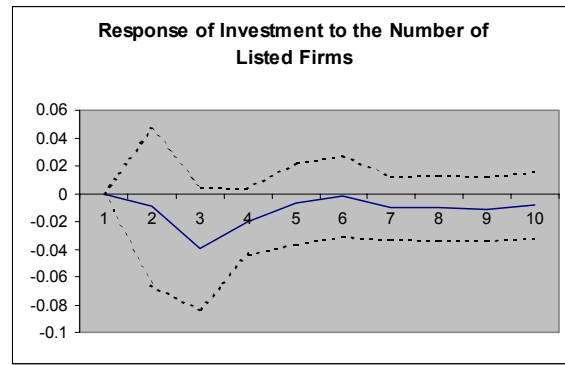
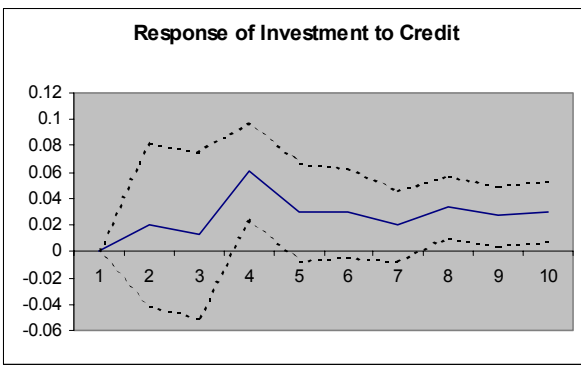


(b) The system (GDP, Credit, stock market trading volume)

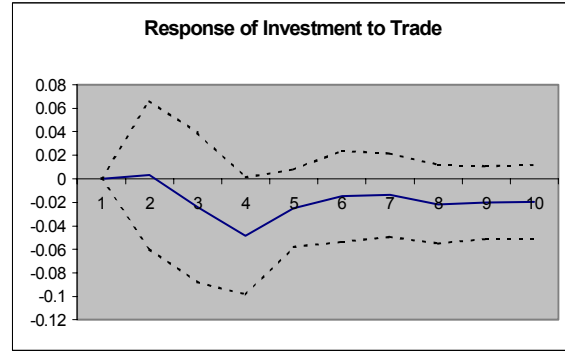
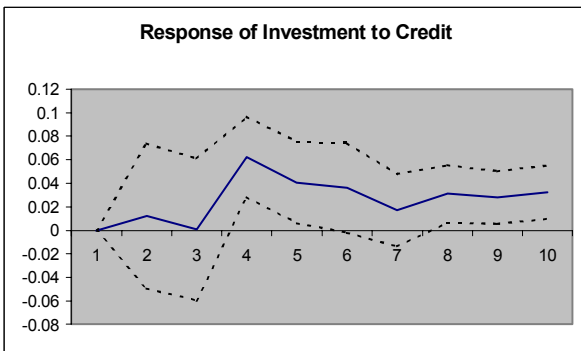
Figure 2-2: Impulse responses to one-standard-deviation shocks in the systems; the dotted lines are the two-standard-error bands



(a) The system (Fixed Investment, Credit, stock market capitalization)



(b) The system (Fixed Investment, Credit, the number of listed firms)



(c) The system (Fixed Investment, Credit, stock market trading volume)

Figure 2-3: Impulse responses to one-standard-deviation shocks in the systems; the dotted lines are the two-standard-error bands

7. Summary of Chapter

Statistical evidence using data for 1995-2005 indicates that increases in the size and sophistication of China's banking sector had positive and significant effects on both output and fixed investment, yet stock market development did not. The latter result is perhaps surprising given that the government intended to use the stock markets to mobilize household savings and channel it into capital accumulation, and to bring state-owned enterprises under presumably more efficient public monitoring and quasi-private control. On the other hand, using a similar empirical approach, Arestis et al. (2001) show that in *developed* economies (US, UK, Japan, Germany, and France), the positive effects of banking sector development on economic growth are much greater than those of stock market development. My results show that this is also the case for China, a *developing* country. Future research of this type for other countries might shed important light on the types of economic environments in which this finding might hold more generally.

The results from this chapter imply that China has under-utilized its stock markets. In order to fully take advantage of the stock markets to promote economic growth, China needs to improve the liquidity of its stock markets by gradually selling off its non-tradable state shares, and to strictly enforce laws and regulations to stop widespread fraud and insider trading.

CHAPTER III

SHARE ISSUE PRIVATIZATION IN CHINA: THEORY

“China is accelerating the privatization of tens of thousands of state-owned businesses that once served as pillars of Communist Party rule, and has decided to let foreign and private investors buy majority stakes in large enterprises the government had previously refused to sell, according to Chinese officials and researchers.”

--Washington Post, November 12, 2003

1. Introduction

Douglass North (1991) argues that institutions evolve to exploit economic gains. Ownership structure is an essential component of economic and political institutions. It is therefore an important topic for academic explorations as well as policy makings. The large-scale privatization wave around the world since 1979 represents an unprecedented change of ownership of resources, a shift of the major player from the State to the market in many transition economies. Since 1979, over 100 developing and developed countries around the world have implemented privatizations. According to Gibbon (2000, p.1), the cumulative value of proceeds raised by privatizing governments exceeded \$1 trillion during the second half of 1999. This large-scale institutional change will greatly shape the economic, political and cultural landscapes of the world in the 21st century.

Two methods of privatization have been used during the past two decades. The former Soviet Union and Eastern European countries have used “voucher privatization”, a privatization method where citizens are given or can inexpensively buy a book of vouchers that represent potential shares in any state-owned company. The “voucher privatization” is a means of quick mass privatization. On the other hand, China and other transition economies have adopted “share issue privatization”, i.e., to privatize their state-owned enterprises (SOEs) by issuing equity shares. This is a more gradual and incremental approach. By far, the largest fraction of total proceeds raised by privatizing governments has been collected through “share issue privatization.”

This large-scale worldwide privatization wave since 1979 has naturally attracted great attention from not only policy makers, but also economists around the world. Since 1994, four papers on the effects of privatization on firm performance have appeared in the *Journal of Finance* (Megginson et al. 1994, Boubakri and Cosset 1998, D’Souza and Megginson 1999, Gupta 2005), one paper on the effects of privatization on firm stock returns has appeared in the *Journal of Finance* (Dewenter and Malatesta 1997), one paper on the relative efficiency of SOEs and private firms has been published in the *American Economic Review* (Dewenter and Malatesta 2001), two papers on the effects of privatization on firm performance in Mexico and Central European countries have been published in the *Quarterly Journal of Economics* (La Porta et al. 1999 and Frydman et al. 1999), and one paper on the effects of privatization on firm performance in Russia has been published in the *Journal of Political Economy* (Barberis

et al. 1996). One paper on the effects of privatization on firm performance in China has been published in the *Journal of Financial Economics* (Sun and Tong, 2003).

Despite the extensive empirical evidence of positive effects of privatization on firm performance, there are surprisingly scarce theoretical models for this topic. Shleifer and Vishny (1994)'s *Quarterly Journal of Economics* paper represents one of the first efforts to analyze the effects of privatization through a rigorous game-theoretical model. Their model relies heavily on the existence of subsidies and bribes between the government and firms in a Nash-bargaining game between them. Though elegant, this model is inherently hard to test empirically due to the unobservability of bribe data. The results of their model are also sensitive to parameter values. Therefore, my purpose in this chapter is to establish a realistic theoretical model that can generate results consistent with the empirical evidence of positive effects of privatization on firm performance. I also intend to construct a model that can generate robust predictions. I hope such an effort will pave a new avenue for theoretical research in the privatization field.

This chapter is organized as follows: section 2 will introduce the main theoretical arguments for privatization, and briefly discuss the history of China's privatization and SOE reforms, section 3 will develop a simple theoretical model, which is a Stackleberg game between the government and the firms, and section 4 concludes.

2. Background

Why do so many developed and developing countries privatize SOEs? After all, as Sheshinski and Lopez-Calva (1998) show, under assumptions of perfect competition, no externalities, complete contracts and low information costs, ownership does not matter for firm performance. However, in the presence of market failures and externalities, perfect competition is no longer a valid assumption, so the SOEs emerge as instruments capable of curing market failures by implementing pricing policies that take account of social marginal costs (“social view”) (Shapiro and Willig 1990).

Despite the potential gains from curing the market failures, SOEs suffer from low efficiency. The current theoretical literature in privatization holds that the ultimate sources of inefficiencies of SOEs are the incompleteness of contracts and increasing information costs, as economies grow more complex and interdependent. These sources of inefficiencies of SOEs lead to the “*agency view*”. Two perspectives within the “*agency view*” have been developed:

(1) The “*managerial view*”, which argues that SOE managers are not properly monitored and therefore the incentives for efficiency are weak (Vickers and Yarrow 1998). Specifically, Laffont and Tirole (1993) argue that it is difficult for SOEs to properly monitor their managers because there is neither an individual owner with strong incentives to monitor managers nor a public share price to provide information about manager actions as judged by market participants. Further, the disciplinary role of takeovers (Scharfstein 1988) does not exist at all;

(2) The “*political view*”, which argues that political interference in the SOEs leads to distortions in objectives and operational constraints. For example, political interference might

encourage management to support full employment policies in an attempt to gain political support at the expense of profit maximization. The constraints take the form of “soft budget constraints” that end up being non-binding due to persistent bailouts of the State (Kornai 1979).¹⁸ These distortions result in excess employment (Shleifer and Vishny 1994, Boycko et al. 1996), employment of politically connected people rather than the best-qualified people (Krueger 1990), poor choices of product and location, over-investment and other inefficiencies.¹⁹

The inefficiencies of SOEs apparently motivated China’s economic reform since 1978, the core of which has been SOE reform. This is because:

(1) SOEs are an important component of China’s economy. As Lin et al. (1998) show, even after 18 years of reform, in 1996 SOEs still employed 57.4% of urban workers and possessed 52.2% of total investment in industrial fixed assets;

(2) SOEs in China have problems such as lack of management incentives (Mi and Wang 2000) and heavy policy burdens. In this second context, Lin et al. (1998) argue that SOEs in China assume too many social-welfare functions, which did more harm than good to SOEs’ performance.

In the 1980s, and against a background of global privatization, China did not privatize much, largely because of ideological concerns. Instead, it decided to consolidate enterprise

¹⁸ Berglof and Roland (1998) and Frydman et al.(2000) show that soft budget constraints are a major source of inefficiency in SOEs, Lin (1999) shows this is exactly the case in China, and Bai and Wang (1999) show that soft budget constraints result in inefficient resource allocation.

¹⁹ See, for example, the “Question of China” part of the article by the American Enterprise Institute for Public Policy Research (1997): “two new paradigms” at http://www.aei.org/publications/pubID.8072/pub_detail.asp.

property rights at the municipal government level and to adopt a “new enterprise governance structure that stressed enterprise autonomy and incentives.” (Li 1997, p. 1081). Specifically, China’s SOE reform from 1978 to 1992 can be divided into three stages:

Stage 1: 1979--1983, China implemented a policy of administrative decentralization and profit retention. As a result, SOEs were allowed to retain some proportion of their profits so that there were incentives to improve efficiency.

Stage 2: 1984--1987, the government no longer directly funded SOE capital investments. Instead, SOEs had to borrow from banks. The government wanted to discipline SOEs’ behavior by hardening their budgets. But in fact, this did not succeed. Because the lending banks were also state-owned, they lacked the incentive to monitor the SOEs. As a result, the budget constraints of SOEs were still “soft”. Especially, the SOEs could still get “policy lending” from state-owned banks at preferential interest rates.

Stage 3: 1988--1992, reform focused on the separation of government ownership from control of SOEs’ operations by implementing the “Contract Responsibility System.” This gave managers more incentives to maximize profits. Groves et al. (1995) show that Chinese managers’ total compensation was positively related to both firm profits and sales, but after a reform contract, the correlation between total compensation and profits increased while the correlation between total compensation and sales decreased. This implies that the main performance measure had changed from sales (the main performance measure in a planned economy) to profits (the main performance measure in a market economy). However, because

SOEs were still not fully responsible for their losses, the “soft budget constraints” still operated at this stage.

Therefore, from the beginning of China’s reforms, there have always been two effects. The first effect is the “convergence-of-interests effect”, which means that as the managers of SOEs get more autonomy (e.g., profit retention) their interests become more aligned with the interests of the firm and their behavior becomes more consistent with the goals of profit maximization and productivity enhancement. In other words, the “managerial view” of the source of inefficiency of SOEs is no longer a serious concern. For example, Groves et al. (1994) shows that the productivity of SOEs increased with increases in bonus payments and in the number of contract workers. On the other hand, the second “political-intervention effect” still exists, so the “political view” of the source of inefficiency of SOEs still applies. This is because, as the ultimate owner of SOEs, the State is responsible for not only the performance (e.g., profitability and productivity) of SOEs but also the social-welfare functions of them (e.g., heavy burdens of retirement pensions, housing, medical cares and redundant workers). This tends to worsen firms’ performance. For example, Jefferson (1998) argues that “the SOE is a kind of impure public good with clear externality and public-policy implications. Nonexcludability and nondiminisability, properties of a public good that are inherent in the classic SOE, create externalities that impair economy-wide economic efficiency.” (p. 428) As a result, even if all reform measures were fully implemented, as long as the ownership structure did not change, the negative “political-intervention effect” would not be mitigated.

In the 1980s, it seemed that the positive “convergence-of-interests” effect dominated the negative “political-intervention effect”. For example, Li (1997)’s study of a panel of 272 Chinese SOEs between 1980 and 1989 shows that there were marked improvements in the marginal productivity of factors and in TFP. However, at the beginning of the 1990s, the negative “political intervention effect” seemed to begin to dominate. Indeed, Holz (2003) shows that in 1990, industrial SOEs in only 3 of the 30 major industrial sectors were running aggregate losses; yet by 1997 there were aggregate losses in 25 of the then 39 sectors (p. vii). A briefing of the National Center for Policy Analysis (1997) shows that about half of China’s 118,000 SOEs lost money in 1996—up from one-third in 1995. Public-sector industries consumed some 75 percent of domestic credit, and at least 20 percent of bank loans were non-performing.²⁰ It was against this background did the Chinese government begin to seriously consider privatization as a way to improve the performances of its SOEs—the only way to mitigate the “political intervention effect”.

In order to privatize SOEs, China established two stock exchanges in 1990 and 1991, and the growth of China’s stock markets has been fast since then.²¹ The development of stock markets greatly facilitated the share issue privatization in China. The average proportion of

²⁰ <http://www.ncpa.org/pd/pdint173.html>

²¹ During the initial phases of the stock market development, China did not claim to aim at privatization. In 1993, the Communist Party approved the creation of a “modern enterprise system”, the core of which was the modern corporation limited by shares. For more details, see http://english.people.com.cn/english/200010/16/eng20001016_52748.html.

Then, China implemented de facto share issue privatization without official recognition. In 1997, Ex-President Zemin Jiang announced the policy of significant ownership diversification of the state sector through complete or partial divestiture of small and medium-sized SOEs. See “Jiang urges China move closer to capitalism” at <http://www.cnn.com/WORLD/9709/12/china>.

state shares in total shares for listed SOEs declined from 1994 to 2003. Jefferson et al.'s (2003) study of a panel of 22000 Chinese large- and medium-size enterprises from 1994 to 1999 shows a “rapidly diversifying ownership structure in which the role of the state is steadily retreating.” (p. 89)

3. A Simple Theoretical Model

To formally study the causes and effects of China's share issue privatization, I set up a two-period Stackleberg game between the government and the firm to capture the strategic interactions between them. In the first period, the government sets its optimal ownership in the firm. The government's objective function is a weighted average of two objectives: (1) an employment objective; (2) a revenue objective. The relative weight of these two objectives is given by c . The cost of government intervention is $g(a)K$, where a is the government's ownership in the firm, as measured by the proportion of its shares in the firm's total shares and $g(a)$ is the capital subsidy rate. I assume that the capital subsidy rate $g(a)$ is an increasing function of a because the higher the fraction of ownership in the firm, the more capital subsidy the government provides it. On the other hand, as a result of owning fraction a of the firm, the government claims a proportion a of the firm's total profits. For purely private firms, $a=0$, while for purely state-owned enterprises, $a=1$. For firms with mixed-ownership, $a \in (0,1)$.

Specifically, the government's maximization problem is to choose its optimal ownership in the firm to maximize the utility of the government policy-maker:

$$\max_a U_g(R, L) = (t + a)[AK^\alpha L^\beta - wL - (r - g(a))K] + cL - g(a)K .$$

where R is government revenue (the first part of the objective function), and L is employment. A and K represent TFP and capital. w and r stand for wage and financial market interest rate. $g(a)$ is the capital subsidy rate, and t is the profit tax rate applied to *all* firms irrespective of their ownership structures. For simplicity, since the government owns fraction a of the firm, I assume that the government shares exactly the fraction a of the capital cost, which means that $g(a) = ar$. I assume that $w=r=1$, $t=0$, $0 < \alpha + \beta < 1$, $c > 0$.²² The government's maximization problem becomes:

$$\max_a U_g(R, L) = a[AK^\alpha L^\beta - L - (1 - a)K] + cL - aK .$$

In the second period, given the ownership structure of the firm, the firm manager maximizes the weighted average of two objectives: profit and employment. This "multitask" objective is consistent with Dong and Putterman (2003) and Bai et al. (2000). For example, Dong and Putterman (2003) argue, "the governments, especially in transition economies, often use state-owned enterprises (SOEs) to pursue non-financial objectives and to finance the resulting social burdens with subsidies and policy loans." (p.110). Bai et al. (2000) argue that, "during transition, maintaining employment and providing social safety net to the unemployed

²² The specific values of these parameters are not the concern of this model.

are important to social stability...because independent institutions for social safety are lacking and firms with strong profit incentives have little incentive to promote social stability due to its public-good nature, state-owned enterprises (SOEs) are needed to continue their role in providing social welfare.” (p. 716)

Specifically, the firm’s maximization problem is to choose capital and labor to maximize the utility of the firm manager:

$$\max_{K,L} U_f(\pi, L) = (1-t-a)[AK^\alpha L^\beta - wL - (r-g(a))K] + b(a)L .$$

where π is the net profit (the first part of the objective function), and $b(a)$ is the firm manager’s weight on employment objective. It is reasonable to assume that the firm manager’s weight on employment is positively correlated with the government ownership in the firm. The more the government owns the firm and controls its operations, the more the firm manager serves as a politician rather than a businessman, and the more weight the firm manager puts on employment in the utility function. In order to get a closed-form solution, I assume a specific functional form of $b(a):b(a)=na$, where $n>0$, and n is named the “employment preference multiplier”. For simplicity, I assume $w=r=1, t=0, 0 < \alpha + \beta < 1, g(a) = ar$, and the firm manager’s maximization problem becomes:

$$\max_{K,L} U_f(\pi, L) = (1-a)[AK^\alpha L^\beta - L - (1-a)K] + naL .$$

The above theoretical setup is well supported by the realities in China. It is an illustration of the “grabbing hand” (extraction of the profits, a) and the “helping hand” (preferential interest rate $r-g(a)$) of the government. ²³

Next, let us carefully examine the features of this model:

(1) *The sequential setup of the game fully reflects the feature of state-dominance of the Chinese economy.* The government explicitly sets the interest rates of the State-owned banks and the profit extraction rate. It implicitly sets its relative weights on the revenue objective (“efficiency”) and the employment objective (“social stability”). These weights vary with time, reflecting the government’s changing concerns in different periods. For example, when unemployment and social tensions are high, the government tends to put higher relative weight on social stability. For example, a *China Daily* report (2003) says, “The top priority for the Chinese Government is tilting towards job creation as soaring unemployment threatens to undermine the country's economic growth and even social stability... Economist Hu Angang, director of the China Study Center with Tsinghua University, said the nation ‘is facing the world's biggest battle against unemployment. The issue of employment will pose the biggest challenge to our country's economic development in the early 21st century. Generating more job opportunities should become the top goal of both the central government and local governments, and the employment policy should be placed highest among all economic and social policies’.”

²³ The “grabbing hand” and “helping hand” of government functions were first used by Shleifer and Vishny (1999) in a different setting. Here I borrow from their terminology.

(2) The “grabbing hand” (profit extraction) is a defining feature of the SOEs. For example, Dong and Putterman (2003) show that, “in 1995, SOEs in industry and other sectors produced about 44% of GDP, but contributed 71% of national fiscal revenue.” (p. 112) This implies that SOEs face higher effective tax rates than private firms.

(3) The preferential interest rate ($r-g(a)$) for SOEs in China is widely recognized. All major banks are state-owned in China. The Chinese government instructs these banks to make loans to SOEs at preferential interest rates (“policy lending”). Cull and Xu (2003) observe that, “policy lending remained a defining characteristic of the Chinese financial system” (p.539).²⁴ Their empirical results show that, “By 1994, direct government transfers had nearly disappeared in our sample. The responsibility to bail out poorly performing SOEs must have been assumed increasingly by banks.”(p. 543) The inefficiency of the “policy lending” will be neatly illustrated by the three propositions to be discussed below. Specifically, Propositions 1, 2 and 3 show that the higher the government ownership (a is higher), the more preferential the interest rate ($g(a)$ is higher and $r-g(a)$ is lower), but the less profitable and productive the firms. This has been confirmed by an Ernst & Young report (2003): “in 2002, the non-performing loans of Chinese banks amounted to a staggering US\$500 billion, a result of over 40 years of extensive policy lending” (p.4). The preferential interest rate for SOEs also exists in other countries. For example, Sapienza (2004) shows that, in Italy, “the stronger the political party in the area where the bank is lending, the lower are the interest rates charged...state-owned banks serve as a mechanism to supply political patronage.” (p.357).

²⁴ The existence of preferential interest rates for “policy lending” has been confirmed by an official of the China Banking Regulatory Commission in an interview with the author.

(4) *The employment objective $b(a)L$ of the firm manager is consistent with empirical evidence.* Chang and Wong (2004) show that, among their sample of 483 firms listed on the Shanghai Stock Exchange at the end of 1999, “about 56% of them still maintain formal ties with local governments and ministries, with the latter acting as the firms’ administrative superiors...and managers’ decision making has been subject to the control of the local party committees since the early 1950s. The promulgation of the Company Law in 1993 did not eliminate the influence over firms’ decision making by local party committees.”(p. 621) The government wants to keep social stability by maintaining a low unemployment rate, so the more the government owns a firm (a is higher), the more weight the firm manager will put on the employment objective in the utility function ($b(a)$ is higher).

The model generates the following theoretical predictions: ²⁵

PROPOSITION 1: *The labor productivity of the firm, as measured by sales per employee (P_1),*

is negatively affected by government ownership:
$$\frac{\partial P_1}{\partial a} = \frac{1}{\beta} \cdot \frac{-n}{(1-a)^2} < 0.$$

PROPOSITION 2: *The labor productivity of the firm, as measured by profits per employee*

(P_2), is negatively affected by government ownership:
$$\frac{\partial P_2}{\partial a} = \left(\frac{1-\alpha}{\beta}\right) \cdot \frac{-n}{(1-a)^2} < 0.$$

PROPOSITION 3: *The profitability of the firm, as measured by return on sales (ROS), is*

negative affected by government ownership:
$$\frac{\partial ROS}{\partial a} = \frac{-n\beta}{[1-(n+1)a]^2} < 0.$$

²⁵ See the appendix for the proofs of these propositions.

The above three propositions lead directly to the following lemma:

LEMMA 1: *A change of control of the firm from the government to a private owner lowers government ownership in the firm and increases profitability and productivity as a result.*

These results are driven by the employment objective in the firm manager's utility function, a defining feature of firms with mixed-ownership in China and other transition economies. As propositions 1, 2 and 3 show, profitability and productivity will not be affected by government ownership if the "employment preference multiplier" $n=0$. As long as $n>0$, we have the following proposition:

PROPOSITION 4: *For any given government ownership, employment rises as the "employment preference multiplier" n increases. Profitability and productivity fall as n increases. In other words, for a given government ownership, the more weight the firm manager puts on employment, the more redundant workers are kept on the job and the lower profitability and productivity ensue.*

It is easy to see the intuition behind Proposition 4: in the firm manager's utility function, for any given level of government ownership (a), if the employment multiplier n is higher, then the weight on employment (na) is higher. Therefore, the firm manager will care more about employment than profit. This causes the manager to "over-employ". As a result,

employment is over its optimal level for profit maximization, resulting in redundant workers. The existence of these redundant workers lowers the firm's productivity and profitability. Excess labor is widely recognized as a persistent problem of inefficient SOEs.²⁶ A report of OECD (2000) on China estimates that, "surplus workers in SOE amounted to at least 20 million, and perhaps as many as 35 million, at the end of 1996. These figures represent between one-fifth and one-third of the total SOE workforce, and between 10% and 17% of total urban employment. Nearly all SOE industry segments have substantial amounts of excess workers." (p. 37)

Propositions 1, 2, 3, 4 and Lemma 1 are supported by direct empirical evidence in chapter 4 of this dissertation. They are also consistent with the results from Chang and Wong (2004): "the decision-making power of local party committees relative to managers is associated negatively with firm performance."²⁷ (p. 617).

PROPOSITION 5: *The optimal degree of government ownership falls when the share of*

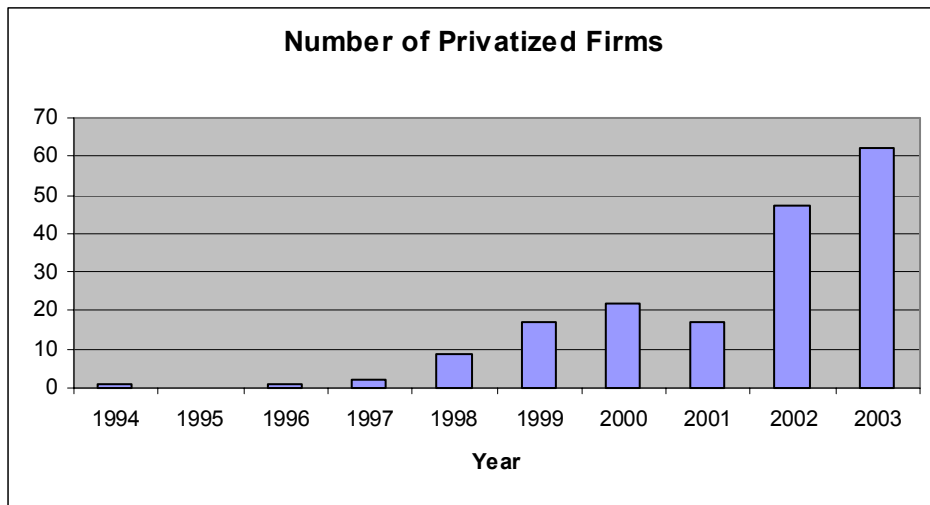
capital in the production function (α) rises:
$$\frac{\partial a^*}{\partial \alpha} = \frac{-2n\beta}{[(2\alpha - 1)(n + 1) + \beta]^2} < 0.$$

Proposition 5 shows that, as the capital share in the production function increases, the cost of government ownership or political intervention in the form of capital subsidy grows

²⁶ See, for example, Shleifer and Vishny (1994).

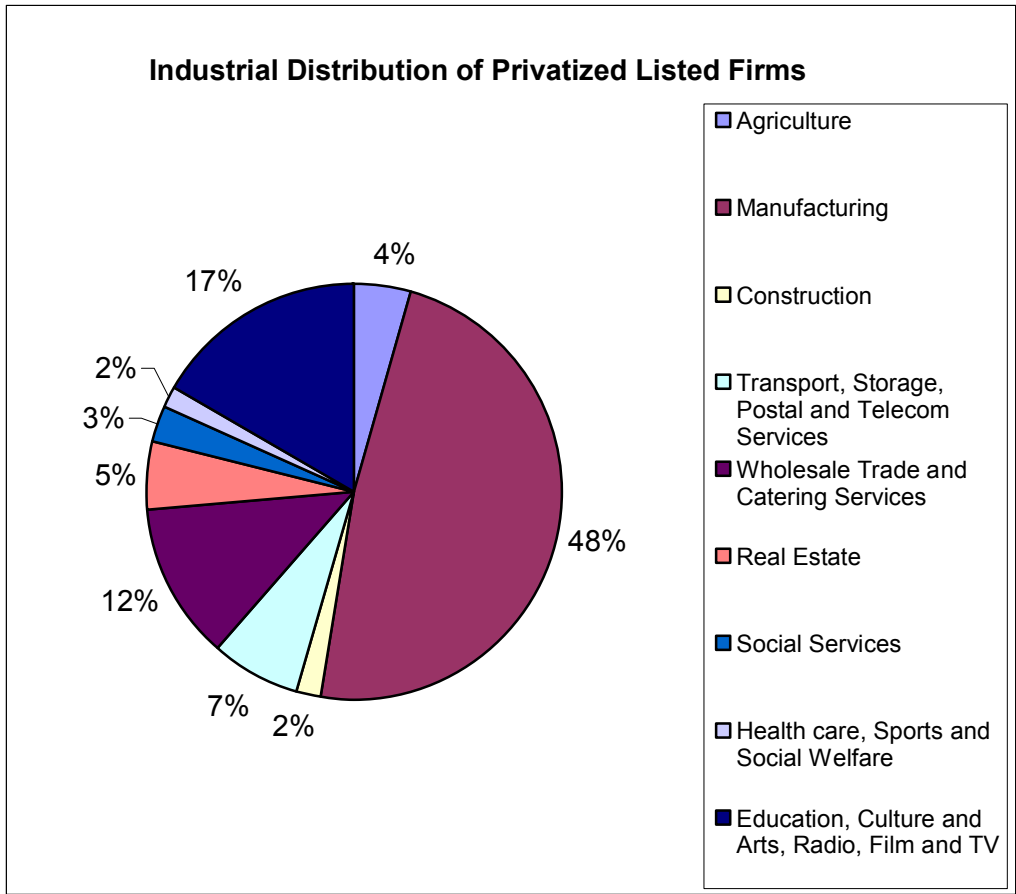
²⁷ They use ROS (return on sales), ROA (return on assets) and ROE (return on equity) as performance measures.

greater than its benefit (profit extraction), so the government decides to reduce its ownership in SOEs. From 1994 to 2003, in China's GDP, the proportion of industry increased from 47% to 52% while the proportion of agriculture decreased from 20% to 14%. This structural change led to the rise of capital share because industry is much more capital-intensive than agriculture, especially for China. Therefore, Proposition 5 shows that it should be the optimal strategy for the Chinese government to reduce its ownership in SOEs and accelerate privatization during this period. Indeed, Figure 3-1 shows that privatization did accelerate during this period. A policy implication of proposition 5 is: for capital-intensive firms, it may be the optimal strategy for the government to reduce its ownership in them. It seems that the Chinese government has followed such an optimal strategy. For example, figure 3-2 shows that, most of the firms that have been privatized by the end of 2002 are in the more capital-intensive manufacturing industry.



Note: By the end of 2002, 116 state-owned enterprises had been privatized. By the end of 2003, 178 state-owned enterprises had been privatized.

Figure 3-1: The Number of Firms with Change-of-Control Within Each Year (Not cumulative)



Note: Among the 116 firms that had been privatized by the end of 2002, most firms (48%) are in the manufacturing industry.

Figure 3-2: The Industrial Distribution of Privatized Listed Firms

The advantages of the above model over previous treatments in this literature are:

(1) In a single analytical framework capturing the main features of the Chinese economy, both the causes (Propositions 4 and 5) and the effects (Propositions 1, 2, 3 and Lemma 1) of privatization are unambiguously explained;

(2) The results are robust for different parameter values of A , n , c , α and β , which means they hold for heterogeneous industries or firms;

(3) The model does not assume incomplete contracts between the government and the firm manager, as Grossman and Hart (1986) do. It does not allow the existence of bribes from firm managers to politicians, as Shleifer and Vishny (1994) do. In other words, even without resorting to incomplete contracts or the possibility of bribes, this model still shows that (a) the reduction in government ownership or political intervention unambiguously increases firm productivity and profitability and reduces redundant employment; (b) the government optimally reduces its ownership or political intervention in response to a growing share of capital (or capital-intensive industries) in GDP. Both results are well supported by empirical evidence. The model also has an important policy implication that it is more beneficial for the government to reduce its ownership or political intervention in capital-intensive firms such as the emerging high-tech firms.

4. Summary of Chapter

The privatization wave has swept the whole world since 1979. This represents one of the most important institutional changes in our era. Despite extensive empirical evidence on the positive effects of privatization on firm performance (measured by profitability and productivity), formal theoretical models are surprisingly lacking. Existing models impose strong assumptions and generate results that are sensitive to parameter values (e.g., the assumption of the existence of bribes between firm managers and politicians in Shleifer and Vishny (1994)). This chapter offers one of the first formal theoretical models of share issue privatization. This model with a realistic setup and weak assumptions generates strong results that are insensitive to parameter values. This analytical framework will hopefully open a new avenue for theoretical research in the privatization field.

An important future research direction is to incorporate firm competition into the theory. The intuition is: as the government reduces its political intervention, more firms become profitable and so more firms will be attracted into the industry. Meanwhile, the transition economies such as China usually liberalize their markets along with their privatization programs. This should result in more fierce firm competition and drive down profitability. With both the positive effect of changes of control and the negative effect of increased competition, the net effect on profitability will then depend on which effect dominates. Change-of-control matters because it represents a dramatic fall in the degree of government ownership and political intervention, the positive impact of which is great enough to offset the negative impact of increased competition on profitability. So the model should generate a

“threshold” that can only be passed by a dramatic decrease in government ownership or political intervention. For example, in the N -Firm Cournot model with a constant marginal cost c and a linear demand function: $P=A-B(Q_{-i}+q_i)$, where Q_{-i} is the total product of firms other than the i th firm, the textbook example (Pepall, Richards and Norman, 1999, p. 353) shows that the equilibrium profit for each firm equal to:

$$\pi_i = \frac{(A-c)^2}{B(N+1)^2}$$

This simple result analytically tracks the decline of profitability due to intensified competition (as N increases, π_i decreases). It can be expected that once this result is incorporated into the model in this chapter, the share issue privatization model with a competition element would generate an ownership “threshold” for privatization to “work”, and this “threshold” can be interpreted as the ownership level that marks a “change-of-control.”

APPENDIX: PROOFS

The proofs are organized in the order of a backward induction.

PROOF OF PROPOSITION 1: The second-period firm manager's maximization problem:

$$\max_{K,L} (1-a)[AK^\alpha L^\beta - L - (1-a)K] + naL$$

$$\text{Assume : } 1 > a > 0, n > 0, 1 > \alpha + \beta > 0, \alpha > 0, \beta > 0$$

FOC(FirstOrderConditions):

$$(1)K : A\alpha K^{\alpha-1}L^\beta - (1-a) = 0 \Rightarrow A\alpha K^{\alpha-1}L^\beta = 1-a$$

$$(2)L : (1-a)A\beta K^\alpha L^{\beta-1} - (1-a) + na = 0$$

$$\Rightarrow (1-a)A\beta K^\alpha L^{\beta-1} = 1 - (n+1)a$$

$$(2)/(1) \Rightarrow (3)K/L = \frac{\alpha[1 - (n+1)a]}{\beta(1-a)^2}$$

$$(4)P_1 = \text{Productivity}_1 = \text{Sales} / \text{Employee} = AK^\alpha L^\beta / L \\ = AK^\alpha L^{\beta-1}$$

$$\text{By(2)and(4)} \Rightarrow P_1 = \frac{1}{\beta} \cdot \left[\frac{1 - (n+1)a}{1-a} \right]$$

$$\Rightarrow \frac{\partial P_1}{\partial a} = \frac{1}{\beta} \cdot \frac{-n}{(1-a)^2} < 0$$

PROOF OF PART OF PROPOSITION 4:

$$P_1 = \frac{1}{\beta} \cdot \left[\frac{1 - (n+1)a}{1-a} \right] \Rightarrow \frac{\partial P_1}{\partial n} = \frac{-a}{\beta(1-a)} < 0$$

PROOF OF PROPOSITION 2:

$$\text{Assume } P_1 > 0 \Rightarrow 1 > (n+1)a \Rightarrow (5) 1 - a - an > 0$$

$$(6) P_2 = \text{Productivity}_2 = \text{Profit} / \text{Employee} = [AK^\alpha L^\beta - L - (1-a)K] / L \\ = AK^\alpha L^{\beta-1} - 1 - (1-a)K / L$$

$$\text{By (2), (3), (6)} \Rightarrow P_2 = \left(\frac{1-\alpha}{\beta}\right) \left[\frac{1-(n+1)a}{1-a}\right]^{-1}$$

$$\Rightarrow \frac{\partial P_2}{\partial a} = \left(\frac{1-\alpha}{\beta}\right) \cdot \frac{-n}{(1-a)^2} < 0$$

PROOF OF PART OF PROPOSITION 4:

$$P_2 = \left(\frac{1-\alpha}{\beta}\right) \left[\frac{1-(n+1)a}{1-a}\right]^{-1} \Rightarrow \frac{\partial P_2}{\partial n} = -\frac{(1-\alpha)a}{\beta(1-a)} < 0$$

PROOF OF PROPOSITION 3:

(7) Profitability=ROS (Return on Sales)

$$= [AK^\alpha L^\beta - L - (1-a)K] / AK^\alpha L^\beta \\ = 1 - \frac{1}{AK^\alpha L^{\beta-1}} - \frac{1-a}{AK^{\alpha-1} L^\beta}$$

$$\text{By (1), (2), (7)} \Rightarrow ROS = 1 - \frac{\beta(1-a)}{1-(n+1)a} - \alpha$$

$$\Rightarrow \frac{\partial ROS}{\partial a} = \frac{-n\beta}{[1-(n+1)a]^2} < 0$$

PROOF OF PART OF PROPOSITION 4:

$$ROS = 1 - \frac{\beta(1-a)}{1-(n+1)a} - \alpha \Rightarrow \frac{\partial ROS}{\partial n} = \frac{-(1-a)a\beta}{[1-a(1+n)]^2} < 0$$

PROOF OF PART OF PROPOSITION 4:

Plug (3) into (2):

$$L^* = \left\{ \left[\frac{(1-a)A\beta}{1-(n+1)a} \right] \left[\frac{\alpha(1-(n+1)a)}{\beta(1-a)^2} \right]^\alpha \right\}^{\frac{1}{1-\alpha-\beta}}$$

$$\Rightarrow \frac{\partial L^*}{\partial n} = \frac{a(1-\alpha)}{(1-a-an)(1-\alpha-\beta) \left\{ \frac{(1-a)^{2\alpha+1} A \beta^{1-\alpha} \alpha^\alpha}{(1-a-an)^{1-\alpha}} \right\}^{\frac{1}{1-\alpha-\beta}}}$$

By (5), $1-a-an > 0$; By assumption, $1-\alpha-\beta > 0$ and $1-\alpha > 0$, $1 > a > 0$. Therefore, $\frac{\partial L^*}{\partial n} > 0$.

When $n=0$, we can get the benchmark optimal employment for profit maximization. As n increases, employment deviates from that benchmark level, and more redundant workers are employed.

PROOF OF PROPOSITION 5:

The first-period government's maximization problem (endogenizing a)

$$\max_a [AK^\alpha L^\beta - L - (1-a)K] + cL - aK$$

FOC (First Order Condition)

$$AK^\alpha L^\beta - L - K + 2aK - K = 0$$

Divide both sides by L:

$$\Rightarrow (8) AK^\alpha L^{\beta-1} - 1 + (2a-2) \frac{K}{L} = 0$$

By (2), (3), (8)

$$\Rightarrow \frac{1}{\beta} \left[\frac{1-(n+1)a}{1-a} \right] - \frac{2\alpha[1-(n+1)a]}{\beta(1-a)} - 1 = 0$$

$$\Rightarrow a^* = \frac{2\alpha + \beta - 1}{(2\alpha - 1)(n+1) + \beta}$$

$$\Rightarrow \frac{\partial a^*}{\partial \alpha} = \frac{-2n\beta}{[(2\alpha - 1)(n+1) + \beta]^2} < 0$$

Q.E.D.

CHAPTER IV

SHARE ISSUE PRIVATIZATION IN CHINA: EVIDENCE

1. Introduction

Although the model in chapter III unambiguously predicts that privatization should improve the profitability and productivity of SOEs as redundant workers get laid off, has China's share issue privatization really worked? It seems so at the aggregate level. As Holz (2003) indicates, "by 2001, the number of industrial sectors in which SOEs were running aggregate losses was down to four (from twenty-five)." (p. vii) However, at the firm level, the results are mixed. Although Wei et al. (2003), Sun and Tong (2003) and Wang, Xu and Zhu (2004) find some evidence of productivity enhancement, they do not find significant changes in profitability after IPOs, and in many cases, they even find significant *decreases* in profitability. This *decrease* in profitability is puzzling given the robust evidence of significant and positive effects of privatization on profitability in other countries.²⁸

How can one explain this "profitability puzzle"? I argue that for China, the key "regime change" may not occur at the IPO of an SOE, but at the change of control from the State to private owners. As a result, if a researcher just compares the profitability of an SOE before and after the IPO, the researcher may not detect any profitability improvement. This is because as shown in Chapter III, though the positive "convergence-of-interests effect" has greatly reduced the sources of inefficiencies of SOEs according to the "managerial view", without a shift of control rights from the State to private entities, the negative "political-intervention effect" still

²⁸ See, for example, Megginson et al. (1994), Boubakri and Cosset (1998) and D'Souza and Megginson (1999).

hurts SOEs' performance. Therefore, an IPO without a change-of-control will *not* reduce the negative “political-intervention effect” on firm profitability. For example, if after an IPO, an SOE reduces its proportion of State shares in total shares from 70% to 60%, then as the largest shareholder, the State still maintains effective control of the firm, and the negative “political-intervention effect” has not been mitigated. With the government still keeping control rights, the decision-making process and the objective function of the firm manager will not change. The stock market investors may play a monitoring role to some degree, but there will probably not be a “regime change” without a change of control. Therefore, unsurprisingly, no significant profitability improvement has been detected after the IPOs.

Formally, Shleifer and Vishny (1994) study a Nash-bargaining model between politicians and firm managers, and show that (1) “as long as politicians maintain control over firms through direct public control or regulation, privatizing cash flows reduces efficiency and increases corruption,” and (2) “managerial control leads to more efficient resource allocation than politician control.”(p. 998) Barberis et al.'s (1996) study of 452 privatized Russian shops shows that “the presence of new owners and new managers raises the likelihood of restructuring...the evidence points to the critical role new human capital plays in economic transformation.”(p. 764) This intuition is confirmed by Frydman et al.'s (1999) study of Central European transition economies too. In the context of China, Sun and Tong (2003) admit that, “there is not much change in corporate governance in China because the government is still the largest shareholder and effective control of the privatized firms.”(p. 210) The reason that Sun and Tong (2003) fail to detect any change-of-control is that they focus on the data between 1994 and 1998, while most changes-of-control occurred after 1998, as Figure 4-1 illustrates.

Based on the above reasoning, I define a change-of-control as *the change of the largest shareholder from the State to a private owner*. Based on the theoretical results of chapter III, I argue that profitability improvements should occur for those firms that have actually experienced transfer of control. Among all listed firms from 1994 to 2003, 178 SOEs have shifted control from the State to non-state legal entities or individuals.²⁹

Part 2 of this Chapter discusses data, methodology and results, part 3 discusses related literature, and part 4 concludes.

2. Data, Methodology and Results

(A) Data

To test the hypothesis that “change-of-control matters”, I analyze the China Stock Market and Accounting Research (CSMAR) Database developed by Shenzhen GTA Information Technology Co. Ltd. This database covers (1) all financial statements and ownership structures of all listed companies in China from 1992 to 2003; (2) all stock market trading data; (3) some corporate governance measures. For the change-of-control data, I use the “Private Listed Companies Database” developed by the SinoFin Information Services of China Center for Economic Research (CCER) at Peking University.³⁰

(B) Methodology

Following the major empirical approaches in the privatization literature, I will first conduct a cross-sectional comparison between the privatized firms and SOEs, and then I will

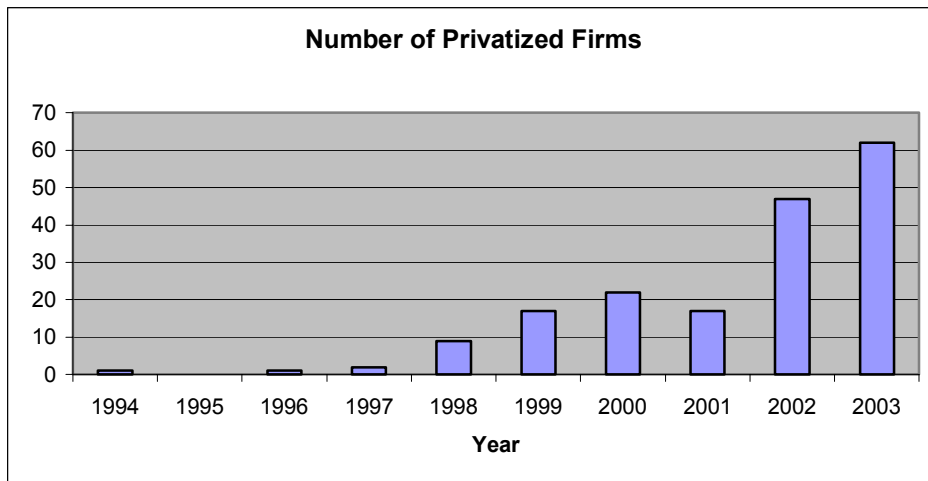
²⁹ There are four major types of shares in China’s SOEs: state shares, state legal entity shares, non-state legal entity shares and private individual shares. There are no preferred stocks; so all shares are common stocks with the same control rights and cash flow rights.

³⁰ I also double-checked these data with a leading Chinese financial website: <http://finance.sina.com.cn>.

use a univariate event study approach to examine the changes in profitability, productivity, employment and leverage before and after the change-of-control. After that, I will take into consideration other factors affecting firm performance and study the effects of privatization in a multivariate framework. To fix the endogeneity problem in the privatization-performance relationship, I will estimate two-stage-least-squares models. Lastly, I will examine the sources of improvements in profitability and productivity due to change-of-control. Specifically, I will examine if the improvements in corporate governance, especially the management turnovers at the changes-of-control, can account for the improvements in firm performance.

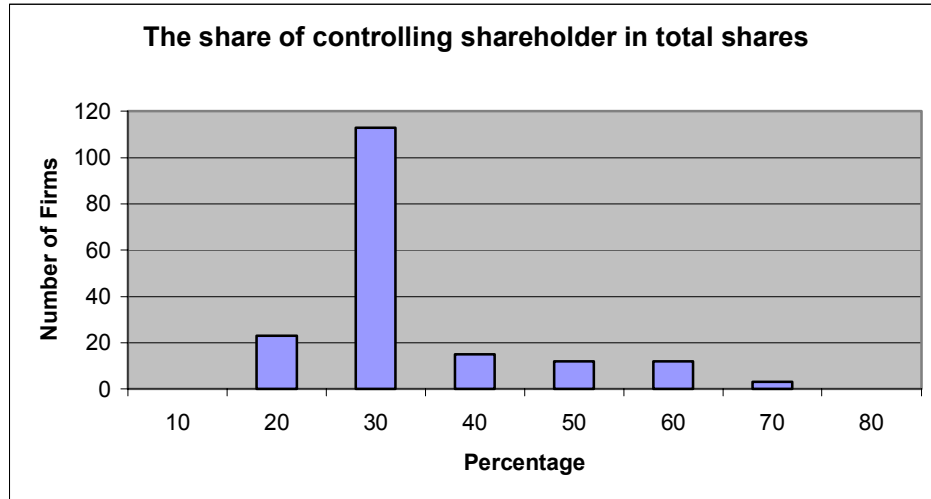
(C) Results

Figure 4-1 shows that, 178 SOEs have been privatized by the end of 2003, and 116 firms have been privatized by the end of 2002. Figure 4-2 shows that, in the majority of cases, the private owner controls about 30% of total shares when it gains control.



By the end of 2002, 116 state-owned enterprises had been privatized. By the end of 2003, 178 state-owned enterprises had been privatized.

Figure 4-1: The Number of Firms with Change-of-Control Within Each Year (Not cumulative)

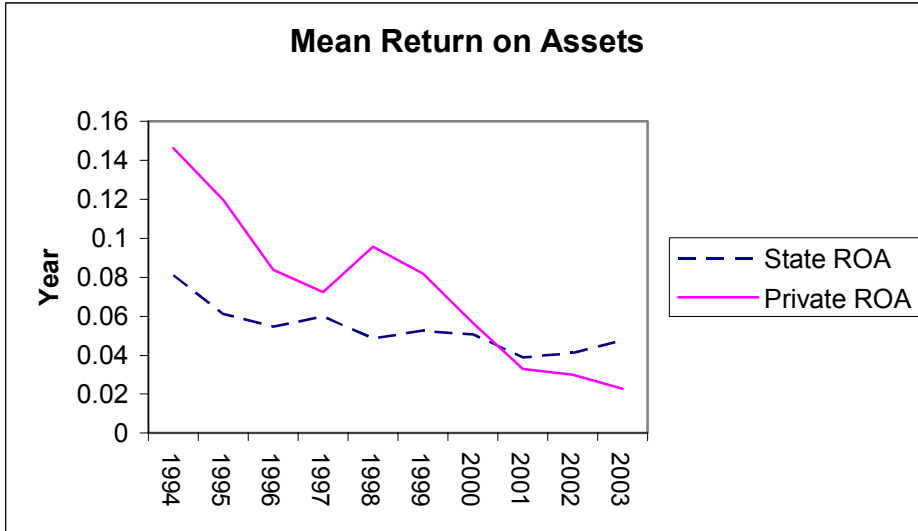


Note: Most private shareholders control about 30% of the total shares of a firm when they gain control of the firm.

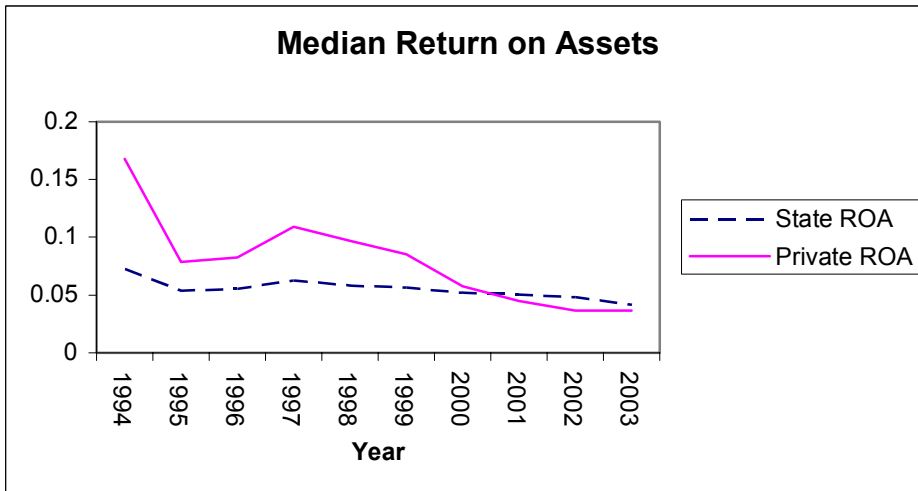
Figure 4-2: The Share of the Controlling Private Shareholder when the Private Owner Gained Control (1994-2003)

a) Cross-sectional Study Results

Figures 4-3, 4-4 and 4-5 show that, in at least 7 years out of the 10 years from 1994 to 2003, the privatized firms enjoy higher profitability than SOEs. Also notable is that the profitability of both privatized firms and SOEs trend downward. This is due to increased competition during this period, especially the competition caused by the entry of firms from the private sector. For example, International Finance Corporation (2000) shows that, during 1991—1997, the output of domestic private firms in China grew on average at an amazing rate of 71% per year (p.1). Between 1985 and 1997, the share of private sector in China’s national industrial output rose from 2% to more than 34% (p.16).

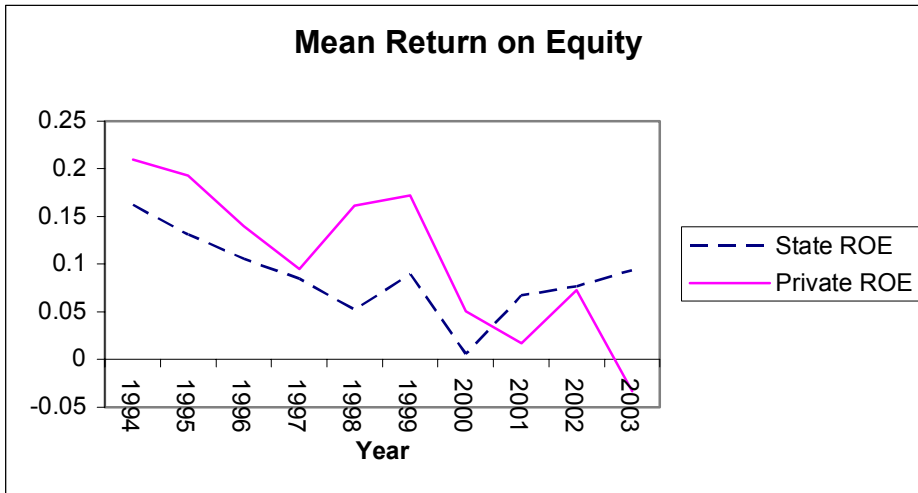


(a) Mean Return on Assets of Privatized Firms versus SOEs

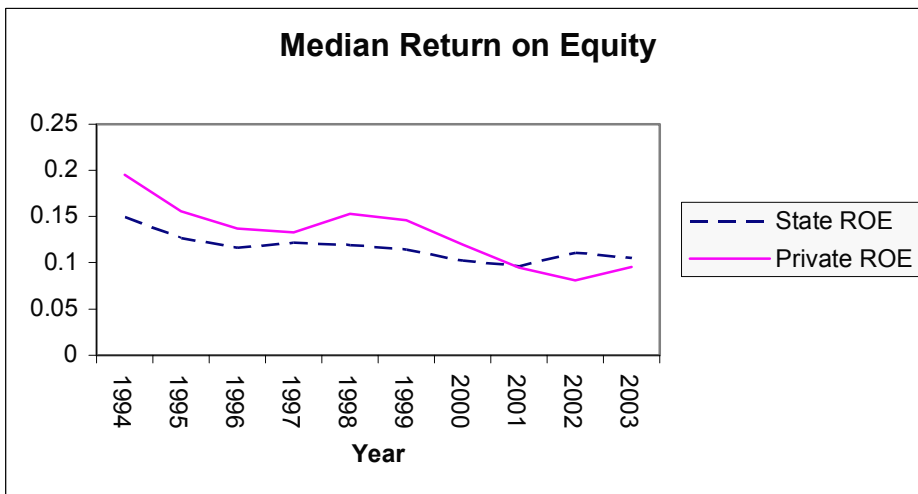


(b) Median Return on Assets of Privatized Firms versus SOEs

Figure 4-3: Return on Assets of Privatized Firms versus SOEs

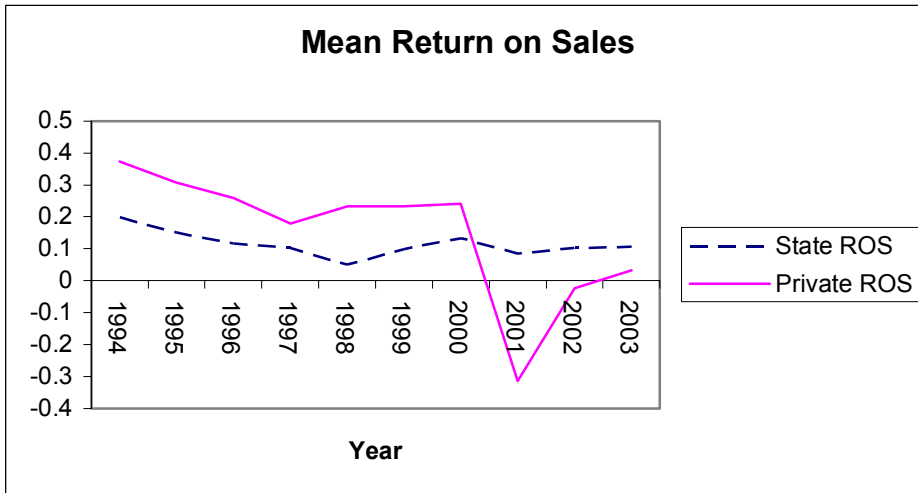


(a) Mean Return on Equity of Privatized Firms versus SOEs

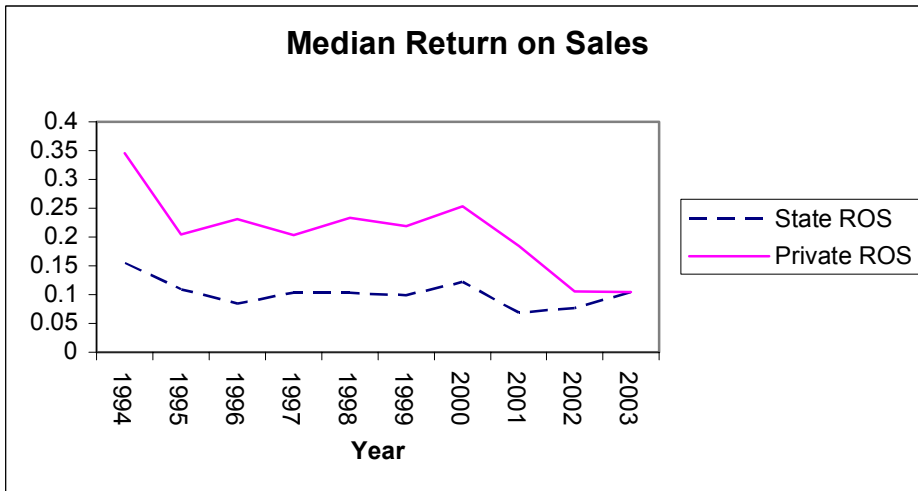


(b) Median Return on Equity of Privatized Firms versus SOEs

Figure 4-4: Return on Equity of Privatized Firms versus SOEs



(a) Mean Return on Sales of Privatized Firms versus SOEs



(b) Median Return on Sales of Privatized Firms versus SOEs

Figure 4-5: Return on Sales of Privatized Firms versus SOEs

b) Univariate Event Study Results

For those 116 SOEs that transferred control, following the routine in the literature, I use a three-year window around the change-of-control year (three years before and three years after the change-of-control, and the change-of-control year is not counted in either the post-privatization period or the pre-privatization period because the change-of-control year involves both periods). For some firms that have fewer than 3 years before or after the change-of-control, I average over the actual number of years.³¹ The sample size is considerably larger than the samples in three major published papers in this field.³² I benchmark the mean (median) profitability and productivity against the mean (median) profitability and productivity of all listed firms in China. Then I conduct t-tests and Wilcoxon tests to examine whether the mean and median profitability (ROA, ROE or ROS) is increased and the mean and median leverage is reduced after the change of control. The results in Panel A of Table 4-1 show that mean ROA and ROS both increase significantly (at 1% level) after the change-of-control. Surprisingly, mean leverage (i.e., “debt/assets”) also increases significantly after the change-of-control. Panel B of Table 4-1 shows that median ROE and ROS both increase significantly (at 1% level) after the change-of-control, while median leverage also increases significantly after the change-of-control.

Next, I calculate the annual average profitability and leverage around the change-of-control year. The results are reported in Figure 4-6. These figure shows that the change-of-control is indeed a pivotal event. Before the change-of-control, ROA (benchmarked

³¹ This kind of “unbalanced window” is also a feature of other studies in this field, e.g., Dewenter and Malatesta (2001) and Gupta (2005).

³² These three papers are: Megginson et al. (1994), Boubakri and Cosset (1998), D’Souza and Megginson (1999), all in the *Journal of Finance*. My sample of 116 firms is 30% larger than the largest sample in those three papers—85 firms in D’Souza and Megginson (1999).

against the the mean and median performance of all listed firms) declines sharply, and around the change-of-control, it starts improving, and it steadily keeps improving after the change-of-control. It seems that leverage increases steadily, which is consistent with results of Huang and Song (2006), who show that the average leverage of all Chinese listed firms seem to increase from year to year .

In order to compare the productivity and employment before and after the change of control, I have collected employment data from 1999 to 2003 for 102 firms from the CSMAR database (the sample period is shorter and the sample size is smaller than in the study of profitability due to data availability). The t-test results for mean productivity and employment are presented in Panel C of Table 4-1. The increase in labor productivity is impressive. Mean profit per employee (benchmarked against all listed firms) turns from a negative number to a positive number—the change-of-control is indeed a turning point. These results are consistent with theoretical predictions in chapter III that labor productivity rises while employment decreases after privatization. The Wilcoxon test results for median productivity and employment in Panel D of Table 4-1 lend further support to the conclusion that change-of-control matters: the change-of-control significantly improves labor productivity and reduces excess employment, thus increasing the efficiency of those firms.

Table 4-1: Comparing Performance, Leverage and Employment before and after Change-of-control

Panel A. *Mean profitability and leverage changes (benchmarked against mean profitability and leverage of all listed firms)*

Variable	Number of Firms	Mean Before	Mean After	Difference
ROA	116	-0.012	0.022	0.034***
ROE	116	0.067	0.084	0.017
ROS	116	0.178	0.434	0.256***
Leverage	116	0.032	0.077	0.045***

Panel B. *Median profitability and leverage changes (benchmarked against median profitability and leverage of all listed firms)*

Variables	Number of Firms	Median Before	Median After	Difference
ROA	116	-0.010	-0.006	0.004
ROE	116	-0.060	-0.047	0.013***
ROS	116	-0.019	0.014	0.033***
Leverage	116	0.032	0.096	0.034***

***, **, * denotes significance at the 1%, 5% and 10% level, respectively

Note: This table reports the significant changes in profitability and leverage of China's listed firms after their control rights shift from the State to private owners. The windows used for comparison are three years before and three years after the change-of-control year. If there are fewer years before or after the change-of-control year, then the actual number of years is used. Panel A and B report the significant improvements in profitability, benchmarked against mean or median profitability of all listed firms.

Table 4-1: Comparing Performance, Leverage and Employment before and after Change-of-control

Panel C. Mean productivity (in million RMB) and employment changes (benchmarked against mean productivity of all listed firms)

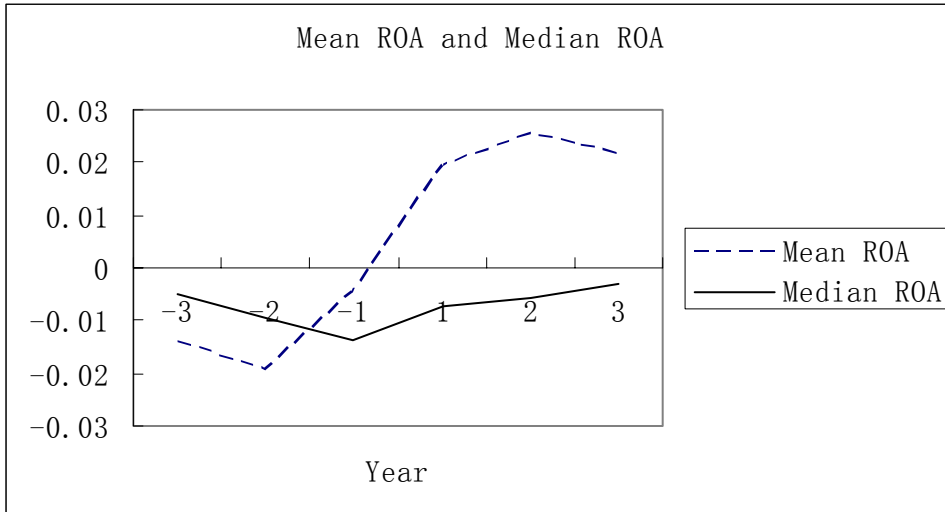
Variable	Number of Firms	Mean Before	Mean After	Difference
Sales/Employee	102	0.488	1.246	0.758***
Profit/Employee	102	-0.111	0.065	0.177**
Employment	102	1730	1627	-103

Panel D. Median productivity (in million RMB) and employment changes (benchmarked against median productivity of all listed firms)

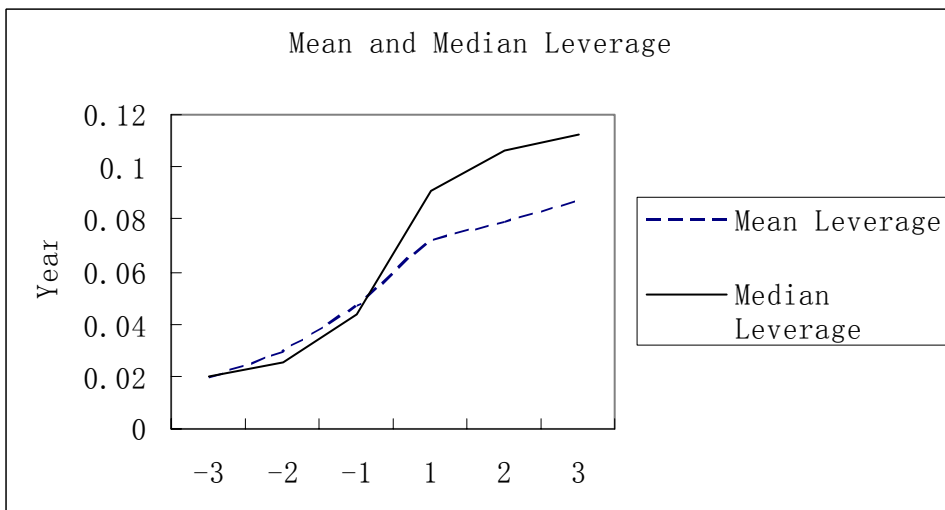
Variables	Number of Firms	Median Before	Median After	Difference
Sales/Employee	102	-0.131	0.137	0.268
Profit/Employee	102	-0.007	-0.001	0.006**
Employment	102	634	1208	-574***

***, **, * denotes significance at the 1%, 5% and 10% level, respectively

Note: This table reports the significant changes in profitability, productivity, leverage and employment of China's listed firms after their control rights shift from the State to private owners. The windows used for comparison are three years before and three years after the change-of-control year. If there are fewer years before or after the change-of-control year, then the actual number of years is used. Panel C and Panel D report significant improvements in labor productivity and reductions in employment benchmarked against mean or median labor productivity of all listed firms. The number of employees is not benchmarked against mean or median employment of all listed firms.



Panel A. Mean ROA and Median ROA (return on assets)



Panel B. Mean Leverage and Median Leverage

Notes: 1) Year 0: Change-of-control Year (Year 0 is not illustrated here because it involves both pre-privatization and post-privatization periods)

2) Both mean (median) ROA and mean (median) leverage have been benchmarked against the mean (median) ROA and mean (median) leverage of all listed firms.

Figure 4-6. Profitability and leverage changes before and after the change-of-control

c) Multivariate Analysis Results

The univariate analysis has not taken into consideration other factors affecting profitability, notably firm size, leverage and business cycle. To overcome this problem, I estimate the following multivariate regression in panel A of Table 4-2:

$$ROA_{i,t} = \alpha_i + \alpha_1 POST_{i,t} + \alpha_2 GDP_{i,t} + \alpha_3 leverage_{i,t-1} + \alpha_4 size_{i,t} + \varepsilon_{i,t}$$

In the above regression, *POST* is a dummy variable that equals 1 if the SOE has been privatized (expected sign: +), *GDP* is the per capita GDP measured at purchasing power parity³³ (used to capture the business cycle effects, expected sign: +), size is measured by $\log(assets)$ or $\log(sales)$ ³⁴ (expected sign:+), *leverage* is calculated as debt/assets (a measure of risk, expected sign: +). *Leverage* is lagged one period in order to avoid the endogeneity problem.³⁵ The results are presented in Table 4-2, which shows that the post-privatization dummy, *POST*, significantly and positively affects firm profitability in both fixed effects models and random effects models. As Sun and Tong (2003) point out, “once individual (or firm-specific) time-invariant variables are controlled, the possible effects of industry are also controlled and so the industry dummy is not necessary under such formulation.”(p. 211) For the same reason, I have not included the industry dummy in my specifications. This evidence lends further support to the argument that “change-of-control matters”, even after conditioning on other factors.³⁶ Panel B of Table 4-2 reports results for the following regression:

³³ Data source: the World Development Indicators (2004) of the World Bank.

³⁴ Fama-French (1995) three-factor CAPM model shows that firm size affects firm performance due to the economy of scale.

³⁵ It is well known that profitability is a significant determinant of firm leverage.

³⁶ GDP is significantly and negatively correlated with ROA. This reflects the opposite directions of movements of the two variables: the upward trend of GDP (rapid economic growth) and the downward trend of ROA (due to increased market competition). Leverage is significantly and negatively correlated with ROA. This may be due to the fact that leverage is not a good measure of risks for SOEs in China due to the “soft-budget constraints.”

$$ROS_{i,t} = \alpha_i + \alpha_1 POST_{i,t} + \alpha_2 GDP_{i,t} + \alpha_3 leverage_{i,t-1} + \alpha_4 size_{i,t} + \varepsilon_{i,t}$$

The evidence in panel A and panel B of Table 4-2 shows that, even after controlling for other factors that may affect the profitability of firms, privatized firms still enjoy significantly higher ROA and ROS. For example, their ROA is about 2-3 percentage points higher than state-owned enterprises (SOEs), and their ROS is about 7-8 percentage points higher than the SOEs.

Panel C of Table 4-2 reports regression results for the following regression:

$$PPE_{i,t} = \alpha_i + \alpha_1 POST_{i,t} + \alpha_2 GDP_{i,t} + \alpha_3 leverage_{i,t-1} + \alpha_4 size_{i,t} + \varepsilon_{i,t}$$

where “PPE” refers to “Profits Per Employee”. The results in Panel C of Table 4-2 show that the labor productivity is significantly higher for privatized firms than the SOEs—the privatized firms enjoy 0.4-0.6 million RMB higher profits per employee.

In order to fix the endogeneity problem associated with the post-privatization dummy, “POST” and firm performance measures in the above multivariate regressions, I then estimate two-stage-least-squares models. In the first stage, I use a Logit or Probit model in order to get fitted value of the probability of being privatized. In this stage, I regress the dummy variable “POST” on lagged profitability variables (ROA or ROS), lagged size variables (log(assets) or log(sales)), and lagged leverage and get fitted values of “POST”, which are then used in the second stage regression as an independent variable. Specifically, the two-stage-least-squares regressions are as follows:

The first-stage:

$$POST_{i,t} = \alpha_i + \alpha_1 P_{i,t-1} + \alpha_2 size_{i,t-1} + \alpha_3 leverage_{i,t-1} + \varepsilon_{i,t}$$

where “P” is a profitability measure (ROA or ROS).

Table 4-2: The impact of change-of-control on firm performance (panel regression results)

Panel A: *The impact of change-of-control on profitability (ROA--return on assets)*

Dependent variable: ROA (return on assets)				
	Random Effects		Fixed Effects	
POST	0.026 (0.009)***	0.027 (0.009)***	0.021 (0.013)*	0.021 (0.013)*
log(assets)	0.010 (0.005)*		0.006 (0.011)	
log(sales)		0.007 (0.003)**		0.013 (0.007)*
GDP	-0.024 (0.007)***	-0.023 (0.007)***	-0.024 (0.010)**	-0.026 (0.010)*
leverage	-0.098 (0.025)***	-0.098 (0.025)***	-0.047 (0.035)	-0.044 (0.035)
R ²	0.058	0.058	0.049	0.041
No. of firms	116	116	116	116
No. of observations	606	606	606	606

***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Note: This table reports results of the panel regressions:

$$ROA_{i,t} = \alpha_i + \alpha_1 POST_{i,t} + \alpha_2 GDP_{i,t} + \alpha_3 leverage_{i,t-1} + \alpha_4 size_{i,t} + \varepsilon_{i,t}$$

The dependent variable is ROA (Return on Assets). The independent variables are: POST (a dummy variable which equals one if the firm has changed control from the State to a private owner), GDP (per capita real GDP measured at purchasing power parity, divided by 1000 for normalization purposes), leverage (debt/assets), and log(Assets) or log(Sales). White-robust standard errors are in parentheses.

Table 4-2: The impact of change-of-control on firm performance (panel regression results)

Panel B: *The impact of change-of-control on Profitability (ROS--return on sales)*

Dependent variable: ROS (return on sales)				
	Random Effects		Fixed Effects	
POST	0.077 (0.029)***	0.079 (0.029)***	0.069 (0.039)*	0.074 (0.039)*
log(assets)	0.021 (0.017)		0.032 (0.032)	
log(sales)		-0.019 (0.012)*		-0.022 (0.022)
GDP	-0.065 (0.022)***	-0.052 (0.022)**	-0.075 (0.032)**	-0.059 (0.030)**
leverage	-0.152 (0.081)*	-0.158 (0.081)**	-0.120 (0.107)	-0.129 (0.107)
R ²	0.026	0.032	0.023	0.030
No. of firms	116	116	116	116
No. of observations	606	606	606	606

***, **, and * denote significance at the 1% , 5% and 10% levels, respectively.

Note: This table reports results of the panel regressions:

$$ROS_{i,t} = \alpha_i + \alpha_1 POST_{i,t} + \alpha_2 GDP_{i,t} + \alpha_3 leverage_{i,t-1} + \alpha_4 size_{i,t} + \varepsilon_{i,t}$$

The dependent variable is ROS (Return on Sales). The independent variables are: POST (a dummy variable which equals one if the firm has changed control from the State to private owners), GDP (per capita real GDP measured at purchasing power parity, divided by 1000 for normalization purposes), leverage (debt/assets), and log(Assets) or log(Sales). White-robust standard errors are in parentheses.

Table 4-2: The impact of change-of-control on firm performance (panel regression results)

Panel C: *The impact of change-of-control on Productivity (Profit per Employee)*

Dependent variable: PPE (Profit Per Employee)				
	Random Effects		Fixed Effects	
POST	0.433 (0.152)***	0.459 (0.147)***	0.525 (0.177)***	0.556 (0.177)***
log(assets)	0.425 (0.088)***		0.459 (0.164)***	
log(sales)		0.350 (0.050)***		0.250 (0.105)**
GDP	-0.346 (0.140)***	-0.337 (0.140)***	-0.408	-0.359 (0.156)**
leverage	0.340 (0.241)	0.236 (0.227)	0.434 (0.291)	0.228 (0.270)
R ²	0.083	0.157	0.082	0.145
No. of firms	102	102	102	102
No. of observations	391	391	391	391

***, **, and * denote significance at the 1% , 5% and 10% levels, respectively.

Note: This table reports results of the panel regressions:

$$PPE_{i,t} = \alpha_i + \alpha_1 POST_{i,t} + \alpha_2 GDP_{i,t} + \alpha_3 leverage_{i,t-1} + \alpha_4 size_{i,t} + \varepsilon_{i,t}$$

The dependent variable is PPE (Profit Per Employee, unit: million RMB). The independent variables are: POST (a dummy variable which equals one if the firm has changed control from the State to private owners), GDP (per capita real GDP measured at purchasing power parity), leverage (debt/assets), and log(Assets) or log(Sales). All coefficients are measured in millions except the coefficient of GDP, which is measured in thousands. White-robust standard errors are in parentheses.

The second-stage:

$$ROA_{i,t} = \alpha_i + \alpha_1 POST_{i,t} + \alpha_2 GDP_{i,t} + \alpha_3 leverage_{i,t-1} + \alpha_4 size_{i,t} + \varepsilon_{i,t}$$

where “POST” is the fitted value from the first-stage regression.

Table 4-3 reports the results from the full sample (1146 listed firms with 6481 observations)³⁷. Panel A shows that there may not be serious endogeneity problems between ROA and “POST”, but there seems to be serious endogeneity problem between ROS and “POST”. Therefore, I focus on the regression in the last column in Panel A, and get fitted values of “POST” from that regression. Then I use these fitted values as an independent variable “POST” in the second-stage regression and get Panel B. The results in Panel B show that privatized firms do enjoy significantly higher profitability, even after controlling for other affecting factors and the endogeneity problem. Panel C and Panel D reports results from a two-stage-least-squares regression using the Probit model in the first stage. The results are qualitatively similar. Panel B of Table 4-3 confirms the results from Panel A of Table 4-2: privatized firms enjoy about 2-3 percentage higher ROA than SOEs. The results in Panel C of Table 4-3 are qualitatively similar to those in Panel B.

³⁷ I have deleted 54 private firms that have directly “gone public” by IPOs from the original full sample of 1200 firms. Thus, the full sample here does *not* include those private firms that have never been owned by the State.

Table 4- 3: Two-Stage-Least-Squares Regression Results (Full sample)

Panel A: *The First Stage Regression: The impact of lagged profitability on privatization (Logit regression)*

Dependent variable: Privatization dummy				
ROA	0.815 (0.931)	1.434 (0.945)		
ROS			1.199 (0.322)***	0.837 (0.294)***
log(assets)	-0.323 (0.079)***		-0.342 (0.079)***	
log(sales)		-0.475 (0.060)***		-0.457 (0.060)***
leverage	3.588 (0.470)***	3.791 (0.472)***	3.967 (0.432)***	3.856 (0.429)***
Pseudo R ²	0.048	0.070	0.055	0.073
No. of firms	1146	1146	1146	1146
No. of observations	6481	6481	6481	6481

***, **, and * denote significance at the 1% , 5% and 10% levels, respectively.

Note: This table reports results of the panel regressions:

$$POST_{i,t} = \alpha_i + \alpha_1 P_{i,t-1} + \alpha_2 size_{i,t-1} + \alpha_3 leverage_{i,t-1} + \varepsilon_{i,t}$$

The dependent variable is *POST* (post-privatization dummy). The independent variables are: lagged “P”, i.e., profitability (ROA or ROS), lagged size (log(Assets) or log(Sales)) and lagged leverage (debt/assets). White-robust standard errors are in parentheses.

Table 4- 3: Two-Stage-Least-Squares Regression Results (Full sample)Panel B: *The Second-stage Regression: Effects of Privatization on ROA (Return on Assets)*

Dependent variable: ROA (return on assets)				
	Random Effects		Fixed Effects	
POST	0.017 (0.005)***	0.020 (0.005)***	0.025 (0.006)***	0.024 (0.006)***
log(assets)	0.007 (0.001)***		0.001 (0.002)	
log(sales)		0.010 (0.001)***		0.014 (0.002)***
GDP	-0.019 (0.001)***	-0.019 (0.001)***	-0.022 (0.001)***	-0.026 (0.001)***
leverage	-0.160 (0.010)***	-0.160 (0.007)***	-0.101 (0.010)***	-0.101 (0.010)***
R ²	0.143	0.154	0.110	0.125
No. of firms	1146	1146	1146	1146
No. of observations	6481	6481	6481	6481

***, **, and * denote significance at the 1% , 5% and 10% levels, respectively.

Note: This table reports results of the panel regressions:

$$ROA_{i,t} = \alpha_i + \alpha_1 POST_{i,t} + \alpha_2 GDP_{i,t} + \alpha_3 leverage_{i,t-1} + \alpha_4 size_{i,t} + \varepsilon_{i,t}$$

The dependent variable is ROA (Return on Assets). The independent variables are: POST (the fitted value of *POST* from the first-stage regression), GDP (per capita real GDP measured at purchasing power parity, divided by 1000 for normalization purposes), leverage (debt/assets), and log(Assets) or log(Sales). White-robust standard errors are in parentheses.

Table 4- 3: Two-Stage-Least-Squares Regression Results (Full sample)

Panel C: *The First Stage Regression: The impact of lagged profitability on privatization (Probit regression)*

Dependent variable: Privatization dummy				
ROA	0.135 (0.423)	0.418 (0.434)		
ROS			0.463 (0.141)***	0.327 (0.134)**
log(assets)	-0.148 (0.036)***		-0.156 (0.036)***	
log(sales)		-0.211 (0.028)***		-0.204 (0.028)***
leverage	1.775 (0.206)***	1.856 (0.208)***	1.941 (0.192)***	1.911 (0.194)***
Pseudo R ²	0.053	0.074	0.058	0.076
No. of firms	1146	1146	1146	1146
No. of observations	6481	6481	6481	6481

***, **, and * denote significance at the 1% , 5% and 10% levels, respectively.

Note: This table reports results of the panel regressions:

$$POST_{i,t} = \alpha_i + \alpha_1 P_{i,t-1} + \alpha_2 size_{i,t-1} + \alpha_3 leverage_{i,t-1} + \varepsilon_{i,t}$$

The dependent variable is *POST* (post-privatization dummy). The independent variables are: lagged “P”, i.e., profitability (ROA or ROS), lagged size (log(Assets) or log(Sales)) and lagged leverage (debt/assets). White-robust standard errors are in parentheses.

Table 4- 3: Two-Stage-Least-Squares Regression Results (Full sample)

Panel D: *The Second-stage Regression: Effects of Privatization on ROA (Return on Assets)*

Dependent variable: ROA (return on assets)				
	Random Effects		Fixed Effects	
POST	0.105 (0.038)***	0.352 (0.042)***	0.029 (0.048)	0.282 (0.053)***
log(assets)	-0.008 (0.001)***		0.002 (0.003)	
log(sales)		0.015 (0.001)***		0.020 (0.002)***
GDP	-0.018 (0.001)***	-0.018 (0.001)***	-0.022 (0.001)***	-0.024 (0.001)***
leverage	-0.180 (0.011)***	-0.231 (0.011)***	-0.106 (0.016)***	-0.170 (0.017)***
R ²	0.143	0.162	0.115	0.136
No. of firms	1146	1146	1146	1146
No. of observations	6481	6481	6481	6481

***, **, and * denote significance at the 1% , 5% and 10% levels, respectively.

Note: This table reports results of the panel regressions:

$$ROA_{i,t} = \alpha_i + \alpha_1 POST_{i,t} + \alpha_2 GDP_{i,t} + \alpha_3 leverage_{i,t-1} + \alpha_4 size_{i,t} + \varepsilon_{i,t}$$

The dependent variable is ROA (Return on Assets). The independent variables are: POST (the fitted value of *POST* from the first-stage regression), GDP (per capita real GDP measured at purchasing power parity, divided by 1000 for normalization purposes), leverage (debt/assets), and log(Assets) or log(Sales). White-robust standard errors are in parentheses.

For robustness check, Table 4-4 reports two-stage-least-squares regression results from a small sample—those firms that have been privatized between 1994 and 2002. The results are qualitatively similar to those in Table 4-3.

Table 4-4: Two-Stage-Least-Squares Regression Results (Small sample)

Panel A: *The First Stage Regression: The impact of lagged profitability on privatization (Logit regression)*

Dependent variable: Privatization dummy				
ROA	0.515 (1.15)	0.971 (1.135)		
ROS			0.658 (0.359)*	0.831 (0.358)**
log(assets)	0.587 (0.116)***		0.579 (0.115)***	
log(sales)		0.146 (0.079)*		0.168 (0.079)**
leverage	3.257 (0.707)***	3.589 (0.706)***	3.422 (0.677)***	3.698 (0.677)***
Pseudo R ²	0.072	0.043	0.076	0.049
No. of firms	116	116	116	116
No. of observations	606	606	606	606

***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Note: This table reports results of the panel regressions:

$$POST_{i,t} = \alpha_i + \alpha_1 P_{i,t-1} + \alpha_2 size_{i,t-1} + \alpha_3 leverage_{i,t-1} + \varepsilon_{i,t}$$

The dependent variable is *POST* (post-privatization dummy). The independent variables are: lagged “P”, i.e., profitability (ROA or ROS), lagged size (log(Assets) or log(Sales)) and lagged leverage (debt/assets). White-robust standard errors are in parentheses.

Table 4-4: Two-Stage-Least-Squares Regression Results (Small sample)

Panel B: *The Second-stage Regression: Effects of Privatization on ROA (Return on Assets)*

Dependent variable: ROA (return on assets)				
	Random Effects		Fixed Effects	
POST	0.396 (0.066)***	0.442 (0.068)***	0.214 (0.076)***	0.194 (0.084)**
log(assets)	-0.010 (0.006)*		-0.003 (0.011)	
log(sales)		-0.010 (0.004)***		0.002 (0.008)
GDP	-0.009 (0.005)*	-0.011 (0.005)**	-0.011 (0.007)	-0.013 (0.007)**
leverage	-0.380 (0.053)***	-0.420 (0.055)***	-0.190 (0.061)***	-0.176 (0.066)***
R ²	0.101	0.106	0.093	0.081
No. of firms	116	116	116	116
No. of observations	606	606	606	606

***, **, and * denote significance at the 1% , 5% and 10% levels, respectively.

Note: This table reports results of the panel regressions:

$$ROA_{i,t} = \alpha_i + \alpha_1 POST_{i,t} + \alpha_2 GDP_{i,t} + \alpha_3 leverage_{i,t-1} + \alpha_4 size_{i,t} + \varepsilon_{i,t}$$

The dependent variable is ROA (Return on Assets). The independent variables are: POST (the fitted value of *POST* from the first-stage regression), GDP (per capita real GDP measured at purchasing power parity, divided by 1000 for normalization purposes), leverage (debt/assets), and log(Assets) or log(Sales). White-robust standard errors are in parentheses.

Table 4-4: Two-Stage-Least-Squares Regression Results (Small sample)

Panel C: *The First Stage Regression: The impact of lagged profitability on privatization (Probit regression)*

Dependent variable: Privatization dummy				
ROA	0.247 (0.658)	0.605 (0.649)		
ROS			0.356 (0.211)*	0.480 (0.210)**
log(assets)	0.355 (0.069)***		0.348 (0.069)***	
Log(sales)		0.089 (0.048)**		0.101 (0.048)**
leverage	1.931 (0.415)***	2.185 (0.422)***	2.002 (0.390)***	2.211 (0.395)***
Pseudo R ²	0.071	0.042	0.074	0.048
No. of firms	116	116	116	116
No. of observations	606	606	606	606

***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Note: This table reports results of the panel regressions:

$$POST_{i,t} = \alpha_i + \alpha_1 P_{i,t-1} + \alpha_2 size_{i,t-1} + \alpha_3 leverage_{i,t-1} + \varepsilon_{i,t}$$

The dependent variable is *POST* (post-privatization dummy). The independent variables are: lagged “P”, i.e., profitability (ROA or ROS), lagged size (log(Assets) or log(Sales)) and lagged leverage (debt/assets). White-robust standard errors are in parentheses.

Table 4-4: Two-Stage-Least-Squares Regression Results (Small sample)

Panel D: *The Second-stage Regression: Effects of Privatization on ROA (Return on Assets)*

Dependent variable: ROA (return on assets)				
	Random Effects		Fixed Effects	
POST	0.418 (0.069)***	0.476 (0.072)***	0.230 (0.080)***	0.210 (0.089)**
log(assets)	-0.011 (0.006)*		-0.004 (0.011)	
log(sales)		-0.011 (0.004)***		0.002 (0.009)
GDP	-0.009 (0.005)*	-0.010 (0.005)**	-0.011 (0.007)	-0.013 (0.006)**
leverage	-0.389 (0.054)***	-0.437 (0.056)***	-0.198 (0.063)***	-0.185 (0.069)***
R ²	0.102	0.108	0.094	0.081
No. of firms	116	116	116	116
No. of observations	606	606	606	606

***, **, and * denote significance at the 1% , 5% and 10% levels, respectively.

Note: This table reports results of the panel regressions:

$$ROA_{i,t} = \alpha_i + \alpha_1 POST_{i,t} + \alpha_2 GDP_{i,t} + \alpha_3 leverage_{i,t-1} + \alpha_4 size_{i,t} + \varepsilon_{i,t}$$

The dependent variable is ROA (Return on Assets). The independent variables are: POST (the fitted value of *POST* from the first-stage regression), GDP (per capita real GDP measured at purchasing power parity, divided by 1000 for normalization purposes), leverage (debt/assets), and log(Assets) or log(Sales). White-robust standard errors are in parentheses.

For robustness check, in Table 4-5, I use a stronger definition of “change-of-control”, i.e., the private owner has gained majority shares in the firm. Table 4-5 shows that, mean and median profitability increases after privatization for those firms too. Though the small sample size seriously limits the power of statistical tests (t-tests and Wilcoxon tests), the results regarding profitability are consistent with the results of more powerful tests in a larger sample as reported in Table 4-1.

Table 4-5: Comparing Performance, Leverage and Employment before and after Change-of-control for Firms that a Private Owner Has Gained Majority Shares

Panel A. *Mean profitability and leverage changes (benchmarked against mean profitability and leverage of all listed firms)*

Variable	Number of Firms	Mean Before	Mean After	Difference
ROA	7	-0.056	0.014	0.069
ROS	7	0.131	0.361	0.230
Leverage	7	0.080	0.141	-0.061

Panel B. *Median profitability and leverage changes (benchmarked against median profitability and leverage of all listed firms)*

Variable	Number of Firms	Median Before	Median After	Difference
ROA	7	-0.033	-0.007	0.026
ROS	7	0.000	0.006	0.006
Leverage	7	0.140	0.093	-0.047

Note: This table reports the changes in profitability and leverage of China’s listed firms after their control rights shift from the State to private owners for those firms that the private owners have gained a majority of shares . The windows used for comparison are three years before and three years after the change-of-control year. If there are fewer years before or after the change-of-control year, then the actual number of years is used. Panel A and B report the improvements in profitability, benchmarked against mean or median profitability of all listed firms. Due to very small sample size, the changes are not statistically significant. However, their signs are generally consistent with theoretical predictions.

For robustness check, Table 4-6 reconstructs the “profitability puzzle”—profitability falls after IPOs for China’s listed firms. Table 4-6 shows that profitability did indeed significantly decrease after IPOs for the sample of 116 firms that have changed control from the State to private owners between 1994 and 2002, confirming the results of Sun and Tong (2003), etc.

Table 4-6: Comparing Profitability before and after the IPO (“Profitability Puzzle” Reconstructed)

Panel A. *Mean profitability changes (not benchmarked against mean profitability of all listed firms)*

Variable	Number of Firms	Mean Before	Mean After	Difference
ROA	116	0.110	0.047	-0.063***
ROE	116	0.254	0.051	-0.203***
ROS	116	0.210	-0.108	-0.317*

Panel B. *Mean profitability changes (benchmarked against mean profitability of all listed firms)*

Variable	Number of Firms	Mean Before	Mean After	Difference
ROA	116	0.036	-0.008	-0.044***
ROE	116	0.115	-0.008	-0.123***
ROS	116	0.003	-0.180	-0.183

***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Note: This table reports the significant decreases in mean profitability of China’s listed firms after their IPOs. The windows used for comparison are three years before and three years after the change-of-control year. If there are fewer years before or after the change-of-control year, then the actual number of years is used. Panel A reports the significant decreases in mean profitability, not benchmarked against the mean profitability of all listed firms, while Panel B reports the significant decreases in mean profitability, benchmarked against the median profitability of all listed firms. These results reconstruct the “profitability puzzle” as documented in the literature.

Table 4-6: Comparing Profitability before and after the IPO (“Profitability Puzzle” Reconstructed)

Panel C. *Median profitability changes (not benchmarked against median profitability of all listed firms)*

Variable	Number of Firms	Median Before	Median After	Difference
ROA	116	0.095	0.059	-0.036***
ROE	116	0.210	0.111	-0.099***
ROS	116	0.162	0.125	-0.037***

Panel D. *Median profitability changes (benchmarked against median profitability of all listed firms)*

Variable	Number of Firms	Median Before	Median After	Difference
ROA	116	0.030	-0.003	-0.033
ROE	116	0.085	-0.006	-0.091***
ROS	116	0.032	-0.005	-0.037***

***, denotes significance at the 1% level

Note: This table reports the significant decreases in median profitability of China’s listed firms after their IPOs. The windows used for comparison are three years before and three years after the change-of-control year. If there are fewer years before or after the change-of-control year, then the actual number of years is used. Panel A reports the significant decreases in median profitability, not benchmarked against the median profitability of all listed firms, while Panel B reports the significant decreases in median profitability, benchmarked against the median profitability of all listed firms. These results reconstruct the “profitability puzzle” as documented in the literature.

d) *The stock market response to change-of-control*

How does the stock market respond to the change-of-control? In order to investigate this question, I have calculated the stock returns based on the following formula, which is used by Dewenter and Malatesta (1997) in their *Journal of Finance* paper, when they examine the stock returns to privatizations in Canada, France, Hungary, Japan, Malaysia, Poland, Thailand, and the U.K.:

P_{it} =closing stock price of company i on day t following initial trade

P_{i0} =initial offer price for company i

$r_i = \log(P_{it}) - \log(P_{i0})$ =raw, unadjusted return to company i

I_t =stock market index on day t

I_o =stock market index on the date of the IPO $I_t - I_o$

$r_i^* = r_i - [\log(I_t) - \log(I_o)]$ =market-adjusted return to company i ³⁸

Using the above formula, I calculate the 3-calendar-day returns around the change-of-control (again, I use the change-of-control instead of the IPO as the defining event of “privatization”, and I use the Shanghai stock market index), and report the results in Table 4-7. Table 4-7 shows that, even though the mean and median 3-day-returns after the change-of-control is still negative, they improve upon the mean and median 3-day-return before the change-of-control. It seems that investors do have some optimistic expectations at change-of-control.

Table 4-7: Stock Performance Before and After the Change-of-Control

Panel A. *Mean and median return changes (not market-adjusted)*

Variable	Number of Firms	Before	After	Difference
Mean Return	116	-0.148	-0.140	0.008
Median Return	116	-0.074	-0.067	0.007

Note: This table reports the changes in mean and median stock returns of listed firms 3 calendar days around their changes-of-control.

³⁸ See P. 1665 in Dewenter and Malatesta: public offerings of state-owned and privately-owned enterprises: an international comparison, *Journal of Finance*, September 1997.

Table 4-7: Stock Performance Before and After the Change-of-Control

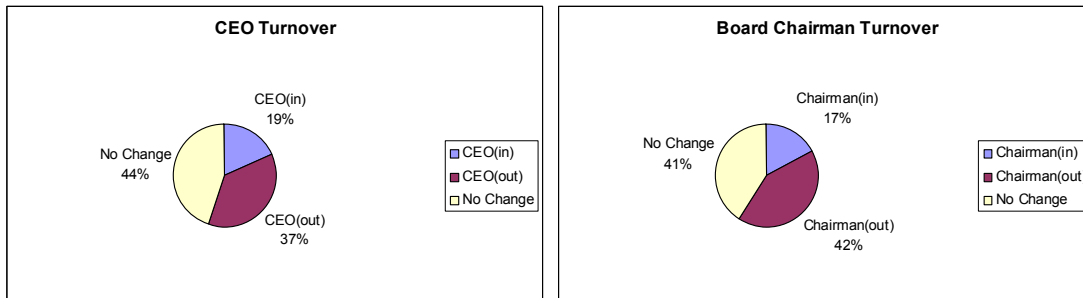
Panel B. Mean and median return changes (market-adjusted)

Variable	Number of Firms	Before	After	Difference
Mean Return	116	-0.147	-0.139	0.008
Median Return	116	-0.095	-0.085	0.010

Note: This table reports the changes in mean and median stock returns of listed firms 3 calendar days around their changes-of-control.

e) The source of performance improvements: does corporate governance matter?

Barberis et al. (1996), Dyck (1997) and Frydman et al. (1999) all emphasize the crucial role of management turnovers in privatization. The improvement of corporate governance associated with the change-of-control is expected to be an important source of performance improvement. Figure 4-7 shows that, 56% of the privatized firms have changed the CEOs and 59% of the privatized firms have changed Chairmen of the Board. In the majority of cases of management turnovers, the new Chairmen or CEOs came from outside the firm.



Note: CEO (in): The new CEO is from inside the firm
 CEO (out): The new CEO is from outside the firm
 Chairman (in): The new Board Chairman is from inside the firm
 Chairman (out): The new Board Chairman is from outside the firm

Figure 4-7: The Percentages of Firms That Have Changed the Board Chairmen or CEOs

Bai et al. (2004) shows that corporate governance does affect the market valuation of firms in China. For example, they find that “high concentration of non-controlling shareholding” and “issuing shares to foreign investors” have positive effects on market valuation, while “a large holding by the largest shareholder”, “the CEO being the chairman or vice chairman of the board of directors”, and “the largest shareholder being the government” have negative effects. They focus on firms during a relatively short period, 1999—2001 and they use Tobin’s Q as the firm performance measure, which may not be a very good measure of firm performance for Chinese listed firms. This is because many shares in Chinese listed firms are non-tradable, and as a result, the stock price may exaggerate the actual value of the firm. Though some adjustments are made in Bai et al. (2004), those adjustments are arguably subjective. I extend their study to data from 1992—2003, and use ROA to measure firm performance to test if corporate governance improvements indeed account for profitability improvements in Chinese listed firms.

The panel random effect regression model generates the following results (White-robust standard errors are in the parentheses):

$$\begin{aligned}
 ROA_{i,t} = & -0.743 + 0.076Private_{i,t} - 0.110CEOin_{i,t} + 0.086CEOout_{i,t} \\
 & (0.123)^{***} \quad (0.015)^{***} \quad (0.067)^* \quad (0.052)^* \\
 & + 0.011Chairin_{i,t} - 0.168Chairout_{i,t} + 0.044\log(Assets)_{i,t} \\
 & (0.052) \quad (0.044)^{***} \quad (0.006)^{***} \\
 & - 0.999Leverage_{i,t} + \varepsilon_{i,t} \\
 & (0.025)^{***}
 \end{aligned}$$

R²=0.33, Number of Firms=983, Number of Observations=3616
 * (***) denotes significance at 10% (1%) level

In this equation, *Private* is a dummy variable that equals 1 if the firm is a privatized firm. If there is a management turnover, and the new CEO comes from inside the firm, then

CEOin equals one; if the new CEO comes from outside the firm, then *CEOout* equals one; if the new chairman of the board of directors comes from inside the firm, then *Chairin* equals one; if the new chairman of the board of directors comes from outside the firm, then *Chairout* equals one.

Obviously, privatized firms enjoy significantly higher profitability than SOEs, the firms with new CEOs from outside the firm enjoy higher profitability, while the firms with new CEOs from inside the firm suffer from lower profitability. These results are consistent with the results of Frydman et al. (1999), who show that, “in the context of transition economies in Central Europe, this means that privatization is effective in enhancing revenue and productivity performance of firms that come to be controlled by outsider-owners, but produces no significant effect in firms controlled by insiders.” (pp. 1186-1187).

These results are very relevant for current policy making in China. China started experimenting with highly controversial MBO (Management Buyout) programs in SOEs in 1999. *China Daily* (2003) reports, “China's business press touted management buyouts (MBOs) throughout 2002. And they heralded 2003 as ‘the year of the MBO’.” However, Dyck’s (1997) theoretical model in the *American Economic Review* regarding management selection and economic transition in Eastern German privatization shows, “privatization policies that discouraged management change or introduced owners without the ability to identify qualified western managers are likely to have significant opportunity costs. For example, Russia’s privatization policy gave incumbent management significant stakes. This shareholding increased managerial incentives, but by entrenching management made it very difficult to introduce the replacement of human capital that this paper suggests is critical to successful restructuring.” Neither the theoretical results of Dyck (1997) nor the empirical results of this

chapter support MBOs in China. In fact, after heated debates in China, in April 2005, in order to contain insider-control and state-owned assets losses, the State-owned Assets Supervision and Administration Commission (SASAC) and the Ministry of Finance jointly issued a document forbidding MBOs in large-scale SOEs in China. However, in January 2006, the SASAC decided to permit MBOs in major SOEs again. The empirical results in this section do not support this latest policy.

3. Related Literature

Due to the lack of unambiguous theoretical predictions in current privatization field, former researchers tend to focus their efforts on the empirical side. There are four major approaches of such empirical investigations, all of which identify the IPO of an SOE as the event that defines “privatization.” This chapter uses all four approaches, yet with a more accurate definition of “privatization”, it arguably produces more accurate results.

The first approach is to compare the relative performances of SOEs and private firms cross-sectionally. Dewenter and Malatesta’s (2001) univariate analysis of *Fortune* 500 firms (top 500 firms around the world) shows that, on average, SOEs have lower profitability, higher leverage, higher employment, and lower labor productivity.³⁹ Ehrich et al. (1994) study 23 international airlines from 1973 to 1983 and show that “state ownership can lower the long-run annual rate of productivity growth or cost decline, but not necessarily their levels in the short run.” (p.1006) On the other hand, Caves and Christensen (1980) compare the postwar productivity performance of the Canadian National Railroad (state-owned) and Canadian Pacific Railroad (private) and find “no evidence of inferior performance by the

³⁹ The higher leverage of the SOEs is due to their “soft budget constraints”, in contrast with the “hard budget constraints” of private firms.

government-owned railroad” (p. 958). But their sample of only 2 firms naturally raises doubts about the representativeness of their results.

The second approach is to compare the performances of SOEs before IPOs and after IPOs (univariate event study approach). Megginson et al. (1994) use a three-year window (3 years before and 3 years after the IPO) and show that mean and median profitability and productivity significantly improve after IPOs. They also find that mean and median leverage falls after IPOs. Surprisingly, they find that mean and median employment *increase* after IPOs. Following Megginson et al.’s (1994) pioneering work and using the same three-year window, Boubakri and Cosset (1998) study *developing* countries, D’Souza and Megginson (1999) study *industrialized* countries, and Dewenter and Malatesta (2001) study *Fortune* Global 500 firms. These three follow-up studies confirm most of Megginson et al. (1994)’s results.

The third approach is to study the effects of government ownership on SOE performance in a multivariate regression framework. Dewenter and Malatesta (2001) regress profitability and productivity on an SOE dummy and control variables, and they find that the SOE dummy is always negatively and significantly correlated with firm performance. They also regress the firm performance measures on the fraction of equity owned by the government and other control variables. They show that government ownership has negative and significant effects on profitability, positive and significant effects on leverage, and negative though insignificant effects on productivity. Gupta (2005) uses a similar approach to examine the effect of private ownership on the profitability and productivity of Indian SOEs and shows that private shares have positive and significant effects on all performance measures.

In summary, the first three major approaches: cross-sectional univariate analysis, univariate event-study, and multivariate regression analysis all lead to similar results: private firms enjoy higher profitability and productivity than SOEs. Private firms also have lower leverage. But in terms of employment, some studies show that employment increases after IPOs, while other studies show the opposite case. My results about profitability and productivity are similar to these studies, but employment significantly declines after the changes of control as redundant workers get laid off.

The fourth approach is to examine the sources of performance improvements after privatization: “when does privatization work?” (Frydman et al. 1999) and “how does privatization work?” (Barberis et al. 1996). Both studies emphasize the importance of management turnovers in successful privatizations. Dyck (1997) emphasizes such importance in the context of Eastern Germany. My results show that in China, new CEOs from outside the privatized firms significantly improve firm performance.

Finally, using evidence from India, Gupta (2005) argues in her paper in *Journal of Finance* that partial privatization without changes of control has significantly improved firm performance in India. However, she uses “Sales” and “Profit” instead of ROA, ROE or ROS as the profitability measures. I use the summary statistics data in Table II of her paper and conduct an intuitive analysis and find that we may probably find that ROA and ROS fall after partial privatization in India. Here I reproduce part of her Table II: (“Sales”, “Profit”, and “Assets” are measured in logarithms):

Table 4-8: Firm Performance Before and After IPOs in India

Variable	Mean Before	Mean After	After-Before t-Statistic of Difference in Means
Sales	5.815	7.061	7.577***
Profit	6.476	6.792	6.583***
Assets	5.417	6.724	7.702***

Source: Gupta, N. “Partial Privatization and Firm Performance.” *Journal of Finance*, April 2005, p. 997, Table II.

Mean sales increase at a rate of $e^{7.061-5.815} - 1 = e^{1.246} - 1 = 247.6\%$, and mean assets increase at a rate of $e^{6.724-5.417} - 1 = e^{1.307} - 1 = 269.5\%$, while mean profit increases at a rate of only $e^{6.792-6.476} - 1 = e^{0.316} - 1 = 37.2\%$. Intuitively, “Sales” and “Assets” increase at a much faster rate than “Profit”, making ROS and ROA deteriorate after partial privatization. This reconstructs the “profitability puzzle” (as found in China) that profitability falls after partial privatization (IPO).

4. Summary of Chapter

This chapter analyzes the causes and effects of share issue privatization in China between 1994 and 2003. It provides a solution to the “profitability puzzle.” This puzzle is that, in contrast with evidence from many other countries, China’s SOEs did not become more profitable after their IPOs. I argue that simply “going public” is not enough to ensure higher profitability. Rather, an actual “change of control” of a firm from the State to private owners is what really raises profitability and improves productivity by reducing excess labor.

Empirical test results from both univariate analysis and multivariate analysis strongly support the “change-of-control matters” hypothesis. The 116 listed firms that experienced

actual transfers of control by the end of 2002 enjoy higher profitability and productivity during the post-change years than pre-change years, and for any given sample year they enjoy higher profitability and productivity than SOEs (or more accurately, state-controlled enterprises). Even after controlling for other factors affecting the profitability of firms and controlling for endogeneity by using two-stage-least-squares technique, the “change-of-control” still significantly contributes to improvements in profitability. Meanwhile, redundant employment within SOEs is reduced in the post-change-of-control years. The stock market seems to respond positively to the change-of-control. My analysis also investigates the sources of firm performance improvements and finds that the improvements in corporate governance, especially the management turnovers associated with the changes of control, are significantly associated with firm performance improvements. This result seems not to support the current policy that allows Management Buyout (MBO) in China’s SOEs.

An important future research direction is to empirically disentangle the effects of intensified competition and change-of-control on firm profitability. Bartel and Harrison (2005) disentangle the effects of privatization and competition in the context of Indonesia, and a similar study can be conducted for China, as reliable data on Chinese firm competition become available in the future.

The empirical results in this chapter strongly support the theoretical results of chapter III that “change-of-control” matters. These results show that the share issue privatization has “worked” in China, and China should continue its privatization of SOEs so as to fully reap the fruits of economic reforms.

CHAPTER V

CONCLUSIONS

This dissertation focuses on two important issues in China's economic growth and structural reforms: (1) the relationship between financial development and economic growth; (2) the effects of share issue privatization. The first issue has been widely recognized as a crucial element for long-run growth in China, while the latter issue has been the core of China's economic reforms.

Chapter II examines the relationship between China's financial development and economic growth. Financial development is measured by bank credit and stock market size or trading volume, while economic growth is measured by GDP or fixed investment. This chapter uses standard VAR techniques to disentangle the causal relationship between those variables (in the sense of Granger-causality). Results from tri-variate VAR estimations show that while banking sector development promotes economic growth in China, stock market development has not yet played an identifiable role in China's economic growth. This may be due to improvements in China's banking sector and the persistent problems with China's stock markets, such as illiquidity as well as fraud and insider trading. Chapter II represents one of the first studies that use multivariate VAR methods to study the relationship between financial development and economic growth in China.

Chapter III establishes a stylized theoretical model to analyze the causes and effects of share issue privatization in China. This model studies a sequential game between Chinese government and firms, which shows the "grabbing hand" and "helping hand" aspects of the

Chinese government when it intervenes into firms' management. This model, with its realistic setup and weak assumptions, predicts that privatization will unambiguously improve firm profitability and labor productivity as redundant workers get laid off. Chapter III sets up one of the first practical models of share issue privatization that generates results consistent with the extensive empirical evidence from developing and developed countries in the literature.

Chapter IV uses two newly available datasets and empirically tests the theoretical predictions of Chapter III. It is motivated by the “profitability puzzle”, i.e., in sharp contrast to extensive evidence from other countries, China's state-owned enterprises did not become more profitable after their IPOs. This chapter argues that the change-of-control, rather than the IPO, should be the event that defines “privatization.” This chapter uses the change of the largest shareholder from the State to a private owner as the definition of “privatization”, and confirms my theoretical prediction that after privatization, Chinese firms become more profitable and productive as redundant workers get laid off. The univariate time-series comparison of profitability and productivity before and after privatization shows that the firms improve profitability and productivity after privatization. The univariate cross-sectional comparison of the profitability of privatized firms and state-owned enterprises shows that privatized firms have higher profitability than state-owned enterprises for the majority of sample years, though the state-owned enterprises did catch up with privatized firms by the end of the sample period. The multivariate regression using panel data generates similar results, even after controlling for endogeneity with two-stage-least-squares technique. The stock market seems to respond positively to privatization. Finally, this chapter investigates how management turnovers associated with privatization affect firm profitability. The results show that new CEOs from outside the firm instead of inside the firm seem to have positive effects on firm profitability.

This chapter proposes a new definition of “privatization”, which is arguably more accurate than previous empirical identifications in the literature, and as a result, it leads to more accurate estimations of the effects of privatization in China and solves the “profitability puzzle” that has troubled researchers for many years.

The results in this dissertation have several key policy implications:

(1) China should take full advantage of its under-utilized stock markets to promote economic growth. Many structural reforms, including gradually selling off the non-tradable state shares, and enforcing stronger laws and regulations to punish fraud and insider trading, should be carried out in order to achieve this goal;

(2) China should continue its share issue privatization. The “profitability puzzle” has been used by some to argue that China’s privatization programs failed. This dissertation uses a better definition of “privatization” and refutes that argument by rigorous theoretical and empirical analyses. This dissertation shows that privatization has indeed “worked” in China in the sense that it improves firm profitability and labor productivity as well as reducing excess labor.

China has risen to a major world player during the past two decades, and it has contributed significantly to world economic growth. It is crucial at this moment to ponder the successes and failures of China’s economic reform and learn lessons from it so that the next steps of China’s reforms and development will remain steady and fast.

REFERENCES

Articles

- The American Enterprise Institute for Public Policy Research. 1997. "Two new paradigms." (http://www.aei.org/publications/pubID.8072/pub_detail.asp)
- Arestis, P., Demetriades, P. O. and Luintel, K. B. 2001. "Financial development and economic growth: the role of stock markets." Journal of Money, Credit and Banking 33: 16 - 41.
- Bai, C. and Wang, Y. 1999. "The myth of the East Asian miracle: the macroeconomic implications of soft budgets." American Economic Review 89: 432-437.
- Bai, C., Li, D., Tao, Z. and Wang, Y. 2000. "A multitask theory of the state enterprise reform." Journal of Comparative Economics 28:716-738.
- Bai, C., Liu, Q., Lu, J., Song, F. and Zhang, J. 2004. "Corporate governance and firm valuations in China." Journal of Comparative Economics 32: 599-616.
- Barberis, N., Boycko, M., Shlerifer, A. and Tsukanova, N. 1996. "How does privatization work? Evidence from the Russian shops." Journal of Political Economy 104: 764-790.
- Bartel, A. and Harrison, A. 2005. "Ownership versus Environment: Disentangle the Sources of Public Sector Inefficiency." Review of Economics & Statistics 87: 135-147.
- Bell, C. and Rousseau, P. L. 2001. "Post-independence India: a case of finance-led industrialization?" Journal of Development Economics, 65:153-175.
- Berglof, E. and Roland, G. 1998. "Soft budget constraints and banking in transition economies." Journal of Comparative Economics 26, 18-40.
- Blackburn, K. and Hung, V. T. Y. 1998. "A theory of growth, financial development, and trade." Economica 65:107-24.
- Boubakri, N. and Cosset, J. 1998. "The financial and operating performance of newly privatized firms: evidence from developing countries." Journal of Finance, 53: 1081-1110.

- Boycko, M., Shleifer, A. and Vishny, R. 1994. "Voucher privatization." Journal of Financial Economics 35: 249-266.
- _____. 1996. "A theory of privatization." Economic Journal 106: 309-319.
- Boyd, J. and Smith, B. 1998. "The evolution of debt and equity markets in economic development." Economic Theory 12: 519-560.
- The *BusinessWeek*. 2005. "China is a private sector economy."
(http://www.businessweek.com/magazine/content/05_34/b3948478.htm)
- _____. "Raging Growth and Ricketty Bourses." Oct. 31, 2005. The McGraw-Hill Companies Inc., Red Oak, IA.
- Caves, D. and Christensen, L. 1980. "The relative efficiency of public and private firms in a competitive environment: the case of Canadian railroads." Journal of Political Economy 88: 958-976.
- Chang, E. and Wong, S. 2004. "Political control and performance in China's listed firms." Journal of Comparative Economics 32: 617—636.
- Chen, X., Skully, M. T. and Brown, K. 2005. "Banking efficiency in China: application of DEA to pre- and post-deregulation eras: 1993-2000." China Economic Review 16: 229 - 245.
- The *China Daily*. 2003. "Jobless situation gets top priority."
(http://www.chinadaily.com.cn/en/doc/2003-08/20/content_256538.htm)
- _____. 2003. "Focus: 'The Last Land Grab in China'."
(http://www.chinadaily.com.cn/en/doc/2003-09/24/content_266884.htm)
- Cho, Y. J. 1986. "Inefficiencies from financial liberalization in the absence of well-functioning equity markets." Journal of Money, Credit and Banking 18:191-200.
- Claessens, S., Djankov, S. and Klingebiel, D. "Stock markets in transition economies." Financial sector discussion paper No. 5. The World Bank, 2000.
- The CNN. 1997. "Jiang urges China move closer to capitalism."
(<http://www.cnn.com/WORLD/9709/12/china/>)

- Cull, R. and Xu, L. 2003. "Who gets credit? The behavior of bureaucrats and state banks in allocating credit to Chinese state-owned enterprises." Journal of Development Economics 71: 533—559.
- Demetriades, P. and Hussein, K. 1996. Does financial development cause economic growth? Time-series evidence from 16 countries. Journal of Development Economics 51:387-411.
- Dewenter, K. and Malatesta, P. 1997. "Public offerings of state-owned and privately-owned enterprises: an international comparison." Journal of Finance 52: 1659-1679.
- _____. 2001. "State-owned and privately-owned firms: an empirical analysis of profitability, leverage, and labor intensity." American Economic Review 91: 320-334.
- Dong, X. and Putterman, L. 2003. "Soft budget constraints, social burdens, and labor redundancy in China's state industry." Journal of Comparative Economics 31: 110-133.
- D'Souza, J. and Megginson, W. 1999. "The financial and operating performance of privatized firms during the 1990s." Journal of Finance 54: 1397-1435.
- Du, J. and Wei, S. 2004. "Does insider trading raise market volatility?" Economic Journal 114: 916 - 942.
- Dyck, A. 1997. "Privatization in Eastern Germany: management selection and economic transition." American Economic Review 87: 565-597.
- The *Economist*. "The Real Great Leap Forward." Sep. 30, 2004. Economist Inc., London.
- _____. "China's Stock Market—A Marginalized Market." Feb. 24, 2005. Economist Inc., London.
- _____. "A Model of Reform." Sep. 1, 2005. Economist Inc., London.
- Ehrlich, I., Gallais-Hamonno, G, Liu, Z. and Lutter, R. 1994. "Productivity growth and firm ownership: an analytical and empirical investigation." Journal of Political Economy 102: 1006-1038.
- Ernst & Young. 2003. "Annual Review: Non-performing Loans in China."
([http://www.ey.com/global/download.nsf/China_E/NPL_Report_2003Oct14/\\$file/China%20NPL%20Report%202003%20-%20FINAL.pdf](http://www.ey.com/global/download.nsf/China_E/NPL_Report_2003Oct14/$file/China%20NPL%20Report%202003%20-%20FINAL.pdf))

- Fama, E. F. and French, K. R. 1995. "Size and book-to-market factors in earnings and returns." Journal of Finance 50: 131-155.
- Forbes Magazine. "China's \$600 Billion Casino." Oct. 1, 2001. Forbes Inc., New York.
- Frydman, R., Gray, C., Hessel, M. and Rapaczynski, A. 1999. "When does privatization work? The impact of private ownership on corporate performance in the transition economies." Quarterly Journal of Economics 114: 1153-1191.
- Galetovic, A. 1996. "Specialization, intermediation and growth." Journal of Monetary Economics, 38:549-59.
- Goodman, J. B. and Loveman, G. 1991. "Does privatization serve the public interest?" Harvard Business Review 69: 26-38.
- Greenwood, J. and Jovanovic, B. 1990. "Financial development, growth, and the distribution of income." Journal of Political Economy 98:1076-1107.
- Grossman, S. J. and Hart, O. D. 1986. "The costs and benefits of ownership: a theory of vertical and lateral integration." Journal of Political Economy 94: 691-719.
- Groves, T., Hong, Y., McMillan, J. and Naughton, B. 1995. "China's evolving managerial labor market." Journal of Political Economy 103: 873-892.
- Gupta, N. 2005. "Partial privatization and firm performance." Journal of Finance 60: 987-1014.
- Harris, R. D. F. 1997. "Stock markets and development: a re-assessment." European Economic Review 41:139-146.
- Huang, S. and Song, F. 2006. "The determinants of capital structure: evidence from China." China Economic Review, forthcoming.
- Jefferson, G. 1998. "China's state enterprises: public goods, externalities, and Coase." American Economic Review 88: 428-432.
- Jefferson, G., Hu, A., Guan, X. and Yu, X. 2003. "Ownership, performance, and innovation in China's large- and medium-size industrial enterprise sector." China Economic Review 14: 89—113.

- Johansen, S. 1991. "Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models." Econometrica 59: 1551 - 1580.
- Kassimatis, K. and Spyrou, S. 2001. "Stock and credit market expansion and economic development in emerging markets: further evidence utilizing cointegration analysis." Applied Economics 33: 1057 - 1064.
- King, R. G. and Levine R. "Finance and growth: Schumpeter might be right." Quarterly Journal of Economics 108:717-738.
- Kornai, J. 1979. "Resource-constrained vs. demand-constrained systems." Econometrica 47: 801—820.
- Krueger, A. O. 1990. "Government failures in development." Journal of Economic Perspectives 4: 9—23.
- Lan, Y. 1997. "The stock market in China: problems and prospects for domestic and foreign investment." Working paper, Chinese Economies Research Center, The University of Adelaide.
- La Porta, R. and Lopez-de-Silanes, F. 1999. "The benefits of privatization: evidence from Mexico." Quarterly Journal of Economics, 114:1193-1242.
- Levine, R. and Zervos, S. 1998. "Stock markets, banks, and economic growth." American Economic Review 88: 537 - 558.
- Levine, R. 2004. "Finance and growth: theory and evidence." Paper prepared for the Handbook of Economic Growth.
- Li, W. 1997. "The impact of economic reform on the performance of Chinese state enterprises." Journal of Political Economy 105:1080—1106.
- Lin, J. Y., Cai, F. and Li, Z. 1998. "Competition, policy burdens, and state-owned enterprise reform." American Economic Review 88: 422-428.
- Lin, J. Y. 1999. "Policy burdens, soft budget constraint and state-owned enterprise reform in China." Working Paper, China Center for Economic Research.
- Lucas, R. E. 1988. "On the mechanics of economic development." Journal of Monetary Economics 22:3-42.

- Maddison, A. 2004. "World development and outlook: 1820-2030: a quantitative perspective." Revised note for Meeting of OECD Economics & Environment Directorates, June 25, 2004.
- Meggison, W. L. and Netter, J. M. 2001. "From state to market: a survey of empirical studies on privatization." Journal of Economic Literature 39:321-388.
- Meggison, W. L., Nash, R. and Randenborgh, M. 1994. "The financial and operating performance of newly privatized firms: an international empirical analysis." Journal of Finance 49: 403-452.
- Mi, Z. and Wang, X. 2000. "Agency cost and the crisis of China's SOE." China Economic Review 11: 297-317.
- Mookerjee, R. and Yu, Q. 1999. "An empirical analysis of the equity markets in China." Review of Financial Economics 8: 41 - 60.
- Morales, M. F. 2003. "Financial intermediation in a model of growth through creative destruction." Macroeconomic Dynamics 7:363-93.
- Murphy, K., Shleifer, A., and Vishny, R. 1991. "The allocation of talent: implications for growth." Quarterly Journal of Economics, 2:503-530.
- The National Center for Policy Analysis. 1997. "Selling privatization in China." (<http://www.ncpa.org/pd/pdint173.html>)
- North, D. 1991. "Institutions." Journal of Economic Perspectives 5: 97-112.
- Osterwald-Lenum, M. 1992. "A note on the fractiles of the asymptotic distribution of the maximum likelihood cointegration rank test statistics: four cases." Oxford Bulletin of Economics and Statistics 54: 461 - 478.
- The *People's Daily*. 2000. "China's SOEs embrace modern enterprise system." (http://english.people.com.cn/english/200010/16/eng20001016_52748.html)
- Phillips, P. C. B. and Perron, P. 1988. "Testing for a unit root in time series regression." Biometrika 75: 335 - 346.
- Prasad, E. S. 2005. "Next steps for China—why financial sector reform is a crucial element of a long-term growth strategy." Finance and Development: A Quarterly Magazine of the IMF 42: 44 - 47.
- Rioja, F. and Valev, N. 2004. "Does one size fit all? A reexamination of the finance and growth relationship." Journal of Development Economics 74: 429 - 447.

- Robinson, J. 1952. "The generalization of the general theory." In: The Rate of Interest and Other Essays, London: McMillian.
- Rousseau, P. L. and Wachtel, P. 1998. "Financial intermediation and economic performance: historical evidence from five industrialized economies." Journal of Money, Credit and Banking 30: 657 - 678.
- _____. 2000. "Equity markets and growth: cross-country evidence on timing and outcomes, 1980 - 1995." Journal of Banking and Finance 24: 1933 - 1957.
- _____. 2002. "Inflation thresholds and the finance-growth nexus." Journal of International Money and Finance 21:777-793.
- Sapienza, P. 2004. "The effects of government ownership on banking lending." Journal of Financial Economics 72: 357—384.
- Scharfstein, D. 1988. "The disciplinary role of takeovers." Review of Economic Studies 55: 185-199.
- Schwert, G. W. 1989. "Tests for unit roots: a Monte Carlo investigation." Journal of Business and Economic Statistics 7: 147 - 159.
- Shapiro, C. and Willig, R. D. 1990. "Economic rationales for the scope of privatization." In The Political Economy of Public Sector Reform and Privatization (Edited by Suleiman and Waterbury), Boulder CO: Westview Press.
- Sheshinski, E. and López-Calva, L. F. 1998. "Privatization and its benefits: theory and evidence." Working paper, Harvard Institute for International Development.
- Shleifer, A. and Vishny, R. 1994. "Politicians and firms." Quarterly Journal of Economics 109: 995-1025.
- Sims, C. A., Stock, J. H. and Watson, M. W. 1990. "Inference in time series models with some unit roots." Econometrica 58: 113 - 144.
- Singh, A. 1995. "Corporate financial patterns in industrializing economies: a comparative international study." International Finance Corporation Technical Paper No.2.
- _____. 1997. "Financial liberalization, stock markets and economic development." The Economic Journal, 107:771-782.
- Stiglitz, J. and Weiss, A. 1981. "Credit rationing in markets with imperfect information." American Economic Review 71: 393-410.

- Sun, Q. and Tong, W. 2003. "China share issue privatization: the extent of its success." Journal of Financial Economics 70:183-222.
- Time Magazine. "China's Market Maladies." Feb. 7, 2005. Time Inc., New York.
- Toda, H. Y. and Yamamoto, T. 1995. Statistical inference in vector autoregressions with possibly integrated processes. Journal of Econometrics 66: 225 - 250.
- Wang, X., Xu, L. and Zhu, T. 2004. "State-owned enterprises going public: the case of China." Economics of Transition. 12: 467-488.
- The *Washington Post*. 2003. "China accelerates privatization, continuing shift from doctrine." (Reporter: Pan, Philip). November 12.
- Tong, D. 1999. "The heart of economic reform: China's banking reform and state enterprise restructuring." Rand Graduate School Dissertation.
- Wei, Z., Varela, O., D'Souza, J. and Hassan, K. 2003. "The financial and operating performance of China's newly privatized firms." Financial Management 32: 107-137.
- Wu, J. "Economist Wu Jinglian adheres to his stance." The People's Daily, March 21, 2001.
- Zhang, A. and Zhang, Y. 2001. "Impact of ownership and competition on the productivity of Chinese enterprises." Journal of Comparative Economics, 29:327-346.
- Zhang, A., Zhang, Y. and Zhao, R. 2002. "Profitability and productivity of Chinese industrial firms: measurement and ownership implications." China Economic Review 13: 65 – 88.

Books

- Bagehot, W. 1873. Lombard Street. New York: Irwin.
- The Central Intelligence Agency. The World Factbook 2006.
(<http://www.cia.gov/cia/publications/factbook/rankorder/2001rank.html>)
- Davis, E. P. 1995. Pension funds: retirement-income security and capital markets: an international perspective. Oxford: Clarendon Press.

- Gibbon, H. 2000. Privatisation Yearbook. London: Thompson Financial.
- Holz, C. A. 2003. China's Industrial State-owned Enterprises: Between Profitability and Bankruptcy. Singapore: World Scientific Press.
- International Finance Corporation. 2000. China's Emerging Private Enterprises. Washington DC.
- Kikeri, S, Nellis, J. and Mary, S. M. 1992. Privatization: the Lessons of Experiences. Washington DC: The World Bank.
- Laffont, J. and Tirole, J. 1993. A Theory of Incentives in Procurement and Regulation. Cambridge, MA: MIT Press.
- Li, Y. 1992. China's Economic Reform and Share-holding System. Peking, China: Peking University Press.
- National Bureau of Statistics of China. 1995-2005, various issues. China Statistical Yearbook.
 _____ . 1995-2005, various issues. China Monthly Statistics.
- Organization for Economic Cooperation and Development. 2005. Economic Survey of China 2005. Paris, France.
 _____ . 2002. China in the World Economy: an OECD Economic and Statistical Survey. Paris, France.
 _____ . 2000. Reforming China's Enterprises. Paris, France.
- Pepall, L., Richards, D. and Norman, G. 1999. Industrial Organization: Contemporary Theory and Practice. New York: South-Western College Publishing.
- Schumpeter, J. 1912. Theory of Economic Development. Cambridge, MA: Harvard University Press.
- Shleifer, A. and Vishny, R. 1999. The Grabbing Hand: Government Pathologies and Their Cures. Cambridge, MA: Harvard University Press.
- Vickers, J. and Yarrow, G. 1988. Privatization: An Economic Analysis. Cambridge, MA: MIT Press.

Databases

Shenzhen GTA Information Technology Co. Ltd., Shenzhen, China. 2005. China Stock Market and Accounting Research (CSMAR) Database.

Economist Intelligence Unit, London. 2005. The Economist Intelligence Unit Database.

International Monetary Fund. 2005. International Financial Statistics Database.

The SinoFin Information Services. 2004. China Private Listed Companies Database.

The World Bank. 2004. The World Development Indicators.