Ownership structure and firm risk: Evidence from China

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"Responsibility equals accountability equals ownership. And a sense of ownership is the most powerful weapon a team or organization can have."

–Pat Summitt

ABSTRACT

This thesis investigates the effects of ownership structure on firm risk in China. The first essay of this thesis provides an overview of the Chinese privatisation programmes that profoundly shapes the ownership structure of Chinese listed firms, and it reviews and discusses the corporate governance and firm outcomes resulting from the privatisation programmes in China. In particular, it presents a detailed survey of China's privatisation programmes from its Share Issue Privatisation (SIP) to the Non-tradable Share (NTS) reform, Overall, it reveals that the SIP has achieved limited success in China, which is mainly due to the partial trading policy and partial privatisation characteristics, while the NTS reform yields greater improvements of governance mechanisms and outcomes.

This thesis then, examines the impact of ownership structure on firm risk in privatised firms. Essay two examines the effect of residual state ownership on stock return volatility following the NTS reform. The empirical evidence shows that residual state ownership mitigates the stock return volatility. It indicates that state ownership retention in the aftermath of sudden privatisation reform can signal the government willingness to bear the firm risk. The mitigating effect is especially pronounced in firms controlled by the government agents. Furthermore, firms with higher government ownership reduce stock return volatility through implementing more conservative corporate policies. However, the volatility-mitigating effect appears to be temporary, lasting only for three years after state shares become fully tradable.

Essay three investigates the relationship between the shareholdings of the Qualified Foreign Institutional Investors (QFIIs) and stock price crash risk. This essay adopts a governance mechanism, threat of exit, to examine the role of QFIIs on stock price crash risk. The evidence shows that long investment horizon and existence of multiple QFIIs exert credible exit threat to discipline management, and in turn, reduce stock price crash risk. Further, it shows that the corporate site visits of portfolio firms by QFIIs is a channel through which the credible exit threat works effectively.

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RESEARCH OUTPUT FROM THE THESIS

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Essay three, "Exit as governance: Qualified foreign institutional investors and stock price crash risk"

- Accounting and Finance Association of Australia and New Zealand Conference 2018
- New Zealand Finance Meeting 2018

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CHAPTER ONE

INTRODUCTION

This chapter first presents the overall motivations and objectives of the thesis. Then it briefly overviews the three essays individually including main findings and contributions. The chapter concludes with an outline of the thesis organisation.

1.1 Motivations and objectives

The structure of ownership is recognised as one of the key corporate governance mechanisms in corporate finance literature. A large body of literature documents that ownership structure affects firm decisions and outputs (e.g., capital structure, corporate governance, and firm performance). While, the impact of ownership structure on firm risk remains largely unexplored, which is viewed to have primary implications to investors (Campbell et al., 2001) and the economy as a whole (Bekaert and Harvey, 1997; Wurgler, 2000). Therefore, this thesis examines how ownership structure affects firm risk in the largest emerging market, China.

The past two decades have witnessed China's economic miracle with fastest growing GDP rate and becoming the second largest economy in the world (the World Bank, 2018). It is well known that the economic success in China is a result of China's economic reform. Being labelled as "Chinese characteristics", the economic reform along with its gradual privatisation approach has attracted increasing attention to the rest of the world. Under the Share Issue Privatisation (SIP) programme, one-third of total shares

were allowed to be traded on the two Chinese stock exchanges (the Shanghai and Shenzhen Stock Exchanges), while the remaining shares remained non-tradable which were mainly held by the state and legal persons[1]. With the partial trading and partial privatisation features, the ownership structure in listed companies was still highly concentrated and a large proportion of listed firms were still under government control. In order to align the interest of controlling and minority shareholders better and further develop the Chinese stock markets, the Non-tradable Share (NTS) Reform was implemented in 2005, aiming to dismantle the dual-share structure by converting non-tradable shares into tradable gradually. It provides opportunities for the second-round privatisation, which could significantly affect the ownership structure in the Chinese listed firms.

Indeed, by implementing the privatisation programmes, the ownership structure of Chinese listed firms changes from purely state-owned to mixed ownership structure. With the gradual privatisation programmes, the mixed ownership structure is dominated by the state, legal persons (institutions), and domestic individuals (Chen et al., 2009).[2] The role of different ownership identities on corporate governance and firm outcomes deserves special attention. Therefore, it is essential to understand how the Chinese government implements the privatisation programmes gradually, and also the success and

[1]Legal person shareholders emerged as a form of ownership when China's central government established its domestic stock markets in 1991. The legal person shareholder category is a mix of various domestic institutions (Xu and Wang, 1997).

[2] The state shareholders include the central government and local governments. Legal persons shareholders includes state-owned enterprises, non-state legal persons (such as private firms or mutual funds), and foreign institutional investors. A shares are normally traded by domestic individual and institutional investors (Qualified Foreign Institutional Investors (QFIIs) were allowed to purchase A-shares under a quota system since 2003). B shares are traded in foreign currencies by foreign institutional and individual investors. Chinese domestic investors were allowed to trade B shares using foreign currency since Feb. 2001. Other share classes, such as H shares, N shares, and S shares, are the shares of Chinese firms listed on other stock exchanges.

challenges of China's privatisation programmes. Essay one provides a detailed survey of the privatisation programmes in China from the SIP to the NTS reform.

Despite the rise of the private sectors resulting from privatisation in China, the role of state ownership, without doubt, remains a central subject matter of modern political economy. A number of studies have documented that state ownership is the source of corporate inefficiency (Shleifer and Vishny, 1994, 1998; Sun and Tong, 2003; Megginson et al. 2014; Huang et al. 2015). Therefore, it is argued state ownership relinquishment is the key solution to improve firm efficiency and economic development (Megginson and Netter, 2001). On the contrary, state ownership is also associated with an image of strong political and financial backups, especially when the market uncertainty is high. Studies argue that state ownership plays a positive role in effective monitoring (Tian, 2001), mitigating excess risk-taking (Boubakri et al. 2013; Khaw et al. 2016), enhancing firm performance (Sun et al., 2002), and value gaining from mergers and acquisitions (Du and Boateng, 2015). The evidence of the role of state ownership is mixed.

In more recent years, however, government ownership has experienced a global resurgence, driven by the volatile global economy, especially after the 2008 global financial crisis (Megginson, 2016). It is also well documented that that stock volatility influences the investor decisions on portfolio diversification (Campbell et al., 2001) and the predictability of expected stock returns (Ang et al., 2006; Jiang et al., 2009a), and also impacts the overall economic development (Bekaert and Harvey, 1997). It appears the effect of state ownership on stock return volatility is an important topic, especially in countries like China, where state ownership plays a dominant role in shaping the nature of risk-taking. More importantly, the NTS reform converts the two-thirds of total shares

from non-tradable to tradable shares, and in such case, investors face heightened uncertainty of a suddenly increased stock supply on the market. The theoretical study of Perotti (1995) documents that governments retaining a substantial equity stake can signal investors that the government is willing to bear residual risk and reduces uncertainty in the aftermath of sudden shocks. The NTS reform provides a unique opportunity to explore whether residual state ownership can reduce stock return volatility when uncertainty is exacerbated due to a natural shock. As such, Essay two investigates the impact of residual state ownership on stock return volatility following the NTS reform in China.

Apart from the influence of state ownership, the roles of foreign institutional investors in China has drawn increasing attention of academics and policy-makers. Indeed, the entry of the Qualified Foreign Institutional Investors (QFIIs) hallmarks a new era of the Chinese capital market opening up. As such, the influence of QFIIs in China becomes an unavoidable research question. In addition, the evidence in terms of the impact of foreign institutional ownership on firm outcomes is mixed. One strand of literature suggests that institutional investors are sophisticated shareholders that can discipline managers through monitoring and intervening when necessary (Ferreira and Matos, 2008; Dyck, 2001; Luong et al., 2017). While the other strand of literature argues that foreign institutional investors pressure managers to inflate earnings, and in turn, pursue short-term profits (Cheng et al., 2011; Manconi et al., 2012; Ferreira et al., 2014). Such a distinction of the impacts of foreign institutional investors is important to the policy makers and investors, especially in weak investor protection countries like China (Allen et al., 2005), where corporate governance is generally poor and foreign institutional investors may take a more active stance in corporate governance practices.

Studies like Huang and Shiu (2009) and Hung and Tseng (2009) argue that QFIIs are in a better position than Chinese domestic investors to discipline management and exert a credible governance force. Given the rapid development of market liberalization in China, QFIIs, as experienced and strategic investors (the CSRC, 2006), are expected to play an important role in disciplining managerial behaviours. In addition, managerial misbehaviours, such as bad news hoarding, are well documented to be the driving factor of stock price crash risk (Jin and Myers, 2006; Kothari, et al., 2009; Kim et al., 2011a, 2011b). Compared to stock return volatility, stock price crash risk captures the negative skewness in the stock returns distribution more precisely (Chen et al., 2001; Kim et al., 2014).[3] The Chinese stock market has experienced substantial volatility. Use monthly annualised stock volatility, Hu et al. (2018) show that the stock market volatility was 50% and 60%, respectively, when the depression hit the stock market in 2008 and 2015. In such cases, the stock market meltdown and investors' panic put the investigation of stock price crash risk under the spotlight. Therefore, it is noteworthy to examine the influence of QFIIs on stock price crash risk in China.

Essay three examines the impact of QFIIs on stock price crash risk. McCahery et al. (2016) argue that the disciplining effect of foreign institutional investors can only function effectively under large equity holding, long investment horizon, and multiple existence of different institutional investors in portfolio firms. Essay three particularly examines the factors under which the QFIIs can affect stock price crash risk, following the theoretical study of McCahery et al. (2016).

[3] It is well documented that stock return volatility is asymmetric (Schert, 1989; Campbell and Hentschel, 1992; Bekaert and Wu, 2000). In particular, stock returns exhibit negative skewness – a tendency for volatility to go up with negative returns.

1.2 Essay one: From Share Issue Privatisation to the Non-tradable Share Reform: A Review of Privatisation in China

Essay one surveys the burgeoning literature on privatisation programmes in China from the SIP to the NTS reform. It synthesises a vast body of literature on how the Chinese government adopts privatisation programmes and the impacts on individual firms, investors, and economic growth.

First, it briefly reviews the history of privatisation and privatisation methods. It summarises the impacts of privatisation on firm outcomes, investors, and economic growth and stock market development. Generally, privatisation significantly boosts firm performance, stock returns in both developed and developing countries, and in turn, credibly contributes to the development of stock market and economic growth.

Apart from the worldwide evidence of privatisation, this essay provides a detailed review of privatisation in China. The establishment of the Shanghai and Shenzhen Stock Exchanges hallmarks the first-round privatisation in China. The SIP, privatizing SOEs through public share offerings, is well known as a partial privatisation because only about one-third of a privatised firm's shares are publicly tradable. While the other two-thirds of shares remain non-tradable and mainly held by the state and legal persons. This unique dual-share structure characteristic creates problems of corporate governance in Chinese listed firms. This essay provides detailed survey from four dimensions of corporate governance: ownership structure, ownership concentration, divergence of control and cash-flow rights, and internal corporate governance. It suggests that, regardless of the significant firm performance improvement due to the SIP, the partial trading and partial

privatisation features not only led to a poor corporate governance system that weakens minority shareholder protection (Wu et al., 2009), but also jeopardises the development of the Chinese stock markets (Liao et al., 2014).

The NTS reform, initiated by the Chinese government in 2005, aims to dismantle the dual-share structure by converting non-tradable shares into tradable gradually. Essay one then summarises the group of literature on the determinants of compensation paid to tradable shareholders from ownership identity, corporate governance, and risk sharing incentive perspective.[4] Later, the essay reviews the impacts of the NTS reform on firm performance and corporate governance. It suggests that the NTS reform better aligns the interests between controlling and minority investors, and improves the firm performance and corporate governance in general (Liao et al., 2014).

This essay provides a comprehensive and detailed review of privatisation in China, summarising the success and challenges of China's privatisation programmes. It reveals the fundamentals behind the scenes of the unique ownership structure, ownership concentration and corporate governance in China. It is of great importance to policymakers, for the further in-depth economic reform; to enterprises, for restructuring of ownership and capital; as well as to investors, for building investment portfolio strategies. It highlights future research opportunities, which also motivates the empirical studies on ownership effects of the Chinese privatised firms, presented in the next two essays of this thesis.

[4] Non-tradable shares are priced based on the book value of firm assets rather than the market value of the firm. Therefore, a critical step of the NTS reform is the negotiation upon how non-tradable shareholders compensate tradable shareholders to exchange the right of trading.

1.3 Essay two: Does residual state ownership increase stock return volatility? Evidence from China's secondary privatisation

Essay two investigates the impact of residual state ownership on stock return volatility after the NTS reform. This essay uses the exogenous NTS reform as a natural experiment, to examine how residual state ownership affects stock return volatility in the aftermath of sudden privatisation reform.

Using manually collected tradable state ownership data of the Shanghai and Shenzhen Stock Exchange firms from 2007 to 2014, with the sample of 6,229 firm-year observations, this essay examines the role of residual state ownership on stock return volatility in the new Chinese setting of fully tradable state shares. The empirical evidence shows that residual state ownership is negatively related to stock return volatility after state shares become tradable. It is in line with Perotti (1995) and Vaaler and Schrage (2009), for whom governments signal their commitment to reduce investor uncertainty through retaining residual state ownership. However, studies like Zou and Adams (2008) and Chen et al. (2013) argue that non-tradable state ownership increases stock return volatility due to the inefficiency of the state ownership. As such, a time effect analysis is further conducted for the relationship between residual state ownership and stock return volatility. It is suggested that the mitigating effect of residual state ownership on stock volatility is proven to be temporary, lasting for approximately three years after firms' state shares become fully tradable. Furthermore, this essay also addresses the channel of how residual state ownership reduces stock return volatility. The results imply government ownership reduces stock return volatility, by reducing the riskiness of corporate policies in the post-reform period. Lastly, the mitigating effect of residual state

ownership on volatility is more pronounced in firms controlled by the government agents (SOIs), which are subject to stronger political incentives on firm decisions (Chen et al., 2009), compared to the firms controlled by state-owned enterprises (SOEs) and private firms. Specifically, the empirical evidence shows that the government is more likely to retain ownership in strategic important firms and sectors. Overall, the key results in this essay are both statistically and economically significant and robust when controlling for possible endogeneity by using the change-in-change approach and the difference-in-difference approach.

Essay two contributes to the literature in several ways. First, it adds to the literature on the merits of state ownership by providing insight into how residual government ownership following sudden reform reduces volatility. Second, it shows that the advantages of volatility reduction through residual government ownership are temporary, implying that, in the long-term, investors' concerns with residual government ownership may outweigh the initial positive signalling effect it provides. Third, it adds new evidence on the financial and operating channels that state ownership could use to influence firm riskiness and, thus, stock volatility after a reform. Fourth, it adds to the literature on the importance of different controlling identities of state ownership as suggested by Megginson (2016), by showing the mitigating effect is more pronounced in government agency-controlled firms compared to firms controlled by SOEs or private firms. Finally, it adds new evidence to the determinants of the privatization decision-making process and, in particular, it finds that the Chinese government seeks to maintain ownership and control in economically important firms and strategic industries after the NTS reform.

1.4 Essay three: Exit as governance: Qualified Foreign Institutional Investors and stock price crash risk

This essay investigates the impact of QFIIs on stock price crash risk in China. Theoretical studies like Shleifer and Vishny (1986) and Kahn and Winton (1998) highlight the mechanisms of how institutional investors discipline portfolio firms. The complementary devices include using voting rights (voice) and threat of exit (exit) (McCahery et al., 2016). In the Chinese setting, the average QFII ownership is only 1% in the A-share markets (Huang and Zhu, 2015), which indicates that intervention by "voice" is less likely to function effectively. Therefore, this essay examines whether QFIIs are still able to discipline management via the threat of exit mechanism, affecting stock price crash risk in this study.

Using the sample of 12,382 firm-year observations representing 1,944 firms from 2003 to 2015,[5] this essay finds that firms with QFIIs are more prone to be associated with lower stock price crash risk. First, investment horizon makes a difference. The longer horizon the QFIIs present in the top 10 shareholders list, the more capable they mitigate stock price crash risk. Second, the existence of multiple QFIIs in one single firm enhances their power to reduce stock price crash risk. Finally, the evidence shows that the corporate site visits of portfolio firms by QFIIs is a mechanism through which QFIIs can reduce stock price crash risk. The results are robust when controlling for possible endogeneity by using the propensity score matching approach and the Heckman two-stage approach.

[5]QFIIs are allowed to invest in A-share listed companies from 2003.

Essay three first adds evidence to the literature on the positive role of institutional ownership in Chinese listed firms, where the overall corporate governance is still weak. Specifically, it examines the impact of QFIIs on stock price crash risk using the domestic A-share markets, the biggest sector in the Chinese stock markets. Its implications are broader and more general. Second, it adds evidence to the literature on the determinants of stock price crash risk, and it shows that QFII ownership can significantly reduce stock price crash risk. Third, it provides empirical evidence of the theory on institutional investors exerting governance through exit threat. It finds that firms with QFIIs of large equity stake, long investment horizon, and multiple existence of different QFIIs are prone to have lower stock price crash risk. The results support McCahery et al. (2016) regarding the determinants of the effectiveness of exit threat. Fourth, it reveals that QFIIs exert effective discipline by site visits. Overall, Essay three provides important implications for the further openness of stock markets in China, and demonstrates the positive impact of QFIIs on stock price crash risk.

1.5 Structure of the thesis

The remainder of this thesis is outlined as follows. The first essay that surveys the privatisation programmes in China is presented in Chapter 2. Chapter 3 discusses the second essay, which provides evidence on the role of residual state ownership on stock return volatility during China's second privatisation. Chapter 4 presents the third essay, which investigates the governance role of QFIIs on stock price crash risk through threat of exit. Chapter 5 outlines the key findings, as well as the implications which may provide for future research directions. The supplementary information, such as variable definitions, correlation matrix, and further tests are presented in the Appendices.

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STATEMENT OF CONTRIBUTION TO DOCTORAL THESIS CONTAINING PUBLICATIONS

(To appear at the end of each thesis chapter/section/appendix submitted as an article/paper or collected as an appendix at the end of the thesis)

We, the candidate and the candidate's Principal Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality.*

Name of Candidate: Feng Xie

Name/Title of Principal Supervisor: Associate Professor Jing Chi

Name of Published Research Output and full reference:

From share issue privatisation to non-tradable share reform: a review of privatisation in China

Xie, F., Chi, J., Liao, J., 2016. From share issue privatisation to non-tradable share reform: a review of privatisation in China. Asian-Pacific Economic Literature 30(2), 90-104

In which Chapter is the Published Work: Chapter two

Please indicate either:

- The percentage of the Published Work that was contributed by the candidate:

  and / or

- Describe the contribution that the candidate has made to the Published Work:

  The published work is a review paper. The candidate has read a large body of literature. Then, the candidate catagorised and synthesised all the relevant literature, and wrote the draft of the paper. The draft has been revised and updated with the supervisors' suggestions and guidance. The candidate has made great contribution to the published work.

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CHAPTER TWO

ESSAY ONE

This chapter presents the first essay that surveys the development of Chinese privatisation programmes from the Share Issue Privatisation to the Non-tradable Share Reform. A brief overview of the study is presented in Section 2.1. Section 2.2 presents the overview of privatisation in developed and other developing countries. Section 2.3 describes the privatisation programmes in China. Section 2.4 concludes and provides future research opportunities. This chapter's appendix and references are presented in the Appendix A and the Reference sections, respectively.

Essay one was published in 2016, so we insert the original published paper in this chapter. The full reference is as follows:

Xie, F., Chi, J., Liao, J., 2016. From share issue privatisation to non-tradable share reform: a review of privatisation in China. *Asian-Pacific Economic Literature* 30(2), 90-104.

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From Share Issue Privatisation to the Non-tradable Share Reform: A Review of Privatisation in China

Abstract

Privatisation in China has proceeded in a gradual path for 30 years. In this paper, we present a detailed summary of the China's privatisation programmes from its Share Issue Privatisation (SIP) to the Non-tradable Share (NTS) Reform. The SIP in China is a primary offering process with state-owned enterprises (SOEs) issuing new shares to private investors, but approximately two-thirds of the shares after their Initial Public Offerings (IPOs) remain non-tradable and are mainly held by the government. The SIP has only achieved limited success due to its partial trading and partial privatisation characteristics, which in turn led to the implementation of the NTS reform in 2005. The reform aims to dismantle the split share structure and provide the opportunities for polishing corporate governance and further privatisation. The research shows that the NTS reform has yielded greater success in improving firm performance and corporate governance than the SIP.

Keywords: privatisation, share issue privatisation, the non-tradable share reform, China

JEL Codes: G38

2.1 Introduction

China has undertaken privatisation over the past 30 years in a unique manner. Large-scale privatisation began with the Share Issue Privatisation (SIP) scheme, signalled by the establishment of the Shanghai and Shenzhen Stock Exchanges in 1990 and 1991, and adopted Non-tradable Share (NTS) reform in 2005. As privatisation is playing a significant role in the reform of the economy, understanding the successes and challenges of China's privatisation programmes is crucial for policymakers and investors. The paper aims to achieve this goal by reviewing the relevant literature.

The Chinese government initiated the SIP by listing the State-owned Enterprises (SOEs) on the Shanghai and Shenzhen Stock Exchanges. State ownership was transferred to the private sector through public issue of small portions of shares. However, the majority of shares in listed SOEs are still held by the government and these are not traded. Given the partial privatisation and partial trading characteristics, the SIP has achieved only limited success. It is even seen as 'nothing different but the logo' or 'new bottles with the old wine' as it does little to weaken the state's role in economic decisions (Xu and Wang, 1997:11). In addition, the partial privatisation and partial trading result in serious conflicts between controlling shareholders and minority shareholders and divergence between political goals and profit maximization, which in turn sabotages further privatisation efforts and leads to poor corporate governance and weak legal protection for minority shareholders (Liao et al., 2014).

In trying to solve the problems associated with the SIP, the Chinese government initiated the NTS Reform in 2005, granting non-tradable shareholders the right to trade

their shares gradually in the secondary markets by paying compensation to tradable shareholders[6]. By the end of 2007, 97% of Chinese A-share listed firms had undertaken the NTS reform (China Securities Regulatory Commissions, 2008). The NTS reform aimed to dismantle the split share structure; to increase the liquidity of the stock markets and to better align the interests between the controlling shareholders and minority shareholders. As a result, the reform is expected to enhance minority shareholder protection; boost firm performance with the improved corporate governance; increase the stock price informativeness; and thereby benefit the development of China's stock markets.

Our review shows that the NTS reform has improved firm operating performance and the internal corporate governance mechanism, including reducing the insider expropriation through related party transactions, enhancing the share price informativeness, and reducing earnings management behaviour of listed firms. We argue that the overall economic and financial market development could be the major reason for the different impacts generated by the SIPs and NTS reform. As Megginson (2005) suggests, a critical step in a successful SOE privatisation is commercialization. Boubakri et al. (2005a) further note that unlike in developed countries that liberalization has been implemented prior to privatisation, trade reforms are generally implemented along with privatisation in developing economies. They document that economic growth (i.e., real GDP growth, trade openness) and stock market development (i.e., the turnover ratio) appear to be the main drivers of the performance improvements of privatised firms in developing countries. China has experienced an unprecedented rate of economic performance in recent years with nearly 10% of annual GDP growth. Meanwhile, the

[6]As most non-tradable shares were purchased at book value of equity, the purchasing prices of non-tradable shares were much lower than those of tradable shares.

stock markets in China enjoy a steady increase in the rapid economic growth environment. The market capitalization in China increases from $42 billion with 323 listed firms in 1995 to $780 billion with 1,377 listed firms in 2005 (the World Bank, 2016). Because of the improved commercialization level during the NTS reform period in comparison with the SIP period, the overall positive impacts generated by the NTS reform are not surprising.

In this paper, we first survey the privatisation programmes in developed and other developing countries, as well as its impacts on firm performance and economic growth. We then present a comprehensive summary of the privatisation programmes in China from the SIPs to the NTS reform. The review identifies the main problems associated with the SIP, and discusses in detail the implementation of the NTS reform and its impacts on firm performance, corporate governance and stock market development. Finally, we provide suggestions for future research.

2.2 Privatisation in developed and other developing countries

2.2.1 The history and methods of privatisation

Privatisation became well-known after the Thatcher government came to power in UK in 1979. However, it was not until the successful British Telecom initial public offering in November 1984 that privatisation became a basic economic policy in the UK. Its successes encouraged other industrialised counties to divest SOEs by implementing privatisation programmes (Megginson and Netter, 2001).

Privatisation has become a popular approach to reform SOEs worldwide and has been a part of government policy tool-kits for improving the efficency and productivity of SOEs, as well as developing product and security markets. From 1980 to 1987, a total of 696 privatisation transactions were recorded by Candoy-Sekse (1988), among which 456 transactions took place in developing countries. Jones et al. (1999) also document that privatisation has become a major worldwide phenomenon since the early 1980s, and governments around the world have obtained nearly $1.2 trillion in proceeds from the divestiture of SOEs through privatisation programmes (the World Bank, 2008).

Brada (1996) documents four methods of privatisation. The first is privatisation through restitution. This method is appropriate when land or other easily identifiable property expropriated in the past can be returned either to the original owner or to his or her heirs. The second method is through sale of state property, under which a government trades its ownership claim for a cash payment. Asset sales and SIPs both fall into this category, with SIP the more popular. More than 90% of the 100 largest common stock offerings in financial history have been SIPs (Megginson et al., 2000). Jones et al. (1999) provide a comprehensive study of how political and economic factors affect the SIP process in terms of the offering price, share allocation, and the transfer of power. Their results indicate that the SIP offers are more often significantly underpriced and over-subscribed. Furthermore, governments tend to favour domestic investors with respect to share allocations, and retain restrictions over certain management decisions (Jones et al. 1999). The third method of privatisation is mass or voucher privatisation, where the government distributes vouchers free or at a nominal price to eligible citizens for stakes in SOEs. The fourth method is privatisation from below, through the start-up of new private business in former socialist countries.

2.2.2 The impacts of privatisation on firm performance

Most studies find significant performance improvements in the newly privatised firms in both developed and developing countries. Megginson, Nash, and Randenborgh (MNR) (1994) compare three-year average post-privatisation financial and operating performance measures with three-year average pre-privatisation performance in 61 SIPs from 18 countries over the period 1961 and 1990. They find significant increases in output (real sales), operating efficiency, profitability, capital investment, and dividend payments, as well as significant reductions in leverage after the privatisation. The MNR method has been widely adopted in later studies, such as in Bortolotti et al. (2001) and D'Souza and Megginson (1999), Boubakri and Cosset (1998), D'Souza et al. (2005), and Boubakri et al. (2005a, 2005b). Similar results are found in these studies that privatisation increases firm output, operating efficiency, and profitability, and reduced firm leverage in both developed and developing countries. However, the change in employment level after privatisation is inconclusive.

Megginson et al. (1994) document significant increases in employment, which is possibly because of the industry deregulation before the privatisation (there tend to be reductions in employment prior to privatisation programmes). In contrast, D'Souza and Megginson (1999) find employment levels decline significantly after privatisation. They argue that these conflicting results could be caused by different sample sizes (regulated utilities represent more than one-third of the sample used by D'Souza and Megginson (1999), while only 13% of the sample used by Megginson et al. (1994)). Megginson and Netter (2001) survey the literature on privatisation and note that employment changes differ between countries and industries. Privatisation does not automatically lead to

employment reductions in divested firms as long as sales can increase fast enough after divestiture to catch up with the large productivity gains.

Boubakri et al. (2005a) and D'Souza et al. (2005) conducted similar studies to examine the potential determinants of performance improvements in divested firms of developed and developing countries, respectively. Their studies suggest that although post-privatisation performance consistently improves across both developed and developing economies, there appear to be differences in the sources of these performance improvements. D'Souza et al. (2005) argue that a well-developed and active financial market allows the newly privatised firms greater access to the capital required for development. Moreover, a high degree of domestic product-market competition can provide healthy competition and stimulate efficiency and profitability. Therefore, the relinquishment of government control and the presence of foreign ownership have the most significant impact on post-privatisation performance improvement in developed counties. However, in developing countries, factors such as the rate of economic growth and institutional factors including stock market development and the extent of legal protection are major determinants of post-privatisation performance improvements (Boubakri et al., 2005a).

2.2.3 The impacts of privatisation on investors

Privatisation has benefited investors. Megginson et al. (2000) examined the long-run buy and hold returns earned by domestic, international, and US investors who purchased shares at the first open-market price in 158 SIPs from 33 countries from 1981 to 1997. They compare one-, three-, and five-year net return indexes for SIPs with the

country index, world index, the S&P 500, and industry- matched firms. Significant and positive net returns were found against all the benchmarks. Similarly, Boardman and Laurin (2000) used 129 SIPs over the period 1980 to 1995 to investigate the determinants of the high SIPs buy and hold returns over the three-year periods. The SIP under-pricing[7] was found to have positive effects on the stock returns by sending an effective signal that government does not intend to interfere after privatisation. Relative firm size was also found to be significantly and positively associated with the stock return of SIPs, as larger firms have more room for efficiency improvements.

Perotti and Oijen (2001) use the political risk indicator of Country Credit Rating (CCR) and International Country Risk Guide (ICRG) to examine the impact of privatisation on local stock market development. They document that the political risk (proxied by CCR and ICRG) in the sample emerging markets has improved as a direct consequence of the privatisation process. They further show that the improvement in the political risk indicators is significantly and positively associated with growth in capitalization and traded value, as well as with returns.

2.2.4 The impacts of privatisation on economic growth and stock market development

Megginson (2005) emphasises the importance of privatisation for economic growth, with privatisation changing the main objective of SOEs from maximizing social welfare to maximizing profits. Moreover, new share listings directly create net new

[7] In terms of the downsides of SIP underpricing, for investors, the degree of underpricing is positively related to the risk of future returns and government interference; while for firms, underpricing may harm the firms of raising capital for expansion (Loughran et al., 1994).

wealth and employment opportunities (Megginson et al., 2000). Barnett (2000) finds that privatisation is correlated with an improvement in macroeconomic performance as manifested in higher real GDP growth rates and lower unemployment. With respect to the impact of privatisation on stock market development, Perotti and Oijen (2001) indicate that a successful privatisation programme requires institutional changes that contribute significantly to the strengthening of the legal framework underlying equity investment. They argue that the magnitude of the impact of privatisation on market development by far exceeds the direct impact of privatisation sales on market capitalization. Whenever a government uses the stock market to privatise SOEs, it has an incentive to facilitate stock market development. Trading liquidity and investment opportunities are increased by listings of large privatised firms. These effects enhance the risk-sharing function of the market and therefore lead to market deepening.

In particular, a sustained privatisation policy can resolve policy uncertainty. A strong relationship is found between gradually reduced political risk in the privatisation process and growth in stock market capitalization, traded value, and excess returns. All in all, privatisation deserves credit for its remarkable impacts on stock market development and economic growth.

2.3 Privatisation in China

The privatisation of China's SOEs began with the Third Plenum of the Eleventh Central Committee of the Communist Party of China (CPC) in December 1978. From the establishment of People's Republic of China in 1949 until 1978, almost all enterprises in China were fully state-owned. SOE executives were appointed and dismissed by the

government and usually treated as government officials. As a result, SOEs were highly unproductive and inefficient. Since 1978, the Chinese government has adopted various methods, trying to improve firm management and performance. However, compared to the privatisation programmes in other countries, China's privatisation programme has gradually undertaken this process. The reason could be that Chinese SOEs have heavy policy-determined burdens which affect the SOEs' efficiency and performance, so it is extremely difficult for the government to implement a large scale privatisation programme due to its social welfare responsibilities.

2.3.1 The SIPs in China

In order to move the establishment of the modern corporate system forward, the Chinese government launched the Corporate Law in December 1993 (Aivazian, et al., 2005). It mandated that to be publicly listed, a company must take the corporate form of a shareholding company. Moreover, the Corporate Law standardises the organization and operation of companies, and stipulates the functions and responsibilities of the shareholders' general meeting, the board of directors, and the board of supervisors.

Under the government policy of "grip on the big companies and release the small ones" (zhuadafangxiao), smaller SOEs would go through restructuring, selling and merging processes; while for medium and big SOEs, the most productive assets and employees are carved out to form shareholding companies which can be listed on the Shanghai and Shenzhen Stock Exchanges, with the non-productive assets remained in the original SOEs, which are normally the parent companies and controlling shareholders of the listed firms (Jiang et al., 2009b). In 1992, the Chinese Securities Regulatory

Commission (CSRC) was established in order to strengthen supervision relating to the stock markets and listed companies.

Unlike SIPs in other countries, China's SIP is a primary offering process with the SOEs issuing new shares to private investors. There are normally six categories of shares in a common listed SOE: state-owned shares, legal person shares, foreign shares, management shares, employee shares, and individual shares (Chen et al., 2009). State-owned shares and legal person shares are non-tradable, and accounted for about two-thirds of total shares in the early stage of China's stock markets. Foreign shares, accounting for less than 2%, are shares offered to overseas investors and include B shares traded in US dollars on the Shanghai Stock Exchange and in HK dollars on the Shenzhen Stock Exchange, H shares listed on the Hong Kong Stock Exchange, and N shares listed on the New York Exchange. Management and employee shares, accounting for less than 1% of total ownership, are offered to managers and employees at a substantial dis- count and with restrictions on trading. In the last group are individual shares, owned by private investors, which can be traded in the secondary markets (Firth et al., 2007).

The main purpose of the SIPs in China was to raise capital for SOEs and to improve SOE performance after they were restructured into shareholding companies and became publicly listed, while the government remained the controlling shareholder (Wang and Xiao, 2009).

2.3.1.1 Firm operating performance after the SIPs

Studies have examined how the SIPs affect firm performance by comparing the pre-privatisation and post-privatisation financial performance of divested companies. It is found by some that they have significantly improved the earnings, sales, and productivity of the privatised firms (Sun and Tong, 2003; Wang et al., 2004; Chen et al., 2006; Jefferson and Su, 2006). However, many studies find reduced profitability following the SIPs (Sun and Tong, 2003; Chen et al., 2006).

Sun and Tong (2003) use the MNR method and compare firm performance three years before and after the SIPs, using 634 SOEs from 1994 to 1998. They document significant improvements in earnings, sales, and employment productivity, but a significant decrease in profitability measured by return on sales (ROS) after the SIP. Similar results have been found by other studies, such as Chen et al. (2006), Wang et al. (2004), and Quan and Huyghebaert (2004).

Jia et al. (2005) investigate the SIP effect on firm performance with 53 SOEs listed on the Hong Kong Stock Exchange. They find that the SIPs in the H-share market led to an increase of 70% in real net profits, 80% in sales, and 50% in capital spending but no improvement in profitability and a significant underperformance of returns against several market index benchmarks. These studies establish the proposition that the profitability of newly privatised firms tends to decline following the SIPs.

However, other analysis using the matched- sample approach suggests that reductions in the profitability of divested firms are less than the matched samples. Wei et

al. (2003) find that the output, assets, and the sales efficiency of SOEs increase after privatisation and leverage decreases significantly, but there is no significant change in profitability, measured as net income divided by sales. They further obtain a matched sub-sample of 41 fully state-owned and 41 privatised firms for the period from 1994 to 1999 to compare profitability and net income, and find that the profitability of the privatised firms improves significantly in comparison with fully state-owned firms.

The disappointing profitability performance after the SIPs is also re-examined by Jiang et al. (2009b). They adopt a matched-sample method that compares the SIPs with the SOEs that have the closest total assets and profitability figures before the SIP period. They find that the profit- ability of SIPs increases by 2.5% on average.

2.3.1.2 The corporate governance of Chinese listed firms after the SIPs

The literature also explores the corporate governance of privatised SOEs after the SIPs. Two major governance issues are explored. The first is the inefficient ownership arrangements, including the high proportion of state ownership in privatised firms as well as the highly concentrated and the pyramiding ownership structures. The second problem is the weak internal corporate governance system, evidenced by the ineffectiveness of the supervisory board and the board of directors.

2.3.1.2.1 Ownership structure

As discussed, a Chinese listed firm typically has six different types of shares. Foreign, management and employee shares only take small proportions of the shares in

listed firms, and therefore the state-owned and legal person ownership are expected to have major impacts on the post-SIP performance and corporate governance of listed firms.

The state continues to hold substantial shareholdings in listed firms after the SIPs in China. It is debatable whether state ownership is the original source of problems of SOEs in China. Sun et al. (2002) document that state control is associated with inefficient monitoring. Without significant independent block-holders in Chinese listed firms, the objective disparity between controlling state shareholders, who are concerned more about political and social goals, and minority shareholders, who are concerned with profit maximization, results in inefficient monitoring and low firm value. On the other hand, state shareholders can get better access to government backing or subsidies.

The evidence on the impact of the state ownership on firm performance is inconclusive. Xu and Wang (1997) find that labour productivity tends to decline as the proportion of shares held by the state in a firm increases. The inefficiency of state ownership is also supported by Sun and Tong (2003) and Jia et al. (2005) who both document the negative relationship between state ownership and the firm's market valuation. However, Tian (2001) states that the state ownership in China has a positive effect on corporate governance, i.e. state ownership reduces agency cost if the state holds more than 30% of the total shares. Sun et al. (2002) detect an inverted U-shape pattern between state ownership and firm performance, indicating that too much government holding of SOE shares means too much control and interference in the firm operation and too little state ownership means too little support to solve SOEs' problems. As for different types of state ownership, Chen et al. (2009) group China's listed companies into four categories, including those controlled by state asset management bureaus (SAMBs),

state-owned enerprisese (SOEs) affiliated to the central government (SOECGs), SOEs affiliated to the local government (SOELGs), and private investors. They find that different state shareholders differ in their management and monitoring effectiveness. The SAMBs perform the worst due to the absence of incentives and the lack of management skills; the SOECGs perform the best as their dominante shareholders have stronger supervision and management skills, while the SOELGs are in-between. In addition, they indicate that private ownership is not necessarily more efficient than certain types of state ownership given the overall weak insitutional enviornment in China. Chen et al. (2009) state that retained state ownership has stronger postive effect on firm performance than private ownership when the insitutional environment is weak.

Legal person shares also cannot be freely traded in the stock markets. Unlike state-owned shares, legal person shares play a more active role in monitoring the manager's performance. Several studies like Sun and Tong (2003), Sun et al. (2002) and Xu and Wang (1997) find that the legal person ownership has a significantly positive effect on firm performance. The positive relationship remains robust for the firms listed in the Hong Kong Stock Exchange (Jia, et al., 2005).

Foreign investors who can provide better monitoring and global governance system standard are suggested to have a positive effect on firm performance. Firms which issue foreign shares are believed to be ready to support market-oriented policies. Studies like Jia et al. (2005) and Wei et al. (2005) document a positive relationship between foreign ownership and firm performance. However, the proportion of foreign ownership is very small (no more than 2%), which would limit its monitoring effect.

2.3.1.2.2 Ownership concentration

Another major characteristic of Chinese listed firms after the SIPs is high ownership concentration. Xu (2004) analyses 3,688 firm-year observations from 1996 to 2001 and shows that the average shareholding of the top three shareholders is 56%, among which the average largest shareholding is 46%.

La Porta et al. (1999) point out that under the high ownership concentration the fundamental agency problem is not the conflict between managers and shareholders, but between controlling and minority shareholders. Many studies investigate the impacts of ownership concentration in China. It is shown that with the small portion of tradable shares and more than 40% of controlling shareholding, controlling shareholders are rarely challenged by other shareholders on important issues (Liu and Lu, 2007). Gul et al. (2010) argue that the concentrated control power can deter the flow of firm-specific information to the market to cover up their self-serving behaviours, contributing to a more opaque information environment. They find a positive relationship between ownership concentration and stock price synchronicity which can harm the price-discovery function for private investors and the development of stock markets. Firth et al. (2007) point out that high ownership concentration reduces the earnings informativeness, and document that the absolute discretionary accruals are positively correlated with state ownership and ownership concentration. Therefore, high ownership concentration leads to information asymmetry and provides weak legal protection to minority shareholders, which in turn has negative effects on firm performance and stock market development (Cheung et al., 2005).

2.3.1.2.3 Separation of control and cash-flow rights

Pyramiding ownership—the formation of a corporate group by investing vertically—is very common in China. For example, a holding company or a person invests in its subsidiary that has its own subsidiaries, and establish the second and third subsidiaries as a financial channel by the controlling owner (Watanabe, 2010). In China, more than 70% of listed companies feature with pyramid structure (Wang and Xiao, 2009). Firms are faced with great agency costs under pyramid structure, because the ultimate owners can grasp large control rights with relatively small cash flow rights, and this separation between control and cash flow rights creates incentives for ultimate owners to expropriate outside small shareholders by transferring resources for their own benefit (Fan et al., 2012). Watanabe (2010) points out that with relative small cash flow rights, the ultimate owners of pyramid-structure firms have smaller bankruptcy responsibility, and therefore have more motivation to adopt risky debt financing behaviours.

Furthermore, Bradford et al. (2013) argue that long control chains can allow an excess use of the internal capital to reallocate funds across firms and units under corporate pyramids. They find the longer the control chain, the lower the dividend payout ratio and the dividend yield. Overall, the separation of control and cash-flow rights is one of the reasons behind the inefficiency of the Chinese SOEs, which thus undermines the firm performance and interests of minority shareholders.

2.3.1.2.4 Internal governance

Chinese companies have a two-tier board structure consisting of a supervisory board and a board of directors. [8] The supervisory board is set up to review the financial affairs of the company and to oversee its financial statements. Some studies have investigated the effectiveness of supervisory boards and boards of directors and argue that the internal governance of Chinese listed firms may not be as strong as the formal structures suggest (Dahya et al., 2002, Firth et al., 2007).

Dahya et al. (2002) argue that supervisory board members have no power to hire or dismiss top managers or directors, and they hold an extremely small portion of shares, giving them little incentive to do their job properly. Similar results are shown in Dahya, et al. (2003) that the supervisory board has little power to affect manager's decisions on behalf of shareholders.

Board of directors of Chinese firms are made up of executive and non-executive director, and since 2003, at least one-third of directors have to be independent to comply with the CSRC regulation. Although minority shareholders are able to vote for the appointment of directors, dominant investors who are state affiliated mostly make the final decisions (Firth et al., 2007). In most cases, top managers and directors in SOEs are government officials or are politically connected with a limited understanding of business operating, and are paid according to their administrative rankings rather than firm performance (Xu and Wang, 1997). Therefore, agency problems occur when directors'

[8] China's company law, enacted in 1993.

main concern is to achieve their political promotion, rather than to maximise the firm value.

In addition, Wang (2015) investigates the effect of politically connected independent directors on firm performance, and points out that having politicians as independent directors may help privately controlled firms obtain external resources controlled by the government, such as accessing debt financing and tax benefits. However, in SOEs, the politically connected independent directors may represent the interests of the state, enlarging the magnitude of related-party transactions. Therefore, the independent directors who have political connections are unable to provide an efficient monitoring or add value to state controlled firms. On the other hand, Chen et al. (2006) and Firth et al. (2007) suggest that the large size of independent directors and supervisory boards could significantly reduce the fraud and tunnelling practices, and enhance information about earnings.

To conclude, the SIPs in China have raised large amounts of capital for Chinese SOEs, and enhanced SOEs' firm performance to some extent. However, the partial trading and partial privatisation features not only lead to a poor corporate governance system that provides weak minority shareholder protection (Wu et al., 2009) but also jeopardises the development of Chinese stock markets. Cai et al. (2007) point out that the separated ownership structure constrains the financing function of the Chinese stock markets in that non-tradable shares tend to be severely undervalued, and equity financing is mainly realised through tradable shares. Moreover, investors speculate in the stock market for short-term return rather than targeting long-term returns since only one-third of total shares outstanding are traded and it is relatively easy to manipulate the stock prices (Liu and Tian, 2012). Therefore, dismantlement of the dual share structure,

relinquishment of government control and improvement of country-level governance institutions are the major challenges influencing the further development of Chinese SOEs and China's stock markets after the SIPs.

2.3.2 The Non-tradable share reform in China

After fully realizing the problems in SOEs and Chinese stock markets caused by SIPs, the government attempted to sell some of the state-owned shares of listed SOEs from 1999 to 2001. However, those attempts ended in failure when the market reacted adversely, dropping sharply. The Shanghai and the Shenzhen Composite Indexes dropped by 7.3% and 6.8% respectively in 1999, and 31% and 32.9%, respectively in 2001 (Liao et al., 2014). In 2005, emphasised as "no turning arrow" by the chairman of the CSRC Dr. Shang Fulin, the Non-tradable Share Reform was launched and non-tradable shareholders pay negotiated compensation to tradable shareholders in order to convert non-tradable shares into tradable gradually.

The Chinese Listed Firm's Non-Tradable Share Reform Regulation issued by the CSRC in 2005 details several steps of the execution procedure. First, non-tradable shareholders with more than two-thirds of the outstanding shares are required to write an attorney's letter to the board of directors to announce a special shareholder's meeting. Second, after receiving the attorney's letter from the non-tradable shareholders, the board of directors hires sponsor institutions and lawyers for assistance and legal advice. Third, the board of directors announces the date of the special meeting which has been discussed with the stock exchanges, and then publishes the proposal of the reform programme, and applies for stock trading suspension. Fourth, within 10 days of the announcement, the

board of directors is entitled to assist the non-tradable shareholders to collect the opinions from tradable shareholders via a hotline, faxes, emails, and media meetings. Fifth, the proposal of the reform can be approved only based on the agreement of more than two-thirds of total shareholders and two-thirds of tradable shareholders. Last, the approved proposals are required to be published within two days after the approval, and then stocks can be traded (CSRC, 2005). Overall, the non-tradable reform attempts to be flexible rather than imposes a one-size-fits-all solution, and leaves the final decision to shareholders, especially tradable shareholders.

As a means of providing stock market stability, following less successful prior attempts, the Chinese government mandates a compulsory lock-up period of 12 months for non-tradable shares after the reform plan's effective day, in order to stabilise the stock markets. In addition, the tradability of the non-tradable shares must be announced 5 days before the end of lock-up period. To avoid an extra increase in the stock supply, a non-tradable shareholder is not allowed to sell more than 5% (10%) of the outstanding shares within 12 (24) months after the lock-up period. By the end of 2007, 97% of the firms trading on the Chinese A-share markets had completed the reform (Li et al., 2011).

Cai et al. (2007) investigate the market reactions around several important event days during the process of the NTS reform. They use event study methodology and find that, in general, the NTS reform generates significant average cumulative abnormal returns of 4.3% during 120 days around the reform without considering the compensation effect. The results indicate that the market interprets the reform as good news; the average market-adjusted buy-and-hold returns over 240 days around the reform reaches 30.8%

after adjusting for compensation, indicating that the reform significantly increases the wealth of tradable shareholders.

2.3.2.1 The determinants of compensation paid to tradable shareholders

The non-tradable share prices are based on the book value of the firm assets which are much lower than the market prices of tradable shares (Cai, et al., 2007). The compensation, therefore, is required by tradable shareholders for granting the tradability of non-tradable shares. Many studies provide evidence that different ownership identities including the state ownership, mutual funds and Qualified Foreign Institutional Investors (QFIIs) ownership, corporate governance and risk sharing incentive have significant impacts on the compensation ratio.

State ownership is found to have a significantly positive effect on the compensation paid to tradable shareholders (Cheng et al., 2012; Chen et al., 2011a; Li et al., 2011). The Chinese government was eager to complete the reform, so that the state-owned firms intend to offer higher compensation trying to set an example to other listed firms. In addition, the faster and more efficiently the controlling shareholders conduct the reform, the more political credits can be added in their political interests, and also the easier for future listings of other state-owned firms (Firth et al., 2010). From the tradable shareholders' perspective, they would require more compensation with larger non-tradable ownership due to the downward pressure on stock prices caused by the extra supply of stocks (Liao et al., 2014; Li et al., 2011; Hou and Lee, 2014; Firth et al., 2010; Zhang and Xia, 2013).

As tradable shareholders, mutual funds get more benefits with higher compensation (Firth et al., 2010). As a result, mutual fund managers should fight for better compensations when voting the reform plans. However, the voting rights were taken away from mutual funds and passed to the Investment Decision Committee whose members are appointed and approved by the CSRC. Since the CSRC was under pressure to ensure the reform was completed efficiently, it put pressure on the mutual fund voting representatives. Firth et al. (2010) document that mutual fund ownership has a negative impact on the compensation. In December 2002, China allowed QFIIs to trade in the A-share markets (Zhen, 2013). Unlike mutual funds, QFIIs face less political pressure and can provide more efficient monitoring to reduce the agency problems.

Yeh et al. (2009) find a negative relationship between foreign ownership and compensation. They argue that foreign ownership stands for good governance, and in this case, tradable shareholders would ask less compensation in firms with foreign shareholders. Similarly, Huang and Zhu (2014) show that foreign ownership is negatively related to the compensation to tradable shareholders. However, by creating an interaction variable between foreign ownership and state control, Huang and Zhu (2014) further find that in state controlled firms, foreign ownership is positively related to the compensation ratio. They give two possible reasons. First, foreign shareholders are considered valuable and therefore they have greater influence on the controlling state shareholders. State shareholders are willing to offer higher compensation in order to retain them. Second, foreign ownership benefits tradable shareholders in state controlled firms given foreign shareholders are less prone to the political pressure and more likely to perform an arms-length negotiation.

With regard to corporate governance, it is argued that firms with weak corporate governance are vulnerable to economic downturns, which makes tradable shareholders demand more compensation for their safeguard (Lee and Yeh, 2004). Yeh et al. (2009) investigate the impacts of corporate governance on compensation ratios. They use the pledge ratio (the percentage of non-tradable shares that are pledged for bank loans) and relative-party transactions (the total amount of related-party transactions to a firm's total sales) to measure the weak corporate governance. They find both measures are positively associated with compensation ratio paid to tradable shareholders, indicating that a higher compensation is required by tradable shareholders in firms with poor corporate governance. On the other hand, efficient monitoring by independent directors is found to have a negative relationship with compensation ratios (Yeh et al., 2009).

Prior to the NTS reform, controlling shareholders were not well diversified, as they held a high proportion of shares of one particular firm. Li et al. (2011) state in firms with high idiosyncratic risk, controlling shareholders would offer high compensation in order to achieve a diversification effect. Their results demonstrate that the compensation ratio is positively related to the gains from risk sharing, especially for the non-diversified non-tradable shareholders as they are exposed to more idiosyncratic risk from their excess shareholdings.

2.3.2.2 The impacts of the NTS reform on firm performance

Several studies have examined the impacts of the NTS reform on firms' financial and operating performance. Liao et al. (2014) and Chi et al. (2014) use the MRN method to compare the changes in output, profitability, employment and productivity of listed

firms before and after the NTS reform. Both studies document that the reform boosts SOEs output, profitability and employment. Different from the "profitability puzzle" after the SIPs documented by Sun and Tong (2003), Wei et al. (2003), Jia et al. (2005) and Chen et al. (2006), the SOEs profitability increases significantly after the NTS reform. Therefore, the NTS reform in China has achieved a greater success on firm financial and operating performance in comparison with the SIPs, especially on profitability (Chi et al, 2014).

With respect to the determinants of the performance improvement, some studies argue that the better alignment of the interests between the controlling and minority shareholders is the main reason behind the performance improvements. Jiang et al. (2008) argue that due to the mandated lock-up period, controlling shareholders have more incentive to pressure firm management to focus more on profit maximization. Moreover, Liao et al. (2014) state that the improvements of SOE performance after the NTS reform are positively related to government agents' privatisation-led incentive of increasing share value. In addition, Chi et al. (2014) and Huang and Wang (2011) find a negative relationship between state ownership and firm performance, revealing that the relinquishment of government control would significantly enhance firm efficiency and profitability. Overall, the NTS reform has successfully improved the firm performance as it adopts a market mechanism that aimed at profit maximization.

2.3.2.3 The impacts of the NTS reform on corporate governance

Following the SIPs in China, the dominant shareholders paid little attention to the stock performance since they are non-tradable and cannot benefit from price appreciation

in the secondary markets. The literature suggests that controlling shareholders expropriate firm resources from minority shareholders to pursue their own interest, which undermines the firm performance and minority shareholder's interests (Claessens et al., 2000).

It is argued that the NTS reform creates an incentive alignment effect exogenously, which narrows the incentive divergence between the controlling and minority shareholders (Kuo et al., 2014). Tradable shares are priced based on the market; while the price of non-tradable shares is primarily based on the net asset value of the firm. Therefore, they have much lower price-earnings ratios than tradable shares. Non-tradable shareholders (who are generally controlling shareholders) have very little focus on minority shareholders' interests (e.g. market based tradable share value) given the market price movement has litter impact on the value of non-tradable shares (Liao et al., 2014; Kuo et al., 2014). The NTS reform reduces this incentive divergence naturally as the key objective of the reform is to convert non-tradable shares into tradable shares.

The impact of the NTS reform on corporate governance is tested using earnings management, related party transactions, share price informativeness and foreign share discount puzzle. Jiang and Habib (2012) investigate earnings management practices in China during the pre-reform, reform transition, and post-reform period from 2001 to 2009. They find an insignificant relationship between tradable shareholding and absolute discretionary accruals in the pre-reform and reform-transition periods, but a strong negative relationship between tradable shareholding and earnings management in the post-reform period. They argue that with the new era of full share circulation, a strong monitoring system is in place for the corporate governance. Tradable shareholding, therefore, can significantly reduce earnings management practices. However, Xiao (2015)

argues that the state shareholders and legal person shareholders obtain their shares at book value when firms go public, so that they have strong incentives to realise capital gains. Therefore, the NTS reform provides them with opportunities to engage in earnings manipulations to facilitate the trading.

A significant increase in income-increasing accruals after the NTS reform is found by Xiao (2015) using the data from 2001 to 2011. Moreover, Kuo et al. (2014) argue that although the incentive alignment effect created by the reform has improved the quantity of financial information, the reform has not fundamentally and automatically increased the quality of the earnings information. They detect that accrual-based earnings management decreases significantly after the reform, while the real-based earnings management, which is less detectable and less scrutinised, has a significant increase after the reform. Kuo et al. (2014), therefore suggest that the reduction of controlling shareholder's expropriation associated with a better legal protection environment still has a long way to go.

Another way for dominant shareholders to expropriate resources from minority shareholders is through related party transactions. Related party transactions are the transactions between a company and related entities, such as parent companies, subsidiaries, affiliates, principal owners, officers, and directors (D'Souza et al., 2010). Liu and Tian (2012) state that the NTS reform could provide better legal protection and decrease the excess control rights which in turn reduce the tunnelling practices through pledging bank loans and related party transactions. However, the evidence in this research area is inconclusive. Zhang and Xia (2013) explore the large shareholders' behaviour after the NTS reform from 2006 to 2010. They document an inverted U-shaped relationship

between the largest shareholding and related-party transactions. When the largest shareholding is less than 30% of outstanding shares, there is a significantly positive relationship between the two variables, but the relationship turns significantly negative when the largest shareholding is larger than 30% of total shares outstanding.

Good corporate transparency not only improves firm performance, but also increases the credibility of firm's disclosure, benefitting minority shareholders and the stock market functions (Hou et al., 2012). Hou et al. (2012) examine the NTS reform effects on the corporate transparency of Chinese listed firms by testing share price informativeness. They find a significant increase in share price informativeness after the NTS reform, especially among those firms with a higher proportion of state-owned shares and non-tradable shares.

The foreign share discount puzzle is a phenomenon that foreign shares are widely traded at a discount as the foreign investors lack local knowledge to detect expropriation activities, and then require higher returns (Bailey et al., 1999). With better corporate transparency, foreign investors' concern for the insider expropriation becomes less, and therefore requires less expected stock returns (Hou and Lee, 2014). Hou and Lee (2014) document a significant decline of the foreign share discount after the NTS reform, and the results are more pronounced in the firms with higher state ownership.

To summarise, studies so far show evidence that the NTS reform provides some solutions for issues caused by split structure ownership in Chinese listed firms, better aligns the interests between controlling and minority investors, and improves the firm performance and corporate governance.

2.4 Conclusion and future research

This paper first summarises previous studies on privatisation in developed and other transitional economies and shows that privatisation has achieved significant improvements in financial and operating performance of divested firms in both developed and other developing countries.

We then discuss the privatisation programmes in China in detail from its SIPs to the NTS reform. Unlike the privatisation in other countries, China's SIPs are partial privatisation programmes with trading restrictions which cause several governance problems, including the conflicts of interest between controlling shareholders and minority shareholders and the managing divergence of political objectives and profit maximization. In this paper, we summarise the studies exploring the firm performance changes after the SIPs and the poor corporate governance of Chinese privatised firms caused by the partial trading and partial privatisation features of the SIPs.

The NTS reform launched in 2005 is expected to provide the solution for corporate governance issues of Chinese listed firms. It would gradually solve the trading restriction for non-tradable shareholders, and also open the gate for Chinese listed SOEs' second round privatisation (Liao et al., 2014). Our paper presents an overview of the NTS reform process, and summaries the improvements of performance and governance associated with the NTS reform. Although not conclusively, the existing empirical results show that the reform improves firm operating performance and corporate governance (e.g., reduces earnings management and the insider expropriation through tunnelling). Overall, the NTS

reform has yielded greater improvements in firm performance and corporate governance compared with the gains from the SIPs in China.

For future research opportunities, as most of listed firms have passed the lock-up period, it would be valuable to investigate the ownership changes from a long-term perspective and the determinants behind the changes. Moreover, existing studies examine the impact of the NTS reform on firm performance and corporate governance when the lock-up period of non-tradable shares generally enforces. Future studies may focus on the impact of the reform on various aspects, e.g., firm performance, corporate financial decisions, corporate governance, and stock markets development when the full share circulation is achieved.

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STATEMENT OF CONTRIBUTION
DOCTORATE WITH PUBLICATIONS/MANUSCRIPTS

We, the candidate and the candidate's Primary Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of candidate:	Feng Xie
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(This form should appear at the end of each thesis chapter/section/appendix submitted as a manuscript/ publication or collected as an appendix at the end of the thesis)

CHAPTER THREE

ESSAY TWO

This chapter presents the second essay of this thesis which investigates the impact of residual state ownership on stock return volatility. Specifically, it examines how the signalling effect of residual state ownership affects stock return volatility following the Non-tradable Share Reform. Section 3.1 overviews the study. Section 3.2 presents related literature review and hypothesis development. Section 3.3 describes the data used in this study. Section 3.4 discusses the empirical results. While Section 3.5 concludes. The chapter's appendices and references are presented in the Appendix B and the Reference sections, respectively.

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Does residual state ownership increase stock return volatility? Evidence from China's secondary privatisation

Abstract

Using hand collected data of tradable state ownership in Chinese listed firms, we find state ownership is significantly and negatively related to stock return volatility after the Non-tradable Share (NTS) reform, which is referred to China's secondary privatisation. This result indicates that the retention of state ownership in the aftermath of sudden changes can signal the government's willingness to bear residual risk and, in turn, mitigate corporate performance uncertainty. In addition, residual state ownership is found to influence firm risk and therefore stock return volatility through more conservative corporate policies. Further, the volatility-mitigating effect is more prevalent in firms in which the government has greater influence on corporate decisions. However, the relationship between state ownership and stock return volatility turns positive three years after state shares become fully tradable, suggesting that the volatility mitigating effect is constrained by a short-term effect. Our results are robust when controlling for endogeneity issues.

Keywords: Investor uncertainty; Residual state ownership; Stock return volatility; China

JEL Classification: **G32, G34, G38**

3.1 Introduction

This study investigates the impact of residual state ownership on stock return volatility after the Non-tradable Share (NTS) reform in China, when all state-owned shares become fully tradable. The NTS reform was launched in 2005 as a major reform in Chinese financial markets, which transferred nearly two-thirds of total shares from non-tradable into tradable shares. Non-tradable shares were mainly held by state agencies or state-owned enterprises (SOEs); and therefore, the NTS reform is also referred to as China's secondary privatisation (Liao et al., 2014).

Although there was an unambiguous global trend of privatisation from the early 1980s, a global resurgence of government ownership is taken place recently, due to the increase of the uncertainty in the global economy after the global financial crisis and the rise of China as a global economic power among other factors (Megginson, 2016). The controversy of state ownership role has been long-standing. One strand of literature argues that governments use SOEs to pursue their political and economic benefits, for example, to achieve excess employment, election support, or private benefits diverted from insider expropriation (Dinc and Gupta, 2011; Liu et al., 2006; Shleifer and Vishny, 1994). Another strand of literature finds that governments provide political and financial back-up, which in turn, improves firm performance (Blanchard and Shleifer, 2001). State ownership also lowers excess risk-taking (Boubakri et al., 2013; Khaw et al., 2016); offers monitoring, especially when legal protection is weak (Chen et al., 2011b; Perotti, 2003); and enhances corporate value during crises (Borisova et al., 2015).

China deserves special attention on this research topic. First, the rise of China as

a global economic power has provided a competing model of business ownership and organization, where the economic rise is dominated by SOEs and the Chinese government controls a significant proportion of shares in listed firms (Megginson, 2016). Second, corporate governance in China, in general, is inefficient (Allen et al., 2005). The evidence of the impact of residual state ownership in China can shed light on other countries with poor legal protection and law enforcement. Third, the NTS reform provides a great natural experiment to examine the influence of residual state ownership in the aftermath of sudden shocks, as the reform is exogenous. Therefore, it is essential to examine the role of residual state ownership in China after the NTS reform, given the great uncertainty caused by the full tradability of nearly half of the market capitalization in the world's second largest economy. The findings of this paper provide evidence for the role of residual state ownership under great uncertainty after a major economic reform in a country with weak an institutional framework and/or poor investor protection.

In this paper, our manually collected tradable state ownership allows us to examine the role of residual state ownership on stock return volatility in a new Chinese setting with full tradability of state shares. Following existing literature (Pan et al., 2015; Li et al., 2011), we use both the monthly and daily realised return volatility and idiosyncratic return volatility to measure stock return volatility. Our paper first contributes to the role of state ownership literature. In contrast with the study of Chen et al. (2013) who find non-tradable state ownership increases stock return volatility in China, we show a significantly negative relationship between tradable state ownership and stock return volatility. This result is in line with Perotti (1995, 2003) who states that the retaining of state ownership in the aftermath of sudden changes signals the government's willingness to bear the residual risk and stabilises the uncertainty of the

financial markets. In addition, state ownership may offer effective monitoring, especially when the investor legal protection is weak (Chen et al., 2011b; Perotti, 2003). After the tradability change of state shares, the state ownership could act as a stabiliser of the markets, and inspire investors' confidence when there is a potential of large extra supply of stocks in the markets. Our study provides empirical evidence to justify the resurgence of state ownership after the 2008 crisis and empirical evidence of the positive role of state ownership in a weak institutional environment and under economic uncertainty suggested by Megginson (2016).

To help address the endogeneity issues, we use three methods in this paper. First, we employ a change-in-change approach. If residual state ownership affects stock return volatility, then the change in residual state ownership should be related to changes in volatility, and this is what we find. Second, we follow Liu et al. (2017) and adopt a variable for corruption as an exogenous shock. Firms located in corrupt provinces are expected to have higher stock return volatility. Using difference-in-difference univariate tests, we find that state-controlled firms have lower stock return volatility in the presence of corruption compared to private firms. Third, as a further robustness test, we extend our sample period from 2007-2014 to 2003-2014. We then construct the treatment group containing firms with state ownership and whose ultimate controller is the state, and the control group with purely private firms. The difference-in-difference tests show that state ownership mutes the stock return volatility aggravated by the 2005 NTS reform. Overall, the estimates addressing endogeneity show that state ownership is associated with less stock return volatility after the NTS reform, which support our argument that residual state ownership credibly signals the government's willingness to bear residual risk in the aftermath of sudden policy shock.

Second, this study examines the time effect of the volatility mitigating effect of residual state ownership. We construct a long-run effect dummy that equals one if the observation year is three years after state shares become fully tradable. The coefficient of the interaction variable between residual state ownership and long-run effect dummy turns positive when the volatility is measured by standard deviation of daily stock returns. Therefore, the volatility mitigating effect of residual state ownership tends to be only pronounced in the short-term after an economic reform. We argue this result suggests the overall poor corporate governance of state ownership, which is in line with Chen et al. (2013). Our study provides important implications on China's secondary privatisation and SOE reform. Retaining residual state ownership shows positive effect on mitigating stock return volatility in a short-time period after the sudden regulation changes (non-tradable shares transferred into tradable shares). However, the residual state ownership tends to increase stock return volatilities in the long-run. Therefore, further privatisation could be critical for the long-run development of the Chinese financial markets. Our evidence calls for further studies on the long-run effect of the resurgence of state ownership after the crisis.

Third, we add new evidence on the corporate policies channels that government ownership could use to influence firm riskiness and, therefore, stock return volatility followed by the NTS reform. We find that firms with higher government ownership are more likely to adopt conservative corporate policies, which in turn, reduce stock return volatility. Further, we find that the volatility mitigating effect of residual state ownership is more pronounced in firms controlled by government agencies, which are subject to stronger political motivations on firm decisions (Chen et al., 2009), compared to SOEs or

non-state controlled firms.

Lastly, we add new evidence to the determinants of the privatisation decision-making process, e.g., the goal of the government during the reform transition and post-NTS reform period. We find the Chinese government maintains the ownership and control in economically important firms and sectors after the NTS reform. The results indicate that state shareholders are motivated to mitigate the concerns associated with the reform. These concerns include investor and manager uncertainty regarding future commitments of the government (Perotti, 1995).

The remainder of the chapter proceeds as follows. Section 3.2 shows the literature review and hypothesis development. Section 3.3 describes the sample and variable measurements. Section 3.4 presents the analyses and discussion of the results. Section 3.5 concludes.

3.2 Literature review and hypothesis development

3.2.1 Institutional background

A unique characteristic of Chinese capital markets before the NTS reform was a dual share structure where almost two-thirds of listed firms' outstanding shares were non-tradable and mainly held by the state, and where only one-third of shares mostly held by individual and institutional investors could be traded freely in the markets (Firth et al., 2007). Literature has documented the problems caused by the partial trading and partial privatisations, including a poor corporate governance system due to incentive disparity between controlling and minority shareholders (Liao et al., 2014); low financing function as the equity financing was mainly realised through tradable shares (Cai et al., 2012); and investor speculation, price manipulation, and highly volatile stock prices as only one-third of the total shares were traded (Liu and Tian, 2012; Allen et al., 2005; Xiong and Yu, 2011).

In 2005, after a few unsuccessful attempts, the Chinese government launched the NTS reform, aiming to overcome these issues. This reform converted non-tradable shares to tradable shares, with negotiated compensation paid from the non-tradable shareholders to tradable shareholders, as the purchase prices of non-tradable shares were much lower than those of tradable shares. In order to avoid a sudden increase of the stock supply, the Chinese government mandates a compulsory lock-up period of at least 12 months for non-tradable shares after the reform completion.

3.2.2 Literature review and hypothesis development

For decades, academics have argued that state ownership is the source of corporate inefficiency, as governments aim to achieve both economic and political benefits, such as excess employment, election support, and private benefits diverted from insider expropriation (Shleifer and Vishny, 1994; 1998). A number of studies have documented that firms enjoy significant firm performance improvements after privatization (Boubakri and Cosset, 1998; Bortolotti et al., 2001; Megginson et al., 1994).

However, privatisation, particularly massive privatisation could create serious risk. Goodhue et al. (1998) point out that the "big bang" privatisation approach may impede the market liberalization transition and reduce social welfare. The NTS reform launched in 2005 opens the gate for the second-round of privatisation in China. As those state shares counted for nearly half of the market capitalization in China and were purchased at the book value of the firm assets at the SIP, the Chinese government is offered a great opportunity to obtain large capital gains following the reform (Cai et al., 2012; Liao et al., 2014). Therefore, it is of high concern whether the residual state ownership will cause high stock return volatility after the NTS reform.

Perotti (1995) presents credible privatisation by adopting a theoretical model and argues that residual state ownership can send a signal to investors that governments are willing to bear residual risk, especially after sudden policy changes that may cause considerable uncertainty. Once the firm is privately owned, a government's capacity to interfere is reduced by the private owner's residual rights of control (Grossman and Hart, 1980). In addition, Pástor and Veronesi (2012) show that political uncertainties increase

stock volatilities and correlations among stocks. Prior studies show that stock volatility is of concern to investors, as it affects investors' portfolio and investment strategies. It is documented that stock return volatility impacts the number of stocks required to fully diversify a portfolio (Campbell et al., 2001) and can also influence the predictability of expected stock returns (Ang et al., 2006) and future earnings (Jiang et al., 2009a).

The uncertainty driven by investor concerns of whether shareholders of previously non-tradable shares, of which the government is the largest, will divest their now tradable shares could increase stock return volatility. Further, the sharp market falls and increased volatility of previous failed NTS reforms (Liao et al., 2014) are evidence of the risks associated with China's secondary privatization.[9] Consistent with Perotti (1995), we argue the Chinese government can credibly signal its willingness to share residual risk through retaining residual state ownership after a firm's NTS reform implementation.

Studies have also documented that state ownership in countries with poor legal protection and law enforcement is able to reduce corporate risk-taking and stabilise corporate performance fluctuation. Boubakri et al. (2013) and Khaw et al. (2016) both find that state ownership is negatively associated with corporate risk-taking using worldwide and Chinese data, respectively. Therefore, following Perotti (1995), Bortolotti and Perotti (2007), and Pástor and Veronesi (2012) and in the absence of a well-functioning legal framework and competitive property rights market, we expect residual state ownership to signal the government's willingness to share residual risk following the NTS policy change. Residual state ownership reduces investor uncertainty

[9] The government's previous attempts at transforming non-tradable state-owned shares into tradable shares did not end well and the stock market dropped sharply. The Shanghai and Shenzhen Composite Indexes dropped by 7.3% and 6.8%, respectively, in 1999 and by 31% and 32.9%, respectively, in 2001, when the government announced such attempts (Liao et al., 2014).

surrounding the reform, which, in turn, reduces stock return volatility. We, therefore, hypothesize the following:

Hypothesis 1: **Residual state ownership is negatively related to the stock return volatility during China's secondary privatisation.**

3.3 Data and variables

3.3.1 Data collection and description

We hand collect firms listed on the Shanghai and Shenzhen Stock Exchanges that have residual state ownership after the NTS reform. The time period of our sample is from the year that state shares of the firm become fully tradable, starting from year 2007 to year 2014.[10] We first manually collect the dates when state shares of each individual firm become fully tradable.[11] Then we manually collect the number of tradable state shares from Sina Finance (http://finance.sina.com.cn), which is the sum of state ownership among the top ten tradable shareholders.

Other data used in this study is collected from the CSMAR China Stock Market Financial database and CSMAR China Listed Firms' Corporate Governance Research database. The firms that do not implement the NTS reform during the sample period are

[10] We exclude from our sample a small number of firms that did not implement the NTS reform between 2007 and 2014. In 2007, our first sample year, 97% of the A-share listed firms had already implemented the NTS reform and, by 2014, only four companies, which were financially distressed firms, had not implemented the reform.

[11] We start the observation year if the announcement of being fully tradable is made before July 1 in a given year. For example, if a firm's state shares became fully tradable on October 11, 2009, the starting year for state ownership data collection will be 2010. That information is hand-collected from the China Securities Regulatory Commission (CSRC) official information disclosure website (www.cninfo.com.cn).

excluded. After deleting the outliers at the 1% and 99% levels, the final sample in our study contains 1,653 listed firms, e.g. 6,229 firm-year observations for the period from 2007 to 2014.

Panel A of Table 3.1 shows the distribution of the firm-year observations categorized by year and the time trend of residual state ownership by year. The firm-year observations increased gradually from 28 in 2007[12] to 1,310 in 2014, illustrating that the state shares become tradable as time goes by. The average tradable state ownership in 2007 and 2008 are 8.93% and 22.45%, respectively indicating firms with less non-tradable state ownership complete the tradability transfer first. From 2009 onwards, the average tradable state ownerships are all above 30%, which shows state is still an important shareholder in listed firms after the NTS reform. Panel B of Table 3.1 shows the distributions of sample firm-year observations categorized by industry.

Table 3.2 reports the summary statistics of residual state ownership changes by year, industry, and the nature of ultimate controller, respectively. Panel A shows that state ownership overall decreased after the NTS reform, but the average decrease level in each year is less than 1%. The changes of state ownership show a big range with the maximum decrease of 57.25% happened in 2014 but also the largest increase of 54.91% happened in 2012. Panel B shows that firms from the financial sector have the highest average reduction of 5% with 70% of firm observations in this sector experiencing a decrease in state ownership. While industries, such as transport, storage and postal services; information transmission, software and information technology services; real estate; culture, sports and

[12] The results hold if we exclude observations in 2007 for robustness.

Table 3.1. Time trend of state ownership and distribution of sample firms

Panel A reports the time trend of the tradable state ownership over the sample period from 2007 to 2014. Panel B reports the distribution of 6229 sample firm-year observations by categorized industry.

Panel A: The time trend of state ownership				
Year	**Observation**	**Mean**	**Min**	**Max**
2007	28	0.089	0.003	0.439
2008	160	0.225	0.003	0.791
2009	447	0.319	0.002	0.790
2010	828	0.313	0.002	0.795
2011	1,044	0.321	0.002	0.797
2012	1,163	0.322	0.002	0.797
2013	1,249	0.336	0.002	0.797
2014	1,310	0.317	0.002	0.797
Total	6,229			

Panel B: By industry[13]		
Industry	**Firm-year observation**	**Percentage (%)**
Agriculture, forestry	81	1.30
Mining	120	1.93
Manufacturing	3,961	63.59
Electric power, heat, gas and water	379	6.08
Construction	102	1.64
Wholesale and retail	607	9.74
Transport, storage and postal services	246	3.95
Accommodation	25	0.40
Information transmission, software and information technology services	83	1.33
Financial	16	0.26
Real estate	362	5.81
Leasing and commercial service	33	0.53
Water conservancy, environment and public facility management	57	0.92
Culture, sports and entertainment	60	0.96
Others	97	1.56
Total	6,229	100

[13] The industry classification is based on the 2012 CSRC industrial classification of listed companies with 16 industries. For more details, please refer to CSRC, 2012. Beijing: The Guidelines for the Industrial Classification of Listed Companies (No. 31).

Table 3.2. Summary statistics of state ownership changes

This table reports summary statistics of the state ownership changes (calculated by S_t-S_{t-1}) by year, by industry, and by the nature of the ultimate controller[14], respectively.

By year					
	Observation	**Mean**	**Median**	**Min**	**Max**
2008	22	-0.016	0.000	-0.332	0.057
2009	141	-0.007	-0.002	-0.469	0.543
2010	410	-0.005	0.000	-0.544	0.505
2011	740	-0.001	0.000	-0.443	0.528
2012	952	-0.001	0.000	-0.249	0.549
2013	1036	-0.004	0.000	-0.425	0.449
2014	1104	-0.010	-0.002	-0.573	0.451
By industry					
	Observation	**Mean**	**Median**	**Min**	**Max**
Agriculture and forestry	64	-0.007	0.000	0.057	0.016
Mining	86	-0.001	0.000	-0.164	0.207
Manufacturing	2,767	-0.007	0.000	-0.573	0.505
Electric power, heat, gas, and water	275	-0.003	0.000	-0.249	0.253
Construction	77	-0.002	0.000	-0.110	0.249
Wholesale and retail	419	-0.003	0.000	-0.318	0.528
Transport, storage, and postal services	179	0.001	0.000	-0.193	0.543
Accommodation and catering	19	-0.003	0.000	-0.056	0.008
Information transmission, software, and information technology services	64	0.006	0.000	-0.121	0.433
Financial	10	-0.051	-0.056	-0.301	0.191
Real estate	268	0.001	0.000	-0.489	0.549
Leasing and commercial service	21	-0.016	-0.004	-0.184	0.029
Water conservancy, environment, and public facility management	45	-0.003	0.000	-0.129	0.179
Culture, sports, and entertainment	44	0.004	0.000	-0.204	0.410
Others	67	0.005	0.000	-0.116	0.267
By the nature of ultimate controller					
	Observation	**Mean**	**Median**	**Min**	**Max**
SOIs	2,039	-0.002	0.000	-0.425	0.549
SOEs	793	-0.003	0.000	-0.489	0.543
Non-state controls	1,573	-0.009	0.000	-0.573	0.502

[14] We categorize firms as SOIs if the ultimate controller is a government agency, as SOEs if the ultimate controller is an SOE, and as non-state controls otherwise.

entertainment have, on average, an increasing of state ownership during the sample period. In addition, firms from manufacturing and real estate report larger range of state ownership changes. Panel C shows the state ownership change in subsamples based on the nature of firms' ultimate controller. Firms whose ultimate controllers are non-state owners, have the largest proportion of decreases in state ownership compared to firms ultimately controlled by the state.

3.3.2 Stock return volatility measures

Following existing literature, we use both the realised return volatility and idiosyncratic return volatility to measure stock return volatility. Similar to the studies of Cheng (2008), Irvine and Pontiff (2009), and Chen et al. (2013), the realised return volatility measures include the standard deviation of stock returns and the standard deviation of market-adjusted stock returns in both daily and monthly frequencies. Following Li et al. (2011) the idiosyncratic return volatility is estimated based on the residual stock returns from the market model regression as below:

$$r_{it}=\alpha_i+\beta_{mt}+\varepsilon_{it} \quad (3.1)$$

Idiosyncratic return volatility is defined as $\sqrt{\text{Var}(\varepsilon_{it})}$ from the above equation.

3.3.3 Control variables

We control for several variables that have been previously identified as determinants of stock return volatility, including firm performance and governance

variables. Sales growth, calculated as the growth rate of annual sales, is included to measure the firm growth opportunity, which is expected to be positively related to performance uncertainty (Boubakri et al., 2013). We use return on assets (ROA), calculated as the ratio of net income to total assets, to measure accounting performance. Shan et al. (2014) state that firms with lower ROA are expected to have higher stock return fluctuation. In addition, we use the valued-weighted annual stock return to measure stock performance, and Tobin's Q to represent corporate market performance. The previous literature supports the positive trade-off between stock return and stock return volatility (French et al., 1987; Ludvigson and Ng, 2007; Lundblad, 2007). We expect a positive relationship between Tobin's Q and stock return volatility, as the higher the corporate value, the higher the growth opportunities, which leads to greater fluctuation in stock returns (Shan et al., 2014; Pan et al., 2015).

We include board independence, board size, leverage, the ratio of intangible assets to total assets, firm size, and firm age as other firm-specific controls. Board independence (calculated as the ratio of the number of independent directors to the total number of directors on the board) and board size (calculated as the natural logarithm of the total number of directors on the board) are expected to be negatively associated with stock return volatility. Firms with a larger board size and more independent board are less likely to make extreme decisions, and therefore, lead to less variable corporate performance (Cheng, 2008). Moreover, higher leverage (the ratio of total debt to total assets), a higher ratio of intangible assets to total assets, smaller and younger firms are riskier; therefore, these firms could have higher stock return volatility (Shan et al., 2014). The detailed description of each variable is shown in the Appendix B.1. Table 3.3 shows the summary

statistics of these variables.[15]

Table 3.3. Descriptive statistics

This table reports summary statistics of the variables in the analysis. The key dependent variables are the standard deviations of monthly stock returns (*SDMR*), monthly market-adjusted stock returns (*SDMAR*) and monthly idiosyncratic returns (*SDMIR*). While *SDDR*, *SDDAR*, and *SDDIR* are the corresponding equivalent daily standard deviations. The full descriptions of all the variables are in the Appendix B.1.

Variables	Observation	Mean	Median	S.D.	Min	Max
SDMR	6,229	0.126	0.113	0.084	0.027	3.631
SDMAR	6,229	0.098	0.088	0.069	0.019	3.321
SDMIR	6,229	0.098	0.088	0.069	0.019	3.322
SDDR	6,229	0.027	0.026	0.012	0.008	0.370
SDDAR	6,229	0.022	0.021	0.012	0.007	0.369
SDDIR	6,229	0.022	0.021	0.012	0.006	0.368
State	6,229	0.318	0.333	0.229	0.002	0.797
Sales growth	6,229	0.208	0.120	0.672	-0.978	14.353
Board independence	6,229	0.367	0.333	0.054	0.143	0.714
Board size	6,229	2.200	2.197	0.200	1.386	3.091
ROA	6,229	0.038	0.033	0.051	-0.652	0.311
Financial leverage	6,229	0.496	0.505	0.054	0.143	0.714
Operating leverage	5,803	1.057	0.956	1.324	-2.994	19.487
Stock return	6,229	0.207	0.063	0.608	-0.819	8.537
Tobin's Q	6,229	1.777	1.432	0.202	0.048	0.938
Intangible/assets	6,229	0.049	0.032	0.074	0.000	0.895
Firm size	6,229	22.374	22.202	1.016	19.848	27.893
Firm age	6,229	2.710	2.773	0.374	0.693	3.555

[15] The correlation matrix of variables is shown in the Appendix B.2. The correlation matrix of the independent variables shows no serious multicollinearity concerns.

3.4 Analyses, results and discussion

3.4.1 Residual state ownership and stock return volatility

To investigate the impact of residual state ownership on stock return volatility after the NTS reform in China, we use multivariate regression of panel data with the Huber-White standard error clustered by industry, controlling for firm and year fixed-effects, which is a common method to control for omitted variables in a panel dataset (Pan et al., 2015). The initial regression specification is as follows:[16]

$$\begin{aligned}\text{Stock return volatility}_{it} = {} & \alpha + \beta_1 \text{State}_{it} + \beta_2 \text{Sales growth}_{it} + \beta_3 \text{ROA}_{it} + \beta_4 \text{Stock return}_{it} + \\ & + \beta_5 \text{Tobin's Q}_{it} + \beta_6 \text{Board independence}_{it} + \beta_7 \text{Board size}_{it} \\ & + \beta_8 \text{Leverage}_{it} + \beta_9 \text{Intangible/assets}_{it} + \beta_{10} \text{Firm size}_{it} \\ & + \beta_{11} \text{Firm age}_{it} + \varepsilon_{it} \end{aligned} \quad (3.2)$$

Table 3.4 reports the results of the above regression model. The residual state ownership variable (State) is significantly and negatively associated with monthly and daily stock return volatility in all models at the 1% or 5% level. Moreover, residual state ownership is economically significant, with magnitudes of -0.0783, -0.1136, -0.1185, -0.0895, -0.1006, and -0.0988[17] in each model, respectively. That is, the increase of residual state ownership by one standard deviation decreases the monthly stock return

[16] We control for the effect of institutional ownership on stock return volatility by adding the share percentage of mutual funds and Qualified Foreign Institutional Investors (QFIIs) as measures of institutional ownership. We find institutional ownership is not significantly related to stock return volatility. Adding institutional ownership does not affect our main results. Therefore, the results with institutional ownership are not tabulated here but are available upon request.

[17] We use the standard deviation of the independent variable multiplied by the coefficient of the independent variable and divided by the mean value of the dependent variable to calculate the economic significance of an independent variable.

volatility measures *SDMR*, *SDMAR*, and *SDMIR* by 7.83%, 11.36%, and 11.85%, respectively, and the daily volatility measures *SDDR*, *SDDAR*, and *SDDIR* by 8.95%, 10.06%, and 9.88%, respectively. This result confirms that residual state ownership following the NTS reform can effectively reduce stock return volatility. The result supports the retention of government ownership following sudden privatization reform to signal the willingness of sharing residual firm risk and build investor confidence (Perotti, 1995).

In addition, ROA is significantly and negatively associated with stock return volatility in the Models 1, 2, and 3. This is consistent with the findings of Dutt and Humphery-Jenner (2013) and Cheng (2008), which indicate that firms with better operating performance tend to have less market performance volatility. We also find that stock return is significantly and positively related to stock return volatility. This finding supports the positive return and risk trade-off theory (French et al., 1987; Ludvigson and Ng, 2007; Lundblad, 2007). In the Models (4), (5), and (6), firm size is found to have a positive relationship with the stock return volatility. This result is opposite to our expectation but is consistent with the findings in Chen et al. (2013). The negative and significant relationship between firm age and stock return volatility indicates that younger firms are associated with higher performance volatility, which is in line with the existing studies (Cheng, 2008; Boubakri et al., 2013; Khaw et al., 2016).

3.4.2 Endogeneity

The negative relationship between residual state ownership and stock return volatility may be subject to endogeneity bias. Previous studies including Boubakri et al.

(2011) and Li and Yamada (2015) find that governments would like to associate with "model" firms, that is, governments are likely to retain state shares in less risky firms. In addition, the level of state ownership may be affected by unobservable firm characteristics that also explain stock return volatility. Residual state ownership is therefore, can be endogenously determined.

In our baseline analyses in the previous section, we initially address endogeneity concerns using firm fixed effects. In this section, we further mitigate such concerns by employing the change-in-change approach. If residual state ownership affects volatility, then the change in residual state ownership should be related to changes in volatility. Table 3.5.1 shows the residual state ownership change variable is negatively and significantly related to stock return volatility changes at the 5% significance level in all six models. Increasing residual state ownership by 1% leads to a 5.52%, 3.30%, and 3.36% decrease in monthly stock return volatility (the Models (1), (2), and (3), respectively) and a 0.92%, 0.88%, and 0.87% decrease in daily stock return volatility (the Models (4), (5), and (6), respectively). For the control variables, the change in annualized stock returns is significantly and positively related to both monthly and daily changes in stock return volatility. Change in firm age is negatively associated with daily stock return volatility changes (the Models (4) to (6)).

Table 3.4. Residual state ownership and stock return volatility

This table presents the results of the relation between residual state ownership and the stock return volatility of sample firms from 2007 to 2014. The stock return volatility measures are the standard deviations of: monthly stock returns (*SDMR*), monthly market-adjusted stock returns (*SDMAR*) and monthly idiosyncratic returns (*SDMIR*), while *SDDR*, *SDDAR* and *SDDIR* are the corresponding equivalent daily standard deviations. The full definitions of all the variables are in the Appendix B.1. Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. All models are fixed at the firm and year levels with Huber-White standard errors clustered by industry.

Dependent variable	**SDMR**	**SDMAR**	**SDMIR**	**SDDR**	**SDDAR**	**SDDIR**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Intercept	0.029	0.014	0.023	0.029*	0.028*	0.032**
	(0.09)	(0.05)	(0.08)	(2.00)	(1.95)	(2.23)
State	**-0.029****	**-0.034*****	**-0.036*****	**-0.005****	**-0.005****	**-0.005****
	(-2.50)	**(-3.38)**	**(-3.75)**	**(-2.34)**	**(-2.32)**	**(-2.27)**
Sales growth	-0.000	0.000	0.000	0.000	0.000***	0.000***
	(-0.40)	(0.23)	(0.40)	(1.23)	(5.00)	(6.27)
ROA	-0.044*	-0.044***	-0.042**	-0.002	-0.001	-0.001
	(-1.82)	(-3.11)	(-2.92)	(-1.18)	(-0.62)	(-0.68)
Stock return	0.051	0.061*	0.061*	0.004***	0.004***	0.004***
	(1.64)	(2.03)	(2.03)	(12.39)	(10.18)	(14.53)
Tobin's Q	-0.001	0.001	0.004	-0.000	-0.000	-0.000
	(-0.19)	(0.35)	(0.38)	(-0.60)	(-0.19)	(-0.34)
Board	-0.011	-0.004	-0.003	-0.003	-0.004	-0.004
independence	(-0.85)	(-0.20)	(-0.14)	(-1.17)	(-1.23)	(-1.21)
Board size	-0.009	-0.011	-0.010	-0.001	-0.001	-0.001
	(-1.19)	(-1.08)	(-1.02)	(-1.11)	(-1.49)	(-1.44)
Financial leverage	0.009	0.003	0.003	0.005	0.006	0.006
	(0.33)	(0.11)	(0.13)	(0.88)	(0.96)	(0.94)
Intangible/assets	0.031	0.028	0.028	0.002	0.002	0.002
	(1.43)	(1.09)	(1.14)	(0.77)	(0.63)	(0.66)
Firm size	0.007	0.007	0.007	0.004***	0.004***	0.004***
	(0.43)	(0.41)	(0.39)	(10.39)	(10.93)	(10.45)
Firm age	-0.001	-0.022	-0.017	-0.026***	-0.031***	-0.031***
	(-0.07)	(-1.23)	(-1.01)	(-28.35)	(-30.82)	(-29.45)
Observation	6229	6229	6229	6229	6229	6229
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.3022	0.2641	0.2685	0.3341	0.2274	0.2303

Table 3.5.1. Endogeneity test of residual state ownership and stock return volatility: Change-in-change approach

This table presents the results of the change-in-change regression analysis of the full sample. The stock return volatility measures are the standard deviations of: monthly stock returns (*SDMR*), monthly market-adjusted stock returns (*SDMAR*) and monthly idiosyncratic returns (*SDMIR*). While *SDDR*, *SDDAR* and *SDDIR* are the corresponding equivalent daily standard deviations. The full definitions of the variables are in the Appendix B.1. Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. All models are fixed at the firm and year levels with Huber-White robust standard errors.

Dependent variable	**ΔSDMR**	**ΔSDMAR**	**ΔSDMIR**	**ΔSDDR**	**ΔSDDAR**	**ΔSDDIR**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Intercept	0.075***	0.060***	0.054***	0.035***	0.029***	0.029***
	(3.66)	(3.26)	(2.81)	(4.97)	(3.93)	(3.90)
ΔState	**-0.055****	**-0.033****	**-0.034****	**-0.009****	**-0.009****	**-0.009****
	(-2.27)	**(-1.96)**	**(-1.97)**	**(-2.07)**	**(-1.97)**	**(-1.96)**
ΔSales growth	-0.000***	-0.000***	-0.000***	-0.000	-0.000	-0.000
	(-5.80)	(-3.64)	(-3.65)	(-0.81)	(-0.07)	(-0.11)
ΔROA	-0.044*	-0.017	-0.014	-0.005	-0.003	-0.003
	(-1.74)	(-0.39)	(-0.58)	(-1.35)	(-0.87)	(-0.93)
ΔStock return	0.045**	0.058***	0.057***	0.009*	0.009*	0.009*
	(2.30)	(3.08)	(3.06)	(1.70)	(1.79)	(1.80)
ΔTobin's Q	0.000	0.001	0.001	-0.001	-0.001	-0.001
	(0.04)	(0.11)	(0.17)	(-0.90)	(-0.85)	(-0.84)
ΔBoard independence	-0.004	-0.005	-0.001	0.005	0.006	0.006
	(-0.15)	(-0.19)	(-0.04)	(1.02)	(1.18)	(1.21)
ΔBoard size	-0.006	-0.007	-0.006	0.003	0.003	0.003
	(-0.51)	(-0.57)	(-0.49)	(1.28)	(1.30)	(1.29)
ΔFinancial leverage	-0.025	-0.018	-0.017	-0.004	-0.003	-0.004
	(-0.86)	(-0.62)	(-0..58)	(-0.51)	(-0.46)	(-0.48)
ΔIntangible/assets	-0.047	-0.057	-0.054	-0.002	-0.004	-0.004
	(-1.19)	(-1.37)	(-1.29)	(-0.43)	(-0.68)	(-0.77)
ΔFirm size	0.004	-0.004	-0.003	-0.002	-0.001	-0.001
	(0.19)	(-0.17)	(-0.16)	(-0.28)	(-0.20)	(-0.23)
ΔFirm age	-0.032	0.008	0.020	-0.164***	-0.175***	-0.173***
	(-0.40)	(0.10)	(0.26)	(-2.58)	(-2.59)	(-2.57)
Observation	4405	4405	4405	4405	4405	4405
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.2426	0.2580	0.2598	0.2041	0.1926	0.1943

In addition, we employ the difference-in-difference univariate tests to examine the volatility-mitigating effect of residual state ownership after the NTS reform. We follow Liu et al. (2017) and adopt corruption[18], a dummy variable which equals one if a firm's headquarters is located where high-profile provincial bureaucratic corruption cases occur, and zero otherwise. Firms located in corrupt provinces are expected to have higher stock return volatility in the presence of corruption. Since we find residual state ownership reduces stock return volatility, we expect state-controlled firms will have lower stock return volatility in the presence of corruption compared to private firms.

In Panel A of Table 3.5.2, the mean and median difference results show that the stock return volatility of firms located where corruption cases occur is significantly larger than firms located away from corruption occurences. In Panel B, state controlled firms have significantly lower stock return volatility, which is consistent with our findings. Panel C presents the results of the mean and median difference of the interaction term of state control and corruption. As expected, the stock return volatility of firms controlled by the state is significantly lower than non-state controlled firms when corruption occurs.

[18] We hand-collect the Corruption values from a list of Chinese corruption cases provided by Wikipedia (https://zh.wikipedia.org/wiki/中华人民共和国腐败案件列表, in Chinese).

Table 3.5.2. Endogeneity test of residual state ownership and stock return volatility: Difference-in-difference univariate approach

This table presents the results of the difference-in-difference univariate test of the impact of residual state control on stock return volatility by using provincial bureaucrats corruption cases as an exogenous nature shock. The mean and median difference tests of *corruption*, *state control*, and the interaction term of *corruption* and *state control* are displayed in Panels A, B, and C, respectively. The stock return volatility measures are the standard deviations of monthly stock returns (*SDMR*), monthly market-adjusted stock returns (*SDMAR*) and monthly idiosyncratic returns (*SDMIR*), while *SDDR*, *SDDAR* and *SDDIR* are the corresponding equivalent daily standard deviations. The full definitions of the variables are in the Appendix B.1. The "Difference" columns report both the t-values for T-test and z-values for the Wilcoxon test of the difference in the means and medians. Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Observation		SDMR		SDMAR		SDMIR		SDDR		SDDAR		SDDIR	
			Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Panel A														
Corruption	1	612	0.127	0.114	0.096	0.089	0.096	0.088	0.027	0.026	0.023	0.022	0.022	0.021
	0	5,617	0.118	0.110	0.098	0.088	0.098	0.088	0.027	0.026	0.022	0.021	0.022	0.021
Difference			0.009***	0.004**	-0.002	0.001	-0.002	0.000	0.000	0.000**	0.001	0.001	0.000*	0.000
Panel B														
State control	1	3,852	0.122	0.110	0.099	0.087	0.099	0.087	0.026	0.025	0.022	0.021	0.021	0.021
	0	2,377	0.133	0.120	0.098	0.089	0.097	0.089	0.030	0.027	0.024	0.022	0.024	0.022
Difference			-0.011***	-0.010***	0.001	-0.002	0.002	-0.002**	-0.004***	-0.002***	-0.002***	-0.001***	-0.003***	-0.001***
Panel C														
State control × Corruption	1	346	0.118	0.108	0.096	0.086	0.096	0.086	0.026	0.026	0.021	0.021	0.021	0.021
	0	5,883	0.127	0.114	0.098	0.088	0.098	0.088	0.027	0.026	0.023	0.021	0.022	0.021
Difference			-0.009***	-0.005***	-0.002	-0.002	-0.002	-0.002	-0.001***	-0.000**	-0.002***	-0.000	-0.001***	-0.000**

To further address the causal relationship between state ownership and stock return volatility, we extend our main sample from 2007-2014 to 2003-2014. We construct the treatment group containing firms with state ownership and whose ultimate controller is the state, and control group with purely private firms. As implied in Section 3.1, we are unable to reliably use state ownership percentage prior while firms complete their NTS reform, and therefore, for our extended sample we use ultimate state control to capture the impact of state ownership during the NTS reform period. The ultimate state control proxy of government ownership is consistent with the SOE classification in prior studies (Liao et al., 2014 and Li and Yamada, 2015). Next, we match the treatment group and control group using the criteria of the same observation year, industry, and with similar firm size. The sample contains 1,046 firms with 3,590 firm-year observations.

A difference-in-difference (DID) test is conducted by using the matched sample to examine the impact of state ownership on stock return volatility. We construct a dummy variable where State control equals one if the firm's ultimate controller is the state, and zero otherwise. The China Securities Regulatory Commission (CSRC) initiated the NTS reform in 2005. Therefore, Reform is a dummy variable equal to one if the observation year is 2005 onwards, and zero otherwise. We expect the NTS policy shock to increase uncertainty, and in turn, stock return volatility. Therefore, the coefficient of Reform is expected to be positive. The interaction, State control×Reform, estimates the influence of state ownership on stock return volatility following the NTS policy shock.

Table 3.5.3 presents the results. As expected, Reform dummy is positively and significantly related to stock return volatility in all models, suggesting that stock return volatility is significantly higher in the post-reform period, than in the pre-reform period. While, State control is negatively and significantly related to stock return volatility. Importantly, the interaction term, State control×Reform is insignificant in all the models.

This indicates that for the treatment group firms, stock return volatility does not significantly increase after the policy shock. As such, state ownership mutes the stock return volatility aggravated by the sudden policy shock.

Table 3.5.3. Endogeneity test of state ownership and stock return volatility: Difference-in-difference matching sample approach

This table presents the results of the relation between state ownership and the stock return volatility of sample firms from 2003 to 2014. The stock return volatility measures are the standard deviations of: monthly stock returns (*SDMR*), monthly market-adjusted stock returns (*SDMAR*) and monthly idiosyncratic returns (*SDMIR*), while *SDDR*, *SDDAR* and *SDDIR* are the corresponding equivalent daily standard deviations. The full definitions of all the variables are in the Appendix. Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. All models control for firm fixed effects[19], with Huber-White standard errors clustered by industry.

Dependent variable	**SDMR**	**SDMAR**	**SDMIR**	**SDDR**	**SDDAR**	**SDDIR**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Intercept	0.5663**	0.5447***	0.5421***	0.1891***	0.1806***	0.1811***
	(2.67)	(2.98)	(3.12)	(3.01)	(3.10)	(3.07)
State control	**-0.0340****	**-0.0286****	**-0.0338*****	**-0.0124*****	**-0.0113*****	**-0.0112*****
	(-2.96)	**(-2.72)**	**(-3.20)**	**(-3.46)**	**(-3.30)**	**(-3.26)**
Reform	**0.0338*****	**0.0249*****	**0.0206*****	**0.0083*****	**0.0040****	**0.0040****
	(7.08)	**(4.63)**	**(4.10)**	**(5.18)**	**(2.42)**	**(2.44)**
State control×Reform	**0.0048**	**0.0011**	**0.0057**	**0.0004**	**0.0002**	**0.0000**
	(0.68)	**(0.16)**	**(0.88)**	**(0.19)**	**(0.11)**	**(0.01)**
Sales growth	0.0161	0.0158	0.0160	0.0041	0.0042	0.0042
	(1.37)	(1.36)	(1.49)	(1.22)	(1.23)	(1.23)
ROA	-0.0792**	-0.0657	-0.0527	-0.0120	-0.0118	-0.0114
	(-2.15)	(-1.59)	(-1.20)	(-0.81)	(-0.78)	(-0.75)
Stock return	0.0476***	0.0493***	0.0455***	0.0099***	0.0108***	0.0108***
	(7.05)	(7.43)	(6.36)	(4.71)	(5.20)	(5.19)
Tobin's Q	0.0020**	0.0025***	0.0024***	0.0007**	0.0008**	0.0007**
	(2.87)	(3.23)	(3.36)	(2.16)	(2.36)	(2.35)
Board independence	0.0566***	0.0405**	0.0380**	0.0100*	0.0085	0.0086
	(3.61)	(2.89)	(2.67)	(1.96)	(1.71)	(1.75)
Board size	0.0119	0.0098	0.0014	0.0012	0.0009	0.0010
	(1.02)	(0.87)	(0.38)	(0.44)	(0.35)	(0.36)
Financial leverage	-0.0814**	-0.0859**	-0.0596*	-0.0336***	-0.0313**	-0.0316**
	(-2.67)	(-2.75)	(-1.79)	(-3.08)	(-2.89)	(-2.91)
Intangible/assets	0.0764**	0.0675**	0.0832***	0.0130	0.0104	0.0100
	(2.26)	(2.42)	(3.30)	(1.34)	(1.49)	(1.46)
Firm size	-0.0234**	-0.0241**	-0.0239**	-0.0078**	-0.0080**	-0.0081**
	(-2.27)	(-2.70)	(-2.64)	(-2.48)	(-2.77)	(-2.74)
Firm age	0.0129	0.0238	0.0242	0.0054	0.0097*	0.0099*
	(0.74)	(1.42)	(1.36)	(0.97)	(1.78)	(1.81)
Observations	3,590	3,590	3,590	3,590	3,590	3,590
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.2180	0.2321	0.2222	0.1414	0.1524	0.1528

[19] We exclude the year fixed effect for the reason that year dummies are highly correlated to the reform dummy.

3.4.3 Residual state ownership and stock return volatility: the time effect

Perotti (1995, 2003) documents that governments signal their willingness to bear the residual risk in the aftermath of sudden changes by retaining state ownership. However, studies including Zou and Adams (2008) and Chen et al. (2013) find a positive relationship between residual state ownership and stock return volatility during the pre-NTS reform period, reflecting the inefficiency and poor growth prospects state ownership could bring to firms. Although the NTS reform is associated with improved firm performance and corporate governance (Jiang and Habib, 2012; Liu and Tian, 2012; Liao et al., 2014), state ownership is generally associated with corporate inefficiency (Shleifer and Vishny, 1994, 1998; Megginson, 2016). Bortolotti and Perotti (2007) discuss that the positive role of residual state ownership may be temporary, and disappear when proper institutional capacity is built up. In addition, Vaaler and Schrage (2009) find state ownership can provide a credible signalling effect in the short-term. Therefore, it is unavoidable to examine whether this signalling effect lasts for a long period or just matters for a relatively short period.

We construct a dummy variable, Long, which equals one if the observation year is three-years after state shares become fully tradable, and zero otherwise. The interaction term of State×Long is to examine whether the negative relationship between residual state ownership and stock return volatility holds in the long-term.[20] We expect that the volatility mitigation effect of the residual state ownership is temporary, as once investor uncertainties are reduced, the inefficiency and poor overall corporate governance of the

[20] We test the time effect by using one-, two-, and three-year dummies once shares become fully tradable. We find no evidence of the relation reversal for the one- and two-year dummies, but the relation reverses for the three-year dummy. This finding implies residual state ownership temporarily decreases stock volatility over the medium term.

state ownership may increase the stock return volatility. The regression is as follows:

$$\begin{aligned}\text{Stock return volatility}_{it} = {} & \alpha + \beta_1 \text{State}_{it} + \beta_2 \text{Long}_{it} + \beta_3 \text{State}\times\text{Long}_{it} + \beta_4 \text{Sales growth}_{it} \\ & + \beta_5 \text{ROA}_{it} + \beta_6 \text{Stock return}_{it} + \beta_7 \text{Tobin's Q}_{it} + \beta_8 \text{Board independence}_{it} \\ & + \beta_9 \text{Board size}_{it} + \beta_{10} \text{Leverage}_{it} + \beta_{11} \text{Intangible/assets}_{it} \\ & + \beta_{12} \text{Firm size}_{it} + \beta_{13} \text{Firm age}_{it} + \varepsilon_{it} \end{aligned} \quad (3.3)$$

The results are shown in Table 3.6. The interaction term shows the incremental effect of the NTS reform to the volatility mitigating of residual state ownership. The coefficient of Long dummy is positively and significant when volatility is measured by SDDAR and SDDIR. While, residual state ownership is still significantly and negatively related to stock return volatility. The coefficients of State×Long are positively significant in the Models (4), (5), and (6) when stock return volatility is estimated using daily data. These results suggest that residual state ownership increases stock return volatility three-year after the NTS reform. It is in line with Cosset et al. (2016) that a privatization program that is continuously implemented over time signals credibility, which in turn, reduces volatility. The results provide an important reminder to policymakers and investors that the signalling effect contributed by residual state ownership can only work in the short-term, three years in this case, after state shares become fully tradable. We have evidence that residual state ownership deteriorates stock return volatility in the long-term after the NTS reform. It is suggested that investors need to balance the trade-off of investing in state-controlled firms, which demonstrate both the poor overall corporate governance and positive signalling effect associated with residual state ownership right after sudden shocks. A government can commit to not interfering with privatized firms by gradually reducing state ownership over time. When reputation for commitment

increases, larger sales

Table 3.6. Residual state ownership and stock return volatility: the time effect

This table presents the results for the time effect on the relation between residual state ownership and stock return volatility of the sample firms from 2007 to 2014. *Long* is a dummy variable that equals one if the observation year is more than three years after state shares become fully tradable and zero otherwise. The stock return volatility measures are the standard deviations of monthly stock returns (SDMR), monthly market-adjusted stock returns (*SDMAR*) and monthly idiosyncratic returns (*SDMIR*), while *SDDR, SDDAR* and *SDDIR* are the corresponding equivalent daily standard deviations. The full definitions of the variables are in the Appendix B.1. Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. All models are fixed at the firm and year levels, with Huber-White standard errors clustered by industry.

Dependent variable	**SDMR**	**SDMAR**	**SDMIR**	**SDDR**	**SDDAR**	**SDDIR**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Intercept	0.740***	0.141	0.174	0.122***	0.056***	0.057***
	(3.85)	(0.76)	(0.93)	(9.92)	(4.21)	(4.78)
State	-0.033**	-0.045***	-0.047***	-0.008**	-0.008***	-0.008***
	(-2.34)	(-3.92)	(-3.96)	(-2.90)	(-3.06)	(-3.00)
Long	-0.002	0.000	0.000	0.000	0.001*	0.0001*
	(-0.30)	(0.08)	(0.07)	(0.87)	(2.11)	(2.11)
State×Long	**0.000**	**0.008***	**0.008***	**0.003*****	**0.003*****	**0.003*****
	(0.06)	**(1.89)**	**(1.95)**	**(8.40)**	**(8.02)**	**(8.11)**
Sales growth	0.000	0.000	0.000	0.000	0.000**	0.000**
	(0.42)	(1.11)	(1.28)	(1.24)	(2.25)	(2.62)
ROA	0.007	0.018	0.018	0.002	0.002	0.002
	(0.27)	(0.81)	(0.85)	(0.93)	(0.82)	(0.79)
Stock return	0.048**	0.037*	0.038**	0.009***	0.003***	0.003***
	(2.89)	(2.14)	(2.19)	(7.42)	(7.26)	(7.15)
Tobin's Q	-0.003	0.001	0.001	-0.001**	-0.001*	-0.001
	(-1.21)	(0.50)	(0.54)	(-2.48)	(-1.78)	(-1.85)
Board independence	-0.028*	-0.023	-0.023	-0.009**	-0.008*	-0.008*
	(-1.92)	(-1.04)	(-1.08)	(-2.46)	(-1.78)	(-1.77)
Board size	-0.002	-0.009	-0.008	-0.001	-0.001	-0.001
	(-0.22)	(-0.71)	(-0.69)	(-0.65)	(-1.00)	(-1.00)
Financial leverage	0.008	0.015	0.016	0.004	0.005	0.005
	(0.41)	(0.87)	(0.88)	(0.72)	(0.86)	(0.87)
Intangible/assets	0.028	0.014	0.015	0.002	0.002	0.001
	(1.07)	(0.53)	(0.59)	(0.36)	(0.35)	(0.34)
Firm size	-0.015	0.003	0.002	0.001**	0.002***	0.002***
	(-1.25)	(0.19)	(0.12)	(2.67)	(9.06)	(8.90)
Firm age	-0.098***	-0.029	-0.033	-0.039***	-0.030***	-0.030***
	(-3.61)	(-0.80)	(-0.95)	(-19.34)	(-11.11)	(-10.76)
Observation	6229	6229	6229	6229	6229	6229
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.2497	0.1817	0.1869	0.2169	0.1482	0.1456

will be preferred in order to improve incentives in reformed firms (Perotti, 1995, Vaaler and Schrage, 2009).[21]

3.4.4 Residual state ownership and corporate polices

In this section, we examine how firm level policies affects the relationship between residual state ownership and volatility estimated above. Serfling (2014) finds that the riskiness of operating and financial policies measured by operating leverage and financial leverage are the proper channels that CEOs can employ to affect stock return volatility. In addition, Bernile et al. (2018) argue that board of directors lower firm risk through conservative corporate policies. As such, we use four measures to proxy corporate policies, including operating leverage, financial leverage (Serfling, 2014; Bernile et al., 2018), total leverage (Garcia-Feijoo and Jorgensen, 2010), and dividend payment (Grullon et al., 2002). Higher operating, financial and total leverage indicate higher policy risk. In contrast, Grullon et al., (2002) argue higher dividend payments are associated with lower firm risk. We expect that state shareholders will advocate for conservative corporate policies to reduce stock return volatility.[22]

Table 3.7 presents the results of the impact of residual state ownership on the riskiness of corporate policies. Residual state ownership is negatively and significantly related

[21] We also examine the change-in-change test and difference-in-difference test with time effect. The results are consistent with our finding that the volatility-mitigating effects are temporary.

[22] We use quarterly data over a three-year window from year t to year t + 2. Firms with at least eight quarters of non-missing data are included. We then run the regression of operating income on sales, for each firm over the three-year window: $Operating\ income_i = \alpha + \pi Sales_i + \varepsilon_i$. Operating leverage is calculated as $\pi_i(\overline{Sales_i}/\overline{Operating\ income_i})$, where $\overline{Sales_i}$ and $\overline{Operating\ income_i}$ denote the three-year average values of sales and operating income for firm i, respectively.

to operating, financial, and total leverage, and positively and significantly related to divided payment. It suggests that firms with high residual state ownership are associated with more conservative corporate policies, which is consistent with Boubakri et al. (2013) who argue that state ownership is negatively associated with firm risk-taking, as governments pursue political objectives.

To examine whether residual state ownership reduces stock return volatility through more conservative corporate policies, we follow the approach adopted by Cosset et al. (2016) and separate the corporate policies into the part that is explained by residual state ownership and the rest that is unrelated to residual state ownership. First, we regress the corporate policies on residual state ownership and obtain the predicted and residual values. Second, we run the regression replacing residual state ownership with the predicted and residual values of the corporate policies. The regressions therefore can examine whether the component of corporate policies that is related to residual state ownership is also related to volatility. Table 3.8 presents the results. In Panel A, residual state ownership is negatively and significantly associated with operating, financial, and total leverage at the 10%, 5% and 1 % levels, respectively. Further, residual state ownership is positively and significantly associated with dividend payment at the 1% level. In Panels B to E, the predicted value of operating leverage, financial leverage, and total leverage are positively and significantly related to stock return volatility, and the predicted value of dividend payment is negatively and significantly related to stock return volatility. These results suggest that residual state ownership affects stock return volatility through influencing the riskiness of firm policies. Specifically, state owners are associated

with conservative corporate policy risk, which leads to lower stock return volatility.[23]

Table 3.7. Impact of residual state ownership on corporate policies

This table presents the results of the relation between residual state ownership and four measures of corporate policies of the sample firms from 2007 to 2014. The full definitions of the variables are in the Appendix. Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. All models control for firm and year fixed effects, with Huber-White robust standard errors clustered by industry.

	Operating leverage	Financial leverage	Total leverage	Dividend payment
Intercept	1.6317**	0.9909***	0.3356	-0.2855**
	(2.94)	(8.41)	(1.12)	(-2.24)
State	-0.4738*	-0.0804**	-0.3279***	0.0465**
	(-1.79)	(-2.35)	(-3.24)	(2.81)
Sales growth	0.0131	0.0079**	0.0067	-0.0011
	(0.47)	(2.24)	(0.61)	(-0.81)
ROA	-0.2383	-0.4978***	-0.2364	0.3613***
	(-0.57)	(-10.53)	(-0.78)	(11.06)
Stock return	-0.0306	0.0237***	-0.0157	-0.0036
	(-1.02)	(6.71)	(-0.93)	(-1.146)
Tobin's Q	0.0143	0.0005	0.0095	-0.0074***
	(0.68)	(0.10)	(0.73)	(-6.57)
Board independence	-0.2837	-0.0420	-0.1501	-0.0583***
	(-0.48)	(-1.07)	(-0.56)	(-3.51)
Board size	0.0541	0.0005	0.0544	0.0148
	(0.39)	(0.04)	(0.62)	(0.86)
Financial leverage	0.0914	/	1.1896***	-0.0705***
	(0.46)	/	(10.50)	(-3.35)
Intangible/assets	0.7762*	-0.0963	0.5339**	-0.0616***
	(2.12)	(-1.73)	(2.70)	(-4.10)
Firm size	-0.0377	-0.0376***	-0.0224	0.0337***
	(-1.17)	(-6.61)	(-1.43)	(6.05)
Firm age	0.1976	0.1653***	0.0643	-0.1717***
	(1.75)	(8.59)	(0.85)	(-7.65)
Observations	5,803	5,803	5,803	5,803
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adj. R-square	0.0220	0.1152	0.0181	0.0983

[23] We also test the time effect on the channel tests of which residual state ownership reduces volatility through corporate policies. The results support our view that the signalling effect given by residual state ownership on the reduction of stock return volatility only exists in the short-term.

Table 3.8. Role of corporate policies on stock return volatility

Panel A reports the results from the regressions of the corporate policy measures on residual state ownership alone. Panels B, C, D, and E present the results from the regressions of stock return volatility measures on the predicted and residual values of corporate policy measures and control variables. The stock return volatility measures are the standard deviations of monthly stock returns (*SDMR*), monthly market-adjusted stock returns (*SDMAR*) and monthly idiosyncratic returns (*SDMIR*), while *SDDR*, *SDDAR* and *SDDIR* are the corresponding equivalent daily standard deviations. The full definitions of the variables are in the Appendix. Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. All models control for firm and year fixed effects, with Huber-White robust standard errors clustered by industry.

Panel A

	Operating leverage	**Financial leverage**	**Total leverage**	**Dividend payment**
State	-0.5022*	-0.0915**	-0.4444***	0.0744***
	(-1.91)	(-2.30)	(-3.97)	(3.52)
Intercept	1.3682***	0.5648***	0.7555***	0.0039
	(4.95)	(19.57)	(6.98)	(0.27)
Observations	5,803	5,803	5,803	5,803
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adj. R-squared	0.0011	0.0138	0.0014	0.0104

Table 3.8 (Continued)

Panel B: Operating leverage and stock return volatility						
	SDMR	**SDMAR**	**SDMIR**	**SDDR**	**SDDAR**	**SDDIR**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Intercept	0.0171	-0.0064	-0.0026	0.0142	0.0118	0.0160
	(0.05)	(-0.02)	(-0.01)	(1.40)	(1.19)	(1.63)
Operating leverage predicted	**0.0546***	**0.0651****	**0.0682*****	**0.0093****	**0.0097***	**0.0095***
	(1.93)	**(2.84)**	**(3.17)**	**(2.19)**	**(2.04)**	**(2.00)**
Operating leverage residuals	-0.0005	-0.0002	-0.0002	-0.0000	-0.0000	-0.0000
	(-0.76)	(-0.25)	(-0.30)	(-1.10)	(-0.73)	(-0.98)
Sales growth	0.0071	0.0075	0.0074	-0.0005*	-0.0005*	-0.0005*
	(1.09)	(1.14)	(1.12)	(-1.91)	(-2.08)	(-1.95)
ROA	-0.0691*	-0.0682*	-0.0655*	-0.0008	0.0007	0.0002
	(-1.76)	(-2.11)	(-2.02)	(-0.35)	(0.28)	(0.09)
Stock return	0.0508	0.0618*	0.0617*	0.0037***	0.0041***	0.0043***
	(1.63)	(2.10)	(2.09)	(11.79)	(10.52)	(13.35)
Tobin's Q	0.0001	0.0020	0.0021	-0.0003	-0.0002	-0.0002
	(0.03)	(0.60)	(0.64)	(-0.79)	(-0.42)	(-0.55)
Board independence	-0.0188	-0.0077	-0.0069	-0.0043	-0.0050	-0.0048
	(-1.31)	(-0.46)	(-0.42)	(-1.28)	(-1.31)	(-1.32)
Board size	-0.0088	-0.0114	-0.0108	-0.0014*	-0.0017*	-0.0016*
	(-0.87)	(-0.79)	(-0.75)	(-1.77)	(-1.80)	(-1.77)
Financial leverage	-0.0021	-0.0071	-0.0067	0.0061	0.0069	0.0067
	(-0.06)	(-0.23)	(-0.22)	(1.03)	(1.16)	(1.09)
Intangible/assets	0.0237	0.0221	0.0226	0.0027	0.0031	0.0029
	(0.98)	(0.86)	(0.90)	(0.81)	(0.87)	(0.81)
Firm size	0.0048	0.0042	0.0038	0.0039***	0.0041***	0.0039***
	(0.26)	(0.22)	(0.20)	(12.14)	(12.37)	(11.90)
Firm age	-0.0037	-0.0247	-0.0204	-0.0268***	-0.0318***	-0.0315***
	(-0.35)	(-1.61)	(-1.32)	(-32.35)	(-33.14)	(-31.43)
Observations	5,803	5,803	5,803	5,803	5,803	5,803
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.3062	0.2702	0.2738	0.3320	0.2250	0.2275

Table 3.8 (Continued)

Panel C: Financial leverage and stock return volatility						
	SDMR	**SDMAR**	**SDMIR**	**SDDR**	**SDDAR**	**SDDIR**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Intercept	-0.0777	-0.1191	-0.1206	-0.0019	-0.0050	-0.0004
	(-0.27)	(-0.41)	(-0.42)	(-0.18)	(-0.46)	(-0.04)
Financial leverage predicted	**0.2977***	**0.3503*****	**0.3674*****	**0.0568****	**0.0600***	**0.0587***
	(2.14)	**(3.15)**	**(3.56)**	**(2.17)**	**(2.09)**	**(2.05)**
Financial leverage residuals	-0.0021	-0.0071	-0.0067	0.0061	0.0069	0.0067
	(-0.06)	(-0.23)	(-0.22)	(1.03)	(1.12)	(1.09)
Sales growth	0.0071	0.0075	0.0074	-0.0005*	-0.0005*	-0.0005*
	(1.09)	(1.14)	(1.12)	(-1.92)	(-2.09)	(-1.96)
ROA	-0.0690*	-0.0681*	-0.0654*	-0.0008	0.0007	0.0002
	(-1.76)	(-2.11)	(-2.03)	(-0.35)	(0.28)	(0.09)
Stock return	0.0509	0.0618*	0.0617*	0.0037***	0.0041***	0.0043***
	(1.63)	(2.10)	(2.09)	(11.82)	(10.55)	(13.39)
Tobin's Q	0.0001	0.0020	0.0021	-0.0003	-0.0002	-0.0002
	(0.02)	(0.60)	(0.64)	(-0.80)	(-0.43)	(-0.56)
Board independence	-0.0186	-0.0077	-0.0068	-0.0043	-0.0050	-0.0047
	(-1.29)	(-0.46)	(-0.41)	(-1.28)	(-1.31)	(-1.32)
Board size	-0.0088	-0.0114	-0.0108	-0.0014*	-0.0017*	-0.0016*
	(-0.87)	(-0.80)	(-0.75)	(-1.77)	(-1.81)	(-1.78)
Intangible/assets	0.0233	0.0220	0.0225	0.0026	0.0030	0.0028
	(0.96)	(0.86)	(0.89)	(0.80)	(0.86)	(0.80)
Firm size	0.0048	0.0042	0.0038	0.0039***	0.0041***	0.0039***
	(0.26)	(0.22)	(0.20)	(12.14)	(12.36)	(11.90)
Firm age	-0.0038	-0.0247	-0.0205	-0.0268***	-0.0318***	-0.0315***
	(-0.36)	(-1.63)	(-1.33)	(-32.30)	(-33.18)	(-31.50)
Observations	5,803	5,803	5,803	5,803	5,803	5,803
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.3063	0.2703	0.2739	0.3321	0.2251	0.2276

Table 3.8 (Continued)

Panel D: Total leverage and stock return volatility						
	SDMR	**SDMAR**	**SDMIR**	**SDDR**	**SDDAR**	**SDDIR**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Intercept	0.0447	0.0269	0.0323	0.0189	0.0167	0.0208*
	(0.13)	(0.08)	(0.10)	(1.71)	(1.54)	(1.95)
Total leverage predicted	**0.0613***	**0.0734****	**0.0768*****	**0.0104****	**0.0109***	**0.0107***
	(1.94)	**(2.85)**	**(3.18)**	**(2.18)**	**(2.04)**	**(1.99)**
Total leverage residuals	-0.0015	-0.0009	-0.0010	-0.0001	-0.0001	-0.0001
	(-1.13)	(-0.68)	(-0.73)	(-1.60)	(-1.26)	(-1.42)
Sales growth	0.0071	0.0075	0.0074	-0.0005*	-0.0005*	-0.0005*
	(1.09)	(1.14)	(1.12)	(-1.91)	(-2.08)	(-1.95)
ROA	-0.0693*	-0.0683*	-0.0657*	-0.0008	0.0007	0.0002
	(-1.76)	(-2.10)	(-2.01)	(-0.36)	(0.27)	(0.08)
Stock return	0.0508	0.0618*	0.0617*	0.0037***	0.0041***	0.0043***
	(1.63)	(2.10)	(2.09)	(11.80)	(10.52)	(13.36)
Tobin's Q	0.0001	0.0020	0.0021	-0.0003	-0.0002	-0.0002
	(0.03)	(0.61)	(0.64)	(-0.79)	(-0.42)	(-0.55)
Board independence	-0.0189	-0.0078	-0.0070	-0.0043	-0.0050	-0.0048
	(-1.31)	(-0.47)	(-0.42)	(-1.28)	(-1.31)	(-1.32)
Board size	-0.0087	-0.0114	-0.0107	-0.0014*	-0.0017*	-0.0016*
	(-0.86)	(-0.79)	(-0.75)	(-1.77)	(-1.80)	(-1.77)
Financial leverage	-0.0003	-0.0060	-0.0056	0.0062	0.0070	0.0069
	(-0.01)	(-0.20)	(-0.19)	(1.05)	(1.13)	(1.10)
Intangible/assets	0.0241	0.0225	0.0230	0.0027	0.0031	0.0029
	(0.99)	(0.88)	(0.91)	(0.82)	(0.87)	(0.81)
Firm size	0.0048	0.0041	0.0038	0.0039***	0.0041***	0.0039***
	(0.25)	(0.22)	(0.20)	(12.14)	(12.37)	(11.90)
Firm age	-0.0037	-0.0247	-0.0204	-0.0268***	-0.0318***	-0.0315***
	(-0.35)	(-1.61)	(-1.32)	(-32.27)	(-33.07)	(-31.37)
Observations	5,803	5,803	5,803	5,803	5,803	5,803
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.3064	0.2702	0.2739	0.3321	0.2250	0.2275

Table 3.8 (Continued)

Panel E: Dividend payment and stock return volatility						
	SDMR	**SDMAR**	**SDMIR**	**SDDR**	**SDDAR**	**SDDIR**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Intercept	0.0947	0.0840	0.0923	0.0277*	0.0260*	0.0299**
	(0.26)	(0.25)	(0.27)	(2.03)	(1.88)	(2.22)
Dividend payment predicted	**-0.3665***	**-0.4399****	**-0.4603*****	**-0.0616****	**-0.0643***	**-0.0628***
	(-1.97)	**(-2.90)**	**(-3.25)**	**(-2.20)**	**(-2.05)**	**(-2.00)**
Dividend payment residuals	0.0056	-0.0013	-0.0007	0.0021	0.0026	0.0027
	(0.43)	(-0.10)	(-0.05)	(1.58)	(1.64)	(1.64)
Sales growth	0.0071	0.0075	0.0074	-0.0005*	-0.0005*	-0.0005*
	(1.09)	(1.14)	(1.12)	(-1.92)	(-2.09)	(-1.96)
ROA	-0.0710	-0.0677*	-0.0652*	-0.0016	-0.0003	-0.0007
	(-1.69)	(-1.88)	(-1.81)	(-0.80)	(-0.13)	(-0.34)
Stock return	0.0509	0.0618*	0.0617*	0.0037***	0.0041***	0.0043***
	(1.63)	(2.10)	(2.09)	(11.66)	(10.36)	(13.19)
Tobin's Q	0.0001	0.0019	0.0021	-0.0003	-0.0001	-0.0002
	(0.04)	(0.61)	(0.65)	(-0.77)	(-0.38)	(-0.51)
Board independence	-0.0183	-0.0077	-0.0068	-0.0041	-0.0048	-0.0046
	(-1.24)	(-0.45)	(-0.40)	(-1.25)	(-1.28)	(-1.29)
Board size	-0.0089	-0.0114	-0.0108	-0.0014*	-0.0017*	-0.0017*
	(-0.90)	(-0.80)	(-0.76)	(-1.87)	(-1.90)	(-1.87)
Financial leverage	-0.0017	-0.0072	-0.0068	0.0062	0.0071	0.0069
	(-0.05)	(-0.24)	(-0.22)	(1.05)	(1.14)	(1.11)
Intangible/assets	0.0236	0.0219	0.0224	0.0028	0.0032	0.0030
	(0.98)	(0.86)	(0.90)	(0.82)	(0.89)	(0.83)
Firm size	0.0046	0.0042	0.0038	0.0038***	0.0040***	0.0038***
	(0.24)	(0.22)	(0.20)	(11.33)	(11.24)	(11.27)
Firm age	-0.0028	-0.0249	-0.0206	-0.0264***	-0.0313***	-0.0311***
	(-0.23)	(-1.45)	(-1.18)	(-37.25)	(-38.60)	(-36.36)
Observations	5,803	5,803	5,803	5,803	5,803	5,803
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.3062	0.2701	0.2738	0.3322	0.2253	0.2278

3.4.5 The role of different ultimate controllers

We further examine the impact of different identities of residual state ownership on stock return volatility. We divide the full sample into three subsamples based on the identities of firms' ultimate controllers. These are firms controlled by SOIs which are government agencies, controlled by SOEs, and by private firms. Chen et al. (2009) and Megginson (2016) point out that the distinct types of state owners have different motivations, which, in turn, affect their decision making in the firms they control. State political control and intervention are most likely to take place in firms controlled by government agencies[24], since the promotion of officials in government agencies depends largely on how well they implement government policies, rather than value creation in controlled firms (Chen et al. 2009). However, SOEs or private owners pay more attention to value maximization. SOEs are market-oriented state-owned enterprises and, although the state is the ultimate controller, SOEs have transitioned to market-oriented corporations (Delios et al., 2006). Therefore, the political goals, such as maximizing social stability and employment, could dictate government agencies to be more conservative to the riskiness of corproate policies, which in turn, have a stronger signalling effect on reducing volatility. In contrast, compared to SOIs, the signalling effect would be weaker for market-oriented SOEs and private firms who focus more on firm growth and wealth maximization.[25]

[24] These include central and local governments, government ministries, government bureaus, state asset investment bureaus, and state asset management bureaus.

[25] We further examine the relation of residual state ownership and the riskiness of corproate policies with these three different ultimate controllers (SOIs, SOEs, and non-state controls). We find that the volatility-mitigating effect through reducing the riskiness of corporate policies is more pronounced in SOIs.

The results for ownership identity and stock return volatility are shown in Table 3.9. Residual state ownership in the SOIs subsample significantly reduces both monthly and daily stock return volatility at the 1% or 5% significance level in all models. The negative relation between residual state ownership and stock return volatility is also economically significant. In particular, a 1% increase in residual state ownership decreases monthly stock return volatility by 10.39%, 9.21%, and 9.29% (the Models (1), (2), and (3), respectively) and daily stock return volatility by 1.74%, 1.77%, and 1.78% in the Models (4), (5), and (6), respectively. However, for SOEs, while the residual state ownership coefficients are negative in all models, only that in the Model (4) is significant. In turn, for non–state-controlled firms, where the government has the least influence on policies and decision making, the residual state ownership coefficients' signs are mixed and insignificant. In sum, the results in Table 3.10 indicate that firms controlled government agencies (SOIs) which are more subject to government influence (Chen et al, 2009), have the most significant signalling effects in reducing stock return volatility.[26]

[26] We also perform change-in-change regressions to examine the role of the controlling shareholder's identity on stock return volatility. The results are in line with those reported in Table 10, that the volatility-mitigating effect is more pronounced in SOI-controlled firms. The results are shown in the Appendix B.3, B.4, and B.5.

Table 3.9. Residual state ownership and stock return volatility for different ultimate controllers (SOIs vs. SOEs vs. non-state controls)

This table presents the results for the relation between residual state ownership and stock return volatility of the sample firms with different ultimate controllers from 2007 to 2014. The ultimate controllers of the companies in Panel A are government agencies, those in Panel B are SOEs, and those in Panel C are private owners. The stock return volatility measures are the standard deviations of monthly stock returns (*SDMR*), monthly market-adjusted stock returns (*SDMAR*), and monthly idiosyncratic returns (*SDMIR*), while *SDDR*, *SDDAR* and *SDDIR* are the corresponding equivalent daily standard deviations. The full definitions of the variables are in the Appendix B.1. Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. All models are fixed at the firm and year levels, with Huber-White robust standard errors clustered by industry.

Panel A: SOIs						
Dependent variable	**SDMR**	**SDMAR**	**SDMIR**	**SDDR**	**SDDAR**	**SDDIR**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Intercept	-0.049	0.015	0.042	0.067	0.070	0.071
	(-0.30)	(0.08)	(0.24)	(0.81)	(0.82)	(0.84)
State	**-0.104*** **	**-0.092*** **	**-0.093*** **	**-0.017** **	**-0.018** **	**-0.018** **
	(-4.22)	**(-5.42)**	**(-5.17)**	**(-2.47)**	**(-2.53)**	**(-2.51)**
Sales growth	0.000	0.000***	0.000***	0.000	0.000*	0.000**
	(1.07)	(3.41)	(3.93)	(0.16)	(2.02)	(2.78)
ROA	-0.063	-0.057	-0.005	-0.005	-0.006	-0.006
	(-1.59)	(-1.51)	(-1.47)	(-0.92)	(-0.98)	(-0.96)
Stock return	0.037***	0.042***	0.042***	0.004***	0.004***	0.004***
	(3.51)	(4.49)	(4.48)	(7.26)	(7.67)	(7.82)
Tobin's Q	0.001	0.004**	0.004**	0.000*	0.001***	0.001***
	(0.26)	(2.17)	(2.20)	(2.13)	(3.40)	(3.30)
Board independence	0.008	0.015	0.018	0.004	0.002	0.002
	(0.48)	(0.97)	(1.13)	(0.68)	(0.38)	(0.37)
Board size	-0.016*	-0.016***	-0.016***	-0.001	-0.001	-0.001
	(-2.00)	(-2.95)	(-3.00)	(-0.74)	(-1.02)	(-1.00)
Financial leverage	0.033	0.008	0.009	0.009	0.009	0.009
	(1.28)	(0.47)	(0.48)	(0.96)	(0.93)	(0.96)
Intangible/assets	0.077	0.087**	0.088**	0.012	0.014	0.013
	(1.64)	(2.94)	(2.92)	(1.38)	(1.74)	(1.63)
Firm size	0.020***	0.019***	0.019***	0.002***	0.002***	0.002***
	(3.05)	(3.33)	(3.38)	(3.61)	(3.22)	(3.11)
Firm age	-0.015	-0.067***	-0.070***	-0.007	-0.008	-0.008
	(-0.44)	(-3.49)	(-3.59)	(-1.15)	(-1.44)	(-1.45)
Observations	2,641	2,641	2,641	2,641	2,641	2,641
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.3484	0.3142	0.3217	0.3880	0.3648	0.3684
Panel B: SOEs, firm-year fixed effects						
Intercept	0.213*	0.107	0.084	0.083***	0.065***	0.068***
	(1.89)	(0.87)	(0.68)	(5.37)	(3.70)	(4.06)
State	**-0.017**	**-0.020**	**-0.022**	**-0.006***	**-0.004**	**-0.004**
	(-1.40)	**(-1.21)**	**(-1.35)**	**(-1.90)**	**(-1.47)**	**(-1.60)**
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,211	1,211	1,211	1,211	1,211	1,211
Adj. R-squared	0.3965	0.3326	0.3418	0.4160	0.3494	0.3552
Panel C: Non-state controls, firm-year fixed effects						
Intercept	-0.323***	-0.282***	-0.281***	0.004	-0.000	0.000
	(-3.69)	(-6.53)	(-6.36)	(0.22)	(-0.01)	(0.02)
State	**0.016**	**0.018**	**0.016**	**-0.003**	**-0.004**	**-0.004**
	(0.64)	**(1.34)**	**(1.28)**	**(-1.32)**	**(-1.28)**	**(-1.20)**
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,377	2,377	2,377	2,377	2,377	2,377
Adj. R-squared	0.4608	0.2999	0.3111	0.3679	0.2429	0.2429

3.4.6 The government decision on privatisation

To further verify whether it is the Chinese government's intension to maintain state shares in privatised firms after the NTS reform, we conduct a logistic test and multivariate test to test the determinants of privatisation decision-making after the reform. The initial regression is as follows:

$$\begin{aligned}\text{State control/ State}_{it} = {} & \alpha+\beta_1\text{Labour}_{it}+\beta_2\text{Weighted MC}_{it}+\beta_3\text{Size}_{it}+\beta_4\text{Leverage}_{it}+\beta_5\text{ROA}_{it} \\ & +\beta_6\text{MB}_{it}+\beta_7\text{Tax to sales}_{it}+\beta_8\text{RPT}_{it}+\beta_9\text{GDP per capita}_{it} \\ & +\beta_{10}\text{GDP growth rate}_{it}+\varepsilon_{it} \qquad (3.4)\end{aligned}$$

The dependent variable State control is a dummy that equals one if the ultimate controller is the state, zero otherwise. State is the proportion of residual state ownership in the firm. In terms of the independent variables, we follow Li and Yamada (2015) by using labour intensity (Labour) as one of the proxies for social stability. Li and Yamada (2015) argue that the social security system for workers outside the SOEs is weak in China. In order to maintain social stability, the government has to control SOEs to keep the employment level high. Therefore, labour intensity is expected to have a positive relationship with state control. We also use industry-weighted market capitalisation (Weighted MC), firm size (size), firm leverage (Leverage) and ROA as the proxies of social stability, following Cosset et al. (2015). It is argued that governments tend to retain high ownership in industry-leading firms to stabilise the business environment (Ng et al., 2009). In addition, bigger firms, highly leveraged firms and under-performing firms tend to be controlled by the government for social stability purpose (Boubakri et al., 2011;

Cosset et al., 2015). Therefore, the expected signs of industry-weighted market capitalisation, firm size, and firm leverage are positive, and that of ROA is negative. For the control variables, we use market to book ratio (MB), tax to sales ratio, and a related party transaction dummy variable (RPT), which equals one if firms have related party transactions with government agencies, and otherwise zero. In addition, we control for macroeconomic factors by using GDP per capita and GDP growth rate in the province where the firm headquarter is located.

Logistic test in the Model (1) of Table 3.10 shows that the government is overall more likely to keep state control in high labour intensity, large sized, highly leveraged, and under-performing firms. The coefficients of Labour, Size, Financial leverage and ROA are all significantly associated with state-controls. Similarly, in the Model (2) when OLS regression analysis is employed, industry-leading, large sized, highly leveraged, and under-performing firms are associated with higher level of residual state ownership. The results are consistent with the findings of Boubakri et al. (2011) and Li and Yamada (2015). Industries including agriculture, forestry; electric power, heat, gas, water; transport, storage, postal services; wholesale and retail; transport, storage, and postal services; accommodation; leasing and commercial service; and water conservancy, environment, and public facility management are strategic industries that the government retains control in, which is consistent with the study of Li and Yamada (2015).[27] All in all, the results reveal that the government has a strong motivation to maintain the social stability after the NTS reform.

[27] We further conduct the analysis of the determinant of privatization decision-making based on the identity of ultimate controllers (SOIs, SOEs, and Non-State controls). The results shown in Appendix B.6 revealed that the intention of retaining state ownership in strategic firms is more observable in SOI rather than in SOE controlled firms.

3.4.7 The government decision on the speed of the NTS reform

Although the NTS reform was initiated by the Chinese government, the timing of the reform process was left up to listed firms. To implement the reform, non-tradable shareholders needed to negotiate with tradable shareholders to complete the reform process, which particularly includes finalising the compensation plan for tradable shareholders and the schedule to un-lockup those converted shares. Therefore, there was considerable latitude for firms especially the controlling shareholders as to when they would complete the process of reform. In our sample, firms take 46 months on average for the whole reform process from the start of reform to the expiration of lock-up period for the converted shares, where the negotiation process takes about two months on average. The speed of the reform implementation could demonstrate the state/controlling shareholders' desire for privatisation. Following Dinc and Gupta (2011), we adopt the Cox-hazard regression analysis to investigate the determinants of the speed of the NTS reform. The initial regression specification for the Cox-hazard regression is as follows:

$$h(t) = h_0(t) \exp (\beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k) \quad (3.5)$$

Table 3.10. Determinants of residual state ownership after the NTS reform

This table represents the logistic and OLS regression results of the determinants of the privatization decision-making process in sample firms from 2007 to 2014. *State control* is a dummy variable, which equals one if a firm's ultimate controlling shareholder is the state and zero otherwise. *State* is the proportion of residual state ownership in a firm. The full definitions of the variables are in the Appendix B.1. Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. Both models are fixed at year level.

Dependent variable	**State control**	**State**
	(1)	**(2)**
Intercept	-1.114	-0.626***
	(-0.82)	(9.89)
Labour	0.083**	-0.001
	(2.01)	(-0.36)
Weighted MC	1.505	0.953***
	(0.78)	(11.62)
Size[28]	0.453***	0.043***
	(12.66)	(13.80)
Financial leverage	0.599***	0.068**
	(3.14)	(2.85)
ROA	-2.646***	-0.147**
	(-3.86)	(-2.44)
MB	-0.001	-0.001
	(-0.08)	(-1.02)
Tax to sales	-1.739	0.294*
	(-1.34)	(2.09)
RPT	0.796***	0.046***
	(2.90)	(5.19)
GDP per capita	-0.714***	-0.010
	(-7.76)	(-1.81)
GDP growth rate	1.057	-0.115
	(0.83)	(-0.95)

[28] We use natural logarithm of total assets to measure size here. However, the results are very similar when firm size is measured by the natural logarithm of total market capitalization.

Table 3.10 (Continued)

Agriculture and forestry	0.681*	0.106***
	(1.92)	(8.67)
Mining	0.410	0.137***
	(1.29)	(11.08)
Manufacturing	-0.117	0.061***
	(-0.53)	(5.02)
Electric power, heat, gas, and water	1.034***	0.146***
	(4.00)	(14.21)
Construction	0.155	0.034***
	(0.49)	(3.63)
Wholesale and retail	1.029***	0.106***
	(4.27)	(7.56)
Transport, storage, and postal services	1.669***	0.170***
	(5.49)	(21.82)
Accommodation and catering	1.864***	0.118***
	(2.75)	(6.37)
Information transmission, software, and information technology services	0.194	0.071***
	(0.59)	(6.97)
Financial	0.162	0.175**
	(0.28)	(2.61)
Real estate	0.141	0.021**
	(0.56)	(3.36)
Leasing and commercial service	2.613***	0.123***
	(3.41)	(16.97)
Water conservancy, environment, and public facility management	2.182***	0.128***
	(3.95)	(9.03)
Culture, sports, and entertainment	-0.724**	0.062**
	(-2.07)	(3.09)
Year fixed effects	Yes	Yes
Observations	6,411	6,411
Log-likelihood	-3490.0586	/
(Pseudo) R-square	0.1803	0.1418

We use two measures to proxy the commitment to the NTS reform, h(t). The first measure is the number of days between starting the NTS reform to the announcement date when all the reformed shares become fully tradable. The second measure is the number of days, starting from the reform confirmation date to the announcement date when all the reformed shares become fully tradable. The key independent variables are State-controls/ State, Labour, Weighed MC, Size, Leverage, and ROA. The control variables are the same as the ones in Table 3.10. The Cox-hazard model results reported in Table 3.11 suggest that firms with the state as the ultimate controller or firms with higher residual state ownership are more likely to take a longer time to finish the full tradable conversion process. Moreover, firms with higher labour intensity, larger size, and higher leverage tend to take a longer reform process. Dinc and Gupta (2011) propose that politicians are likely to delay privatization because it is politically costly for them. They find privatisation of Indian SOEs is delayed in the regions where there is tough competition for voter support between different parties. We argue that our results are in line with Dinc and Gupta (2011). Our results indicate that state shareholders have incentive to delay the NTS reform to mitigate concerns arising from the reform. Those concerns include investors and managers' worry about future commitments of the government (Perotti, 1995).

Table 3.11. Speed of the NTS reform: Cox-hazard model

This table presents the Cox-hazard model results of the speed of the privatization decision-making process in the Chinese listed firms from 2007 to 2014. The figures in brackets are the z-values of the independent variables. The dependent variables are number of days from the reform start date to the fully tradable date, and number of days from the date of the reform confirmation to the date that state ownership becomes fully tradable. The full definitions of the variables are in Appendix B.1. Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Dependent variable: number of days between the reform start date and the fully tradable date		
Independent variables	**Hazard ratio**	**Hazard ratio**
State control	**0.850****	
	(-2.30)	
State		**0.709****
		(-2.39)
Labour	0.919***	0.918***
	(-3.35)	(-3.40)
Weighted MC	3.871	4.998
	(1.29)	(1.57)
Size[29]	0.849**	0.838***
	(-2.54)	(-2.76)
Financial leverage	1.705**	1.704**
	(2.24)	(2.24)
ROA	0.518	0.612
	(-0.92)	(-0.69)
Non-tradable	1.092	1.106
	(1.28)	(1.46)
MB	0.960**	0.962**
	(-2.07)	(-1.96)
Tax to sales	0.201	0.215
	(-1.64)	(-1.60)
RPT	1.228	1.252
	(0.57)	(0.63)
GDP per capita	1.000**	1.000**
	(-2.43)	(-2.51)
GDP growth rate	0.377	0.363
	(-1.10)	(-1.15)
Observations	1,018	1,018
Log-likelihood	-6018.3960	-6018.1781

[29] The results are very similar when using the natural logarithm of total market capitalization instead of total assets.

Table 3.11. (Continued)

Panel B: Dependent variable: number of days between the reform confirmation date and the fully tradable date		
Independent variables	**Hazard ratio**	**Hazard ratio**
State control	**0.859****	
	(-2.16)	
State		**0.708****
		(-2.41)
Labour	0.924***	0.923***
	(-3.14)	(-3.19)
Weighted MC	2.577	3.303
	(0.92)	(1.19)
Size[30]	0.845***	0.837***
	(-2.60)	(-2.78)
Financial leverage	1.711**	1.696**
	(2.26)	(2.23)
ROA	0.458	0.532
	(-1.12)	(-0.91)
Non-tradable	1.110	1.123*
	(1.52)	(1.69)
MB	0.982**	0.984
	(-0.95)	(-0.84)
Tax to sales	0.213	0.225
	(-1.59)	(-1.57)
RPT	1.248	1.258
	(0.62)	(0.64)
GDP per capita	1.000*	1.000**
	(-1.87)	(-1.99)
GDP growth rate	0.355	0.338
	(-1.16)	(-1.22)
Observations	1,018	1,018
Log-likelihood	-6028.4869	-6027.9051

[30] The results are very similar when using the natural logarithm of total market capitalization instead of total assets.

3.5 Conclusion

In this paper, we rely on a manually collected unique database where state ownership is fully tradable. The evidence shows that residual state ownership significantly reduces stock return volatility after the sudden policy change of the NTS reform. Importantly, we show residual state ownership affects stock return volatility by influencing the corporate policies, and the volatility mitigation is primarily driven by firms in which the government has greater influence on corporate decision making. However, the volatility mitigation and corporate policies channels through which mitigation is achieved, are temporary, lasting for up to three years. In addition, we find the government tends to retain control and shares in economically strategic firms, including large, high-labour intensity, and underperforming firms.

The findings suggest that, when facing the opportunity of trading and obtaining large capital gain, the Chinese government chooses to retain the state shares and control in economically strategic firms to act as a stabiliser of the financial markets and send credible signals of the willingness to share risk with investors. However, the retention of state ownership is not a panacea of reducing the market uncertainty. Our results suggest that the signalling effect disappear in the long-term (three years) after the state shares become fully tradable. Therefore, our study provides in-depth and broad implications to investors and also to the policymakers' decisions on further SOE reform strategies. The evidence from this study also calls for further studies on the long-run effect of the resurgence of state ownership after the 2008 crisis.

CHAPTER FOUR

ESSAY THREE

This chapter presents the third essay of this thesis, which investigates the impact of Qualified Foreign Institutional Investors (QFIIs) on stock price crash risk. Specifically, it examines how QFIIs exert effective monitoring through a governance mechanism, threat of exit, to reduce stock price crash risk. Section 4.1 overviews the study. Section 4.2 presents related literature review and hypothesis development. Section 4.3 describes the data used in this study. Section 4.4 discusses the empirical results, while Section 4.5 concludes. The chapter's appendices and references are presented in Appendix C and the Reference sections, respectively.

Exit as governance: Qualified foreign institutional investors and stock price crash risk

Abstract

This study investigates the impact of the Qualified Foreign Institutional Investors (QFIIs) on stock price crash risk in China through a governance mechanism: threat of exit. Using a sample of 1,944 Chinese A-share listed firms over the period from 2003 to 2015, this study finds that investment horizon and existence of multiple QFIIs in the portfolio firm exert credible exit threat to discipline management, and in turn, reduce stock price crash risk. It further provides empirical evidence that QFIIs exert a strong governance force through site visits to the portfolio firms, and in turn, reduce stock price crash risk. The results are robust when controlling for possible endogeneity.

Keywords: Foreign institutional investment, QFIIs, stock price crash risk, China

JEL Codes: G32, G34, G38

4.1 Introduction

Market liberalisation and integration have played an important role in world economic development over a recent decades, and the influences of foreign institutional investors in portfolio firms have drawn increasing attention from academics and policy-makers. However, there has not yet been any consensus on whether foreign institutional investors can discipline management effectively. One strand of literature argues that foreign ownership is associated with higher corporate transparency and lower information asymmetries (e.g. Aggarwal et al., 2011; He et al., 2013; Chen et al., 2013). The other strand of literature proposes the short-termism theory of foreign investors. It is argued that foreign investors are indifferent to domestic investors as they primarily focus on short-term performance and pursue short-term profits, which in turn, has no motivation on disciplining management, and may sabotage firm governance and outputs (Cheng et al., 2011; Manconi et al., 2012; Ferreira et al., 2014).

To better understand whether foreign institutional investors can discipline management of portfolio firms in emerging markets, this study investigates the impact of the Qualified Foreign Institutional Investors (QFIIs) on stock price crash risk in China. Motivations to link QFIIs with stock price crash risk comes from the following reasons. First, China is the largest developing country with the fastest economic growth. In particular, the openness of its stock markets attracts increasing attention from academics and economists. Second, despite record high levels of inward foreign direct investment (FDI), foreign investors had been prevented from trading in the Chinese domestic A-share

markets until 2003 in China.[31] The introduction of QFII scheme in December 2002 allows foreign institutional investors to invest in the Chinese domestic A-share markets, which greatly accelerated the opening up process of the Chinese capital markets. Therefore, it is of great importance to examine the impact of QFIIs. Third, the importance of stock price crash risk for portfolio management and asset pricing has been well documented. Studies like Jin and Myers (2006), Kim et al. (2011a, 2011b) state that a major driving factor of crash risk is the poor corporate governance system resulting from the managers' tendency to withhold bad news and overinvestment because of career concerns and short-term compensation. A few Chinese studies, such as Hung and Tseng (2009) and Huang and Zhu (2015) document that QFIIs can provide arms-length monitoring and improve corporate governance. However, to our knowledge, there is little literature to examine whether foreign institutional investors can mitigate stock price crash risk. Fourth, it is argued that foreign investment would expose portfolio firms with international risk (Chen, et al., 2013), and foreign speculators may be responsible for the severity of financial crises (Stiglitz, 2000). For example, it is argued that the herding behaviour and imprudent competition of foreign institutional investors might be one of the triggers of the East Asian financial crisis in 1997 (Corsetti, et al., 1999; King, 2001). As the Chinese stock markets have often been regarded as highly speculative with general poor corporate governance and weak legal protection (Allen et al., 2005), it is of great importance to examine the role of QFIIs on stock price crash risk in China.

Using a sample of 1,944 Chinese A-share listed firms from 2003 to 2015, we find that QFIIs can conditionally reduce stock price crash risk. In addition, we argue that the

[31] Foreign investors were allowed to trade B-shares using foreign currency since 1992. The B-shares are traded in US dollars on the Shanghai Stock Exchange and in Hong Kong dollars on the Shenzhen Stock Exchange. In addition, foreign investors are allowed to trade in other stock exchanges, such as the Hong Kong, the New York Stock Exchanges, and the Singapore Stock Exchanges.

discipline effect of QFIIs is mainly carried out through an indirect mechanism: threat of exit. Theoretical studies like Shleifer and Vishny (1986) and Kahn and Winton (1998) highlight the mechanisms of how institutional investors govern portfolio firms. One is exerting minoring effort by using voting rights (voice) and the other is threat of exit (exit). In the Chinese setting, the average QFII ownership is only 1% in the A-share markets (Huang and Zhu, 2015), so it is expected that in comparison to engaging with management through voting, QFIIs who have little voting power, are more likely to exert discipline effect though the threat of exit. A survey conducted by McCahery et al. (2016) states that threat of exit is an effective channel for institutional investors to exert monitoring efforts through large share holdings, long-term investment, or existence of multiple institutional investors. Therefore, we first examine the effect of exit threat on stock price crash risk through shareholding, investment horizon, and existence of multiple QFIIs. Our study provides empirical evidence that firms with long-term and multiple QFIIs are prone to be associated with lower stock price crash risk.

It is possible that QFII investment may be based upon a clientele preference. QFIIs may choose to invest in firms with lower stock price crash risk, and therefore, our analysis could be subject to potential endogeneity bias. We address the concern by using two econometric approaches: the propensity score matching model and the Heckman two-stage sample selection model. These results are consistent with our main findings.

One challenge arises in investigating how QFIIs use exit threat as a corporate mechanism to influence manager's behaviours, as the threat of exit is unobservable. McCahery et al. (2016) state that the use of private discussions and negotiations can effectively discipline managers' behaviours. In addition, Cheng et al. (2018) and Jiang

and Yuan (2018) document that institutional investors' site visits boost stock returns and firm innovation, respectively. In this study, we shed light on the exit threat mechanism by using corporate site visits as the channel of discipline. The results suggest that firms with QFII ownership tend to receive more site visits from different QFIIs. Further, we find that corporate site visits, as an effective discipline channel, significantly reduce stock price crash risk. Therefore, it suggests that QFIIs exert credible exit threat through corporate site visits, which in turn, reduce stock price crash risk.

Finally, to add more evidence of the positive role of QFIIs on effective monitoring, we further examine the impact of QFIIs on cash dividend payments, as dividend payments can significantly prevent managers from bad news hoarding and overinvestment (Kim et al., 2018; Officer et al., 2011). The results suggest that firms with QFIIs increase dividend payments when the QFIIs have higher equity stake and longer investment horizon, as well as the existence of multiple QFIIs.

Our study contributes to the existing literature in several ways. First, it enriches the literature on the controversy of the role of foreign institutional investors in emerging markets. That is, foreign institutional investors can exert effective discipline on management. In addition, prior Chinese studies mainly focus on foreign institutional and individual investors in B- or H-share markets, which are segmented from the main Chinese markets. Our study of QFII ownership in China's A-share markets provides broader implications to policy makers and investors. Second, it extends the existing literature of the impact of foreign institutional investors on stock price crash risk. Prior studies, such as He et al., 2013 and Kim and Yi, 2015, focus mainly on the effect of foreign institutional ownership on stock price informativeness and synchronicity, but

little is known about the role of foreign institutional investors in influencing the negative skewness-stock price crash risk. Our study fills this gap and provides empirical evidence of the positive role of foreign institutional investors on reducing stock price crash risk. Third, this study provides empirical evidence for the theory on institutional investors exerting governance through exit threat. Specifically, we find the exit threat is implemented through large equity holdings, long-term investment, and existence of multiple QFIIs. We also provide evidence that site visits are an effective channel for institutional investors to exert threat of exit. Overall, our study provides important implications to policy makers and investors on further development and openness of stock markets and predicting stock price crash risk.

The rest of the chapter is organised as follows: Section 4.2 reviews the related literature and develops hypothesis. Section 4.3 presents the sample and variables in this study. Section 4.4 discusses the methodology and results. Section 4.5 concludes.

4.2 Literature review and hypothesis development

4.2.1 Institutional background and related literature on foreign institutional investors

Since the early 1990s, the Chinese government founded the Shanghai and Shenzhen Stock Exchanges. In 1992, a B-share market was established, which allowed foreign investors to trade B-shares in foreign currency. Later in 1993, industry-leading firms were allowed to issue H-shares on the Hong Kong Stock Exchange, N-shares on the New York Stock Exchange, and other major exchanges in the world. After February 2001,

Chinese investors were allowed to trade B-shares in foreign currency. Further, with the accession of World Trade Organization (WTO)in 2001, the process of opening up the Chinese capital markets has entered a new era. On 1st December, 2002, the China Securities Regulatory Commission (CSRC) issued the "Provisional Measures on Administration of Domestic Securities Investments of Qualified Foreign Institutional Investors (QFIIs)" (the CSRC, 2002), which allows selected QFIIs to enter the Chinese A-share markets. The aim was to deepen the openness of the Chinese capital markets and enhance the management skills in the listed firms, and in turn, improve the development of the legal system of the Chinese financial markets.

Under China's QFII framework, foreign financial institutions can be granted the QFII status only if they meet certain requirements, including quantitative benchmarks relating to the assets size and management experience. QFIIs are selected under a quantitative quota system where they need to apply for an approved quota in Chinese currency for developing their investment portfolio in the Chinese A-share markets. In addition, the investment of QFIIs need to be in compliance with shareholding restrictions: first, shares held by each QFII in any single listed firm cannot exceed 10 percent of total outstanding shares of such firm; second, total shares held by all QFIIs in one single listed firms cannot exceed 20 percent of the total outstanding shares of such firm.

In 2006, the CSRC revised and issued "Regulations on Administration of Domestic Securities Investments of Qualified Foreign Institutional Investors", which lowered the assets size requirements, increased the investment quota limit, and simplified the quota approval management system[32]. It signals the Chinese government's intention

[32] For more information, please refer to "Regulations on Administration of Domestic Securities Investments of Qualified Foreign Institutional Investors" (the CSRC, 2006).

to encourage the QFIIs as potential strategic investors with long-term investment perspectives. By the end of 2016, there were 278 QFIIs in A-share markets with a USD 87.31 billion of total investment (the State Administration of Foreign Exchange, 2016).

Table 4.1 presents the details of top ten largest QFIIs at the end of 2016. The largest QFII is Monetary Authority of Macao with a USD 3 billion investment capital in the Chinese A-share markets. The top ten largest QFIIs are mainly from regions in Asia and Europe, and entered the Chinese A-share markets after 2014.

The evidence is mixed in terms of the impact of foreign institutional ownership on firm behaviour and outcomes. One strand of literature argues that foreign institutional investors bring high standards of information disclosure, and provide better managerial and technical expertise, which in turn, improves firm performance (Dyck, 2001; Ferreira and Matos, 2008; Luong, et al., 2017). In addition, foreign institutional investors also improve corporate governance practices, especially in countries with weak legal protection. Using the data from 23 countries over the period from 2003 to 2008, Aggarwal et al. (2011) find foreign institutional investors, compared to domestic institutional investors, can improve corporate governance in emerging markets significantly. Prior studies further state that foreign institutional investors could improve accounting information disclosure and further improve stock price informativeness and synchronicity (Jiang and Kim, 2004; Gui et al., 2010; He et al., 2013; Kim and Yi, 2015), which in turn, reduces agency problems, such as tunnelling (Huang and Zhu, 2015; Zhang et al., 2017). The disciplinary role of foreign institutional investors is also proved in terms of investment efficiency (Chen, et al., 2013; Ferreira and Matos, 2008). As to the monitoring mechanisms, theoretical studies of Hirschamn (1970) and McCahery et al. (2016)

demonstrate two theories of how institutional investors influence the management: using voting right (voice) and selling and voting with their feet (exit). Studies like Douma et al. (2006), Chen et al. (2007), Ferreira and Matos (2008), and McCahery et al. (2016) base on the traditional theory and find that foreign and independent institutional investors with large holdings and long investment horizon are motivated to use their control rights through intervention in management decisions. Recent theory posits that institutional investors can govern firms even when they have little intervention power (Bharath et al., 2013; McCahery et al., 2016). That is, institutional investors could use exit threat to pressure the management for improvement.

Another strand of literature, however, argues that foreign institutional investors represents "hot money" by pursuing short-term profits with little concern for long-term firm prospects. Ferreira et al. (2014) argue that short-termism of foreign investors may pressure the stock markets, and in turn, increase the risk exposure of listed firms. It is also evidenced that foreign speculators are responsible for the severity of financial crises (Stiglitz, 2000). In addition, Cheng et al. (2011) and Manconi et al. (2012) provide evidence that institutional investors under short-termism theory tend to focus on current earning news and short-term performance excessively.

Table 4.1. The top ten largest QFIIs

This table lists the information of the top ten largest QFIIs in China at the end of 2016, including the names, origins, trustee bank, registration date, and the amount of investment quota of QFIIs.

Ranking	QFIIs	Origins	Trustee bank	Registration date	Investment Quota (in billions)
1	**Monetary Authority of Macao**	Macao	Bank of China	27-10-16	3.00
2	**Norges Bank**	Norway	National City Bank of New York	13-02-15	2.50
3	**ABU Dhabi Investment Authority**	United Arab Emirates	Hong Kong and Shanghai Banking Corporation	25-12-15	2.50
4	**Hong Kong Monetary Authority**	Hong Kong	National City Bank of New York	22-09-14	2.50
5	**UBS AG**	Switzerland	National City Bank of New York	28-11-16	2.19
6	**Société Générale**	France	Hong Kong and Shanghai Banking Corporation	27-10-16	1.70
7	**JF Asset Management Limited**	Hong Kong	China Construction Bank	27-07-16	1.53
8	**Fubon Life Insurance Co. Ltd**	Taiwan	National City Bank of New York	28-09-15	1.50
9	**Kuwait Investment Authority**	Kuwait	Industrial and Commercial Bank of China	22-01-14	1.50
10	**Oppenheimer Funds, Inc.**	United State	Hong Kong and Shanghai Banking Corporation	28-11-16	1.50

4.2.2 Related literature on stock price crash risk

Stock price crash risk measures the asymmetry in risk, defined as the negative skewness in the distribution of returns for individual stocks (Chen et al., 2001; Jin and Myers, 2006). Prior studies document several theoretical frameworks of generating stock price crash. Cao et al. (2002) argue that traders with less information are hesitated about the trading signals sent by informed traders, and would delay trading until the price drops, which generates stock price crash. Hong and Stein (2003) state the key determinants of the stock price crash risk is investor hereogeneity, which potentially blocks the negative information outflow to be fully incorporated into stock prices, therefore increasing stock price crash risk. More recent studies focus on the agency theory framework. Jin and Myers (2006) provide a theoretical analysis linking bad news hoarding by managers with stock price crash risk. They propose that managers tend to withhold bad news to the public due to career concerns. Once the bad news accumulated and reached to a threshold level, stock price crashes.

Prior studies on the determinants of stock price crash risk are heavily framed from an agency perspective. For example, financial reporting can be a key determinant of stock price crash risk. Hutton et al. (2009) and Chen et al. (2017a) find that earnings management, measured by accumulated accruals, is positively related to stock price crash risk. In addition, Francis et al. (2016) investigate the impact of real earnings management on stock price crash risk, and find that firms engage in real earnings management are prone to price crash. Beside accruals and real earnings management, managers also use other methods to manage earnings, such as corporate tax avoidance. Kim et al. (2011a)

find that corporate tax avoidance increases stock price crash risk. In addition, managers may also use voluntary disclosures, such as corporate social responsibility (CSR), to conceal bad news for an extended period. Kim et al. (2014) reveal that firms with better CSR disclosures tend to have lower stock price crash risk. Zhang et al. (2016) argue that corporate philanthropy (a component of CSR) can reduce the stock price crash risk in China. Another strand of literature investigates the impacts of managerial incentives and characteristics on stock price crash risk. CFO's equity incentive is found to have a positive relationship with stock price crash risk (Kim et al., 2011b). Excess perks of executives in China also increases the risk of price crash (Xu et al., 2014). Further, Kim et al. (2016) reveal that firms having overconfident CEOs are more likely to have high stock price crash risk. CEO age is also documented as one of the factors determining stock price crash risk. Andreou et al. (2017) find that firms with younger CEOs are more likely to experience price crashes, which indicates that CEOs have more incentives to hoard bad news in their early career. Moreover, effective internal and external corporate governance mechanisms are found to play an important role in reducing stock price crash risk. Chen et al. (2017b) find that high quality internal control (control environment, risk assessment, control activities, information and communication, and monitoring) mitigates stock price crash risk. Further, Kim et al. (2018) argue that higher cash dividend payment indicates less minority shareholder expropriation, and therefore, mitigates stock price crash risk. External monitoring, such as institutional investors ownership (An and Zhang, 2013; Callen and Fang, 2013) and analyst coverage (Kothari et al., 2009) can alleviate stock price crash risk. Finally, social norms can also influence stock price crash risk. Studies show that more intense religious environment (Callen and Fang, 2015), and high social trust (Cao et al., 2016; Li et al., 2017) are negatively related to stock price crash risk.

4.2.3 Hypothesis development

A framework of the costs and benefits of monitoring established by Chen et al. (2007) shows that monitoring costs decrease the independence of institutional investors. It argues that investors such as foreign institutional investors face lower monitoring costs, compared to investors who have a higher risk of damaging the business ties. Therefore, foreign institutional investors with no potential business ties, have more incentives to stay and monitor the management instead of simply trading. In the context of China, a number of recent studies show that QFIIs are able to monitor listed firms. Huang and Zhu (2015) also point out that QFIIs have greater influence than domestic institutional investors over the controlling shareholders in Chinese listed firms, as they are less prone to political pressure, and therefore, more likely to provide arm-length negotiation and monitoring. It is revealed that QFIIs can effectively monitor corporate insiders, and in turn, improve firm efficiency by improving information asymmetry and relaxing investment cash-flow sensitivity (Hung and Tseng, 2009), and can also help reduce the incidence of corporate fraud (Aggarwal et a., 2014, Wu et al., 2015). As such, we expect that QFIIs can reduce stock price crash risk by providing effective monitoring.

In terms of the effectiveness of monitoring provided by institutional investors, it is well documented that the proportion of equity holdings of institutional investors is the key factor of influencing the effectiveness of monitoring (Douma et al., 2006; Chen et al., 2007; Ferreira and Matos, 2008; McCahery et al., 2016). However, in the Chinese setting, the block shareholders are mainly the state and legal persons, and QFII ownership accounts only 1% on average in A-share markets, resulting QFIIs have minor power of voting rights (Huang and Zhu, 2015). As such, QFIIs are expected to have minor effect

on promoting governance practices through voting (voice). Therefore, in this study, we examine the effect of QFIIs based on the theory of threat of exit. With the presence of threat of exit, institutional investors, especially the minority investors who have inadequate voting rights, still enable to influence and discipline management (McCahery et al., 2016). Moreover, McCahery et al. (2016) state that long-term and existence of multiple institutional investors can exert effective discipline to the management even with minor shareholdings.

In sum, we expect that QFIIs in China can effectively discipline the management of portfolio firms, and in turn, mitigate stock price crash risk. We hypothesise that:

Hypothesis 1: The presence of QFIIs is negatively related to stock price crash risk.

Further, corporate site visits are one of the most prevalent and important types of information acquisition activities in the market (Brown et al., 2015; McCahery, et al., 2016). It is documented that institutional investors can acquire useful information by observing the operation of a firm or direct communicating with managers by visiting a firm's headquarter and its operation facilities (Cheng et al., 2018). In addition, through site visits, institutional investors can exert effective monitoring to discipline managers, which in turn, increase stock returns (Cheng et al., 2018) and firm innovation (Jiang and Yuan, 2018). Therefore, we further expect that corporate site visits by QFIIs can be the effective channel through which QFIIs reduce stock price crash risk.

4.3 Sample and variables

4.3.1 Sample

The initial sample consists of all Chinese A share listed companies from 2003 to 2015[33]. The data in this study is obtained from the China Securities Market and Accounting Research (CSMAR) database. We exclude (1) financial service firms, (2) firms with fewer than 30 trading weeks of stock return data in a fiscal year, (3) firm-year observations with missing information to obtain the control variables. Our final sample includes 12,382 firm-year observations representing 1,944 individual firms. To mitigate the effects of outliers, we winsorize continuous variables at the 1% and 99% levels.

Panels A and B of Table 4.2 show the sample firm-year observations and QFIIs distribution across industries and by year, respectively. The industry classification is based on the 2012 CSRC industrial classification of listed companies with 17 industries.[34] Panel A shows that the majority of our sample observations are in the manufacturing industry (58.65%). Similarly, the majority of the firms with QFII ownership are from the manufacturing industry (62.58%). While transport, storage and postal services industry accounts for 9.63%, and wholesale and retail accounts for 6.77% of firms with QFII ownership. Panel B reports the chronological distribution of our sample firms and firms with QFII ownership. There are more observations in the later sample period, indicating the underlying growth in China's capital markets. In terms of firms with QFIIs, it reveals an overall increasing trend of QFIIs representative from 2003 to 2015, except for a sharp

[33] QFIIs are allowed to invest in A-share market from 2003.
[34] For more details, please refer to the CSRC, 2012. Beijing: "The Guidelines for the Industrial Classification of Listed Companies (No. 31)".

decrease in 2007 and 2008, which could be driven by the global financial crisis, and a slight decrease in 2012 and 2013, which could be due to the overall bad performance of the Chinese A-share markets in 2012.

4.3.2 Measuring firm-specific crash risk

Following Chen et al. (2001), Hutton et al. (2009), and Kim et al. (2011a, 2011b), we measure firm-specific crash risk using two measures. We first estimate firm-specific weekly returns, denoted W, by using the following equation:

$$R_{i,t}= \alpha_i+\beta_1 R_{m,t-2}+ \beta_2 R_{m,t-1}+ \beta_3 R_{m,t}+ \beta_4 R_{m,t+1}+ \beta_5 R_{m,t+2}+ \varepsilon_{i,t} \quad (4.1)$$

where $R_{i,t}$ is the return on stock i in week t and $R_{m,t}$ is the value-weighted A-share market return on week t. The firm-specific weekly returns for firm i in week t are measured by $W_{i,t}=\ln(1+\varepsilon_{i,t})$.

The first measure of crash risk is the negative coefficient of skewness, NCSKEW, calculated by taking the negative of the third moment of firm-specific weekly returns for each sample year and dividing it by the standard deviation of firm-specific weekly returns raised to the third power. Specifically, the equation is as follows:

$$NCSKEW= -[n(n-1)^{3/2} \sum w_{j,\tau}^3]/[(n-1)(n-2)(\sum w_{j,\tau}^2)^{3/2}] \quad (4.2)$$

where n is the number of trading weeks of firm i in year t. A higher NCSKEW indicates a firm is more likely to crash.

The second measure is the down-to-up volatility, DUVOL, calculated as the logarithm of the ratio of the standard deviation of firm-specific weekly returns in "down" weeks to the standard deviation of firm-specific returns in "up" weeks. If a firm's specific weekly return is higher than the mean value over year t, then the week is a "up" week, otherwise a "down" week. Specifically, the equation is as follows:

$$DUVOL_{j,\tau}=\log\{(n_u-1)\sum_{Down} w_{j,\tau}^2/(n_d-1)\sum_{Up} w_{j,\tau}^2\} \quad (4.3)$$

where n_u and n_d are the number of "up" and "down" weeks over year t, respectively. A higher value of DUVOL, a firm is more likely to crash.

Table 4.2. Sample distribution

Panel A and B of this table show the sample firm-year observations and QFIIs distribution across industry and year, respectively.

Panel A: By industry

Industry	Firm-year observation	Percentage (%)	Firms with QFII ownership	Percentage (%)
Agriculture, forestry	183	1.48	14	1.11
Mining	394	3.18	30	2.39
Manufacturing	7,263	58.65	783	62.58
Electric power, heat, gas and water	650	5.25	56	4.46
Construction	286	2.33	22	1.75
Wholesale and retail	699	5.64	85	6.77
Transport, storage and postal services	554	4.47	121	9.63
Accommodation	66	0.53	11	0.88
Information transmission, software and information technology services	424	3.42	25	1.99
Real estate	875	7.06	64	5.18
Leasing and commercial service	170	1.37	21	1.67
Scientific research and technical service	37	0.30	0	0.00
Water conservancy, environment and public facility management	141	1.14	7	0.56
Education	12	0.10	0	0.00
Health and social work	28	0.23	0	0.00
Culture, sports and entertainment	154	1.24	7	0.56
Others	179	1.45	6	0.48
Total	12,382	100	1,252	100

Panel B: By year				
Year	**Firm-year observation**	**Percentage (%)**	**Firms with QFII ownership**	**Percentage (%)**
2003	773	6.25	9	0.80
2004	773	6.25	35	2.87
2005	778	6.28	88	7.01
2006	858	6.93	162	12.90
2007	425	3.43	82	6.53
2008	345	2.79	67	5.33
2019	736	5.94	100	7.96
2010	900	7.27	128	10.19
2011	997	8.05	119	9.47
2012	1416	11.43	104	8.28
2013	1,455	11.75	95	7.56
2014	1,451	11.72	122	9.71
2015	1,475	11.92	141	11.39
Total	12,382	100	1,252	100

4.3.3 Measuring QFIIs ownership

We have four measures of QFIIs ownership in Chinese listed firms. The presence of QFII ownership, QFII, is a dummy variable that equals one if a listed firm has QFII ownership, zero otherwise. QFII ownership concentration, Top10, refers to a dummy variable that equals one if a firm has QFII ownership in its top ten shareholders list, zero otherwise. QFII investment horizon, Long, is a dummy variable that equals one if a firm has QFIIs in the top ten shareholders list, whose investment horizon is longer than six months in the observation year, zero otherwise. Existence of multiple QFIIs, MultiQFII, is a dummy variable that equals to one if a firm has more than one QFII in its top ten shareholders list in the observation year, zero otherwise.

4.3.4 Control variables

We also include a series of control variables that are known to influence stock price crash likelihood. The lagged variable of crash risk ($NCSKEW_{t-1}$ or $DUVOL_{t-1}$) is included to control the potential serial correlation. Following Chen et al. (2001) and Kim et al. (2011a, 2011b), we include the following control variables that have been commonly used in the prior studies as the predictors of crash risk. First, we include Dturn, the detrended stock trading volume, a proxy of investor opinion heterogeneity, which is positively related to stock price crash risk (Hong and Stein, 2003). Second, we include Return and Sigma, measured by the average firm-specific weekly return over the past year and the standard deviation of weekly firm-specific stock returns over the past year, respectively. Past returns and volatility are related to future crash risk given that firms

with higher returns and volatility are more likely to undergo a future price crash (Chen et al., 2001). Further, some firm-level control variables are included: Size, is calculated as the natural logarithm of total assets. Leverage refers to the ratio of total liabilities to total assets. ROA refers to return on assets. MB refers to market to book equity ratio; and ABACC[35], the absolute value of abnormal accruals, which is a proxy of earnings management (Hutton et al., 2009; Kim et al., 2011a, 2011b; Kim and Zhang, 2016). Studies like Hutton et al. (2009) find that firms with large size, low leverage ratio, poor performance, high growth, and more earnings management are more prone to crash. In addition, it is expected that firms with poor corporate governance are more like to have high stock price crash risk (Andreou et al., 2017; Chen et al., 2017a). Therefore, for the internal corporate governance variables, we follow Xu et al. (2014) and include State, which is a dummy variable equal to one if the ultimate controller is the State. Top1 refers to the percentage of top one shareholding. Independence, refers to a ratio of the number of independent directors to the total number of directors on the board; and Board size is measured by the natural logarithm of the total number of directors on the board.

4.4 Empirical tests and results

4.4.1 Descriptive statistics

Table 4.3 displays the summary statistics of the variables in our study[36]. The detailed description of each variable is shown in the Appendix C.1. In our sample, the average value for NCSKEW and DUVOL are -0.262 and -0.079, respectively, which are

[35] The construction of ABACC is detailed in the Appendix C.2.
[36] We test the correlations between the variables and find no significant multicollinearity problems. Please refer to the Appendix C.3.

similar to those reported in Li et al. (2017). The four measures of QFIIs have the average values of 0.101, 0.058, 0.037, and 0.009, respectively. That is, 10.1% of the sample have QFII ownership, and 5.8% of them have QFIIs in their top ten shareholder list. In addition, 3.7% of the sample have long-term QFIIs (more than six months) in their top ten shareholder lists, and 0.9% of them have more than one QFII in their top ten shareholder lists.

4.4.2 Baseline regression analysis: QFII ownership and stock price crash risk

To investigate the impact of QFII ownership on firm-specific future stock price crash risk, we apply the following model:

$$\begin{aligned} CrashRisk_{t+1} = \alpha + \beta_1 QFII_t \,/\, Top10_t \,/\, Long_t \,/\, MultiQFII_t \\ + \gamma \times Control\ variables + Industry\ dummies + Year\ dummies + \varepsilon_t \end{aligned} \quad (4.4)$$

where the dependent variable, $CrashRisk_{t+1}$ is measured by NCSKEW or DUVOL. Following stock price crash risk literature, we measure all independent variables in year t, which is a one-year lag from the dependent variable. As such, it allows us to examine the effect of QFII ownership in year t on predicting the crash risk in year t+1. The key independent variables are the four measures of QFII ownership: QFII, Top10, Long, and MultiQFII. The Equation (4.4) controls for industry and year fixed effects. Further, we cluster the standard errors by both the firm and time level to alleviate concerns of potential cross-sectional and time-series dependence in the data (Kim et al., 2011a, 2011b; Xu et al., 2014; Li et al., 2017).

Table 4.3. Descriptive statistics

This table reports the summary statistics of the variables included in the analysis. The full descriptions of all variables are summarised in the Appendix C.1.

Variables	Observations	Mean	Min	Max	Std. Dev.
$NCSKEW_{t+1}$	12,382	-0.262	-4.621	4.792	0.728
$DUVOL_{t+1}$	12,382	-0.079	-1.123	1.143	0.218
$QFII_t$	12,382	0.101	0.000	1.000	0.301
$Top10_t$	12,382	0.058	0.000	1.000	0.234
$Long_t$	12,382	0.037	0.000	1.000	0.188
$MultiQFII_t$	12,382	0.009	0.000	1.000	0.093
$NCSKEW_t$	12,382	-0.235	-4.621	6.214	0.725
$DUVOL_t$	12,382	-0.070	-1.015	1.512	0.216
$Return_t$	12,382	-0.001	-0.119	0.000	0.002
$Sigma_t$	12,382	0.047	0.006	0.491	0.020
$Dturn_t$	12,382	-0.074	-1.866	1.849	0.257
$Size_t$	12,382	21.996	18.814	25.683	1.136
$Leverage_t$	12,382	0.483	0.008	0.974	0.193
ROA_t	12,382	0.040	-0.984	0.775	0.069
MB_t	12,382	2.566	0.325	10.998	1.774
$ABACC_t$	12,382	0.062	0.000	1.614	0.072
$State_t$	12,382	0.683	0.000	1.000	0.465
$Top1_t$	12,382	0.372	0.003	0.894	0.157
$Independence_t$	12,382	0.362	0.000	0.714	0.054
$Boardsize_t$	12,382	2.200	1.386	2.944	0.205
$Excessdiv_t$	12,382	-0.021	-0.270	0.760	0.117
$Sitevisits_t$	12,382	0.049	0.000	1.000	0.217

Table 4.4 reports the regression results. Long and MultiQFII are both negatively and significantly related to stock price crash risk in the Models (4), (7) and (8) at the 5% and 10% levels. It suggests that long-term QFIIs are able to exert effective monitoring to discipline management, which in turn, reduce stock price crash risk. The results are consistent with the findings of Douma et al. (2006), Chen et al. (2007), Ferreira and Matos (2008), and McCahery et al. (2016). In addition, consistent with McCahery et al. (2016), the results reveal that the existence of multiple QFIIs strengthens the effectiveness of monitoring. However, the results show little evidence that QFII ownership (QFII and Top10) have a mitigating effect on stock price crash risk. This is reasonable because the overall QFII ownership is still minor in Chinese listed firms.

The lagged variable of crash risk ($NCSKEW_t$ or $DUVOL_t$) is positively and significantly related to crash risk in all the models at the 1% level, indicating crash risk is persistent (Chen et al., 2001; Callen and Fang, 2015; Li et al., 2017). Consistent with the findings of Chen et al., 2001; Kim et al., 2011a, 2011b; Callen and Fang, 2015; Li et al., 2017, Return and Sigma are both positively and significantly related to crash risk, which suggests that firms with higher return and volatility are more prone to undergo a future price crash. In addition, there is a positive and significant relationship between MB and crash risk in all the models at the 1% level, which is in line with the findings of prior studies that growth stocks are more likely to crash (Harvey and Siddique, 2000; Chen et al., 2001, Callen and Fang, 2015; Xu et al, 2014; Li et al., 2017). Surprisingly, the leverage ratio (Leverage) is negatively and significantly related to stock price crash risk at the 10% level in the Models (5) to (8). Hutton et al. (2009) explain that the negative

relation most likely reflects endogeneity in firms' capital structure choices, that firms with less crash-prone firms are able to establish higher level of indebtedness.[37]

4.4.3 Endogeneity issue

We first use the propensity score matching approach to address the potential endogeneity issue. The mechanism of propensity score matching is to produce two groups of firms that can be matched optimally according to the included control variables. In our case, the treatment groups are the firms with QFII ownership, QFIIs in top ten shareholders list, QFII investment period longer than six months, or multiple QFIIs, control groups vice versa. The treatment and control groups are made to be as statistically alike as possible for the control variables.

In the first-stage analysis, we estimate the following probit model to predict the presence of QFII ownership:

$$\begin{aligned} QFII_t/\ Top10_t/\ Long_t/\ MultiQFII_t = {} & \alpha + \beta_1 Size_t + \beta_2 Leverage_t + \beta_3 ROA_t + \beta_4 MB_t \\ & + \beta_5 ABACC_t + \beta_6 State_t + \beta_7 Top1_t + \beta_8 Indenpendence_t \\ & + \beta_9 Boardsize_t + \beta_{10} Return_t + \text{Industry dummies} \\ & + \text{Year dummies} + \varepsilon_t \end{aligned} \quad (4.5)$$

[37] Apart from NCSKEW, DUVOL, Return, Sigma, Size, MB, and Leverage, the rest of the control variables are not statistically significant, which is in line with Xu et al. (2014). The possible reason could be the relatively low degree of freedom in the regression model. The degree of freedom is constrained by the firm and year fixed effects, and two-way clusters of standard errors methods.

Table 4.4. QFII ownership and stock price crash risk

This table presents the results of the relationship between QFII ownership and stock price crash risk of the sample from 2003 to 2015. QFII is a dummy variable equal to one if a firm has QFII ownership, zero otherwise; Top10 is a dummy variable equal to one if a firm has QFII ownership in its top ten shareholders list, zero otherwise; Long is a dummy variable equal to one if a firm has QFII investment longer than six months in the observation year, zero otherwise; MultiQFII is a dummy variable equal to one if a firm has more than one QFII in the observation year, zero otherwise. The full descriptions of all variables are summarised in the Appendix C.1. A superscript *, ** or *** denotes significance at the 10%, 5% or 1%, respectively. All models control for industry and year fixed effect with the Huber-White standard error clustered by both firm and year.

	$NCSKEW_{t+1}$				$DUVOL_{t+1}$			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
$QFII_t$	0.033				0.010			
	(1.21)				(1.5)			
$Top10_t$		-0.003				-0.006		
		(-0.11)				(0.81)		
$Long_t$			-0.436				-0.018*	
			(-1.66)				(-2.01)	
$MultiQFII_t$				-0.075**				-0.035**
				(-2.24)				(-2.41)
$NCSKEW_t$	0.064***	0.064***	0.064***	0.064***				
	(3.93)	(3.94)	(3.94)	(3.92)				
$DUVOL_t$					0.058***	0.058***	0.058***	0.058***
					(4.14)	(4.14)	(4.13)	(4.12)
$Return_t$	20.170**	19.888**	19.809**	19.855**	7.589**	7.494**	7.469**	7.486**
	(2.26)	(2.21)	(2.21)	(2.21)	(2.74)	(2.69)	(2.69)	(2.68)
$Sigma_t$	3.883**	3.843**	3.825**	3.831**	1.153***	1.138***	1.133***	1.135***
	(2.82)	(2.79)	(2.79)	(2.78)	(3.14)	(3.1)	(3.10)	(3.09)

Table 4.4. (Continued)

$Dturn_t$	-0.018	-0.018	-0.018	-0.018	0.006	0.006	0.006	0.006
	(-0.57)	(-0.56)	(-0.54)	(-0.54)	(0.73)	(0.74)	(0.75)	(0.74)
$Size_t$	0.023	0.025*	0.026*	0.025*	0.003	0.003	0.004	0.003
	(1.69)	(1.81)	(1.86)	(1.83)	(0.52)	(0.66)	(0.71)	(0.66)
$Leverage_t$	-0.103	-0.107	-0.111	-0.109	-0.025*	-0.027*	-0.028*	-0.028*
	(-1.65)	(-1.74)	(-1.77)	(-1.75)	(-1.79)	(-1.92)	(-1.96)	(-1.92)
ROA_t	0.143	0.150	0.154	0.152	0.024	0.027	0.028	0.028
	(0.72)	(0.76)	(0.78)	(0.77)	(0.35)	(0.39)	(0.41)	(0.41)
MB_t	0.041***	0.041***	0.042***	0.042***	0.011***	0.011***	0.011***	0.011***
	(4.08)	(4.11)	(4.07)	(4.10)	(3.53)	(3.55)	(3.52)	(3.32)
$ABACC_t$	0.044	0.043	0.043	0.042	-0.009	-0.010	-0.009	-0.009
	(0.59)	(0.58)	(0.58)	(0.57)	(-0.35)	(-0.38)	(-0.37)	(-0.37)
$State_t$	0.003	0.003	0.005	0.003	0.003	0.003	0.003	0.003
	(0.14)	(0.16)	(0.22)	(0.17)	(0.35)	(0.37)	(0.44)	(0.38)
$Top1_t$	0.000	0.000	-0.000	0.000	0.000	0.000	0.000	0.000
	(-0.08)	(-0.07)	(-0.06)	(-0.07)	(0.35)	(0.37)	(0.38)	(0.39)
$Independence_t$	-0.131	-0.134	-0.133	-0.133	-0.015	-0.015	-0.015	-0.015
	(-1.17)	(-1.19)	(-1.18)	(-1.18)	(-0.47)	(-0.48)	(-0.48)	(-0.48)
$Boardsize_t$	-0.027	-0.027	-0.027	-0.028	-0.002	-0.002	-0.002	-0.002
	(-0.72)	(-0.73)	(-0.72)	(-0.74)	(-0.17)	(-0.19)	(-0.18)	(-0.22)
Industry fix effect	YES	YES	YES	YES	YES	YES	YES	YES
Year fix effect	YES	YES	YES	YES	YES	YES	YES	YES
Adj R-square	0.0838	0.0874	0.0839	0.0838	0.0831	0.0865	0.0834	0.0833
Observations	12,382	12,382	12,382	12,382	12,382	12,382	12,382	12,382

The dependent variables are the four measures of QFII ownership. The independent variables are commonly used in the literature for controlling firm performance and corporate governance perspectives. The model is fixed at the industry and year levels.[38]

Prior studies state that foreign institutional investors are inclined to invest in markets with stronger shareholder rights, and in firms with less information asymmetry. Studies based on the home bias theory argue that foreign portfolio investors exhibit a large home bias against countries with poor governance and different cultures (Ahearne et al., 2004; Kho et al., 2009; Anderson et al., 2011). Furthermore, Aggarwal et al. (2005) use the portfolio holdings of 576 US mutual funds invested in emerging markets and investigate the portfolio preferences of foreign institutional investors at both country-level and firm-level disclosure and polices. It is stated that foreign institutional investors are more likely to invest in markets with strong accounting standards and legal protection, and good corporate governance, such as greater accounting transparency at the firm level. Panel A in Table 4.5 represents the results of the determinants of QFII presence. It shows in the Model (1) that QFIIs are more likely to invest in large size, low leverage, good operating performance, high growth, and low earnings management firms. Similarly, QFIIs with ownership concentration, long investment horizon and multiple QFIIs are also inclined to stay in firms with good operating performance and good corporate governance measures, which is consistent with Aggarwal et al. (2005), Ferreira and Matos (2008), and Liu et al. (2014). Further, the results reveal that QFIIs are more likely to invest in the

[38] We also test the model with firm and year fixed effects, and the results are very similar.

state controlled firms in China for the incentive of building strong connection with the Chinese government (Liu et al., 2014).

In the second-stage regression, we use a sample containing two groups of firms (treated group and control group) which are generated from the probit models in the Equation (4.5), and re-run the regression shown in the Equation (4.4). In Panel (B) of Table 4.5, the results show that Long and MultiQFII are both negatively and significantly related to stock price crash risk at the 10% levels, as shown in the Models (7) and (8). It suggests that long investment horizon and multiple existences of QFIIs are prone to reduce the stock price crash risk. The results are consistent with our main findings.

Second, we also apply the Heckman (1979) two-stage approach to alleviate the potential endogeneity of QFII ownership. We further obtain the inverse Mills ratio (Lambda) from the probit model conducted in the first-stage of the propensity score matching analysis. Then, we add Lambda into the Equation (4.4) to control for unobserved heterogeneity in the selection concerns.

Table 4.6 presents the results of the second-stage of Heckman two-stage model. The inverse Mills ratio (Lambda) is insignificant in all the models, suggesting that there is no unobservable selection bias in our sample. Importantly, we continue to find that QFIIs with long-term investment and existence of multiple QFIIs are negatively and significantly associated with stock price crash risk at the 10% levels, as shown in the Models (3), (4), (7), and (8). The results support our argument that QFIIs can exert effective monitoring to discipline the management and reduce stock price crash risk.

Table 4.5. QFII ownership and stock price crash risk: Propensity score matching model

This table presents the results of propensity score matching estimations. Panel A presents the presence of QFII ownership. Panel B presents the results of the relationship between QFII ownership and stock price crash risk using the match sample obtained from the tests in Panel A based on the propensity score. The full descriptions of all variables are summarised in the Appendix C.1. A superscript *, ** or *** denotes significance at the 10%, 5% or 1%, respectively. The models in Panel A control for industry and year fixed effect with the Huber-White standard error. The models in Panel B control for industry and year fixed effect with the Huber-White standard error clustered by both firm and year.

Panel A

	$QFII_t$	$Top10_t$	$Long_t$	$MultiQFII_t$
$Size_t$	0.298***	0.303***	0.323***	0.282***
	(14.35)	(12.45)	(11.36)	(6.05)
$Leverage_t$	-0.844***	-0.890***	-1.007***	-1.121***
	(-7.35)	(-6.54)	(-6.16)	(-3.97)
ROA_t	1.504***	1.623***	1.771***	2.818***
	(5.07)	(4.73)	(4.31)	(4.34)
MB_t	0.047***	0.045***	0.052***	0.003***
	(3.90)	(3.27)	(3.11)	(3.27)
$ABACC_t$	-0.501*	-0.329	-0.263	-0.140
	(-1.90)	(-1.02)	(-0.67)	(-0.22)
$State_t$	0.113***	0.068*	0.506***	0.132
	(2.83)	(1.91)	(7.74)	(1.33)
$Top1_t$	0.001	0.001	0.002	0.007***
	(1.08)	(1.04)	(1.40)	(2.66)
$Independence_t$	-0.458	0.392	0.230	0.188
	(-1.44)	(1.01)	(0.49)	(0.24)
$Boardsize_t$	-0.137	0.061	0.108	-0.330
	(-1.49)	(0.56)	(0.84)	(1.44)
Industry effects	YES	YES	YES	YES
Year effects	YES	YES	YES	YES
Log-likelihood	-3622.9444	-2471.2370	-1674.7594	-512.9987
Observations	12,305	12,305	12,305	12,305

Panel B

	$NCSKEW_{t+1}$				$DUVOL_{t+1}$			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
$QFII_t$	0.018				0.006			
	(0.62)				(0.75)			
$Top10_t$		0.037				0.001		
		(1.31)				(0.09)		
$Long_t$			-0.041				-0.023*	
			(-1.10)				(-1.96)	
$MultiQFII_t$				-0.053				-0.046*
				(-0.74)				(-1.80)
$NCSKEW_t$	0.088***	0.096***	0.052**	0.064***				
	(5.52)	(3.09)	(2.45)	(3.92)				
$DUVOL_t$					0.091***	0.050*	0.025	0.058***
					(5.27)	(1.99)	(1.71)	(4.12)
$Return_t$	20.207**	128.043	210.900*	19.855**	7.244***	22.420	62.660**	7.486**
	(2.94)	(1.38)	(2.17)	(2.21)	(3.63)	(1.25)	(2.85)	(2.68)
$Sigma_t$	4.254**	10.019**	14.737*	3.831**	1.264**	1.933	4.275**	1.135***
	(2.23)	(1.60)	(2.09)	(2.78)	(2.45)	(1.56)	(2.85)	(3.09)
$Dturn_t$	0.059	0.121	-0.040	-0.018	0.008	0.036	0.043	0.006
	(0.56)	(1.39)	(-0.28)	(-0.54)	(0.24)	(1.69)	(1.26)	(0.74)
$Size_t$	0.027	0.032	0.062	0.025*	0.004	0.004	0.007	0.003
	(1.73)	(1.42)	(1.78)	(1.83)	(0.73)	(0.77)	(0.85)	(0.66)
$Leverage_t$	-0.071	-0.118	-0.217	-0.109	-0.019	-0.021	-0.011	-0.028*
	(-0.92)	(-0.86)	(-1.29)	(-1.75)	(-0.62)	(-0.52)	(-0.24)	(-1.92)
ROA_t	0.077	0.510	-0.205	0.152	-0.019	0.139	0.009	0.028
	(0.19)	(1.41)	(-0.49)	(0.77)	(-0.14)	(1.43)	(0.09)	(0.41)
MB_t	0.048***	0.035**	0.047**	0.042***	0.014***	0.007	0.011**	0.011***
	(3.59)	(2.23)	(2.44)	(4.10)	(3.65)	(1.27)	(2.24)	(3.32)

ABACC$_t$	0.060	0.210	0.596	0.042	-0.036	0.108	0.100	-0.009
	(0.44)	(0.70)	(1.23)	(0.57)	(-0.77)	(1.02)	(0.84)	(-0.37)
State$_t$	-0.031	-0.077*	-0.106*	0.003	-0.012	-0.027*	-0.034	0.003
	(-0.80)	(-2.13)	(-1.95)	(0.17)	(-1.04)	(-1.91)	(-1.47)	(0.38)
Top1$_t$	0.000	0.001	-0.002	0.000	0.000	0.001	-0.000	0.000
	(0.13)	(0.65)	(-0.106)	(-0.07)	(0.07)	(0.89)	(-0.07)	(0.39)
Independence$_t$	-0.079	0.108	-1.042*	-0.133	0.045	-0.011	-0.274*	-0.015
	(-0.31)	(0.40)	(-1.94)	(-1.18)	(0.54)	(-0.15)	(-1.86)	(-0.48)
Boardsize$_t$	0.055	-0.002	-0.191	-0.028	0.044**	0.004	-0.012	-0.002
	(1.07)	(-0.02)	(-1.25)	(-0.74)	(2.74)	(0.18)	(-0.33)	(-0.22)
Industry fix effects	YES	YES	YES	YES	YES	YES	YES	YES
Year fix effects	YES	YES	YES	YES	YES	YES	YES	YES
Adj R-squared	0.0953	0.1014	0.0786	0.0790	0.0928	0.0859	0.0705	0.0433
Observations	2,504	1,446	912	218	2,504	1,446	912	218

Table 4.6. QFII ownership and stock price crash risk: Heckman two-stage model

This table presents the results of Heckman two-stage analysis. Panel A presents the presence of QFII ownership. Panel B presents the results of the relationship between QFII ownership and stock price crash risk with the inverse Millis ratio (Lambda) obtained from the tests in Panel A of Table 4.5. The full description of all variables are summarised in the Appendix C.1. A superscript *, ** or *** denotes significance at the 10%, 5% or 1%, respectively. The models in Panel A control for industry and year fixed effect with the Huber-White standard error. The models in Panel B control for industry and year fixed effect with the Huber-White standard error clustered by both firm and year.

The second-stage

	$NCSKEW_{t+1}$				$DUVOL_{t+1}$			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
$QFII_t$	0.033				0.010			
	(1.28)				(1.62)			
$Top10_t$		-0.002				-0.006		
		(-0.08)				(-0.81)		
$Long_t$			-0.044*				-0.018*	
			(-1.78)				(-2.12)	
$MultiQFII_t$				-0.058*				-0.030*
				(-2.01)				(-2.03)
$NCSKEW_t$	0.064***	0.064***	0.064***	0.064***				
	(3.96)	(3.99)	(3.95)	(3.92)				
$DUVOL_t$					0.058***	0.058***	0.057***	0.058***
					(4.07)	(4.11)	(4.05)	(4.12)
$Return_t$	20.281**	20.021**	19.912**	19.855**	7.695**	7.607**	7.571**	7.486**
	(2.23)	(2.18)	(2.18)	(2.21)	(2.67)	(2.63)	(2.62)	(2.68)
$Sigma_t$	3.852**	3.810**	3.791**	3.831**	1.139**	1.123**	1.118**	1.135***
	(2.74)	(2.71)	(2.71)	(2.78)	(3.02)	(2.90)	(2.99)	(3.09)
$Dturn_t$	-0.015	-0.015	-0.014	-0.018	0.007	0.007	0.008	0.006
	(-0.47)	(-0.46)	(-0.44)	(-0.54)	(0.89)	(0.88)	(0.91)	(0.74)
$Size_t$	0.035	-0.015	0.039	0.025*	0.007	-0.008	0.016	0.003

Table 4.6. (Continued)

	(0.21)	(-0.10)	(0.25)	(1.83)	(0.14)	(-0.17)	(0.33)	(0.66)
Leverage$_t$	-0.143	0.004	-0.155	-0.109	-0.040	0.006	-0.068	-0.028*
	(-0.31)	(0.01)	(-0.32)	(-1.75)	(-0.28)	(0.04)	(-0.47)	(-1.92)
ROA$_t$	0.212	-0.061	0.230	0.152	0.050	-0.036	0.098	0.028
	(0.22)	(-0.07)	(0.25)	(0.77)	(0.16)	(-0.13)	(0.35)	(0.41)
MB$_t$	0.043	0.036	0.043	0.042***	0.011	0.009	0.013	0.011***
	(1.61)	(1.47)	(1.65)	(4.10)	(1.32)	(1.13)	(1.54)	(3.32)
ABACC$_t$	0.022	0.088	0.032	0.042	-0.018	0.003	-0.020	-0.009
	(0.08)	(0.45)	(0.20)	(0.57)	(-0.21)	(0.05)	(-0.38)	(-0.37)
State$_t$	0.008	-0.05	0.026	0.003	0.005	0.000	0.023	0.003
	(0.12)	(-0.15)	(0.11)	(0.17)	(0.21)	(0.03)	(0.32)	(0.38)
Top1$_t$	0.000	-0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.02)	(-0.26)	(0.06)	(-0.07)	(0.31)	(0.02)	(0.47)	(0.39)
Independence$_t$	-0.145	-0.178	-0.116	-0.133	-0.022	-0.029	-0.005	-0.015
	(-0.51)	(-0.74)	(-0.73)	(-1.18)	(-0.22)	(-0.40)	(-0.11)	(-0.48)
Boardsize$_t$	-0.034	-0.036	-0.024	-0.028	-0.005	-0.006	0.001	-0.002
	(-0.41)	(-0.64)	(-0.34)	(-0.74)	(-0.20)	(-0.38)	(0.05)	(-0.22)
Lambda	0.052	-0.150	0.046	-0.706	0.020	-0.045	0.044	-0.251
	(0.08)	(-0.26)	(0.09)	(-1.13)	(0.10)	(-0.24)	(0.27)	(-1.00)
Industry fix effects	YES	YES	YES	YES	YES	YES	YES	YES
Year fix effects	YES	YES	YES	YES	YES	YES	YES	YES
Adj R-squared	0.0836	0.0834	0.0836	0.0795	0.0828	0.0827	0.0829	0.0766
Observations	12,305	12,305	12,305	12,305	12,305	12,305	12,305	12,305

4.4.4 Corporate site visits and stock price crash risk

In this section, we examine how QFIIs exert discipline management through corporate site visits, and in turn, reduces stock price crash risk. We first obtain the data of corporate site visits from the China Stock Market and Accounting Research (CSMAR) database. Then, we manually matched the visitors with the list of QFIIs provided by the State Administration of Foreign Exchange[39]. Since the site visit data is only available from 2012, our sample period starts from 2012 to 2015. We use Sitevisits, a dummy variable that equals one if any QFII visit a firm's site in the observation year, otherwise zero.

Table 4.7 reports the results. In Panel A, we use the probit model to examine the impact of QFIIs on corporate site visits. It shows that a firm with QFII ownership, QFIIs in top ten shareholders list, long-term QFIIs, and multiple QFIIs, are more likely to attract site visits from QFIIs. Furthermore, Panel B shows that corporate site visits can significantly reduce stock price crash risk at the 10% level in both models. It suggests that firms with QFIIs exert better monitoring by their site visiting, which in turn, are prone to have lower stock price crash risk.

4.4.5 Additional test: QFII ownership and dividend policy

Agency theory suggests that dividend payouts to shareholders reduce the amount of cash under insiders' control and consequently limit the opportunities for insiders to

[39] The list of QFIIs by the end of 2016 is retrieved from https://www.safe.gov.cn/shenzhen/2016/1231/104.html.

spend cash inefficiently or divert it to themselves at the expense of minority shareholders (Jensen, 1986), and in turn enhance minority shareholder protection. Based on the institutional investors monitoring theory, it is expected that foreign institutional investors, in our case, QFIIs have a heightened incentive to push for a higher dividend payouts because they are more independent from management and controlling shareholders than domestic shareholders. Consistent with this argument, studies like Baba (2009) and Kim et al. (2010) find that foreign institutional ownership is associated with higher dividends. Moreover, Kim et al. (2018) find that dividend payments mitigate stock price crash risk by curtailing overinvestment decisions by managers. Therefore, we examine the impact of QFII ownership on dividend policy to further support the positive role of QFIIs on enhancing minority shareholder protection. We use Excessdiv, measured as a firm's cash dividend payout ratio (cash dividend per share to total assets per share) minus the industry average dividend payout ratio in the same observation year. The results in Table 4.8 show that the presence of QFII, QFIIs with large equity holdings, long-term investment, and existence of multiple QFIIs are positively and significantly related to dividend payments at the 1% level in the full sample. The results indicate that QFIIs influence portfolio firms to pay more dividends, which may indirectly mitigate stock price crash risk.

Table 4.7. Corporate site visits and stock price crash risk

This table presents the results of how QFIIs affect stock price crash risk through corporate site visits from 2012 to 2015. Sitevisits is a dummy variable equal to one of any QFIIs visit a firm's site in the observation year, otherwise zero. The full descriptions of all variables are summarised in the Appendix C.1. A superscript *, ** or *** denotes significance at the 10%, 5% or 1%, respectively. Panel A presents the Probit model results. Models in Panel B control for industry and year fixed effect with the Huber-White standard error clustered by both firm and year.

Panel A

Dependent variable	**Sitevisit$_t$**			
Independent variables				
QFII$_t$	0.235***			
	(3.04)			
Top10$_t$		0.456***		
		(5.76)		
Long$_t$			0.279***	
			(2.69)	
MultiQFII$_t$				0.312*
				(1.68)
Year effects	YES	YES	YES	YES
Industry effects	YES	YES	YES	YES
Log likelihood	-1,855.785	-1,844.481	-1,856.770	-1,858.900
Observations	5,781	5,781	5,797	5,797

Panel B

	NCSKEW$_{t+1}$	**DUVOL$_{t+1}$**
	(1)	**(2)**
Sitevisit$_t$	-0.062*	-0.019*
	(-3.13)	(-2.71)
NCSKEW$_t$	0.066*	
	(2.85)	
DUVOL$_t$		0.061*
		(2.7)
Return$_t$	113.799	39.384
	(1.56)	(1.82)
Sigma$_t$	11.426	3.550
	(2.09)	(2.30)
Dturn$_t$	-0.054	-0.007
	(-1.37)	(-0.53)
Size$_t$	0.005	-0.004
	(0.29)	(-0.61)
Leverage$_t$	-0.012	-0.013
	(-0.12)	(-0.68)
ROA$_t$	0.160	0.025
	(0.67)	(0.35)
MB$_t$	0.028*	0.007
	(2.42)	(1.79)

$ABACC_t$	0.129	0.021
	(1.39)	(0.56)
$State_t$	0.024	0.012
	(0.82)	(1.00)
$Top1_t$	0.000	0.000
	(0.22)	(0.35)
$Independence_t$	-0.101	-0.051
	(-0.85)	(-1.13)
$Boardsize_t$	-0.053*	-0.011
	(-3.03)	(-1.53)
Industry fix effects	YES	YES
Year fix effects	YES	YES
Adj R-squared	0.0450	0.0393
Observations	5,797	5,797

Table 4.8. QFII ownership and dividend policy

This table presents the results of the impact of QFII ownership on dividend payout ratio of sample firms from 2003 to 2015. Excessdiv is measured as a firm's cash dividend payout ratio (cash dividend per share to total assets per share) minus the industry average dividend payout ratio in the same observation year. The full descriptions of all variables are summarised in the Appendix C.1. A superscript *, ** or *** denotes significance at the 10%, 5% or 1%, respectively. All models control for industry and year fixed effect with the Huber-White standard error clustered by firm.

	Excessdiv$_t$			
	(1)	**(2)**	**(3)**	**(4)**
QFII$_t$	0.022***			
	(4.37)			
Top10$_t$		0.026***		
		(3.57)		
Long$_t$			0.036***	
			(2.61)	
MultiQFII$_t$				0.061***
				(3.23)
Size$_t$	0.024***	0.025***	0.025***	0.025***
	(10.68)	(10.90)	(11.05)	(10.91)
Leverage$_t$	-0.086***	-0.087***	-0.087***	-0.088***
	(-8.35)	(-8.44)	(-8.51)	(-8.54)
ROA$_t$	0.615***	0.616***	0.618***	0.616***
	(14.68)	(14.70)	(14.68)	(14.67)
MB$_t$	0.003**	0.003**	0.003**	0.003**
	(2.23)	(2.27)	(2.30)	(2.36)
State$_t$	-0.012***	-0.012***	-0.012***	-0.012***
	(-2.91)	(-2.87)	(-2.87)	(-2.88)
Top1$_t$	0.001***	0.001***	0.001***	0.001***
	(4.43)	(4.43)	(4.35)	(4.37)
Independence$_t$	-0.047*	-0.050*	-0.048*	-0.050*
	(-1.69)	(-1.78)	(-1.73)	(1.76)
Boardsize$_t$	0.014*	0.013*	0.013*	0.014*
	(1.86)	(1.76)	(1.76)	(1.84)
Industry fix effect	YES	YES	YES	YES
Year fix effect	YES	YES	YES	YES
Adj R-square	0.2556	0.2553	0.2545	0.2550
Observations	12,382	12,382	12,382	12,382

4.5 Conclusions

This study investigates the role of QFIIs in China on stock price crash risk from 2003 to 2015 through a governance mechanism: exit threat. We find that QFIIs play an important role of governing firm management, even when the direct intervention power, by using voting rights, is inadequate. The effectiveness of crash risk mitigation analysis suggests that QFIIs can exert credible exit threat to discipline management if they have long-term investment and the existence of multiple QFIIs. In addition, it reveals that QFIIs exert effective discipline through visiting portfolio firm's sites. That is, firms visited by QFIIs are better monitored, which in turn, have lower stock price crash risk. Our results are robust to alternative empirical specifications and endogeneity concerns.

In summary, this study sheds light on an important research question on the impact of Qualified Foreign Institutional Investors (QFIIs) on stock price crash risk. We encompass the conditions of QFIIs for the effectiveness of stock price crash risk mitigation. It also provides important implications to policy makers on further openness of Chinese stock markets, and implies to investors that QFIIs may serve as one of the indicators when predicting and eschewing future stock price crash risk.

CHAPTER FIVE

CONCLUSION

This chapter concludes the thesis by providing a summary of the key findings and implications for each of the three essays in Section 5.1. Section 5.2 suggests potential directions for future research.

5.1 Major findings and implications

5.1.1 Essay one: From Share Issue Privatisation to the Non-tradable Share Reform: A Review of Privatisation in China

The first essay provides a detailed survey of the privatisation programmes in China from the SIP to the NTS reform. It also reviews the corporate governance characteristics resulting from the privatisation programmes. The SIP was initiated to raise capital for fully state-owned enterprises and to improve SOE's efficiency and performance, by issuing new shares to private investors in the secondary stock markets, while the rest of shares held by the state and legal persons remained non-tradable. Studies argue that the partial trading and partial privatisation features bring two major problems of the corporate governance in China. One is the inefficient ownership arrangement, including the high proportion and concentration of state ownership, as well as the pyramiding ownership structure (Sun and Tong, 2003; Xu, 2004; Wang and Xiao, 2009). The other one is the weak internal corporate governance system mainly due to the principle-principle agency problem (Dahya et al., 2002; Firth et al., 2007).

The Chinese government launched the NTS reform in 2005 to dismantle the dual share structure by converting non-tradable shares into tradable gradually. Studies show that the NTS reform narrows the interest divergence between controlling and minority shareholders, which in turn, significantly improves firm output and efficiency (Chi et al., 2014; Liao et al., 2014), and corporate governance, such as reducing earnings management and increasing share price imformativeness (Jiang and Habib, 2012, Liu and

Tian, 2012; Hou et al., 2012). In addition, the NTS reform opens the gate of secondary privatisation in China, which further enhances the market liberalisation (Liao et al., 2014).

Overall, Essay one presents the transition of the Chinese listed firms along with privatisation programmes. It reveals that firm performance and corporate governance of the Chinese listed firms have been improved over time, and the gradual privatisation programmes deserve the credit. Indeed, privatisation is recognised as one of the most important elements of economic growth. It is well evidenced by its remarkable impact on firm efficiency and output (Megginson et al., 1994; Boubakri and Cosset, 1998; D'Souza et al., 2005), stock return, and the development of stock market (Barnett, 2000). With the detailed discussion of the successes and challenges of the stock market development in China, Essay one provides insight and guidance to policymakers of the future SOEs reform and privatisation in China, and reinforce investors' understanding of the fundamental of the Chinese stock markets.

5.1.2 Essay two: Does residual state ownership increase stock return volatility? Evidence from China's secondary privatisation

The second essay examines the impact of residual state ownership on stock return volatility. Using hand-collected tradable state ownership data following the NTS reform from 2007 to 2014, it shows that residual state ownership significantly mitigates stock return volatility measured by both monthly and daily stock returns. Furthermore, three analyses are conducted to address the possible endogeneity issue of the negative relation between residual state ownership and stock return volatility. First, the study uses change-in-change model, and shows that the increase of state ownership reduces stock return

volatility. Second, an exogenous shock, Corruption, is adopted to address the endogeneity bias. The difference-in-difference univariate analysis shows that the stock return volatility of firms controlled by the state is significantly lower than that of non–state-controlled firms when there is a corruption shock. Third, by extending the sample period from 2007-2014 to 2003-2014, the study employs a difference-in-difference matching sample analysis, and show that state ownership mutes the stock return volatility aggravated by the sudden policy shock (the NTS reform).

Nonetheless, Vaaler and Schrage (2009) find state ownership can provide a credible signalling effect in the short-term. Studies like Zou and Adams (2008) and Chen et al. (2013) argue that state ownership increases stock return volatility due to its inefficiency. As such, Essay two further tests the negative relation between residual state ownership and stock return volatility with time effect. The results show that the volatility mitigating effect is temporary, lasting for three years after the state shares become fully tradable. Therefore, it is suggested that residual state ownership can credibly signal the government willingness to share risk in the aftermath of sudden shock (the NTS reform, in this case), and therefore, reduces stock return volatility in the short-term. Once the uncertainty reduces overtime, the inefficiency of state control outweighs the signalling effect.

In addition, firm-level policies are found to be effective channels of how residual state ownership affect stock return volatility. Using the predicted value of the measures of corporate policies explained by residual state ownership, Essay two shows that residual state ownership decreases stock return volatility through reducing the riskiness of corporate policies. Moreover, the subsample analyses of different ultimate controllers on

stock return volatility suggest that government agents who have strong political goals, are more conservative to the riskiness of corporate policies, which in turn, have stronger signalling effects on reducing stock return volatility.

This essay further verifies the Chinese government's intention to maintain state ownership after the NTS reform. The results of the determinants of residual state ownership demonstrate that industry-leading, large, highly leveraged, and underperforming firms are associated with higher levels of residual state ownership. It suggests that the government has strong motivations to maintain the ownership in economic and strategic important firms and sectors. In addition, the Cox hazard analysis of the determinants of the NTS reform speed shows that state shareholders have incentives to delay the NTS reform to mitigate the concerns associated with the reform. All in all, The results reveal that the government is very cautious in terms of state ownership relinquishment after the NTS reform.

Uncertainty and risk are one of the primary concerns in stock markets and economics. In particular, uncertainty associated with political regulations has featured more importantly in recent years. It is well documented that stocks are more volatile and correlated in times of high uncertainty (Pastor and Veronesi, 2013). This essay sheds light on an important research question of the role of residual state ownership on stock return volatility in the aftermath of sudden political regulation change. More importantly, this essay highlights the time passage of the volatility mitigating effect. It provides important insights for policymakers and investors in terms of the trade-off between the positive signalling effect of residual state ownership against the inefficiencies that persist in state-controlled firms.

5.1.3 Essay three: Exit as governance: Qualified Foreign Institutional Investors and stock price crash risk

The third essay of this thesis investigates the impact of foreign institutional investors – qualified foreign institutional investors (QFIIs) on stock price crash risk. Using a sample of 1,944 Chinese A-share listed firms over the period from 2003 to 2015, it finds that long-term and existence of multiple QFIIs in the portfolio firm exert credible exit threat to discipline management, and in turn, reduce stock price crash risk. For the endogeneity issues, this essay first applies the propensity score matching approach. The treatment groups are the firms with QFII ownership, QFIIs in top ten shareholders list, QFII investment period longer than six months, or the presence of multiple QFIIs in single portfolio firm, control groups vice versa. The treatment and control groups are made to be as statistically alike as possible for the control variables. The results show that long-term investment horizon and existence of multiple QFIIs can reduce stock price crash risk. Second, the Heckman two-stage model is employed to alleviate the potential unmodeled selection to treatment, that is unobservable variables that may affect both the presence of QFIIs and stock price crash risk. The inverse Mills ratio obtained from the first-stage regression shows there is little concern of unobserved heterogeneity in selection. Importantly, the negative relation between QFII measures and stock price crash risk is still robust.

Using threat of exit as a governance mechanism, this essay further examines the channel of how QFIIs reduce stock price crash risk in the presence of QFIIs' minor voting power (average 1% of QFII ownership). Essay three uses corporate site visits as the

channel of how QFIIs exert monitoring to disciplining managers. It shows that QFIIs measures are positively and significantly associated with site visits, implying that firms with QFII ownership tend to attract more QFIIs' site visits. In addition, site visits are found to have a negative relationship with stock price crash risk. It suggests that QFIIs exert credible exit threat through corporate site visits, which in turn, reduce stock price crash risk.

To further verify the monitoring role of QFIIs, this essay examines the impact of QFIIs on dividend policy. The empirical evidence shows that the presence of QFII, QFIIs with large equity holdings, long-term investment, and existence of multiple QFIIs are positively and significantly related to dividend payments. It suggests the QFIIs exert effective monitoring and increase cash dividend payment, which in turn enhance minority shareholder protection.

Overall, this essay sheds light on an important research question of the role of foreign institutional investors (QFIIs) from the perspective of stock price crash risk. Given that risk management is one of the centre concerns for investors, especially after the 2008 global financial crisis, this essay provides evidence of how QFIIs in China reduce stock price crash risk by adopting the exit threat mechanism, and implies that QFIIs can be one of the indicators when predicting stock price crash risk. Moreover, it provides important implications to the policymakers in terms of further development of openness of stock markets, such as strategic planning and regulation.

5.2 Areas of future research

This thesis first overviews the ownership structure in China resulting from the privatisation programmes. Then it thoroughly investigates the impacts of state ownership and foreign institutional ownership on firm risk in privatised firms. This thesis is expected to orient directions for future research.

The first essay points out that current literature so far has only addressed the effect of the NTS reform, and studies use full share circulation period are yet to be investigated. Therefore, it would be valuable to investigate the ownership changes in the full tradability era and the determinants behind the changes. For example, the role of state ownership and legal person ownership on firm performance and corporate governance after being fully tradable. Along with the ownership change, relegation of intervention power of controlling shareholder would also be interesting to investigate. A survey study conducted by Gan et al. (2017) using SIPs sample, points out that the transfer of control rights from the state to private, could achieve performance improvement through appointment of top management, investment decisions, and distribution of profits. Future studies could investigate the control right privatisation in the post-NTS reform period.

The second essay provides empirical evidence to support the theoretical argument that residual state ownership sends credible signal to reduce investor's uncertainty in the aftermath of sudden regulation change. Due to the unavailability of data, the residual state ownership is measured as the sum of state ownership in top ten shareholdings, rather than the total state ownership. This essay shows that the retention of state ownership which subjects to the political objectives sends credible signal that the government is willing to

share risk to reduce uncertainty. While, for future research, the motivations and impacts of another type of ownership – legal person ownership, transferred from non-tradable to tradable, would be noteworthy to investigate. Legal persons, compares to the government, are less constrained by political objectives, and therefore, their interests would be better aligned with private investors. For instance, the determinants of legal person ownership change after legal person shares become fully tradable.

The third essay injects empirical evidence into the controversy of the role of foreign institutional investors. It suggests that QFIIs can significantly reduce stock price crash risk. Due to the small proportion of QFII ownership in the Chinese listed firms and unavailability of the data, this essay adopts binary QFII ownership measures that are unable to measure the quantities and strength of QFII ownership. It is expected that there is an increasing trend of QFII ownership with further market openness, so future studies could improve the proxies of QFIIs. For example, using QFII ownership ratio and classifying QFIIs into three groups: dedicated, quasi-index and transient investors. Further, this essay provides empirical evidence that QFIIs reduce stock price crash risk through the threat of exit mechanism. Although the corporate site visiting is used as the channel of how QFIIs exert "threat", the data of corporate site visits is only available from 2012, which fails to cover the whole sample period from 2003. Chen and Swan (2011) and Gallagher et al. (2013) use "Swing" measure for threat of exit. This "Swing" measure is based on the trading pattern of institutional investors to identify whether institutional investors trade to threat or cut-and-run.[40] However, to the best of our knowledge, the trading data for each individual QFII is not available for the Chinese listed firms. Future

[40] Chen and Swan (2003) use eight trading patterns for each stock each year: (1) Buy Sell-Buy (BSB), (2) Sell-Buy-Sell (SBS), (3) Sell-Buy (SB), (4) Buy-Sell (BS), (5) Hold-Hold-Hold (HHH), (6) Buy-Buy-Buy (BBB), (7) Sell-Sell-Sell (SSS), and finally, (8) Others. BSB pattern is found to be the best proxy to capture the nature of threat of exit.

studies can employ this approach to measure threat of exit when the data becomes available. Nonetheless, Essay three sheds light on the monitoring role of foreign institutional investors on stock price crash risk, and future research may extend the investigation of the impact of foreign institutional ownership on corporate governance, such as CEO turnover, board structure and executive compensation.

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APPENDIX A

FOR ESSAY ONE

As suggested by the reviewers, understanding the subsequent process of the NTS reform and how state ownership changes after being granted the trading rights are essential for future studies. In particular, it provides valuable insights and research directions on topics, such as the second-round privatization, corporate financial decisions, and financial markets liberalization. Therefore, Appendix A.1 presents the average length of lock-up period of state shares in the NTS reform. Appendix A.2 to A.4 reviews the aggregate state ownership changes when the full share circulation is achieved.

Reviews of lock-up period of state shares

The sample in Appendix A.1 contains 1,630 reformed A-share firms listed in the Shanghai and Shenzhen Stock Exchanges. The data of the individual reform announcement date and effective date is obtained from the China Stock Market and Accounting Research (CSMAR) database. The lock-up expired date of each firm is hand-collected from the China Securities Regulatory Commission (CSRC) official information disclosure website (www.cninfo.com.cn).

Appendix A.1. Lock-up period of state shares

	Reform announcement to lockup expired		Reform announcement to Reform effective		Reform effective to lockup expired	
	(days)	(years)	(days)	(years)	(days)	(years)
SOIs	1475.87	4.04	64.82	0.18	1411.05	3.87
SOEs	1368.23	3.75	79.95	0.22	1288.28	3.53
Privates	1187.34	3.25	93.94	0.26	1093.40	2.99
Total	1440.79	3.95	84.62	0.23	1356.17	3.72

It reports the process of state shares becoming fully tradable in two phases: the reform plan negotiation and non-tradable share lock-up. The average reform plan negotiation time period is 84.62 days (0.23 years). The SOIs experience the shortest negotiation time, which suggests that the government is more motivated to implement the reform. While the state-shares lock-up period takes averagely 3.72 years, among which, the time of locking-up for the state shares in SOIs, SOEs, and private firms are 3.87 years, 3.53 years and 2.99 years, respectively. State shares in SOIs are overall have longest process time period with averagely 4.04 years, which may due to the concerns of market stability are stronger in SOIs.

Reviews of aggregate state ownership change in the full share circulation period

Our sample contains reformed A-share firms listed in the Shanghai and Shenzhen Stock Exchanges in the post NTS reform period. Our sample commerce the year a firm's state-owned shares become fully tradable.[41] The data of tradable state ownership are hand-collected from Sina Finance (http://finance.sina.com.cn), calculated as the total state shares percentage of top ten tradable shareholdings. We use, Aggregate state ownership, measured as the percentage change of state ownership in the observation year using the beginning year of fully tradability in each individual firm as the benchmark. Excluding the benchmark year of each individual firms, we end up having 1,630 listed firms and 6,615 firm-year observations from 2007 to 2014.[42]

[41] We start the observation year of the announcement of being fully tradable is made before July 1 in a given year. For example, if a firm's state shares became fully tradable on October 11, 2009, then the starting year of state ownership data collection will be 2010.

[42] The original tradable state ownership data is from 2006 to 2014. Excluding the beginning year of each individual firm, the final sample period if from 2007 to 2014.

Appendix A.2 shows the distribution of firm-year observations categorized by year and industry of aggregate state ownership change. Panel A shows that state ownership overall decreases 1.748% on average over the sample period. From 2007 to 2014, state ownership relinquishes more with time trend, except in 2009, which may be due to the global financial crisis. Panel B shows the distribution of aggregate state ownership by industry. The majority of industries have decreased state ownership, but the state ownership increases in the industries of transport, storage and postal services; scientific research and technical service; and culture, sports and entertainment, which may due to the government strategic policy. We also include the distribution of aggregate state ownership by year and industry in 2014 (the final year of the sample period). In Appendix A.3, Panel A shows that, since the state shares became fully tradable, state ownership decreased 2.886% overall by the end of 2014. However, the aggregate state ownership change fluctuated from -58.864% to 64.072%. In Panel B, aggregate state ownership change decreased in all industries overall, expect industry of culture, sports, and entertainment with 3.285% state ownership increase.

Appendix A.4 reports the difference of aggregate state ownership change based on the identities of ultimate controllers by using t-test and wilcoxon Z test. The change of state ownership in firms ultimately controlled by SOIs, SOEs and private entities are -1.761%, -1.445%, and -1.963%, respectively. Panel A shows there is no significant difference of aggregate state ownership between SOIs and SOEs. However, the difference is significant between SOIs (SOEs) and private firms shown in Panel B (C) that private firms have significant decrease of state ownership, compared to SOIs and SOEs.

Appendix A.2. Aggregate state ownership change distribution: Full sample

This table reports the sample distribution of aggregate state ownership percentage change by year and industry. The sample includes all A-share listed firms. The sample period starts from 2007 to 2014. The sample start year is counted as the year of fully tradability of state shares.

Panel A: By year

Year	Observations	Mean	Median	Min	Max	SD
2007	38	-0.528	-0.253	-13.908	12.858	4.275
2008	156	-0.369	0.181	-11.790	12.475	2.532
2009	270	0.094	-0.334	-33.129	54.995	7.027
2010	709	-0.704	-0.278	-47.815	53.905	6.754
2011	1002	-1.304	-0.419	-47.815	54.300	7.022
2012	1311	-1.488	-0.422	-58.864	63.622	8.082
2013	1486	-2.034	-0.692	-58.594	64.656	8.987
2014	1643	-2.886	-1.001	-58.864	64.072	9.352
Total	6615	-1.748	-0.555	-58.864	64.656	8.250

Panel B: By industry

Industry	Observations	Mean	Median	Min	Max	SD
Agriculture, forestry	110	-1.343	-0.545	-17.638	14.436	3.886
Mining	184	-2.805	-0.343	-33.961	8.347	6.700
Manufacturing	3972	-1.987	-0.638	-58.864	64.656	7.987
Electric power, heat, gas and water	270	-3.218	-0.966	-54.593	61.811	12.906
Construction	149	-2.384	-0.548	-26.654	18.101	6.158
Wholesale and retail	453	-1.263	-0.327	-43.244	37.924	7.851
Transport, storage and postal services	223	0.190	-0.064	-33.149	54.995	13.975
Accommodation	35	-0.291	-0.384	-13.427	6.677	4.172
Information transmission, software and information technology services	285	-1.820	-0.638	-22.497	18.842	4.929
Finance	158	-3.127	-1.985	-31.635	51.295	7.967
Real estate	427	-0.062	-0.257	-40.782	47.943	7.564
Leasing and commercial service	85	-0.754	-0.547	-18.380	10.465	3.530
Scientific research and technical service	15	0.145	-0.147	-4.396	7.459	3.145
Water conservancy, environment and public facility management	78	-2.932	-0.631	-37.769	16.278	8.613
Education	5	-3.695	-0.012	-17.595	-0.012	7.779
Health and social work	14	-0.187	0.000	-1.255	0.974	0.524
Culture, sports and entertainment	66	1.734	-0.449	-14.176	64.072	12.610
Others	86	-0.190	-0.222	-5.989	21.449	3.850
Total	6615	-1.750	-0.556	-58.864	64.656	8.251

Appendix A.3. Aggregate state ownership change distribution: Final year

This table reports the sample distribution of aggregate state ownership percentage change by year and industry. The sample includes all A-share listed firms. The sample period starts from 2006 to 2014. The sample start year is counted as the year of fully tradability of state shares.

Panel A: By year						
Year	**Observations**	**Mean**	**Median**	**Min**	**Max**	**SD**
2014	1643	-2.886	-1.001	-58.864	64.072	9.352
Total	1643	-2.886	-1.001	-58.864	64.072	9.352
Panel B: By industry						
Industry	**Observations**	**Mean**	**Median**	**Min**	**Max**	**SD**
Agriculture, forestry	29	-2.631	-1.693	-17.638	11.868	5.122
Mining	48	-3.548	-1.035	-33.961	1.252	7.142
Manufacturing	994	-3.224	-1.027	-58.864	63.622	9.081
Electric power, heat, gas and water	65	-5.918	-2.926	-49.843	59.696	15.227
Construction	41	-3.531	-0.726	-26.654	6.261	6.988
Wholesale and retail	101	-1.315	-0.748	-43.244	37.924	9.478
Transport, storage and postal services	61	-1.413	-0.366	-33.149	53.917	11.967
Accommodation	8	-3.657	-2.976	-13.427	4.565	5.770
Information transmission, software and information technology services	72	-2.596	-1.048	-21.873	12.200	5.330
Finance	38	-4.699	-3.291	-31.635	30.120	8.960
Real estate	98	-1.019	-0.677	-40.782	47.137	9.625
Leasing and commercial service	24	-1.765	-1.256	-18.380	10.465	4.686
Scientific research and technical service	5	-0.131	-0.300	-4.396	6.844	4.279
Water conservancy, environment and public facility management	18	-2.259	-0.610	-31.127	3.967	7.589
Education	1	-17.595	-17.595	-17.595	-17.595	.
Health and social work	4	-0.305	-0.469	-1.255	0.974	0.949
Culture, sports and entertainment	18	3.285	-1.289	-8.451	64.072	17.365
Others	18	-0.190	-0.524	-5.989	21.449	5.863
Total	1643	-2.886	-1.001	-58.864	64.072	9.352

Appendix A.4. Difference of aggregate state ownership change: ultimate controllers

This table reports the results of the t-test and wilcoxon Z-test of the aggregate state ownership percentage change difference between CSOEs, LSOEs and Privates. Superscripts *, **, and *** denote the significant levels of 10%, 5%, and 1%, respectively.

Panel A: CSOEs Vs LSOEs			
	CSOEs	**LSOEs**	**Difference**
Observations	1110	2318	
Mean	-1.761	-1.445	0.316
			(0.93)
Median	-0.381	-0.507	-0.126
			(-0.06)
Panel B: CSOEs Vs Privates			
	CSOEs	**Privates**	**Difference**
Observations	1110	3187	
Mean	-1.761	-1.963	-0.202
			(-0.67)
Median	-0.381	-0.619	-0.238**
			(-2.44)
Panel A: LSOEs Vs Privates			
	LSOEs	**Privates**	**Difference**
Observations	2318	3187	
Mean	-1.445	-1.963	-0.518**
			(-2.26)
Median	-0.507	-0.619	-0.112***
			(-2.65)

APPENDIX B

FOR ESSAY TWO

Appendix B.1. Definitions of the variables

Variable	Definition
SDMR	Standard deviation of monthly stock returns
Standard deviation of monthly market-adjusted stock returns (SDMAR)	Standard deviation of the difference between monthly stock returns and value-weighted market returns
Standard deviation of monthly idiosyncratic returns (SDMIR)	Standard deviation of residuals from a market model regression using monthly stock returns
SDDR	Standard deviation of daily stock returns
Standard deviation of daily market-adjusted stock returns (SDDAR)	Standard deviation of the difference between daily stock returns and value-weighted market returns
Standard deviation of daily idiosyncratic returns (SDDIR)	Standard deviation of residuals from a market model regression using daily stock returns
State	Total state ownership of the top 10 tradable shareholders
State control	Dummy variable that equals one if the ultimate controller of a firm is the state and zero otherwise
Sales growth	Growth rate of annual sales
ROA	Ratio of net income to total assets
Board independence	Ratio of the number of independent directors to the total number of directors on the board
Board size	Natural logarithm of the total number of directors on the board
Financial leverage	Ratio of total debt to total assets
Operating leverage	Percentage change in operating income for a percentage change in sales
Operating income	Operating profit after depreciation
Sales	Operating revenue
Stock return	Annualized buy-and-hold stock returns
Tobin's Q	Ratio of the sum of the market value of equity and the total book value of liability to the total book value of assets
Intangible/assets	Ratio of intangible assets to total assets
Firm size	Natural logarithm of the firm's total market capitalization
Firm age	Natural logarithm of the number of years since the firm's establishment to the year of observation
Labour	Total number of workers divided by total assets, scaled by 10^6
Weighted MC	Industry-weighted market capitalization
Non-tradable	Ratio of the number of NTSs to the total number of shares before the NTS reform
MB	Market-to-book equity ratio
Tax to sales	Ratio of tax expenses to total sales

RPT	Dummy variable that equals one if firms have related-party transactions with government agencies and zero otherwise
GDP per capita	Provincial GDP per capita based on the location of a firm's headquarters
GDP growth rate	Provincial GDP growth rate based on the location of the firm's headquarters
Long	Dummy variable that equals one if the observation year is more than three years after the state shares became fully tradable and zero otherwise
Corruption	Dummy variable that equals one if the observations are located in areas of high-profile provincial bureaucratic corruption and zero otherwise

Appendix B.2. Correlation matrix of the identified variables

This table present the correlation matrix of the variables for the sample of 1,860 listed firms with 6,682 firm-year observations. The stock return volatility measures are the standard deviations of monthly stock returns (SDMR), monthly market-adjusted stock returns (SDMAR), and monthly idiosyncratic returns (SDMIR), while SDDR, SDDAR and SDDIR are the corresponding equivalent daily standard deviations. The description of each variable is summarized in Appendix B.1.

	SDMR	**SDMAR**	**SDMIR**	**SDDR**	**SDDAR**	**SDDIR**	**State**	**Sales growth**	**ROA**	**Stock return**	**Tobin's Q**	**Board independence**	**Board size**	**Financial leverage**	**Intangible/ assets**	**Firm size**	**Firm age**
SDMR	1.000																
SDMAR	0.759	1.000															
SDMIR	0.760	0.999	1.000														
SDDR	0.432	0.432	0.435	1.000													
SDDAR	0.398	0.457	0.458	0.971	1.000												
SDDIR	0.406	0.467	0.468	0.970	0.999	1.000											
State	-0.039	-0.034	-0.034	-0.082	-0.066	-0.068	1.000										
Sales growth	-0.002	0.001	0.001	-0.005	-0.003	-0.003	0.009	1.000									
ROA	-0.024	-0.007	-0.007	0.003	0.002	0.000	-0.026	0.000	1.000								
Stock return	0.374	0.415	0.420	0.206	0.230	0.235	-0.009	-0.004	0.054	1.000							
Tobin's Q	0.097	0.172	0.173	0.077	0.117	0.117	-0.081	-0.008	0.170	0.260	1.000						
Board independence	-0.011	-0.011	-0.011	-0.037	-0.031	-0.030	0.001	-0.009	-0.030	-0.011	0.003	1.000					
Board size	-0.056	-0.052	-0.049	-0.053	-0.058	-0.060	0.189	0.000	0.015	-0.014	-0.109	-0.344	1.000				
Financial leverage	0.019	0.014	0.018	-0.052	-0.044	-0.045	0.180	0.010	-0.388	0.028	-0.244	0.018	0.123	1.000			
Intangible/ assets	-0.027	-0.027	-0.027	-0.042	-0.035	-0.035	0.046	0.010	-0.013	-0.016	0.050	-0.023	0.027	-0.064	1.000		
Firm size	-0.034	0.023	0.025	-0.137	-0.095	-0.100	0.263	-0.010	0.270	0.204	0.006	0.076	0.253	0.108	-0.024	1.000	
Firm age	-0.059	0.010	0.011	-0.191	-0.132	-0.133	0.038	0.020	-0.096	0.003	0.021	-0.020	0.006	0.212	0.029	0.035	1.000

Appendix B.3. Endogeneity test of the state ownership and stock return volatility: Change-in-change approach (SOIs)

This table reports the subsample analysis of the change-in-change for the impact of residual state ownership on stock return volatility in SOIs. The stock return volatility measures are the standard deviations of monthly stock returns (SDMR), monthly market-adjusted stock returns (SDMAR), and monthly idiosyncratic returns (SDMIR), while SDDR, SDDAR and SDDIR are the corresponding equivalent daily standard deviations. The definitions of all the variables are shown in Appendix B.1. A superscript *, ** or *** denotes significance at the 10%, 5% or 1%, respectively. All models are fixed at firm and year level with the Huber-White robust standard error.

Dependent variable	**Expected signs**	**ΔSDMR**	**ΔSDMAR**	**ΔSDMIR**	**ΔSDDR**	**ΔSDDAR**	**ΔSDDIR**
Independent variables		**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Intercept		0.083*	0.036	0.023	0.022**	0.012	0.012
		(1.73)	(0.66)	(0.49)	(2.07)	(1.47)	(1.41)
ΔState	-	**-0.121*** **	**-0.088** **	**-0.089*** **	**-0.008** **	**-0.007***	**-0.006***
		(-2.84)	**(-2.14)**	**(-2.18)**	**(-2.17)**	**(-1.71)**	**(-1.64)**
ΔSales growth	+	-0.000***	-0.000***	-0.000***	-0.000	-0.000	-0.000
		(-6.84)	(-3.79)	(-3.64)	(-0.86)	(-0.41)	(-0.40)
ΔROA	-	0.018	0.040	0.039	-0.003	-0.003	-0.003
		(0.31)	(0.68)	(0.65)	(-0.32)	(-0.29)	(-0.31)
ΔStock return	±	0.081*	0.089**	0.089**	0.015	0.016	0.016
		(1.95)	(2.18)	(2.17)	(1.38)	(1.43)	(1.44)
ΔTobin's Q	+	-0.009	-0.008	-0.008	-0.003	-0.003	-0.003
		(-0.76)	(-0.68)	(-0.66)	(-1.01)	(-1.03)	(-1.02)
ΔBoard independence	-	0.009	-0.001	0.003	0.010	0.011	0.011
		(0.21)	(-0.02)	(0.06)	(1.39)	(1.47)	(1.46)
ΔBoard size	-	-0.004	-0.009	-0.008	0.002	0.002	0.002
		(-0.22)	(-0.48)	(-0.41)	(0.72)	(0.68)	(0.72)
ΔLeverage	+	-0.078	-0.093	-0.093	-0.017	-0.018	-0.018
		(-1.03)	(-1.24)	(-1.23)	(-0.90)	(-0.92)	(-0.92)
ΔIntangible/assets	+	0.022	0.034	0.038	0.002	0.001	-0.000
		(0.39)	(0.68)	(0.75)	(0.27)	(0.13)	(-0.01)
ΔFirm size	-	-0.021	-0.028	-0.029	-0.010	-0.009	-0.009
		(-0.44)	(-0.61)	(-0.62)	(-0.75)	(-0.72)	(-0.74)
ΔFirm age	-	0.076	0.471*	0.480*	0.048	0.066	0.068
		(0.28)	(1.66)	(1.69)	(0.72)	(0.97)	(1.00)
Observations		2,039	2,039	2,039	2,039	2,039	2,039
Firm fixed effect		Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect		Yes	Yes	Yes	Yes	Yes	Yes
R-squared		0.2884	0.3006	0.3017	0.2142	0.2287	0.2311

Appendix B.4. Endogeneity test of the state ownership and stock return volatility: Change-in-change approach (SOEs)

This table reports the subsample analysis of the change-in-change for the impact of residual state ownership on stock return volatility in SOEs. The stock return volatility measures are the standard deviations of monthly stock returns (SDMR), monthly market-adjusted stock returns (SDMAR), and monthly idiosyncratic returns (SDMIR), while SDDR, SDDAR and SDDIR are the corresponding equivalent daily standard deviations. The definitions of all the variables are shown in Appendix B.1. A superscript *, ** or *** denotes significance at the 10%, 5% or 1%, respectively. All models are fixed at firm and year level with the Huber-White robust standard error.

Dependent variable	**Expected signs**	**ΔSDMR**	**ΔSDMAR**	**ΔSDMIR**	**ΔSDDR**	**ΔSDDAR**	**ΔSDDIR**
Independent variables		**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Intercept		0.126**	0.058	0.060	0.034***	0.026**	0.025**
		(2.22)	(1.08)	(1.10)	(2.85)	(2.19)	(2.32)
ΔState	-	**-0.044**	**-0.040**	**-0.040**	**-0.010***	**-0.008**	**-0.007**
		(-1.21)	**(-1.50)**	**(-1.48)**	**(-1.83)**	**(-1.48)**	**(-1.43)**
ΔSales growth	+	-0.002	-0.003	-0.002	0.000	-0.000	-0.000
		(-0.58)	(-0.60)	(-0.58)	(0.06)	(-0.05)	(-0.00)
ΔROA	-	0.020	-0.043	-0.046	-0.015*	-0.011	-0.011
		(0.31)	(-0.60)	(-0.64)	(-1.94)	(-1.37)	(-1.26)
ΔStock return	±	0.019***	0.026***	0.025***	0.003***	0.003***	0.003***
		(2.97)	(3.51)	(3.32)	(3.25)	(3.21)	(3.47)
ΔTobin's Q	+	0.000	0.002	0.003	0.001	0.001	0.001
		(0.09)	(0.76)	(0.82)	(1.48)	(1.44)	(1.50)
ΔBoard independence	-	-0.048	-0.040	-0.032	0.005	0.003	0.004
		(-0.82)	(-0.58)	(-0.45)	(0.67)	(0.42)	(0.49)
ΔBoard size	-	-0.054	-0.028	-0.025	-0.003	-0.003	-0.003
		(-1.80)	(-0.83)	(-0.75)	(-1.00)	(-0.80)	(-0.95)
ΔLeverage	+	-0.006	-0.026	-0.021	-0.008	-0.006	-0.007
		(-0.18)	(-0.69)	(-0.56)	(-1.19)	(-0.96)	(-1.04)
ΔIntangible/assets	+	-0.099	-0.290***	-0.297***	-0.017	-0.023**	-0.021*
		(-1.13)	(-3.45)	(-3.50)	(-1.44)	(-2.08)	(-1.85)
ΔFirm size	-	0.054***	0.045***	0.046***	0.005***	0.006***	0.005***
		(4.30)	(3.31)	(3.36)	(3.37)	(3.21)	(3.11)
ΔFirm age	-	-1.193*	-0.512	-0.482	-0.218	-0.229*	-0.233*
		(-1.89)	(-1.25)	(-0.81)	(-1.60)	(1.74)	(1.93)
Observations		793	793	793	793	793	793
Firm fixed effect		Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect		Yes	Yes	Yes	Yes	Yes	Yes
R-squared		0.3441	0.3119	0.3159	0.3581	0.3642	0.3777

Appendix B.5. Endogeneity test of the state ownership and stock return volatility:

Change-in-change approach (Non-State controls)

This table reports the subsample analysis of the change-in-change for the impact of residual state ownership on stock return volatility in Non-State controls. The stock return volatility measures are the standard deviations of monthly stock returns (SDMR), monthly market-adjusted stock returns (SDMAR), and monthly idiosyncratic returns (SDMIR), while SDDR, SDDAR and SDDIR are the corresponding equivalent daily standard deviations. The definitions of all the variables are shown in Appendix B.1. A superscript *, ** or *** denotes significance at the 10%, 5% or 1%, respectively. All models are fixed at firm and year level with the Huber-White robust standard error.

Dependent variable	**Expected signs**	**ΔSDMR**	**ΔSDMAR**	**ΔSDMIR**	**ΔSDDR**	**ΔSDDAR**	**ΔSDDIR**
Independent variables		**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Intercept		0.024	0.043***	0.037**	0.038***	0.033***	0.033***
		(1.36)	(2.92)	(2.39)	(3.51)	(2.90)	(2.88)
ΔState	-	**0.009**	**0.046**	**0.045**	**-0.009**	**-0.010**	**-0.011**
		(-0.31)	**(1.58)**	**(1.51)**	**(-1.29)**	**(-1.56)**	**(-1.62)**
ΔSales growth	+	-0.000***	-0.000***	-0.000***	0.000**	0.000***	0.000**
		(-10.09)	(-10.75)	(-9.67)	(2.21)	(2.68)	(2.36)
ΔROA	-	-0.035	0.006	0.012	0.001	0.003	0.003
		(-1.08)	(0.22)	(0.41)	(0.26)	(0.66)	(0.62)
ΔStock return	$\pm$	0.008*	0.034***	0.033***	0.004***	0.005***	0.005***
		(1.87)	(7.45)	(7.40)	(3.66)	(3.91)	(3.95)
ΔTobin's Q	+	0.009**	0.004	0.004	-0.001	-0.001	-0.001
		(2.05)	(0.86)	(0.92)	(-1.14)	(-1.03)	(-1.05)
ΔBoard independence	-	-0.034	-0.017	-0.014	0.003	0.004	0.005
		(-0.68)	(-0.35)	(-0.30)	(0.21)	(0.28)	(0.30)
ΔBoard size	-	-0.003	-0.011	-0.011	0.008	0.008	0.008
		(-0.11)	(-0.50)	(-0.49)	(1.61)	(1.59)	(1.59)
ΔLeverage	+	0.002	0.021	0.022	0.002	0.002	0.002
		(-0.08)	(1.02)	(1.06)	(0.39)	(0.31)	(0.31)
ΔIntangible/assets	+	-0.097	-0.096	-0.094	-0.008	-0.011	-0.011
		(-1.46)	(-1.40)	(-1.37)	(-0.69)	(-0.90)	(-0.86)
ΔFirm size	-	0.027***	0.012	0.013*	0.003	0.004*	0.004*
		(3.49)	(1.77)	(1.85)	(1.60)	(1.85)	(1.78)
ΔFirm age	-	-0.017	-0.088	-0.072	-0.230**	-0.246**	-0.245**
		(-0.27)	(-1.14)	(-0.92)	(-2.30)	(-2.32)	(-2.31)
Observations		1,573	1,573	1,573	1,573	1,573	1,573
Firm fixed effect		Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect		Yes	Yes	Yes	Yes	Yes	Yes
R-squared		0.3421	0.2675	0.2686	0.2725	0.2215	0.2220

Appendix B.6. The determinants of privatisation decision making: logistic test

This table represents the logistic regression results of the determinants of the privatisation decision-making process in sample firms from 2007 to 2014. The dependent variable is a set of dummy variables, which equals 1 if a firm's ultimate controlling shareholder is the state, or government agencies or SOEs and zero otherwise. The definitions of all the variables are shown in the Appendix B.1. A superscript *, ** or *** denote the significance levels of 10%, 5% or 1%, respectively.

Dependent variable	**SOIs**	**SOEs**	**Non-State controls**
	(1)	**(2)**	**(3)**
Intercept	-1.327	-1.905	-1.114
	(-1.01)	(-0.59)	(-0.82)
Labour	0.111***	-0.217*	0.083**
	(2.72)	(-1.91)	(2.01)
Weighted MC	1.069	-1.734	1.505
	(0.59)	(-0.45)	(0.78)
Size[43]	0.410***	0.106	0.453***
	(11.91)	(1.29)	(12.66)
Leverage	0.471***	-0.399	0.599***
	(3.59)	(-0.82)	(3.14)
ROA	-2.247***	-1.597	-2.646***
	(-3.35)	(-1.01)	(-3.86)
MB	-0.009	0.032	-0.001
	(-0.70)	(1.14)	(-0.08)
Tax to sales	-0.222	-10.442***	-1.739
	(-0.17)	(-2.62)	(-1.34)
RPT	0.621**	0.659	0.796***
	(2.48)	(1.38)	(2.90)
GDP per capita	-0.629***	-0.356	-0.714***
	(-7.04)	(-1.64)	(-7.76)
GDP growth rate	1.507	-2.914	1.057
	(1.22)	(-0.99)	(0.83)

[43] We use natural logarithm of total assets to measure size here. However, the results are very similar when firm size is measured by the natural logarithm of total market capitalisation.

Appendix B.6 (Continued)

Industry dummies			
Agriculture, forestry	0.771**	-0.849	0.106***
	(2.20)	(-0.68)	(8.67)
Mining	0.131	1.164	0.137***
	(0.43)	(1.42)	(11.08)
Manufacturing	-0.122	0.024	0.061***
	(-0.55)	(0.03)	(5.02)
Electric power, heat, gas and water	1.036***	-0.505	0.146***
	(4.07)	(-0.61)	(14.21)
Construction	0.010	0.745	0.034***
	(0.03)	(0.89)	(3.63)
Wholesale and retail	0.880***	0.593	0.106***
	(3.72)	(0.79)	(7.56)
Transport, storage and postal services	1.379***	0.643	0.170***
	(4.82)	(0.81)	(21.82)
Accommodation	1.931***	/	0.118***
	(2.85)	/	(6.37)
Information transmission, software and	0.224	-0.095	0.071***
information technology services	(0.69)	(-0.09)	(6.97)
Financial	-1.066*	3.099***	0.175**
	(-1.90)	(3.42)	(2.61)
Real estate	0.080	0.428	0.021**
	(0.32)	(0.54)	(3.36)
Leasing and commercial service	0.996**	2.656***	0.123***
	(2.12)	(3.12)	(16.97)
Water conservancy, environment and public	0.980**	2.058**	0.128***
facility management	(2.47)	(2.50)	(9.03)
Culture, sports and entertainment	-1.070***	1.612*	0.062**
	(-2.99)	(1.91)	(3.09)
Year fixed effect	YES	YES	YES
Observation	6,411	6,386	6,411
Log likelihood	-3615.5785	-813.4750	-3490.0586
Pseudo R-square	0.1670	0.0637	0.18.03

APPENDIX C

FOR ESSAY THREE

Appendix C.1. Definitions of the variables

Variable	Definition
NCSKEW	The negative coefficient of skewness, calculated by taking the negative of the third moment of firm-specific weekly returns for each sample year and dividing it by the standard deviation of firm-specific weekly returns raised to the third power. See Eq. (4.2) for details.
DUVOL	The down-to-up volatility. For any stock i in year t, we separate all of the weeks with firm-specific weekly returns below the annual mean (down weeks) from those with firm-specific weekly returns above the annual mean (up weeks) and compute the standard deviation for each of these subsamples separately. We then take the natural logarithm of the ratio of the standard deviation of the down weeks to the standard deviation of the up weeks. See Eq. (4.3) for details.
QFII	A dummy variable equals one if a firm has QFII ownership in the observation year, zero otherwise.
Top10	A dummy variable equals one if a firm has QFII ownership in its top ten shareholders, zero otherwise
Long	A dummy variable equals one if a firm has QFIIs in the top ten shareholders list with investment longer than six months in the observation year, zero otherwise.
MultiQFII	A dummy variable equals to one if a firm has more than one QFII in its top ten shareholders list in the observation year, zero otherwise.
Return	The mean of firm-specific weekly returns over the fiscal year.
Sigma	The standard deviation of firm-specific weekly returns over the fiscal year.
Dturn	The detrended stock trading volume, calculated as the average monthly share turnover for the current fiscal year minus the average monthly share turnover for the previous fiscal year, where the monthly share turnover is the monthly trading volume divided by the total number of floating shares on the market in that month.
Size	The natural logarithm of the book value of total assets at the end of the fiscal year.
Leverage	Firm financial leverage, calculated as total liabilities divided by total assets.
ROA	Firm profitability, calculated as income before extraordinary items divided by total assets.
MB	The market-to-book ratio of firm i in year t, i.e., (market price at the end of fiscal year × number of shares outstanding + net asset value per share × number of non-tradable outstanding shares)/book value of equity.
ABACC	The absolute value of discretionary accruals, where discretionary accruals are estimated from the modified Jones model (Dechow et al., 1995). See the Appendix C.2 for a detailed explanation.
State	A dummy variable equals one if a firm's ultimate controller is the state, zero otherwise.
Top1	The percentage of the largest shareholding.
Independence	Independence of the board, measured as the ratio of the number of independent directors over the total number of directions on the board.
Boardsize	The natural logarithm of the number of directors on the board.
Excessdiv	A firm's cash dividend payout ratio (cash dividend per share to total assets per share) minus the industry average dividend payout ratio in the same observation year.
Sitevisits	A dummy variable equals one if any QFII visits a firm's site in the observation year, otherwise zero.

Appendix C.2. Measuring of firm-specific earnings management (ABACC)

We employ the modified Jones model (Dechow et al., 1995) to estimate discretionary accruals, which is a common measure of earnings management. Specifically, we first estimate the following cross-sectional regressions for each industry for each year from 2003 to 2015:

$$\frac{TA_{i,t}}{Asset_{i,t-1}} = \alpha_0 \times \frac{1}{Asset_{i,t-1}} + \beta_1 \times \frac{\Delta Sales_{i,t}}{Asset_{i,t-1}} + \beta_2 \times \frac{PPE_{i,t}}{Asset_{i,t-1}} + \varepsilon_{i,t} \quad \text{(C.1)}$$

The estimated coefficients from the Equation (C.1) are then used to calculate discretionary accruals ($DiscACC_{i,t}$) using the following equation:

$$DiscACC_{i,t} = \frac{TA_{i,t}}{Asset_{i,t-1}} - (\hat{\alpha_0} \times \frac{1}{Asset_{i,t-1}} + \hat{\beta_1} \times \frac{\Delta Sales_{i,t} - \Delta AR_{i,t}}{Asset_{i,t-1}} + \hat{\beta_2} \times \frac{PPE_{i,t}}{Asset_{i,t-1}} \quad \text{(C.2)}$$

where $TA_{i,t}$ is total accruals from firm i in year t, calculated as operating profits minus cash flow from operations; $Asset_{i,t-1}$ is the book value of total assets from firm i at the beginning of year t; $\Delta Sales_{i,t}$ is the change in total revenue of firm i in year t; $\Delta AR_{i,t}$ is the change in accounts receivable for firm i in year t; and $PPE_{i,t}$ is the gross amount of fixed assets for firm i at the end of year t. The variable $ABACC_{i,t}$ is the absolute value of discretionary accruals for firm i at year t.

Appendix C.3. Correlation matrix of the identified variables

This table present the correlation matrix of the variables for the sample of 1,944 listed firms with 12,382 firm-year observations. The description of each variable is provided in Appendix C.1.

	$Duvol_{t+1}$	$Ncskew_{t+1}$	$QFII_t$	$Top10_t$	$Long_t$	$MultiQFII_t$	$Duvol_t$	$Ncskew_t$	$Return_t$	$Dturn_t$	$Signma_t$	$Size_t$	$Leverage_t$	ROA_t	MB_t
$Duvol_{t+1}$	1														
$Ncskew_{t+1}$	0.883	1													
$QFII_t$	0.014	0.016	1												
$Top10_t$	-0.022	-0.014	0.407	1											
$Long_t$	-0.028	-0.022	0.378	0.785	1										
$MultiQFII_t$	-0.027	-0.020	0.244	0.378	0.482	1									
$Duvol_t$	0.093	0.097	-0.006	-0.032	-0.034	-0.008	1								
$Ncskew_t$	0.093	0.098	0.004	-0.019	-0.029	-0.006	0.884	1							
$Return_t$	-0.010	-0.019	-0.011	0.008	0.012	0.006	0.052	0.062	1						
$Dturn_t$	-0.015	-0.022	-0.014	0.006	0.013	0.007	-0.117	-0.110	-0.198	1					
$Signma_t$	0.020	0.028	0.008	-0.007	-0.018	-0.007	-0.072	-0.076	-0.823	0.276	1				
$Size_t$	-0.115	-0.104	0.126	0.133	0.140	0.075	-0.119	-0.105	0.065	0.090	-0.090	1			
$Leverage_t$	-0.002	-0.002	-0.036	-0.042	-0.034	-0.036	-0.005	-0.009	-0.008	0.016	0.017	0.357	1		
ROA_t	0.015	0.025	0.119	0.106	0.097	0.074	-0.028	-0.007	0.034	-0.082	-0.059	0.092	-0.352	1	
MB_t	0.033	0.043	-0.001	0.016	0.006	-0.002	-0.051	-0.036	-0.278	0.162	0.397	-0.248	-0.046	0.079	1
$ABACC_t$	0.026	0.032	-0.027	-0.024	-0.020	-0.006	0.034	0.028	-0.064	-0.011	0.087	-0.094	0.061	-0.036	0.107
$State_t$	0.037	0.031	0.051	0.022	0.081	0.018	0.028	0.025	0.054	0.021	-0.074	0.159	0.192	-0.058	-0.123
$Top1_t$	0.016	0.015	0.048	0.038	0.053	0.042	0.018	0.011	0.065	-0.159	-0.101	0.196	0.012	0.128	-0.151
$Boardsize_t$	0.027	0.024	0.030	0.023	0.042	-0.006	0.011	0.012	0.061	-0.033	-0.096	0.182	0.101	0.025	-0.151
$Independence_t$	-0.054	-0.056	-0.002	0.025	0.014	0.019	-0.042	-0.044	-0.044	0.029	0.063	0.099	-0.002	0.001	0.079

Appendix C.3. (Continued)

	$ABACC_t$	$State_t$	$Top1_t$	$Boardsize_t$	$Independence_t$
$ABACC_t$	1				
$State_t$	-0.009	1			
$Top1_t$	-0.011	0.208	1		
$Boardsize_t$	-0.059	0.222	0.047	1	
$Independence_t$	0.011	-0.083	-0.018	-0.383	1