MACQUARIE University

The Economic Consequences of Controlling Shareholder Share Pledging: Evidence from China

By

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DECLARATION

I certify that the work in this thesis entitled *The Economic Consequences of Controlling Shareholder Share Pledging* has not been previously submitted for a degree nor has it been submitted as part of requirements for a degree to any other university or institution other than Macquarie University.

I also certify that the thesis is an original piece of research work, which contains no material previously published or written by another person except where due reference is made in the thesis itself. Any help and assistance that I have received in my research work and the preparation of the thesis itself have been appropriately acknowledged.

Signed:

Wei Liu

Dated: 5 December 2019

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ABSTRACT

The practice that insiders, including executives, directors, block shareholders, pledge shares as collaterals to secure loans from financial institutions is pervasive across the global capital markets. Given the emerging problems and scandals resulted from insider share pledging, regulators and outside shareholders regard insider share pledging as a significant corporate governance concern. Although a few studies have explored the economic consequences of insider share pledging, there are no studies investigating whether and how insider share pledging affect agency conflicts and information risk, which in turn could affect firms' cost of equity capital. This thesis fills this gap using a large sample of controlling shareholder share pledging (share pledging for short, henceforth) in Chinese capital market.

This thesis consists of three self-contained research papers in the areas of share pledging, agency conflicts, information risks, and firms' cost of equity capital. The first paper (in Chapter two) examines how share pledging affects tunnelling (i.e., agency conflicts). This study documents a positive relation between share pledging and firm tunnelling. Specifically, the presence of share pledging leads to a 14.9% increase in tunnelling, which translates into an increase of 13.3 million RMB inter-corporate loans to the controlling shareholders. Moreover, this positive relation between share pledging and tunnelling in non-state-owned enterprises (group-affiliated firms) is stronger than that in state-owned enterprises (non-group-affiliated firms). This study also finds that strong monitoring of multiple large shareholders, high analysts' coverage, and strong institutional environment help mitigate the tunnelling level induced by share pledging, suggesting that better internal and external corporate governance mechanisms help curb the tunnelling behaviour induced by share pledging. By further investigation, this study finds that the cumulative abnormal returns (CARs) around the interim announcements of share pledging are significantly negative, suggesting that the market anticipates and penalizes the tunnelling activities induced by share pledging. Finally, the results show that share pledging impairs firm performance, which is consistent with the tunnelling story of share pledging. Overall, the findings suggest that share pledging exacerbates firm tunnelling in an emerging market when external monitoring and shareholder protection is relative weak.

The second paper (in Chapter Three) examines how share pledging affects corporate disclosure quality (i.e., information risk). This study documents a negative relation between share pledging and corporate disclosure quality. Specifically, the presence of share pledging leads to 5.56 times decrease in disclosure quality. Moreover, this negative relation between share pledging and corporate disclosure quality in non-state-owned enterprises is stronger than that in state-owned enterprises. These results suggest that the margin call pressure and the related risk of losing control rights resulted from share pledging provides controlling shareholders with incentives to manipulate corporate disclosure. Further,

this study has explored the channels that controlling shareholders use to manipulate corporate disclosure. The results show that share pledging leads to up-ward earnings management, optimistic management forecasts, and decreased conditional accounting conservatism. Finally, this study finds that, as corporate disclosure quality decreases, share pledging exerts an incremental negative effect on firm value.

The Third paper (in Chapter Four) examines how share pledging affects firms' cost of equity capital. This study documents a positive relation between share pledging and firms' cost of equity capital. Specifically, firms with share pledging have a cost of equity capital that is 24.6 basis points higher than do firms without share pledging, which implies an additional annual cost of 14.7 million RMB for an average firm with share pledging to finance with equity. This study also has explored the channels through which share pledging increases cost of equity capital. The results suggest that share pledging increases firms' cost of equity capital by imposing information risk and agency conflicts on outside investors. By cross-sectional analysis, this study finds that the positive association between share pledging and cost of equity capital is more pronounced in firms with higher level of information asymmetry, non-state-owned enterprises, firms with weaker monitoring of multiple large shareholders, and firms with weaker regional institutional environment. By further investigation, this study also documents a positive relation between share pledging and firms' systematic risk, suggesting that the information risks and agency conflicts related to share pledging are non-diversifiable. Finally, this study finds that firms with share pledging have a cost of debt that is 23.6 basis points higher than do firms without share pledging, which implies an additional annual cost of 5.3 million RMB for an average firm with share pledging to finance with debts.

The findings in this thesis contribute to the current debate regarding economic consequences of the controversial financial innovation, namely, insider share pledging, and provide policy implications for regulators and investors.

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CHAPTER ONE

OVERVIEW OF THE THESIS

1.1 Background, Aims and Objectives

According to a survey (Larcker and Tayan, 2010), about 25% of firms allow directors or executive officers to pledge shares in the United States during the year 2006-2009. Anderson and Puleo (2015) show that 26% of their randomly drawn samples from S&P publicly listed firms have insider share pledging. Singh (2018) reports that controlling shareholders of around half of listed firms in India have pledged their shares at least once from year 2009 to 2014. In China, according to data provided by CSMAR, firms with controlling shareholder share pledging account for more than 40% of Chinese non-financial listed firms in A-share stock market.

Although share pledging loans help relieve shareholder's financial constraints which contributes to the economic development, controlling shareholder share pledging exposes the listed firms under risks because of the macroeconomic fluctuation. The cases of forced sale related to controlling shareholder share pledging are not rare in Chinese capital market. During the year 2017-2018, the controlling shareholders in Pengqi Technology, Geo-jade Petroleum Corporation, Royal Group, XunYou experienced forced sales and lost the control rights. Due to the risk of control rights transfer, controlling shareholder share pledging (share pledging for short, henceforth) raises concerns among regulators and investors.

Share pledging is the financing activity of shareholders, which appears not associated with the listed firms. However, in the case of controlling shareholder share pledging, on the one hand, controlling shareholder's behaviour may affect the listed firms' behaviour. On the other hand, the forced sales related to share pledging may lead to control rights transfer, which may affect the listed firms' performance, stock price, and corporate decision. For example, Shanghai Raas announced on 7 December 2018 that "because the controlling shareholder, Raas China Limited, breached the share pledging contract involving 78.11 million shares, the pledgees (the creditors) initiated a forced sale". Then, the stock price of Shanghai Raas dropped from 19.54 yuan to 6.81 yuan per share for 10 consecutive trading days.

Given the pervasiveness and the potential risks and agency issues related to share pledging, the authorities across the global have issued regulations for insider share pledging. In August 2006, Securities and Exchange Commission (SEC) mandates footnote disclosure in firms' proxy statement of any outstanding shares pledged by directors or named executive officers. Financial Services Authority (FSA) in U.K have implemented pledging disclosure requirements in January 2009, and have required that directors must get clearance from chairman or other designated director if they pledge shares of the firm. In January 2007, the Financial Supervisory Commission in Taiwan issued a new regulation that limits the amount of a bank loan backed by board members' pledged shares in listed firms to up to 60% of the market value of the pledged shares. In October 2011, the Legislative Yuan in Taiwan passed amendment to Article 197–1 of the Company Act, which prohibits the exercise of voting rights of "excessive pledged shares", defined as those that exceed half of the shares held by a director on election.

In January 2009, the Securities Exchange Board of India (SEBI) issued a new regulation that requires publicly listed firms to mandatorily disclose the number of insiders' pledged shares.

Compare to the pervasiveness of share pledging in capital market, there is a lack of academic researches regarding the economic consequence of share pledging. The extant researches have investigated how share pledging affects firm performance (Kao, Chiou, and Chen, 2004; Chen, Kao, and Chen, 2007), firm value (Hao and Liang, 2009; Wang and Chou, 2018; Dou, Masulis, and Zein, 2019), earnings management (Asija, Marisetty, Rangan, 2014; DeJong, Liao, and Xie, 2019). However, few studies explore the risks generated by share pledging, and whether investors can identify these risks and hence demand a higher risk premium for holding the listed firms' stocks. This thesis is going to fill this gap by identifying the agency conflicts and information/estimation risks related to share pledging.

With these in mind, the following research objectives are addressed in this thesis:

1) To explore the impacts of share pledging on firm tunnelling;

2) To examine whether share pledging decreases the listed firms' information disclosure quality;

3) To investigate the association between share pledging and the listed firms' cost of equity capital.

These research objectives are addressed in three self-contained research papers presented in this thesis respectively. Details for each paper are elaborated in the following subsections.

1.1.1 Paper 1 (Chapter Two): Controlling Shareholder Share Pledging and Tunnelling: Evidence from China

Given the pervasiveness of share pledging in Chinese capital market, this study empirically examines how share pledging affects the tunnelling level in the listed firms. In particular, this paper addresses the following research questions in the Chinese context:

1) Whether and how share pledging affects the tunnelling level of the listed firms?

2) Could strong corporate governance mechanisms constrain the tunnelling behaviour induced by share pledging?

3) Can the market anticipate the tunnelling behaviour induced by share pledging?

The initial data of share pledging and the relevant financial data are obtained from the Chinese Stock and Market Accounting Research (CSMAR) database. The State-Owned Enterprise (SOEs) information is collected from the data base of China Centre for Economic Research (CCER), provided by SinoFin Information Services. The data of group affiliation is hand-collected. The sample period spans from the year 2003 to 2017. After data merging, the final sample consists of 3,003 unique firms and 22,063 firm-year observations from year 2003 to 2017.

The findings in this paper are as follows:

1) share pledging is positively related to the tunnelling level of the listed firms, and this positive relation between share pledging and firm tunnelling is significantly stronger in non-SOEs (group-affiliated firms) than that in SOEs (non-group-affiliated firm).

2) Strong monitoring of multiple large shareholders, high analysts' coverage, and strong institutional environment help mitigate the tunnelling behaviour induced by share pledging.

3) The cumulative abnormal returns (CARs) around the interim announcements of share pledging are significantly negative.

4) Share pledging impairs firm performance.

Overall, the findings in this paper suggest that share pledging exacerbates firm tunnelling in an emerging market when external monitoring and shareholder protection is relative weak.

1.1.2 Paper 2 (Chapter Three): Controlling shareholder share pledging and corporate disclosure quality: Evidence from China

While extant researches have extensively investigated the valuation effect related to insider share pledging (Wang and Chou, 2018; Singh, 2018; Dou, Masulis, and Zein, 2019), only a few studies have investigated how share pledging affects corporate decisions, such as corporate risk taking (Meng, Ni, and Zhang, 2018), earnings management (DeJong, Liao, and Xie, 2019). In this paper, we fill this gap by exploring whether and how controlling shareholder share pledging affects corporate disclosure quality.

The initial data of share pledging and the relevant financial data are obtained from the Chinese Stock and Market Accounting Research (CSMAR) database. The State-Owned Enterprise (SOEs) information is collected from the data base of China Centre for Economic Research (CCER), provided by SinoFin Information Services. The sample period spans from the year 2003 to 2017. After data merging, the final sample consists of 3,016 unique firms and 21,877.

The findings in this paper are as follows:

1) Share pledging is negatively related to corporate disclosure quality, and this negative relation between share pledging and corporate disclosure quality is stronger in non-state-owned enterprises than that in state-owned enterprises.

2) Share pledging deteriorates corporate disclosure quality by conducting up-ward earnings management, issuing optimistic management forecasts, and decreasing conditional accounting conservatism.

3) As corporate disclosure quality decreases, share pledging exerts an incremental negative effect on firm value.

1.1.3 Paper 3 (Chapter Four): Controlling shareholder Share pledging and Cost of Capital: Evidence from China

Although some studies have investigated the market reaction of share pledging and how share pledging affects shareholder wealth (e.g., Wang and Chou, 2018; Dou, Masulis, and Zein ,2019), few studies explore whether and how investors perceive share pledging, and whether investors price the risks related to share pledging. We fill this gap by investigating the association between share pledging

and firms' cost of equity capital. In particular, this paper addresses the following research questions in the Chinese context:

1) Whether and how share pledging affects the cost of equity capital of the listed firms?

2) How information environment and corporate governance affect the association between share pledging and cost of equity capital?

3) Are the agency conflicts and information risks related to share pledging non-diversifiable?

4) Does share pledging also affect the cost of debt of the listed firms?

The findings in this paper are as follows:

1) Share pledging is positively associated with cost of equity capital of the listed firms, and the positive association between share pledging and cost of capital is more pronounced in firms with higher level of information asymmetry, Non-SOEs, firms with weaker monitoring of multiple large shareholders, and firms with weaker regional institutional environment.

2) The agency conflicts and information risk related to share pledging is non-diversifiable.

4) Share pledging not only generates a higher cost of equity but also a higher cost of debt.

1.2 Contribution of the thesis

This thesis contributes to the literature in several ways. First, the results in paper 1, 2, 3 show that share pledging exacerbates firm tunnelling and deteriorates the listed firms' disclosure quality, which in turn intensifys investors' perceived risks and therefore increases the listed firms' cost of equity capital. These findings contribute the emerging literature examining the economic consequences of insider share pledging in capital markets.

Second, by exploring the impact of share pledging on firm tunnelling, paper 1 extends the tunnelling literature. Prior literature finds that the deviation between control rights and cash flow rights provides controlling shareholder with incentives to tunnel the firm (La Porta, Lopez-de-Silanes, and Shleifer, 1999; Claessens, Djankov, Fan, and Lang, 2002). The deviation between control rights and cash flow rights results from pyramiding structure, cross holding, participating in management and dual class equity (La Porta, Lopez-de-Silanes, and Shleifer, 1999). However, the results in paper 1 show that share pledging creates deviation between control rights and cash flow rights, enables controlling shareholder to influence the board's decision even after pledging shares and to transfer stock price crash risks to creditors and minority shareholders, which in turn provides controlling shareholders with incentives to tunnel the firm.

Third, prior studies find that corporate disclosure quality is determined by capital market transactions, corporate control contests, shareholder litigation, proprietary costs, and corporate governance (Healy and Palepu,2001; Eng and Mak,2003). By presenting the evidence that share pledging provides controlling shareholders with incentives to change corporate disclosure policy, paper 2 extends the disclosure literature.

Finally, by identifying share pledging as another source of risk that drives firms' cost of capital, paper 3 complements to the literature regarding the determinants of firms' cost of capital. Prior work predominantly focuses on how various information risks and business risks that stem from firms' operating environment and business model affect firms' cost of capital (e.g., Modigliani and Miller, 1958; Armstrong, Core, Taylor, and Verrecchia, 2011; Lambert, Leuz, and Verrecchia, 2011; Ng and Rezaee, 2015; Johnstone, 2016; Dhaliwal, Judd, Serfling, and Shaikh, 2016; Konchitchki, Luo, Ma, and Wu, 2016). However, very little is known about how the personal borrowing by insider-owners affects firms' cost of capital. Paper 3 explores this research question by investigating the relation between share pledging and firms' cost of equity capital, and provides new empirical evidence that share pledging is another determinant of cost of capital.

1.3 Organisation of the Thesis

The remainder of the thesis is organized as follows. Chapter Two to Four comprise the three self-contained papers. The relevant tables and references for each chapter are incorporated into the respective chapter. Chapter Five is the concluding chapter which summarizes the findings of each of the three papers and draws conclusions and implications.

It also discusses the limitations of the thesis and suggestions for future research.

CHAPTER TWO

(Paper One)

CONTROLLING SHAREHOLDER SHARE PLEDGING AND TUNNELLING: EVIDENCE FROM CHINA

Abstract

We investigate the impact of controlling shareholder share pledging (share pledging for short henceforth) on tunnelling in an emerging market. By using a large sample of Chinese listed firms, we find a positive relation between share pledging and tunnelling. Specifically, the presence of share pledging leads to a 14.9% increase in tunnelling. This positive relation between share pledging and firm tunnelling is significantly stronger in non-SOEs (group-affiliated firms) than that in SOEs (non-group-affiliated firm). We also find that strong monitoring of multiple large shareholders, high analysts' coverage, and strong institutional environment help mitigate the tunnelling level induced by share pledging. Further, we find that the cumulative abnormal returns (CARs) around the interim announcements of share pledging are significantly negative. Finally, we find that share pledging impairs firm performance. Overall, our findings suggest that share pledging exacerbates firm tunnelling in an emerging market when external monitoring and shareholder protection is relative weak.

Keywords: controlling shareholder share pledging, tunnelling, SOEs, group-affiliated firms

2.1 Introduction

It becomes prevalent for controlling shareholders to put up stocks as collaterals for a personal loan. There exist a number of studies investigating the economic consequence of controlling shareholder share pledging (share pledging for short henceforth)[1] such as the impact of share pledging on bond yield spread, corporate risk taking, earnings management and firm performance. Chiou, and Chen (2004), Chen, Kao, and Chen (2007) find that share pledging impairs firm performance. They conjecture that share pledging is a source of deviation between insiders' control rights and cash flow rights, which leads to agency conflicts between insiders and outsiders. Wang and Chou (2018), and Dou, Masulis, and Zein (2019) argue that the agency conflicts arising from insider share pledging decreases firm valuation. However, these studies do not provide direct evidence to corroborate the underlying assumption that share pledging results in agency conflicts between insiders and outsiders. In this study, we fill this gap by exploring the association between share pledging and firm tunnelling.

We argue that share pledging aggravates the agency conflicts between controlling shareholders and minority shareholders. First, during the pledging period, the cash flow rights of the pledged shares belong to the pledgees (financial institutions) instead of the pledgors (the controlling shareholders). It creates deviation between controlling shareholders' control rights and cash flow rights, which in turn results in agency conflicts between controlling shareholders and minority shareholders (Kao, Chiou, and Chen, 2004; Chen, Kao, and Chen, 2007; Wang and Chou, 2018; Dou, Masulis, and Zein, 2019). Second, share pledging enables controlling shareholders not only to transfer the risk of stock price crash to pledgees and the minority shareholders but also to reclaim investment (Hao Xiangchao, Liang Qi, 2009), which in turn aggravates the agency conflicts between controlling shareholders and minority shareholders.

The Chinese stock market offers a good opportunity to explore the relation between share pledging and tunnelling. First, in China, it is prevalent for controlling shareholders to take loans from financial institutions by pledging shares. In our sample, there are more than one third of firms with share pledging. There is a clear increasing trend of share pledging. Specifically, the percentage of firms with share pledging increases from 19.497% in year 2003 to 49.728% in year 2017 in our sample period. As share pledging is widely used by controlling shareholders, since the year 2007, the Chinese Security Regulatory Commission (CSRC) requires all listed firms to make a public interim announcement when any shareholder's pledged shares exceed 5% of the listed firms' total outstanding shares. More strictly, in 2016, the CSRC requires all listed firms to make a public interim announcement when any large shareholder who holds 5% of the listed firm's total shares conducts share pledging transaction. These disclosure requirements offer us an access to comprehensive data sets of share pledging activities, which allows us to deeply explore the association between share pledging and firm tunnelling, and how

[1] However, in section 4.5.1 "The valuation effect of shareholders share pledging" where we discuss the valuation effect of share pledging by different shareholders, we keep the term controlling shareholder share pledging in order to distinguish it from the share pledging by other shareholders.

investors react to the announcements of share pledging. Second, the Chinese stock market is well-suited for research of tunnelling activities conducted by controlling shareholders. On the one hand, compared with the firms in the United States and other western countries, Chinese listed firms are characterized by concentrated ownership structure, and most listed firms are controlled by the largest holders. On average, a largest shareholder owns over one-third of a firm's ownership (Jiang and Kim, 2015). On the other hand, the legal system in China offers few options for the minority shareholders to take effective actions against controlling shareholders' expropriation. Due to the relative weak institutional environment, the problem of controlling shareholder tunnelling is still pervasive (Jiang, Lee, and Yue, 2010; Jiang and Kim, 2015; Jiang, Rao, and Yue, 2015).

To test the relation between share pledging and tunneling, we use both an indicator variable and a continuous variable to measure the share pledging activities conducted by controlling shareholders, over the year 2003-2017. Next, we follow prior research and measure tunneling as the inter-corporate loans to controlling shareholders (Jiang, Lee, and Yue, 2010; Liu and Tian, 2012). When we use the dummy variable to measure the presence of share pledging, our base line results show a positive association between share pledging and tunnelling. Specifically, the presence of share pledging leads to a 14.9% increase in tunnelling, which translates into an increase of 13.3 million RMB inter-corporate loans to the controlling shareholders. In addition, when we use the ratio of controlling shareholders' pledged shares to a firm's total shares as independent variable, our results show a significant positive relation between pledging ratio and tunnelling level.

To further provide evidence that share pledging is associated with firm tunnelling, we conduct a set of cross-sectional tests in settings that provide variation in controlling shareholders' tunnelling incentives. First, we investigate whether the association between share pledging and tunnelling varies between Non-SOEs (group-affiliated firms) and SEOs (non-group-affiliated firms). Our results show that the positive effect of share pledging on tunnelling is significantly stronger in non-SOEs (group-affiliated firms) than that in SOEs (non-group-affiliated firms). These results further support our main hypothesis, and are consistent with the evidence documented by prior tunnelling literature (Berkman, Cole, and Fu, 2009; Jiang, Lee, and Yue, 2010; Fan, Wong, and Zhang, 2013; Bae, Kang, and Kim, 2002; Bertrand, Mehta, and Mullainathan, 2002; Fisman and Wang, 2010). Second, we explore the internal and external monitoring mechanisms that could help mitigate the tunnelling activities induced by share pledging. Our results show that strong monitoring of multiple large shareholders, high analysts' coverage, and strong institutional environment can mitigate the tunnelling activities induced by share pledging.

Next, we conduct a set of additional analyses. First, we utilize a sample of interim announcements regarding share pledging to investigate how investors react to share pledging activities. Our results show an overall negative market reaction to share pledging announcements, indicating that investors perceive share pledging as a risk related to tunnelling. Second, given the findings that share pledging exacerbates

tunnelling, we examine whether it would impair a listed firm's performance. Our results show that share pledging impairs a listed firm's future accounting and market performance.

At last, given the endogenous concerns regarding reverse causality and unobservable omitted variables, we rerun the base line models by using firm fixed-effect model (FE), propensity score matched samples (PSM) analysis, and instrumental variable approach. We obtain similar results, which lend robustness to our findings.

We contribute to the corporate governance literature in the following ways. First, despite the prevalence of share pledging activities, only a few studies examined the impact of share pledging on earnings management (DeJong, Liao, and Xie,2019), bond yield spreads (Ouyang, Wang, and Chan,2018), firm value (Singh, 2018), margin call pressure (Chan, Chen, Hu, and Liu,2018), corporate risk taking (Meng, Ni, and Zhang,2018). The logic of these studies is based on the perspective that the risk of losing control rights provides controlling shareholder with incentives to change the firm's decision such as financial reporting policy, financial decisions, and developing strategies. However, in this paper, we take a look at the other perspective that share pledging provides controlling shareholders with incentives to tunnel the listed firms. Thus, we extend the literature on the economic consequence of share pledging.

Second, we extend the tunnelling literature by exploring the relation between share pledging and firm tunnelling. Prior literature finds that the deviation between control rights and cash flow rights provides controlling shareholder with incentives to tunnel the firm (La Porta, Lopez-de-Silanes, and Shleifer, 1999; Claessens, Djankov, Fan, and Lang, 2002). The deviation between control rights and cash flow rights results from pyramiding structure, cross holding, participating in management and dual class equity (La Porta, Lopez-de-Silanes, and Shleifer, 1999). However, we explore the share pledging behaviour and argue that share pledging creates deviation between control rights and cash flow rights, which in turn provide controlling shareholder with incentives to tunnel the firm.

Third, recent literature argues that the presence of multiple large shareholders is an effective way to curb the opportunistic behaviour of insiders (Maury and Pajuste, 2005; Mishra, 2011; Attig, El Ghoul, Guedhami, and Rizeanu, 2013), especially in an emerging market where corporate governance is weak and the problem of tunnelling is widespread (Jiang and Kim, 2015; Boateng and Huang, 2017). We complement the prior studies from the perspective of the association between share pledging and tunnelling.

The remainder of this paper proceeds as follows. Section 2 presents hypothesis development. Section 3 describes data and methodology. Section 4 reports the empirical results. Section 5 conducts a set of robustness checks. Section 6 concludes this paper.

2.2 Hypothesis Development

2.2.1 Share pledging and tunnelling

Although, controlling shareholder share pledging should be considered as their personal financial conducts, it provides controlling shareholders with incentives to tunnel the listed firms for the following reasons. First, share pledging creates a deviation between control rights and cash flow rights. According to Article 68 of *The Guaranty Law* and Article 213 of *The Property Law*, during the pledging period, the derivatives, such as stock dividends and cash dividends shall be pledged with the original collaterals. Thus, during the pledging period, the cash flow rights of the pledged shares do not belong to the pledgors. However, according to Article 51 of *The Regulations for Pledged Share Repurchase and Registration*, during the pledging period, the pledgors keep the rights to attend shareholders' meetings, to put forth proposals, and to vote on the board. In another word, during the pledging period, while losing the cash flow rights of the pledged shares, the pledgors still keep the control rights of the listed firm. Therefore, share pledging creates a deviation between control rights and cash flow rights (Kao, Chiou, and Chen, 2004; Chen, Kao, and Chen, 2007), which in turn provides controlling shareholders with incentives to tunnel the listed firms (La Porta, Lopez-de-Silanes, and Shleifer, 1999; Claessens, Djankov, Fan, and Lang, 2002).

Second, by pledging shares, controlling shareholders can reclaim investment in advance but still keep the control rights of the listed firms (Hao and Liang, 2009). After pledging shares, controlling shareholders take loans from financial institutions, which can be regarded as reclaiming the investment in advance. However, the preserved control rights enable the controlling shareholders to influence the boards' decisions. Thus, by reclaiming investment in advance through share pledging, controlling shareholders leave less interests in the listed firms but still control the listed firms, which provides them incentives to tunnel the listed firms.

Third, controlling shareholders can transfer the risk of share price crash to creditors and minority shareholders because they have already reclaimed the investment (at least part of the investment) by taking share pledging loans from creditors. For creditors, there are two occasions when they have to use forced sale to protect themselves. When the market price of pledged shares drops down to the forced liquidation line, or when the share pledging loans are already expired but the controlling shareholders do not pay back the loans or repurchase the pledged shares, creditors have the rights to auction the pledged shares or close position by force. Thus, pledgees (creditors) share the risk of stock price crash with pledgors, which will generate pledgors' moral hazard problems, for example, tunnelling the listed firms. For the minority shareholders, after the controlling shareholders pledge shares, they bear the costs and losses resulting from the potential risk of stock price crash.

Taking together, share pledging enables controlling shareholder to create deviation between control rights and cash flow rights, to reclaim investment in advance, and to transfer the risk of stock price crash to the creditors and minority shareholders, which in turn provide the controlling shareholders

with incentives to tunnel the listed firms. In addition, as a typical transitional economy, Chinese institutional environment for investor protection is weak, and controlling shareholders own, on average, more than one-third of the ownership in listed firms (Jiang and Kim, 2015). As a result, controlling shareholders have abilities to tunnel the listed firms. Therefore, we propose that:

H1. Controlling shareholder share pledging is positively associated with the severity of firm tunnelling.

2.2.2 Share pledging and tunnelling in Non-SOEs and SOEs

China has been transferring from the central-planned economy to market-oriented economy in the last forty years, at the beginning of the reforming process, almost all listed firms in Shanghai and Shenzhen stock exchange are SOEs. As the reforming process moving forward, more and more Non-SOEs go to public, but even up to today, SOEs still account for about half of all listed firms in Chinese capital market, and the government or its agent is the ultimate controller.

Prior tunnelling literature mainly focuses on privately controlled firms and argues that the deviation between control rights and cash flow rights provides controlling shareholders with incentives to consume private benefit by expropriating wealth of minority shareholders. Although the pyramid structure building of SOEs leads to the deviation between control rights and cash flow rights, its purpose is for separating firms from political interference rather than for tunnelling (Fan, Wong, and Zhang, 2013). In China, compared to Non-SOEs, SOEs are unlikely to tunnel their listed firms for private benefits because the government is not literally a person who can directly or personally benefit from tunnelling (Jiang and Kim. 2015). Berkman, Cole and Fu (2009) find that tunnelling is least likely to occur when a State Non-Corporate Entity is the controlling shareholder since the benefits of the loan guarantees will accrue to the taxpayer rather than to the bureaucrats in charge of the State Non-Corporate Entities. Jiang, Lee, and Yue (2010) directly study controlling shareholder tunnelling and find that controlling shareholders in China utilize inter-corporate loans to transfer money from listed firms to themselves or other firms under their control, but this occurs less often in SOEs. Thus, we propose that:

H2. The positive association between share pledging and tunnelling is stronger in Non-SOEs than that in SOEs.

2.2.3 Share pledging and tunnelling in group-affiliated firms and non-group-affiliated firms

La Porta, Lopez-de-Silanes, and Shleifer (1999) conclude that the central agency problem in large corporations around the world is to restrict expropriation of minority shareholders by controlling shareholders. In most business groups, ownership is highly concentrated, and controlling shareholders have control rights over their cash flow rights, which in turn creates agency problems between controlling shareholders and minority shareholders. Bertrand, Mehta, and Mullainathan (2002) examine tunnelling in pyramidal ownership structures of business groups and find that the controlling shareholders of business groups expropriate minority shareholders by diverting non-operating

components of profits from firms near the bottom of the pyramid to the firms near the top of the pyramid. Meanwhile, Bae, Kang, and Kim (2002) document that Korean business groups (chaebols) are characterized by crossing-holding and examine whether these firms benefit from acquisitions they make, or such acquisitions just provide a way for controlling shareholders to increase wealth by increasing the value of other firms affiliated with the group. Their results show that minority shareholders of chaebol firms lose from the acquisition, while the controlling shareholders of these firms gain from such acquisitions. By using a sample of related party transactions (RPTs) within Chinese business groups for over the years 1998-2008, Fisman and Wang (2010) find that although RPTs create value for the business groups, the controllers of these business groups extract this value back through loan guarantees. These evidences suggest that the structure of business group provides controlling shareholders with incentives and ability to expropriate the minority shareholders. Therefore, we propose that:

H3. The positive association between share pledging and tunnelling is stronger in group-affiliated firms than that in non-group-affiliated firms.

2.2.4 Internal and external monitoring mechanisms, share pledging and tunnelling

Corporate governance is, to a large extent, a set of mechanisms through which outside investors protect themselves against expropriation by the insiders (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 2000). Recent studies document that multiple large shareholders (MLS) can restrain extraction of private benefits by competing for control (Bloch and Hege, 2003; Maury and Pajuste, 2005) and monitoring controlling shareholders (Pagano and Röell, 1998). Consistent with the theoretical predictions, Maury and Pajuste (2005) find that the contestability of the largest shareholder's control power has a positive effect on firm value. Mishra (2011) further shows that the presence and the barning power of MLS promote corporate risk taking, suggesting that the presence and barning power of MLS improve internal governance and hence promote a more optimal non-conservative investment policy. Attig, El Ghoul, Guedhami, and Rizeanu, (2013) show that the presence of MLS enhances the valuation of firms' cash holdings, indicating that the presence of MLS reduces the free-rider problem resulted from the widely-held corporate ownership and curbs controlling shareholders' extraction of private benefits.

While coalition could be formed among any large shareholders, coalition between the controlling shareholders and the second largest shareholders in emerging economies is rare (Boateng, and Huang, 2017) for the following reasons. First, controlling shareholders in China, on average, hold over one-third of the total shares in listed firms (Jiang and Kim, 2015), which provides controlling shareholders with enough power to control the listed firms. Second, the institutional environment for minority shareholder protection in Chinese capital market is weak, and some of the corporate governance mechanisms are not effective. For instance, independent directors do not play a monitoring role (Hu, Tam, and Tan, 2010). Consequently, the assumed coalition between the controlling shareholder and the

second largest shareholder would leave other large shareholders no options but to withdraw their investment if they are economic agents just as assumed by finance theories. Therefore, we propose that:

H4a. The positive association between share pledging and tunnelling is weaker in firms with the presence of MLS than that in firms without the presence of MLS.

Firms in countries with weak investor protection have a weak internal corporate governance and more agency issues than do firms in countries with strong investor protection. Analysts' coverage plays a substitute governance role in countries with weak investor protection (Sun, 2009). Using a sample of more than 2,500 firms from 27 countries, Lang, Lins, and Miller (2004) show that, when family or management is the largest block holder and when the institutional environment for investor protection is weak, the interaction of analysts' coverage and family or management control becomes positivly related to Tobin's Q. This finding suggests that: (1) more analysts' covrage is associateed with higher valuation in firms with poor internal coporate governance, (2) analysts' monitoring is more valuable in countries with weak institutional environment for investor protection than that in countries with stong institutional environment for investor protection. Given the relative weak institutional environment for minority shareholder protection in Chinese capital market, we expect that analysts' coverage plays an important role in restaining controlling shareholder tunnelling behavior arising from share pledging. Therefore, we propose that:

H4b. The positive association between share pledging and tunnelling is weaker in firms with high analysts' coverage than that in firms with low analysts' coverage.

Governance mechanisms help protect the minority shareholders from being expropriated by the controlling shareholders. However, the effectiveness of corporate governance hinges on the overall institutional environment (Johnson, Boone, Breach and Friedman, 2000). As the market-oriented reform deepens, China's institutional environment improves. For instance, controlling shareholders usually use inter-corporate loans or non-operation fund occupancy (NOFO) to tunnel listed firms (Jiang, Lee, and Yue, 2010; Jiang, Rao, and Yue, 2015). However, on May 26, 2006, the CSRC issued a regulation that clearly required the chairman of the board of the controlling shareholder to be personally responsible for the NOFO clearance. Then, on June 1, 2006, both the Shanghai and Shenzhen Stock Exchanges issued a regulation that required listed firms to update NOFO balances regularly. The stock exchanges also disclose the names of the persons who are responsible for the NOFO problem to major public media outlets, which acts as an effective corporate governance mechanism when formal legal system is relative weak (Dyck, Volchkova, and Zingales, 2008). Given the stringent monitoring of regulators and the public media after the reform, controlling shareholders' tunnelling activities are restrained to a certain extent.

However, China is a large country, the reform paces are different across areas/provinces, which in turn leads to a large variation in the institutional environment. The institutional infrastructures, such as law enforcement, capital market development, product market completion in the eastern provinces, are better than those in the western provinces. Since stronger institutional environment is associated with

better investor protection (Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1997, 1998), we therefore propose that:

H4c. The positive association between share pledging and tunnelling is weaker in areas with strong institutional environment than that in areas with weak institutional environment.

2.3. Data and Methodology

2.3.1 Data source and sample description

We select Chinese A-share firms as research samples spanning from the year 2003 to 2017. The initial data is obtained from the Chinese Stock and Market Accounting Research (CSMAR) database. Specifically, we first collect the data of large shareholder share pledging and the names of controlling shareholders from the Shareholder subset. Then, we collect the interim announcements of large shareholder share pledging activities in the Share Pledging subset, and the data of other receivables occupied by controlling shareholders and the firms under their control from the Related Party Transactions subset. Next, we collect the financial data of listed firms from the Financial Statements sub-data-set. Finally, the State-Owned Enterprise (SOEs) information is collected from the data base of China Centre for Economic Research (CCER), provided by SinoFin Information Services. The data of group affiliation is hand-collected. Our research period starts with the year 2003 because since then: (1) all Chinese listed firms have been required by the CSRC to disclose the identities of their ultimate owners as well as the controlling chains in financial statement, (2) all listed firms have been required by the CSRC to disclose share status of top ten shareholders, including the number of pledged shares, in financial statements, (3) some of the key control variables, for example the identity of the controlling shareholders, begin to be disclosed in financial statements.

To construct firm-year observations for empirical analysis, we start the data process with 30,097 firm-year observations of share pledging in non-financial firms, and we then merge share pledging with data for each firm's characteristics and obtain 26,630 firm-year observations. We further exclude 4,567 observations with missing values for key variables. To alleviate the impact of outliers, we winsorize all continuous variables at the 1% and 99% level. After these screening procedures, the final sample consists of 3,003 unique firms and 22,063 firm-year observations from year 2003 to 2017.

Table 2.1 presents the number and the percentage of firms with controlling shareholder share pledging by year. The percentage of pledged firms in column (3) shows an increasing trend by year, it increases from 19.497% in year 2003 to 49.728% in year 2017, which is similar trend reported by Li, Liu, and Wang (2019). The results in column (4) shows that the ratio of controlling shareholder's pledged shares to the total shares of listed firms also increases from 4.407% in year 2003 to 9.338% in year 2017. These data descriptions indicate that share pledging activities are prevalent in recent years.

Table 2. 1

Description of the data sets of controlling shareholder share pledging

This table presents the number and percentage of firms with share pledging by year, disclosed in year-end financial statement. Column (1) presents the number of firms with controlling shareholder share pledging. Column (2) presents the total number of listed firms excluding financial industry in our samples. Column (3) presents the percentage of firms with controlling

shareholder share pledging. Column (4) reports the ratio of controlling shareholders' pledged shares to the total shares of listed firms.

Year	Number of Pledged Firms (1)	Number of All Listed Firms (2)	Percentage of Pledged firms (3)	Percentage of Pledged Shares (4)
2003	31	159	19.497%	4.407%
2004	83	428	19.393%	4.764%
2005	160	764	20.942%	4.829%
2006	211	939	22.471%	4.840%
2007	211	1,030	20.4851%	4.048%
2008	253	1,140	22.193%	4.510%
2009	250	1,051	23.787%	5.210%
2010	274	1,216	22.533%	4.617%
2011	358	1,535	23.322%	4.637%
2012	611	1,982	30.827%	6.519%
2013	724	2,096	34.542%	7.111%
2014	851	2,144	39.692%	8.003%
2015	1,048	2,331	44.959%	8.033%
2016	1,189	2,495	47.655%	8.398%
2017	1,369	2,753	49.728%	9.338%
Total	7,623	22,063	--	--

2.3.2 Measuring variables

Controlling shareholder tunnelling

The inter-corporate loans occupied controlling shareholders of Chinese listed firms are charged at very low interests, or even zero, and in many cases, they are never paid back, which indicates that controlling shareholder tunnels the listed firm and consequently exerts adverse economic consequences to the listed firm (Jiang, Lee, and Yue, 2010; Jiang, Rao, and Yue, 2015). Thus, inter-corporate loan is a primary tool that controlling shareholder use for tunnelling in Chinese capital market (Jiang, Lee, and Yue, 2010). While the CSRC has required listed firms to disclose controlling shareholder fund occupation and issued regulations aiming to tackle this problem, this practice has not abated due to the weak law enforcement in Chinese capital market (Liu and Tian, 2012). Following prior tunnelling literature (e.g., Jiang, Lee, and Yue, 2010; Liu and Tian, 2012; Jiang, Rao, and Yue, 2015), this study uses other receivables to total assets to measure inter-corporate loans to controlling shareholders, denoted by *Tunnelling*.

Controlling shareholder share pledging

Following prior researches (e.g., Meng, Ni, and Zhang, 2018; Ouyang, Wang, and Chan, 2018; DeJong, Liao, and Xie, 2019), we define a dummy variable *PledgeDum* that equals one for a firm with share pledging in a given year, and zero otherwise. In addition, in order to capture the variation of the number of controlling shareholders' pledged shares, we create a continuous variable *PledgeRatio* defined as the ratio of a controlling shareholder's pledged shares to a listed firm's total shares. These two variables serve as independent variables in this study.

2.3.3 Regression models

In this paper, we set the following equation as base line regression model:

$$Tunnelling_{it} = \alpha_0 + \alpha_1 PledgeDum_{it}(PledgeRatio_{it}) + \boldsymbol{\beta} * \boldsymbol{Controls} + Year + Industry + \varepsilon_{i,t} \quad (1)$$

Where the dependent variable is *Tunnelling* and the independent variables are *PledgeDum* and *PledgeRatio*, which are defined above. ***Controls*** is a vector consisting of all control variables. We include control variables in our regression analysis as follows. First, we control for a set of firm characteristic and firm performance measures. The tunnelling literature shows that tunnelling is more likely to occur in firms with smaller size, higher leverage ratio, lower profitability (Jiang, Lee, and Yue, 2010; Liu and Tian, 2012; Jiang, Rao, and Yue, 2015). Thus, we include firm size (*Size*), leverage (*Leverage*), return on assets (*ROA*), and sales growth (Growth) as control variables. Second, we control for a set of corporate governance measures. Boards' members play as monitors that turn to be less effective as the free-riding problem arises. Therefore, board size and the proportion of outside directors are determined by managers' private benefit and the cost of monitoring, and are positively related to insiders' private benefit and negatively related to the cost of monitoring (Raheja, 2005; Boone, Field, Karpoff, and Raheja, 2007; Harris, and Raviv, 2008). Thus, we include board size (*BoardSize*) and proportion of independent directors (*IndSize*) as control variables. Liu and Lu (2007) suggest that there is more opportunistic behaviour of management when the CEO is also the board chair. Thus, we include the COE and board chair duality (*Dual*) as a control variable. Larger size auditing firms have a stronger incentive to maintain high audit quality than do smaller auditing firms because the larger size auditing firms are more concerned about their reputations (DeAngelo, 1981; DeFond, Wong, and Li, 1999). Thus, we include international big four auditing firms (*Big4*) as a control variable. Dyck and Zingales (2004) suggest that managers tend to assist controlling shareholders to tunnel the firms. The greater the conflict of interest between managers and shareholders, the more likely it is that managers will help controlling shareholders to tunnel the firms. Thus, we include the agency cost between managers and shareholders (*AgencyCost*). Third, we control for a set of ownership measures. Jiang, Lee, and Yue (2010), Jiang, Rao, and Yue (2015) find that the percentage of shares held by the controlling shareholders is positively associated with controlling shareholders' tunnelling activities and non-operational fund occupancy. Thus, we include the percentage of shares held by controlling shareholders (*Top1*) as a control variable. Prior research show that larger difference between control rights and cash flow rights is associated with higher controlling shareholder tunnelling activities (Jiang, Lee, and Yue, 2010; Liu and Tian, 2012; Jiang, Rao, and Yue, 2015), and institutional investors' ownership is associated with lower controlling shareholder tunnelling activities (Jiang, Rao, and Yue, 2015). Thus, we include the difference between control rights and cash flow rights (*Excess*), and institutional ownership (*Institute*) as control variables. Given that controlling shareholder tunnelling is less likely to occur in SOEs than in Non-SOEs (Jiang, Lee, and Yue, 2010; Jiang, Rao, and Yue, 2015), we include a dummy variable *NonSOE*, which equals one for Non-SOEs and zero otherwise, as a control variable. Finally, prior research suggests that the controlling shareholders in group-affiliated firms are more likely to expropriate the minority shareholders than are those in non-group-affiliated firms (Bertrand, Mehta, and Mullainathan, 2002; Bae, Kang, and Kim, 2002; Fisman and Wang, 2010). Thus, we control a dummy variable *Group*, which equals one for group-affiliated firms and zero otherwise, as a control variable. We also include year

fixed-effect and Industry fixed-effect to control for the omitted variables that may affect tunneling in the same industry during any given year. In robustness tests, we further include province-by-year and industry-by-year fixed effects to control for any time-varying differences across provinces and industries and firm fixed effects to control for time invariant heterogeneity across firms. For the detailed definition of all control variables, please see Appendix C.

2.3.4 Summary statistics

Panel A of Table 2.2 presents descriptive statistics for variables of interest that are used to examine our hypothesis. The results show that the mean value of *Tunnelling* is 2.745%, which suggest that, on average, the inter-corporate loan occupied by a controlling shareholder accounts for 2.745% of the listed firm's total assets. This 2.745% tunnelling level is similar with those reported by prior studies (Liu and Tian, 2012; Jiang, Rao, and Yue, 2015).

The mean value of *PledgeDum* is 0.346, which means that there are 34.6% of firms whose controlling shareholders pledge shares and indicates that share pledging is prevalent in China in recent years. As to the ratio of controlling shareholders' pledged shares, the mean value of *PledgeRatio* is 6.747%. these results are similar with thoes reported by prior studies (Meng, Ni, and Zhang, 2018; Ouyang, Wang, and Chan, 2018; DeJong, Liao, and Xie, 2019).

For the firm's characteristic variables, the average total assets (*Size*) is 21.904 in natural logarithm (approximate 3,256.8 million RMB), and the leverage (*Leverage*) has a mean value of 45.045%. For the firm's performance measures, the return on assets (*ROA*) has a mean value of 4.081%. Sales growth rate (*Growth*) has a mean value of 23.337%.

For the governance variables, the average number of board members (*BoardSize*) is 2.161 in natural logarithm (approximate 9 persons), and the proportion of independent directors (*IndSize*) is 36.902%. The mean value of the duality of CEO and chief director (*Dual*) are 0.225, suggesting that duality is quite common in China. The listed firms that are audited by international big four auditing firms (*Big4*) account for 5.400% of total listed firms. The agency cost between management and shareholders (*AgencyCost*) is 4.769%, which means that the General and Administrative Expenses accounts for 4.769% of firms' total assets.

For the ownership measures, the average holding percentage of the largest shareholder (*Top1*) is 35.976%, suggesting that controlling shareholders are dominant in China. The average deviation of cash flow rights from control rights (*Excess*) are 5.108%, indicating that the deviation of cash flow rights from control rights in China is prevalent. The mean holding percentage of institutional investors (*Institute*) is 4.327%, indicating that institutional investors could exert influence on the boards of directors. Finally, about half (47.100%) of our sample firms are Non-SOEs (*NonSOE*) and more than half sample firms (65.100%) are group-affiliated firms (*Group*).

Panel B of Table 2.2 presents the results from univariate tests for samples that are broken down by share pledging status. The firms with share pledging (*PledgeDum*=1) report an average tunnelling level

of 3.027%, which is significantly higher than the 2.596% reported by firms without share pledging (*PledgeDum*=0). The difference of medians shows a similar pattern. This result provides initial evidence that supports H1, which predicts that share pledging is positively associated with tunnelling.

Table 2. 2
Summary statistics and univariate test of controlling shareholder tunnelling
This table reports summary statistics for the variables of interest and univariate test of dependent variable *Tunnelling* for Chinese A-share non-financial firms over the years 2003 to 2017 which includes 22,063 firm-year observations. Panel A reports summary statistics for variables of interest. In panel B, T test (Chi-squared test) is used to examine the equality of means (medians) between the firms with and without controlling shareholder share pledging. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

Panel A Summary statistics for dependent, independent and control variables

variable	Obs.	Mean	STD	Min	Median	Max
Tunnelling (%)	22,063	2.745	4.618	0.033	1.187	30.380
PledgeDum	22,063	0.346	0.476	0.000	0.000	1.000
PledgeRatio (%)	22,063	6.747	11.594	0.000	0.000	48.313
Size	22,063	21.904	1.251	19.388	21.751	25.782
Leverage (%)	22,063	45.045	20.885	5.142	45.098	90.267
ROA (%)	22,063	4.081	5.599	-16.000	3.628	21.798
Growth (%)	22,063	23.337	61.055	-61.506	12.631	450.213
BoardSize	22,063	2.161	0.201	1.609	2.197	2.708
IndSize	22,063	36.902	5.192	28.571	33.333	57.143
Dual	22,063	0.225	0.418	0.000	0.000	1.000
Big4	22,063	0.054	0.226	0.000	0.000	1.000
AgencyCost	22,063	4.769	2.994	0.425	4.247	16.259
Top1 (%)	22,063	35.976	15.025	9.229	34.016	74.856
Excess (%)	22,063	5.108	7.648	0.000	0.000	27.928
Institute (%)	22,063	4.327	4.794	0.000	2.686	21.528
NonSOE	22,063	0.471	0.499	0.000	0.000	1.000
Group	22,063	0.650	0.477	0.000	1.000	1.000

Panel B Univariate test of controlling shareholder tunnelling

	PledgeDum=0	*PledgeDum*=1	Difference	T-value (Chi-squared
	(1)	(2)	(1) – (2)	value)
Mean	2.596	3.027	-0.431	-6.604***
Median	1.122	1.318	-0.196	52.408***

2.4. Empirical Results

2.4.1 Share pledging and tunnelling

We start our main analysis by examining how share pledging affects tunnelling. Table 2.3 presents the multi-regression results. We run two sets of regressions, one for the dummy independent variable *PledgeDum*, reported in column (1), and the other for the continuous independent variable *PledgeRatio*, reported in column (2).

The result in column (1) shows that the presence of share pledging is positively associated with the tunnelling activities conducted by controlling shareholder. The economic magnitude is also meaningful. The estimated coefficients on *PledgeDum* in column (1) implies that a firm with share pledging has a tunnelling level that is 0.409% higher than does a firm without share pledging. Given that the sample mean of tunnelling is 2.745%, this 0.409% increase translate into a 14.9% (=0.409%/2.745%) increase in tunnelling relative to the sample mean. In addition, given that the average firm has a 3,256.8 million RMB inter-corporate loan to controlling shareholder, this 0.409% increases imply an additional 13.3 (=0.409%*3256.764) million RMB inter-corporate loan occupied by the controlling shareholder for an average firm in a given year.

The result in column (2) shows that the shares a controlling shareholder pledges is positively associated with the tunnelling level. To compute the economic significance of share pledging ratio (*PledgeRatio*) in column (2), we first compare the difference in *PledgeRatio* for firms with share pledging and firms without share pledging. [1]The average firm with share pledging has a *PledgeRatio* of 19.528%. Since *PledgeRatio* takes the value of zero for firms without share pledging, the estimated coefficients on *PledgeRatio* in column (2) implies that the difference in tunnelling between these two types of firms is 0.352% (=0.018*19.528), which is 12.8% (=0.352%/2.745%) of the sample mean value of tunnelling. For the remainder of this study, we only calculate the economic significance of the dummy variable *PledgeDum* that identifies the presence of share pledging.

The estimated coefficients on control variables are generally in line with the findings in prior literature. Firms with smaller size, higher leverage, worse performance, higher agency cost have a higher tunnelling level, which is consistent with the findings reported by prior studies (e.g., Jiang, Lee, and Yue, 2010; Ma, Ma, and Tian, 2013; Jiang, Rao, and Yue, 2015). Institutional investors' ownership (*Institute*) is negatively related to firm tunnelling. The results also show that the estimated coefficients on *Group* are significantly positive, suggesting that tunnelling is more likely occur in group-affiliated firms, which is consistent with the findings reported by Fisman and Wang (2010).

Table 2. 3
Share pledging and tunnelling
This table reports the impact of share pledging on tunnelling. All the model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and are calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	Tunnelling	*Tunnelling*
	(1)	(2)
PledgeDum	0.409***	
	(4.084)	
PledgeRatio		0.018***
		(3.629)
Size	-0.908***	-0.901***
	(-8.334)	(-8.236)
Lev	0.051***	0.050***
	(11.380)	(11.280)
ROA	-0.084***	-0.084***
	(-5.266)	(-5.179)
Growth	0.001	0.001
	(1.299)	(1.356)
BoardSize	-0.212	-0.197
	(-0.658)	(-0.613)
IndSize	0.016	0.016
	(1.463)	(1.522)
Dual	-0.115	-0.108
	(-0.990)	(-0.921)
Big4	0.275	0.278
	(1.351)	(1.365)
AgencyCost	0.145***	0.146***
	(3.509)	(3.578)
Top1	-0.031***	-0.033***
	(-8.879)	(-9.612)
Excess	0.004	0.003

[1] *PledgeRatio* is not a strict contiguous variable because when a firms does not have share pledging, *PledgeRatio* is defined as zero. Therefore, when using *PledgeRatio* as an independent variable, following Dhaliwal, Judd, Serfling, and Shaikh (2016), we compare the difference of *Tunnelling* (the dependent variable) between firms with and without controlling shareholder share pledging.

	(0.591)	(0.447)
Institute	-0.051***	-0.051***
	(-5.331)	(-5.395)
NonSOE	-0.022	0.009
	(-0.132)	(0.051)
Group	0.238*	0.230*
	(1.809)	(1.762)
_cons	25.620***	25.506***
	(11.939)	(11.859)
Year	Yes	Yes
Industry	Yes	Yes
Observations	22,063	22,063
Adjusted-R^2	0.225	0.225

2.4.2 Share pledging and tunnelling in SOEs and Non-SOEs

Although China has been transferring from the central-planned economy to market-oriented economy in the last forty years and a large number of Non-SOEs go to public, SOEs still account for about half of all listed firms in Chinese capital market and the sate-ownership influences corporate behavior deeply. Prior studies suggest that, in Chinese capital market, tunneling is unlikely occur in Non-SOEs (Fan, Wong, and Zhang, 2013; Jiang and Kim. 2015; Jiang, Lee, and Yue, 2010). Table 2.4 examines how state-ownership affects the association between share pledging and tunnelling.

The estimated coefficient on *PledgeDum* × *NonSOE* in column (1) suggests that the presence of share pledging in Non-SOEs results in a significantly higher tunneling level than does that in SOEs. Further, the joint significance of *PledgeDum* and the interaction term *PledgeDum* × *NonSOE* is statistically significant at 1% level. In terms of the economic significance, the estimated coefficient on *PledgeDum* × *NonSOE* implies that, relative to the presence of share pledging in SOEs, the presence of share pledging in Non-SOEs leads to a 0.109% higher tunnelling level, which translate into a 4.0% (0.109%/2.745%) increase in tunnelling relative to the sample mean. Finally, the estimated coefficient on *PledgeRatio*× *NonSOE* in column (2) suggests that the share pledging ratio (*PledgeRatio*) in Non-SOEs imposes a stronger impact on tunneling than does that in SOEs. Overall, these results show that the positive association between share pledging and tunnelling is stronger in Non-SOEs than that in SOEs, which confirms H2.

Table 2. 4

Share pledging and tunnelling in Non-SOEs and SOEs

This table reports the impact of how state-ownership affects the association between share pledging and tunnelling. All the model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	Tunnelling	*Tunnelling*
	(1)	(2)
PledgeDum	0.446***	
	(4.500)	
PledgeDum × NonSOE	0.109**	
	(2.512)	
PledgeRatio		0.017***
		(3.385)
PledgeRatio × NonSOE		0.004**
		(2.341)
NonSOE	0.010	0.011
	(0.063)	(0.064)
Size	-0.908***	-0.900***

	(-8.330)	(-8.189)
Lev	0.051***	0.050***
	(11.376)	(11.287)
ROA	-0.084***	-0.084***
	(-5.288)	(-5.206)
Growth	0.001	0.001
	(1.291)	(1.392)
BoardSize	-0.210	-0.197
	(-0.650)	(-0.612)
IndSize	0.016	0.016
	(1.476)	(1.522)
Dual	-0.115	-0.108
	(-0.990)	(-0.922)
Big4	0.272	0.280
	(1.353)	(1.385)
AgencyCost	0.145***	0.146***
	(3.521)	(3.584)
Top1	-0.031***	-0.033***
	(-8.857)	(-9.565)
Excess	0.004	0.003
	(0.589)	(0.451)
Institute	-0.051***	-0.051***
	(-5.328)	(-5.368)
Group	0.235*	0.232*
	(1.781)	(1.775)
_cons	25.615***	25.497***
	(11.958)	(11.801)
Year	Yes	Yes
Industry	Yes	Yes
Observations	22,063	22,063
Adjusted-R^2	0.225	0.225
F-statistic (*PledgeDum*(*PledgeRatio*)+ *PledgeDum*(*PledgeRatio*)× *NonSOEs*)	10.78***	6.61***

2.4.3 Share pledging and tunnelling in group-affiliated and non-group affiliated firms.

Business groups play an important role in Chinese capital market, and business groups account for 65% of all listed firms in our sample. The corporate behaviour is more complicated in business group than that in non-business groups. Prior studies show that the controlling shareholders in group affiliated firms are more likely tunnel the firms than that in non-group affiliated firms (Bertrand, Mehta, and Mullainathan, 2002; Bae, Kang, and Kim, 2002; Fisman and Wang, 2010). Table 2.5 explores how group affiliation affects the association between share pledging and tunnelling.

The estimated coefficient on *PledgeDum* × *Group* in column (1) suggests that the presence of share pledging in group affiliated firms results in a significantly higher tunneling level than does that in non-group affiliated firms. Further, the joint significance of *PledgeDum* and the interaction term *PledgeDum* × *Group* is statistically significant at 1% level. In terms of the economic significance, the estimated coefficient on *PledgeDum* × *Group i*mplies that, relative to the presence of share pledging in non-group affiliated firms, the presence of share pledging in group affiliated firms leads to a 0.180% higher tunnelling level, which translate into a 6.6% (0.180%/2.745%) increase in tunnelling relative to the sample mean. Finally, the estimated coefficient on *PledgeRatio* in column (2) suggests that the share pledging ratio in group affiliated firms imposes a stronger impact on tunneling than does that in non-group affiliated firms. Overall, these results show that the positive association between share pledging

and tunnelling is stronger in group affiliated firms than that in non-group affiliated firms, which confirms H3.

Table 2. 5

Share pledging and tunnelling in group-affiliated and non-group affiliated firms.

This table reports the impact of how group affiliation affects the association between share pledging and tunnelling. All the model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	Tunnelling	*Tunnelling*
	(1)	(2)
PledgeDum	0.297**	
	(2.342)	
PledgeDum × Group	0.180**	
	(2.098)	
PledgeRatio		0.021***
		(4.504)
PledgeRatio × Group		0.003***
		(2.646)
Group	0.171	0.254***
	(1.161)	(3.253)
Size	-0.907***	-0.901***
	(-8.306)	(-26.849)
Lev	0.051***	0.050***
	(11.426)	(28.084)
ROA	-0.084***	-0.084***
	(-5.260)	(-14.237)
Growth	0.001	0.001*
	(1.312)	(1.925)
BoardSize	-0.217	-0.195
	(-0.674)	(-1.149)
IndSize	0.016	0.016***
	(1.450)	(2.673)
Dual	-0.112	-0.109
	(-0.969)	(-1.550)
Big4	0.281	0.276**
	(1.397)	(2.045)
AgencyCost	0.145***	0.146***
	(3.520)	(13.146)
Top1	-0.031***	-0.033***
	(-8.757)	(-15.825)
Excess	0.004	0.003
	(0.555)	(0.879)
Institute	-0.051***	-0.051***
	(-5.299)	(-8.356)
NonSOE	-0.011	0.004
	(-0.062)	(0.055)
_cons	25.660***	25.494***
	(11.984)	(28.762)
Year	Yes	Yes
Industry	Yes	Yes
Observations	22,063	22,063
Adjusted-R^2	0.225	0.225
F-statistic (*PledgeDum(PledgeRatio)+ PledgeDum(PledgeRatio)× Group*)	8.06***	22.87***

2.4.4 Internal and external monitoring mechanisms, share pledging and tunnelling

2.4.4.1 Multiple large shareholders (MLS), share pledging and tunnelling

Recent studies show that multiple large shareholders (MLS) can restrain extraction of private benefits by competing for control (Bloch and Hege, 2003; Maury and Pajuste, 2005) and monitoring controlling shareholders (Pagano and Röell, 1998). Table 2.6 examines whether the internal governance

mechanism, MLS, curbs tunnelling induced by controlling shareholder share pledging. Following prior research, we capture the governance role of MLS in two ways. First, to capture the presence of MLS, we create an indicator variable *MLSDum* that is set to one if there exists at least one large shareholder (excluding the controlling shareholder) with at least 10% of voting rights (Faccio, Lang, and Young, 2001; Maury and Pajuste, 2005), and zero otherwise. Second, to capture the barning power of MLS, following the prior literature (Mishra, 2011; Attig, El Ghoul, Guedhami, and Rizeanu, 2013), we first calculate *Vote231* defined as the ratio of total voting rights of the second and third largest shareholders to the voting rights of the largest shareholder. Then, we create an indicator variable *HighPower* that is set to one if *Vote231* is above the sample median and zero otherwise. The variables of interest are the interaction terms *PledgeDum*×*MLSDum*, *PledgeRatio*×*MLSDum*, *PledgeDum*×*HighPower*, *PledgeRatio*×*HighPower*.

The estimated coefficient on *PledgeDum* × *MLSDum* in column (1) suggests that the presence of share pledging in firms with the presence of MLS results in a significantly lower tunneling level than does that in firms without the presence of MLS. Further, the joint significance of *PledgeDum* and the interaction term *PledgeDum* × *MLSDum* is statistically significant at 1% level. In terms of the economic significance, the estimated coefficient on *PledgeDum* × *MLSDum* implies that, relative to the presence of share pledging in firms without the presence of MLS, the presence of share pledging in firms with the presence of MLS leads to a 0.070% lower tunnelling level, which translates into a 2.6% (0.070%/2.745%) decrease in tunnelling relative to the sample mean. In addition, the estimated coefficient on *PledgeRatio*× *MLSDum* in column (2) suggests that the share pledging ratio in firms with the presence of MLS impose a weaker impact on tunneling than does that in firms without the presence of MLS. The estimated coefficients on *PledgeDum* × *HighPower* and *PledgeRatio*× *HighPower* in column (3) and (4) show the same pattern, suggesting that the share pledging ratio in firms with strong bargaining power of MLS imposes a weaker impact on tunneling than does that in firms with weak bargaining power of MLS.

Overall, these results suggest that the presence and bargaining power of MLS helps mitigate tunnelling activities induced by share pledging, which is consistent with the findings in the prior literature that MLS exert effective monitoring on controllers and can restrict the extraction of private benefit by controllers (Pagano and Roell, 1998; Faccio, Lang, and Young, 2001; Maury and Pajuste,2005; Mishra, 2011; Attig, El Ghoul, Guedhami, and Rizeanu, 2013; Jiang and Kim, 2015). Thus, the results reported in Table 6 confirm H4a.

Table 2. 6

Multiple large shareholders, share pledging and tunnelling

This table reports the impact of how governance role affects the association between share pledging and tunnelling. All the model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	Tunnelling	*Tunnelling*	*Tunnelling*	*Tunnelling*
	(1)	(2)	(3)	(4)
PledgeDum	0.262***		0.303**	
	(3.039)		(2.128)	

PledgeDum × MLSDum	-0.070**			
	(-2.352)			
PledgeRatio		0.015**		0.014***
		(2.519)		(4.216)
PledgeRatio × MLSDum		-0.008***		
		(-2.761)		
MLSDum	-0.275**	-0.300***		
	(-2.579)	(-3.050)		
PledgeDum × HighPower			-0.197*	
			(-1.919)	
PledgeRatio × HighPower				-0.013*
				(-1.861)
HighPower			-0.527*	-0.141*
			(-1.925)	(-1.816)
Size	-0.902***	-0.895***	-0.907***	-0.899***
	(-8.314)	(-8.216)	(-8.343)	(-26.774)
Lev	0.050***	0.050***	0.051***	0.050***
	(11.393)	(11.268)	(11.408)	(28.049)
ROA	-0.083***	-0.083***	-0.084***	-0.084***
	(-5.192)	(-5.110)	(-5.270)	(-14.185)
Growth	0.001	0.001	0.001	0.001*
	(1.394)	(1.441)	(1.278)	(1.887)
BoardSize	-0.187	-0.174	-0.205	-0.191
	(-0.587)	(-0.545)	(-0.633)	(-1.124)
IndSize	0.017	0.017	0.016	0.016***
	(1.562)	(1.615)	(1.482)	(2.676)
Dual	-0.115	-0.108	-0.115	-0.106
	(-0.990)	(-0.925)	(-0.991)	(-1.518)
Big4	0.324	0.331	0.287	0.294**
	(1.605)	(1.635)	(1.404)	(2.167)
AgencyCost	0.145***	0.146***	0.145***	0.146***
	(3.504)	(3.568)	(3.506)	(13.162)
Top1	-0.033***	-0.035***	-0.032***	-0.034***
	(-9.003)	(-9.703)	(-7.262)	(-14.047)
Excess	0.005	0.004	0.004	0.003
	(0.631)	(0.485)	(0.585)	(0.811)
Institute	-0.053***	-0.053***	-0.051***	-0.051***
	(-5.511)	(-5.560)	(-5.278)	(-8.442)
NonSOE	-0.050	-0.020	-0.038	-0.002
	(-0.299)	(-0.116)	(-0.229)	(-0.031)
Group	0.225*	0.217	0.231*	0.221***
	(1.725)	(1.665)	(1.771)	(3.201)
_cons	25.611***	25.506***	25.704***	25.582***
	(11.968)	(11.895)	(11.869)	(28.831)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Observations	22,063	22,063	22,063	22,063
Adjusted-R^2	0.225	0.225	0.225	0.225
F-statistic (*PledgeDum(PledgeRatio)+ PledgeDum(PledgeRatio)× MLSDum*)	7.75***	7.28***		
F-statistic (*PledgeDum(PledgeRatio)+ PledgeDum(PledgeRatio)× HighPower*)			8.28***	25.54***

2.4.4.2 Analysts' coverage, share pledging and tunnelling

Analysts' coverage plays a substitute governance role in countries with weak investor protection (Sun, 2009). Given that the institutional environment for investor protection in Chinese capital market is still weak (Jiang and Kim, 2015), we expect that analysts' coverage is one of the import outside governance mechanisms. Table 2.7 examine whether the external governance mechanism, analysts'

coverage, restrains tunnelling induced by share pledging. We define analysts' coverage as the logarithm of the number of analysts following a firm in a given year, denoted by *AnalystCoverage*. Then, we create an indicator variable *HighCoverage* that is set to one if *AnalystCoverage* is above the sample median and zero otherwise. The variables of interest are the interaction terms *PledgeDum* × *HighCoverage, PledgeRatio* × *HighCoverage*.

The estimated coefficient on *PledgeDum* × *HighCoverage* in column (1) suggests that the presence of share pledging in firms with high analysts' coverage results in a significantly lower tunneling level than does that in firms with low analysts' coverage. Further, the joint significance of *PledgeDum* and the interaction term *PledgeDum* × *HighCoverage* is statistically significant at 1% level. In terms of the economic significance, estimated the coefficient on *PledgeDum* × *HighCoverage* implies that, relative to the presence of share pledging in firms with low analysts' coverage, the presence of share pledging in firms with high analysts' coverage leads to a 0.631% lower tunnelling level, which translates into a 23.0% (=0.631%/2.745%) decrease in tunnelling relative to the sample mean. In addition, the estimated coefficient on *PledgeRatio* × *HighCoverage* in column (2) suggests that the share pledging ratio in firms with high analysts' coverage imposes a weaker impact on tunneling than does that in firms with high analysts' coverage.

Overall, these results suggest that the analysts' coverage helps mitigate tunnelling activities induced by share pledging, which is consistent with the findings that analyst coverage plays an import monitoring role in insiders' extraction of private benefit (Sun, 2009). Thus, the results reported in Table 2.7 confirm H4b.

Table 2. 7

Analyst's coverage, share pledging and tunnelling

This table reports the impact of how analyst's coverage affects the association between share pledging and tunnelling. All the model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	Tunnelling	*Tunnelling*
	(1)	(2)
PledgeDum	0.682***	
	(4.356)	
PledgeDum × *HighCoverage*	-0.631***	
	(-4.036)	
PledgeRatio		0.014***
		(4.216)
PledgeRatio × *HighCoverage*		-0.013***
		(-2.612)
HighCoverage	-0.041	-0.141*
	(-0.388)	(-1.816)
Size	-0.868***	-0.899***
	(-7.703)	(-26.774)
Lev	0.050***	0.050***
	(11.466)	(28.049)
ROA	-0.079***	-0.084***
	(-4.712)	(-14.185)
Growth	0.001	0.001*
	(1.348)	(1.887)
BoardSize	-0.201	-0.191
	(-0.631)	(-1.124)
IndSize	0.015	0.016***
	(1.431)	(2.676)

Dual	-0.108	-0.106
	(-0.923)	(-1.518)
Big4	0.249	0.294**
	(1.223)	(2.167)
AgencyCost	0.148***	0.146***
	(3.620)	(13.162)
Top1	-0.031***	-0.034***
	(-8.904)	(-14.047)
Excess	0.005	0.003
	(0.608)	(0.811)
Institute	-0.045***	-0.051***
	(-4.591)	(-8.442)
NonSOE	-0.043	-0.002
	(-0.257)	(-0.031)
Group	0.220*	0.221***
	(1.697)	(3.201)
_cons	24.721***	25.582***
	(11.311)	(28.831)
Year	Yes	Yes
Industry	Yes	Yes
Observations	22,063	22,063
Adjusted-R^2	0.226	0.225
F-statistic (*PledgeDum(PledgeRatio)+ PledgeDum(PledgeRatio)× HighCoverage*)	9.60***	6.61***

2.4.4.3 Institutional environment, share pledging and tunnelling

In China, the institutional infrastructures, such as law enforcement, capital market development, product market completion in the eastern provinces, are better than those in the western provinces. To examine how institutional environment affects the association between share pledging and tunnelling, we employ the marketization indexes constructed by the National Economic Research Institute (NERI) to measure the quality of regional institutional environment across provinces (Wang, Fan, and Yu, 2016). NERI categorizes 19 indicators of institutional arrangements and policies into five main areas related to market-oriented reforms, which include: (1) size of government in the regional economy, (2) growth of the non-state sectors, (3) product market development, (4) factor market development, (5) service sector and legal framework development. Then, NERI utilizes a weighting scheme to construct a broad index to measure the overall marketization and institutional environment. We denote this index as *MarketizationIndex*, which measures a particular province's institutional environment relative other provinces and use a 0 to 10 scale for each province. A larger value of *MarketizationIndex* indicates a stronger institutional environment. Finally, we create an indicator variable *StrongIE* that is set to one if *MarketizationIndex* is below the sample median and zero otherwise. The variables of interest are the interaction terms including *PledgeDum* × *StrongIE*, *PledgeRatio* × *StrongIE*.

Table 2.8 presents the results that examine whether the external governance mechanism, institutional environment, is effective to restrain tunnelling induced by share pledging. The estimated coefficient on *PledgeDum* × *StrongIE* in column (1) suggests that the presence of share pledging in firms with strong institutional environment results in a significantly lower tunneling level than does that in firms with weak institutional environment. Further, the joint significance of *PledgeDum* and the interaction term *PledgeDum* × *StrongIE* is statistically significant at 1% level. In terms of the economic

significance, the estimated coefficient on *PledgeDum* × *StrongIE* implies that, relative to the presence of share pledging in firms with weak institutional environment, the presence of share pledging in firms with strong institutional environment leads to a 0.252% lower tunnelling level, which translate into a 9.2% (=0.252%/2.745%) decrease in tunnelling relative to the sample mean. In addition, the estimated coefficient on *PledgeRatio*× *StrongIE* in column (2) suggests that the share pledging ratio in firms with strong institutional environment imposes a weaker impact on tunneling than does that in firms with weak institutional environment.

Overall, these results suggest that stronger institutional environment helps mitigate tunnelling activities induced by controlling shareholder share pledging. Thus, the results reported in Table 2.8 confirm H4c.

Table 2. 8

Institutional environment, share pledging and tunnelling

This table reports the impact of how analyst's coverage affects the association between share pledging and tunnelling. All the model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	Tunnelling	*Tunnelling*
	(1)	(2)
PledgeDum	0.513***	
	(5.779)	
PledgeDum × SrongIE	-0.252**	
	(-2.157)	
PledgeRatio		0.024***
		(2.799)
PledgeRatio × SrongIE		-0.013**
		(-2.449)
SrongIE	-0.306***	-0.304*
	(-4.052)	(-1.981)
Size	-0.894***	-0.889***
	(-26.610)	(-8.342)
Lev	0.050***	0.050***
	(28.320)	(11.249)
ROA	-0.083***	-0.082***
	(-14.117)	(-5.165)
Growth	0.001*	0.001
	(1.886)	(1.377)
BoardSize	-0.232	-0.216
	(-1.369)	(-0.675)
IndSize	0.015**	0.015
	(2.416)	(1.401)
Dual	-0.099	-0.090
	(-1.408)	(-0.769)
Big4	0.325**	0.330
	(2.401)	(1.557)
AgencyCost	0.151***	0.152***
	(13.514)	(3.613)
Top1	-0.030***	-0.032***
	(-14.620)	(-9.480)
Excess	0.004	0.003
	(1.006)	(0.399)
Institute	-0.052***	-0.052***
	(-8.548)	(-5.366)
NonSOE	-0.096	-0.058
	(-1.229)	(-0.344)
Group	0.235***	0.227*
	(3.425)	(1.751)
_cons	25.362***	25.260***
	(28.622)	(11.986)

Year	Yes	Yes
Industry	Yes	Yes
Observations	22,063	22,063
Adjusted-R^2	0.226	0.226
F-statistic (*PledgeDum(PledgeRatio)+ PledgeDum(PledgeRatio)× SrongIE*)	19.55***	6.03***

2.4.5 Additional analysis

2.4.5.1 The valuation effect of shareholder share pledging

Given the findings so far, it is natural to ask whether the investors anticipate the tunnelling activities induced by controlling shareholder share pledging. Does the market penalize the firms with controlling shareholder share pledging? Prior literature argues that the market can at least partly price firm tunnelling. Bertrand, Mehta, and Mullainathan (2002) find that stock market recognizes controlling shareholder tunnelling and incorporate it into pricing. Cheung, Rau, Stouraitis, (2006), and Cheung, Jing, Lu, Rau, and Stouraitis (2009) document that there is a negative market reaction to the related party tractions that represent tunnelling conducted by controlling shareholders. Thus, we next turn our attention to the valuation effect of controlling shareholder share pledging. According to the mandatory disclosure requirement of CSRC, when any large shareholder's pledged shares exceed 5% of a listed firm's total shares, the listed firm has an obligation to make an interim public announcement to disclose such share pledging activity. We obtain the data sets of interim announcements of large shareholder share pledging and daily returns from CSMAR data base. This data sets, over the years 2003 to 2017, allow us to make an event study to investigate how investors react to the share pledging activities of shareholders, especially of the controlling shareholders. Because some firms are involved with making more than one share pledging announcements during a short time (such as within one month), we delete the announcements if a firm has more than one share pledging announcements within 120 trading days. We also delete the announcements with no data of stock returns on the announcement date due to data missing or trading suspension. If the announcement was made after the close of trading, we choose the next trading day as the announcement date. This screening process results in a final sample of 4,886 valid events (announcements).

We use the standard event-study methodology to measure the market reaction to the share pledging of large shareholders. We compute the ex post abnormal returns (AR) as following:

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \quad (2)$$

Where R_{it} and R_{mt} represent the daily returns of a listed firm engaged in share pledging transaction i (i = 1…N) at time t and the daily market index return at time t, respectively. We use the Aggregate A Share Index return as the market index return. The coefficients, $\hat{\alpha}_i$ and $\hat{\beta}_i$, are the OLS estimators of the market model regression. We compute the AR_{it} by estimating $\hat{\alpha}_i$ and $\hat{\beta}_i$ from the OLS regression using 90 daily returns beginning with day t = -110 and ending with day t = -21 relative to the announcement day t = 0.

We then construct the cumulative abnormal returns (CARs) over any time interval, between dates T_1 and T_2 as following:

$$CAR_i(T_1, T_2) = \sum_{t=T_1}^{T_2} AR_{it} \quad (3)$$

Panel A of Table 2.9 reports CAR*s* estimated by using the whole sample of share pledging events and subsamples of controlling shareholders and other shareholders. The results in column (1) and (2) show a clear pattern that the average CARs estimated by different event windows in full sample and the subsample of controlling shareholder share pledging are negative and statistically significant above 5% level (except for CAR [-1, +1] in column (1)). The results in column (3) show that the CARs are not significantly different from zero. These results suggest that, on average, the market can anticipate the tunnelling behaviour induced by controlling shareholder share pledging. These findings lend more supports to our hypothesis that controlling shareholder share pledging exacerbates firm tunnelling.

Panel B of Table 2.9 reports CARs estimated by using the subsamples divided by the investing directions of the share pledging loans. The results in column (1) show a clear pattern that the average CARs estimated by different event windows in the subsamples of pledgors themselves (the share pledging loans are invested into the pledgers themselves) are negative and statistically significant above 10% level. The results in column (2) show that the average CARs estimated by different event windows in the subsamples of related parties (the share pledging loans are invested into pledgors' related parties) are negative and are statistically significant to some extent. However, the results in column (3) show that the average CARs estimated by different event windows in the subsamples of listed firms (the share pledging loans are invested into listed firms) are not significantly different from zero. These results suggest that, when pledgors invest the loans into themselves or their related parties, investors expect that these large shareholders have strong incentives to tunnel the listed firms. The findings in Panel B are consistent with those documented by Singh (2018), who finds that controlling shareholder share pledging for personal loans destroy firm value, and controlling shareholder share pledging for firm loans increase firm value.

To further explore the valuation effect of controlling shareholder share pledging, we rerun the base line model by using CARs estimated by different event windows as dependent variables. Panel C of Table 2.9 reports the multi-regression results. The results in column (1), (3), and (5) show that the presence of controlling shareholder share pledging exerts a significantly negative impact on CARs, indicating that the market responds negatively when the firms announce share pledging conducted by controlling shareholders. Further, the results in columns (2), (4), (6) show that the more shares that controlling shareholders pledge, the more negative response that the market makes. These results suggest that controlling shareholder share pledging provides controlling shareholders with incentives to tunnel listed firms which in turn induce a negative market response. Overall, the results on Table 2.9 lend further support for our main hypothesis.

Table 2. 9

The valuation effect of large shareholder share pledging

Panel A CARs for different types of pledgors

This Panel reports CARs estimated by using the whole sample of all share pledging events and subsamples of controlling shareholders and other shareholders. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	All Shareholder Share Pledging	Controlling Shareholder Share Pledging	Other Shareholder Share Pledging
	n= 4,886	n=3,413	n=1,473
	(1)	(2)	(3)
CAR [-1, +1] (%)	-0.115	-0.209**	0.103
	(-1.234)	(-2.398)	(0.440)
CAR [-3, +3] (%)	-0.324**	-0.487***	0.053
	(-2.487)	(-3.461)	(0.188)
CAR [-5, +5] (%)	-0.437***	-0.587***	-0.087
	(-2.745)	(-3.282)	(-0.266)

Panel B CARs for different investing directions of the controlling shareholder share pledging loans

This Panel reports CARs estimated by using the subsamples divided by the investing directions of the share pledging loans. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	Pledgors Themselves	Related Parties	List Firms
	n=4,348	n=313	n=225
	(1)	(2)	(3)
CAR [-1, +1] (%)	-0.153*	-0.407	0.627
	(-1.960)	(-1.411)	(0.665)
CAR [-3, +3] (%)	-0.363***	-1.216**	0.856
	(-2.912)	(-2.576)	(0.845)
CAR [-5, +5] (%)	-0.507***	-0.747	0.770
	(-3.183)	(-1.205)	(0.748)

Panel C Regressions of CARs for share pledging announcements

This Panel presents the regression of CARs estimated by different event windows on controlling shareholder share pledging. The dependent variables are the CARs estimated by using 1-day, 3-day, and 5-day event window. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	CAR [-1, +1]	*CAR* [-1, +1]	*CAR* [-3, +3]	*CAR* [-3, +3]	*CAR* [-5, +5]	*CAR* [-5, +5]
	(1)	(2)	(3)	(4)	(5)	(6)
PledgeDum	-0.164***		-0.202***		-0.234***	
	(-2.765)		(-2.844)		(-2.716)	
PledgeRatio		-0.017**		-0.029**		-0.036**
		(-2.062)		(-2.305)		(-2.162)
Size	-0.073	-0.079	-0.155	-0.165	-0.247	-0.258
	(-0.582)	(-0.614)	(-1.237)	(-1.264)	(-1.647)	(-1.649)
Lev	-0.005	-0.004	0.001	0.003	-0.002	0.000
	(-0.626)	(-0.482)	(0.089)	(0.326)	(-0.251)	(0.052)
ROA	-0.007	-0.011	-0.004	-0.009	-0.012	-0.019
	(-0.356)	(-0.484)	(-0.180)	(-0.427)	(-0.487)	(-0.768)
Growth	0.003	0.003	0.004	0.004	0.008**	0.008**
	(1.078)	(1.108)	(1.042)	(1.074)	(2.321)	(2.361)
BoardSize	0.449	0.396	0.354	0.261	0.969	0.850
	(0.846)	(0.757)	(0.534)	(0.397)	(1.412)	(1.232)
IndSize	0.004	0.002	0.006	0.002	0.010	0.006
	(0.147)	(0.075)	(0.211)	(0.079)	(0.410)	(0.226)
Dual	-0.332**	-0.326**	-0.518***	-0.509**	-0.586**	-0.575**
	(-2.298)	(-2.237)	(-2.671)	(-2.630)	(-2.228)	(-2.222)
Big4	-1.076	-1.077	-0.746	-0.751	-0.655	-0.665
	(-1.299)	(-1.322)	(-0.847)	(-0.859)	(-0.766)	(-0.780)
AgencyCost	0.023	0.018	0.045	0.037	0.014	0.003
	(0.664)	(0.506)	(0.990)	(0.782)	(0.308)	(0.064)
Top1	-0.011	-0.015*	-0.016	-0.024**	-0.018*	-0.027**
	(-1.379)	(-1.729)	(-1.598)	(-2.128)	(-1.814)	(-2.622)
Excess	-0.018*	-0.016	-0.011	-0.007	-0.010	-0.005
	(-1.703)	(-1.482)	(-0.682)	(-0.411)	(-0.412)	(-0.187)
Institute	0.012	0.013	0.011	0.014	0.001	0.005
	(0.586)	(0.647)	(0.466)	(0.574)	(0.051)	(0.215)
NonSOE	-0.064	-0.179	0.131	-0.080	-0.206	-0.483
	(-0.166)	(-0.498)	(0.270)	(-0.175)	(-0.428)	(-1.100)
Group	0.136	0.173	0.131	0.202	0.227	0.323
	(0.546)	(0.724)	(0.356)	(0.571)	(0.474)	(0.689)
_cons	-0.264	0.039	1.871	2.413	2.734	3.436

	(-0.093)	(0.013)	(0.537)	(0.682)	(0.684)	(0.851)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,884	3,88	3,884	3,884	3,884	3,884
Adjusted-R^2	0.020	0.021	0.023	0.025	0.026	0.028

2.4.5.2 The impact of share pledging on firm performance

Given that share pledging provides controlling shareholders with incentives to tunnel the listed firms, we therefore expect that share pledging would impair firm performance. We examine the relation between firm performance and share pledging by estimating the following model:

$$ROA_{i,t}(TobinQ_{i,t}) = \alpha_0 + \alpha_1 PledgeDum_{i,t-1}(PledgeRatio_{i,t-1}) + \alpha_2 Controls_{i,t-1} + Year + Industry + \varepsilon_{i,t-1} \quad (4)$$

The dependent variables in the left side of the model are return on assets (*ROA*), and Tobin's q ratio (*TobinQ*). The independent variables in the right side of the model are the lags of *PledgeDum* and *PledgeRatio*. We control for the lags of the control variables used in the base line model in Table 2. We also control year and industry fixed effects. Since share pledging exacerbates firm tunnelling, we expect that share pledging impairs firm performance and hence that the coefficient α_1 is expected to be significantly negative.

Table 2.10 presents the results that how share pledging affects a firm's accounting and market performance. The results show that the estimated coefficients on $PledgeDum_{t-1}$ and $PledgeRatio_{t-1}$ are all negative and statistically significant above 1% level, which suggest that share pledging has a strong negative impact on firms' accounting and market performance. These results are consistent with our tunnelling story.

Table 2. 10
The effect of share pledging on firm performance
This table reports the results of how share pledging affects the listed firm's performance. All the model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	ROA_t	ROA_t	$TobinQ_t$	$TobinQ_t$
	(1)	(2)	(3)	(4)
$PledgeDum_{t-1}$	-0.508***		-1.343***	
	(-5.817)		(-5.583)	
$PledgeRatio_{t-1}$		-0.018***		-0.046***
		(-4.498)		(-4.283)
ROA_{t-1}	0.512***	0.512***		
	(25.518)	(25.741)		
$TobinQ_{t-1}$			0.320***	0.320***
			(13.427)	(13.446)
$LagSize_{t-1}$	0.216***	0.210***	0.842***	0.824***
	(3.265)	(3.182)	(4.795)	(4.693)
$Leverage_{t-1}$	-0.022***	-0.021***	-0.016*	-0.016*
	(-7.491)	(-7.527)	(-1.945)	(-1.875)
$Growth_{t-1}$	0.001	0.001	0.010***	0.010***
	(1.436)	(1.395)	(3.137)	(3.111)
$BoardSize_{t-1}$	0.167	0.157	0.467	0.443
	(0.633)	(0.601)	(0.680)	(0.657)
$IndSize_{t-1}$	-0.006	-0.006	-0.027	-0.028
	(-0.745)	(-0.801)	(-1.150)	(-1.203)
$Dual_{t-1}$	-0.073	-0.081	-0.211	-0.232
	(-0.892)	(-0.988)	(-1.013)	(-1.099)
$Big4_{t-1}$	0.382*	0.389*	0.911*	0.935*

	(1.861)	(1.916)	(1.698)	(1.773)
$AgencyCost_{t-1}$	0.213***	0.212***	0.491***	0.489***
	(9.869)	(9.818)	(8.565)	(8.483)
$Top1_{t-1}$	0.023***	0.025***	0.068***	0.073***
	(9.750)	(10.740)	(10.743)	(12.080)
$Excess_{t-1}$	-0.002	-0.002	-0.004	-0.002
	(-0.416)	(-0.278)	(-0.244)	(-0.116)
$Institute_{t-1}$	0.102***	0.101***	0.287***	0.286***
	(9.927)	(9.877)	(11.627)	(11.568)
$NonSOE_{t-1}$	-0.864***	-0.860***	-2.412***	-2.378***
	(-6.411)	(-6.270)	(-6.036)	(-6.038)
$Group_{t-1}$	-0.073	-0.077	-0.393	-0.411
	(-0.711)	(-0.751)	(-1.547)	(-1.600)
_cons	-5.050***	-4.936***	-19.299***	-19.016***
	(-3.166)	(-3.101)	(-4.705)	(-4.629)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Observations	18,057	18,057	18,057	18,057
Adjusted-R^2	0.414	0.413	0.218	0.217

2.5. Robustness tests

2.5.1 Addressing potential endogeneity

The preceding analyses provide evidences that share pledging is positively associated with tunnelling. There are two potential endogenous concerns regarding causality. First, there might be a reverse causality between share pledging and firm tunnelling. Firms with more severe tunnelling might be more likely to have share pledging because share pledging is an important tool for controlling shareholders to reclaim investment. Second, there might be some unobservable factors, for example the macro-economic changes, that affect both share pledging and firm tunnelling. To alleviate these endogenous concerns, we conduct the following tests: (1) adding additional fixed effects, (2) conducting propensity score matched sample analysis, (3) performing instrumental variables regressions.

2.5.1.1 Adding additional fixed effects and performing change analysis

To account for the potential unobservable omitted variables that might affect both share pledging and tunnelling, we first include additional firm fixed effect to account for time invariant heterogeneity across firms, and include industry-by-year and province-by-year fixed effects to account for the unobservable time variant heterogeneity across industries and the incorporation provinces in a given year. The results in Table 2.11 show that the estimated coefficients on the *PledgeDum* and *PledgeRatio* remain statistically significant at 10% level after including these additional fixed effects, suggesting that our main findings are not driven by the potential macro-economic changes in the incorporation provinces or trends in certain industries.

Table 2. 11
Including firm, industry-by-year and province-by-year fixed effects

This panel reruns the base line models in Table 2 by adding firm, industry-by-year and province-by-year fixed effects. All the model specifications include year, firm, industry-by-year, and province-by-year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at firm level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	Tunnelling	*Tunnelling*
	(1)	(2)
PledgeDum	0.133*	
	(1.806)	

PledgeRatio		0.005*
		(1.680)
Size	-0.973***	-0.970***
	(-16.315)	(-16.297)
Lev	0.040***	0.040***
	(17.095)	(17.059)
ROA	-0.032***	-0.031***
	(-5.296)	(-5.271)
Growth	-0.001**	-0.001**
	(-2.410)	(-2.363)
BoardSize	-0.030	-0.033
	(-0.128)	(-0.138)
IndSize	0.011	0.011
	(1.420)	(1.419)
Dual	0.226***	0.227***
	(2.642)	(2.653)
Big4	-0.556**	-0.556**
	(-2.529)	(-2.533)
AgencyCost	0.195***	0.196***
	(12.332)	(12.359)
Top1	-0.022***	-0.023***
	(-6.087)	(-6.270)
Excess	-0.014**	-0.014**
	(-2.261)	(-2.304)
Institute	-0.018***	-0.018***
	(-2.851)	(-2.866)
NonSOE	0.381**	0.388**
	(2.293)	(2.325)
Group	-0.196*	-0.195*
	(-1.743)	(-1.736)
_cons	27.520***	27.526***
	(8.377)	(8.378)
Year	Yes	Yes
Firm	Yes	Yes
Industry×Year	Yes	Yes
Province×Year	Yes	Yes
Observations	22,063	22,063
Adjusted-R^2	0.244	0.244

2.5.1.2 Conducting propensity score matched sample analysis

The choice of controlling shareholder pledging share might not be random, firms with and without share pledging may be systematically different. To mitigate the concern that our findings suffer from an omitted variable that is correlated both with tunnelling, we construct propensity score matched (PSM) samples to correct for any endogenous selection on observed variables (Rosenbaum and Rubin, 1983; Dehejia and Wahba, 2002).

To conduct PSM analysis, we first choose firm size (*Size*), leverage ratio (*Levereage*), return on assets (*ROA*), sales growth rate (*Growth*), board size (*BoardSize*), the proportion of independent directors (*IndSize*), CEO and board chairman duality (*Dual*), international auditors (*Big4*), agency cost (*AgencyCost*), holding percentage of the largest shareholder (*Top1*), holding percentage of institutional investors (Institute), non-state ownership (*NonSOE*), group affiliation (*Group*), stock turnover rate (*Turnover*), stock return adjusted by industry (*AdjReturn*) and the standard deviation of stock return (*StdReturn*) as matching variables[1]. Using Logit Regression model, we regress the indicator variable

[1] Except for the control variables used in the base line models, we also choose stock turnover rate (*Turnover*), stock return adjusted by industry (*AdjReturn*) and the standard deviation of stock return (*StdReturn*) as matching variables, since the anecdotal evidence suggests that financial

PledgeDum on the matching variables and estimate the probability (i.e., the propensity score) that controlling shareholders in the listed firms pledge shares to for loans. Column (1) in Panel A of Table 12 reports the results of logistic regression. Next, we match each firm with share pledging to a firm without share pledging with the closest propensity score. We match without replacement and require the propensity scores for each matched pair within ±1% of each other.[1] The resulting samples consist of 5,860 firm-year observations with share pledging matched to 5,860 firm-year observations without controlling shareholder share pledging. Then, we estimate the base line models by using the PSM samples.

Following Fang, Tian, and Tice (2014), and Dhaliwal, Judd, Serfling, and Shaikh (2016), we perform several diagnostic tests to validate our matching procedure. If the matching procedure is successful, we should find: (1) the matching variables in the matched samples do not explain any variation in the likelihood that controlling shareholders in the listed firms pledge their shares for loans, (2) the difference in the propensity scores of firms with share pledging and firms without share pledging is negligible, (3) the means of the matching variables are not statistically different between firms with and without controlling shareholder share pledging.

We test these predictions in three ways. First, we rerun the same model specification as in column (1) of Panel A in Table 2.12 for the matched samples and report the results in column (2). The results show that all of the matching variables are not statistically significant, and the pseudo-R^2 drops down to 0.1%, indicating that the matching variables in the matched samples do not explain any variation in the likelihood that controlling shareholder pledge their shares for loans. Second, we examine the difference of the propensity scores between firms with and without share pledging in the PSM samples and tabulate the results in Panel B of Table 2.12. The results show that the mean difference is insignificantly less than 0.003 and therefore trivial. Third, we compare the mean value of matching variables between firms with and without share pledging in the PSM samples. Panel C report the univariate tests. The results show that the matching variables are not significantly different across firms with and without share pledging in the PSM samples. Taking together, these diagnostic tests suggest that our matching procedure are successful.

Panel D reruns the base line models by using the PSM samples. The results show that firms with share pledging have a higher level of tunnelling, which is consistent with the findings documented in Table 2.3.

Table 2. 12
Propensity score matched sample analysis

This table reports the results of how share pledging affects tunnelling by using PSM sample. All the model specifications in Panel A and D include industry and year fixed effects. In Panel A, the robust z-statistics are reported in parenthesis. In Panel D, the robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

institutions are more willing to accept stocks with high liquidity and stable returns as collaterals. Thus, stock turnover rate, stock return and the standard deviation of stock return are likely to be related to the probability that controlling shareholders pledge their shares for loans.

[1] We use the ±1% cut-off so that the matched firms are very similar. We also use ±0.5%, ±2.5%, ±5% as cut-off, the results are consistent.

Panel A Pre-match propensity score regression and post-match diagnostic regression

	PledgeDum	*PledgeDum*
	Pre-match regression	Post-match regression
	(1)	(2)
Size	0.022	0.033
	(1.039)	(1.586)
Leverage	0.016***	-0.001
	(14.254)	(-0.944)
ROA	-0.033***	0.000
	(-9.076)	(0.001)
Growth	0.000	0.000
	(1.572)	(0.014)
BoardSize	-0.242**	0.029
	(-2.264)	(0.249)
IndSize	-0.002	-0.001
	(-0.570)	(-0.164)
Dual	0.081**	-0.049
	(2.042)	(-1.131)
Big4	-0.663***	-0.107
	(-7.129)	(-0.968)
AgencyCost	-0.037***	0.011
	(-5.385)	(1.600)
Top1	0.004***	0.001
	(2.868)	(0.904)
Excess	0.008***	-0.003
	(3.284)	(-1.264)
Institute	0.017***	-0.000
	(4.528)	(-0.107)
NonSOE	-1.951***	0.014
	(-42.114)	(0.272)
Group	0.546***	-0.118***
	(13.260)	(-2.645)
TurnOver	0.001	0.003
	(0.124)	(0.567)
AdjRtrn	0.059	-0.010
	(1.486)	(-0.241)
StdReturn	0.661*	0.118
	(1.778)	(0.360)
_cons	-1.826***	-0.734
	(-3.018)	(-1.395)
Year	Yes	Yes
Industry	Yes	Yes
Observations	21,573	11,720
Pseudo R^2	0.189	0.001

Panel B Estimated propensity score distribution for the PSM samples

	N	mean	sd	min	P25	P50	P75	max
PledgeDum=0	5,860	0.416	0.182	0.035	0.034	0.444	0.556	0.858
PledgeDum=1	5,860	0.413	0.179	0.035	0.034	0.444	0.547	0.850
Mean Difference	--	0.003	--	--	--	--	--	--
T-value	--	(0.970)	--	--	--	--	--	--

Panel C Mean differences of the matching variables for the PSM samples

	PledgeDum=0 (obs. 5,860)	*PledgeDum*=1 (obs. 5,860)	Difference	T-value
	Mean	Mean		
	(1)	(2)	(3) = (1) - (2)	(4)
Size	21.780	21.789	-0.009	-0.404
Leverage	44.187	43.744	0.443	1.157
ROA	3.981	4.040	-0.059	-0.583
Growth	23.652	23.705	-0.053	-0.046
BoardSize	2.138	2.138	0.000	0.066
IndSize	37.126	37.136	-0.010	-0.106
Dual	0.276	0.273	0.003	0.373
Big4	0.034	0.0316	0.002	0.828
AgencyCost	4.735	4.813	-0.078	-1.435
Top1	34.364	34.403	-0.039	-0.146
Excess	5.635	5.628	0.007	0.160
Institute	4.280	4.292	-0.012	-0.136

NonSOE	0.290	0.287	0.003	0.347
Group	0.600	0.602	0.002	0.120
TurnOver	5.721	5.791	-0.070	-0.981
AdjRtrn	0.004	0.004	0.000	0.055
StdRet	0.142	0.143	-0.001	-0.626

Panel D Regression results of the base line models by using PSM samples

	Tunneling	*Tunneling*
	(1)	(2)
PledgeDum	0.487***	
	(5.024)	
PledgeRatio		0.022***
		(4.891)
Size	-0.962***	-0.956***
	(-7.177)	(-7.193)
Leverage	0.055***	0.054***
	(9.407)	(9.321)
ROA	-0.076***	-0.074***
	(-4.553)	(-4.393)
Growth	0.000	0.000
	(0.197)	(0.261)
BoardSize	-0.505	-0.465
	(-1.348)	(-1.251)
IndSize	0.007	0.008
	(0.539)	(0.598)
Dual	0.015	0.020
	(0.112)	(0.154)
Big4	0.622*	0.643*
	(1.826)	(1.905)
AgencyCost	0.100**	0.102**
	(2.354)	(2.423)
Top1	-0.031***	-0.035***
	(-7.167)	(-7.929)
Excess	0.006	0.005
	(0.779)	(0.624)
Institute	-0.050***	-0.050***
	(-4.337)	(-4.351)
NonSOE	-0.232	-0.133
	(-1.060)	(-0.586)
Group	0.384***	0.362***
	(2.995)	(2.839)
_cons	27.961***	27.841***
	(10.287)	(10.279)
Year	Yes	Yes
Industry	Yes	Yes
Observations	11,720	11,720
Adjusted-R^2	0.236	0.237

2.5.1.3 Instrumental variable regressions

While the previous analysis helps alleviate the endogeneity concerns, it still possible that the endogeneity arising from the omitted variable remains. For instance, we are unable to observe the macro economic factors, for example the business cycles, which possibly affect share pledging and tunneling simultaneously. Thus, we next examine the robustness of our findings by using instrumental variables approach.

Instrumental variables must satisfy two conditions to be consider valid instruments. First, the relevance condition requires that the instruments are correlated with our measures of share pledging (*PledgeDum*, *PledgeRatio*) after controlling for the set of control variables in our base line models. Second, the exclusion restriction requires that the instruments are correlated with tunneling only through

their correlation with measures of share pledging after controlling for the set of control variables. According to these two conditions, we select the natural logarithm of the number of financial institutions (*FinaInst*) located in a firm's incorporation province as an instrumental variable. The controlling shareholders of listed firms pledge shares to financial institutions such as commercial banks, security companies, funds, trust companies, assets management companies, which are qualified pledgees. In the area where a listed firm is located, larger number of qualified pledgees provides more availabilities for controlling shareholder to take share pledging loans. Thus, the number of qualified pledgees is positively related to share pledging activities in the same area. Meanwhile, there are no theories or empirical evidences show that the number of qualified pledgees is directly related to tunnelling conducted by controlling shareholders. Therefore, these two properties of *FinaInst* make it an ideal instrumental variable.

Table 2.13 presents the results from instrumental variable regression by using two stage least square method (2SLS). According to the above arguments, we expect that *FinaInst* is positively related to *PledgeDum* and *PledgeRatio*. The first stage results of 2SLS in columns (1) and (2) show that the estimated coefficients on of *FinaInst* are significantly positive at 1% and 5% level, respectively, indicating that the instrumental variable is positively related to the endogenous variable and suggesting that the selected instrumental variable meets the relevance condition. Further, we perform various tests, the results suggest that our selected instrumental variables are valid. Specifically, the Dubin-Wu-Hausman test rejects the null hypothesis that our share pledging measures are exogenous. The high *F*-statistics and partial R^2 of our instruments imply that our results do not suffer from the problem of weak instruments. Finally, the second stage results in columns (3) and (4) show that the estimated coefficients on *PledgeDum* and *PledgeRatio* are significantly positive at 1% and 5% level, respectively, indicating that greater share pledging casually increases tunneling conducted by controlling shareholders. Thus, the results in Table 2.13 show that, after controlling for endogeneity, our main results still hold.

Table 2. 13
Results from 2SLS method
This table reports the results of how share pledging affects tunnelling by using an instrumental variable approach. All model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	PledgeDum	*PledgeRatio*	*Tunnelling*	*Tunnelling*
	First Stage	First Stage	Second Stage	Second Stage
	(1)	(2)	(3)	(4)
FinaInst	0.020***	0.303**		
	(3.252)	(2.540)		
PledgeDum			6.641***	
			(2.675)	
PledgeRatio				0.445**
				(2.215)
Size	0.016***	0.031	-0.281***	-0.374***
	(4.009)	(0.409)	(-5.478)	(-9.449)
Leverage	0.003***	0.062***	0.044***	0.055***
	(12.651)	(15.730)	(6.666)	(4.348)
ROA	-0.013***	-0.309***	-0.130***	-0.181***
	(-12.732)	(-15.647)	(-3.887)	(-2.880)
Growth	0.001***	0.011***	0.002	0.002
	(5.515)	(4.208)	(1.049)	(0.839)

BoardSize	-0.041	-1.322***	-0.674***	-0.986***
	(-1.574)	(-2.625)	(-2.867)	(-2.687)
IndSize	-0.015	-0.531	0.241	0.108
	(-0.494)	(-0.887)	(0.944)	(0.333)
Dual	0.019***	0.111	0.044	-0.032
	(2.607)	(0.806)	(0.581)	(-0.429)
Big4	-0.069***	-1.446***	-0.698***	-0.882***
	(-5.047)	(-5.516)	(-3.313)	(-2.689)
AgencyCost	-0.027***	-0.436***	-0.220***	-0.233***
	(-12.955)	(-10.863)	(-3.436)	(-2.806)
Top1	0.001***	0.081***	-0.013***	0.016
	(4.269)	(17.350)	(-4.065)	(0.986)
Excess	0.002***	0.070***	0.015***	0.035**
	(3.747)	(7.962)	(2.626)	(2.341)
Institute	0.003***	0.076***	-0.008	0.004
	(3.987)	(4.933)	(-0.777)	(0.254)
NonSOE	-0.384***	-7.996***	-2.582***	-3.588**
	(-50.168)	(-54.639)	(-2.688)	(-2.224)
Group	0.100***	2.186***	0.809***	1.119**
	(14.063)	(16.135)	(3.182)	(2.517)
_cons	-0.091	3.423*	14.376***	16.503***
	(-0.843)	(1.655)	(17.956)	(11.090)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Observations	22,062	22,062	22,062	22,062
Adjusted-R^2	0.228	0.238	0.049	0.051
Test of endogeneity, weak instruments				
DWH *F*-statistics	28.01 ($p < 0.000$)	27.93 ($p < 0.000$)		
F-statistics	61.92 ($p < 0.000$)	65.43 ($p < 0.000$)		
Partial R^2	0.220	0.199		

2.5.2 Using alternative samples

Prior to 2005, approximate two thirds of the stocks in Chinese stock market are non-tradable shares (NTS). In 2005, the China Securities Regulatory Commission (CSRC) announced a reform aiming at eliminating NTS. By the end of 2007, the total market value of the firms completed the reform accounts for 97% of the total Chinese A-share market capitalization (Li, Wang, Cheung, and Jiang, 2011). After the reform, the pre-reform non-tradable shares can be traded the stock market, which may lead to a substantial increase in the amount of shares that controlling shareholder could pledge for loans. Thus, our main results may be affected by the Split Share Structure Reform. In addition, in the year 2006, the Ministry of Finance of the People's Republic of China issued new version of Accounting Standards for Business, which is put into practice in the year 2007. The financial data of listed firms is quite different under the old and new version of Accounting Standards for Business. To rule out the impact of Split Share Structure Reform and accounting standards changes, we restrict the samples after the year 2007. Table 2.14 presents results from the samples of year 2007-2017. The results in column (1) and (2) show that the coefficients of *PledgeDum* and *PledgeRatio* are both positive and statistically significant at 1% level, which is consistent with the results reported in base line model in table 2.3.

Table 2. 14
Results from the samples after year 2007

This table reports the impact of share pledging on tunnelling by using the subsamples after 2007. All the model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and are calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	Tunneling	*Tunneling*
	(1)	(2)
PledgeDum	0.260***	
	(3.171)	
PledgeRatio		0.011***
		(2.661)
Size	-0.903***	-0.899***
	(-7.898)	(-7.842)
Leverage	0.049***	0.048***
	(11.645)	(11.682)
ROA	-0.047***	-0.047***
	(-3.358)	(-3.315)
Growth	0.001	0.001
	(1.540)	(1.576)
BoardSize	-0.002	-0.003
	(-0.306)	(-0.378)
IndSize	0.092	0.101
	(0.284)	(0.310)
Dual	0.021**	0.022**
	(2.264)	(2.317)
Big4	-0.140	-0.135
	(-1.434)	(-1.376)
AgencyCost	0.390**	0.392**
	(2.204)	(2.216)
Top1	0.100***	0.101***
	(2.814)	(2.855)
Excess	-0.032***	-0.033***
	(-8.754)	(-9.213)
Institute	-0.041***	-0.041***
	(-4.569)	(-4.591)
NonSOE	-0.017	-0.005
	(-0.112)	(-0.032)
Group	0.336**	0.332**
	(2.493)	(2.472)
_cons	22.801***	22.737***
	(9.911)	(9.879)
Year	Yes	Yes
Industry	Yes	Yes
Observations	19,773	19,773
Adjusted-R^2	0.191	0.191

2.5.3 Using alternative dependent variables

Following prior studies (e.,g., Cheung, Rau, Stouraitis, 2006; Cheung, Jing, Lu, Rau, and Stouraitis, 2009; Liu and Tian, 2012), we calculate the cumulative abnormal returns (CARs) around the announcement of RPTs with the controlling shareholder, [1] the smaller value of CARs are more likely associated with the presence of the value-destroying tunneling activities conducted by controlling shareholder.[2]

The results in Table 2.15 show that the estimated coefficients on *PledgeDum* and *PledgeRatio* are all positive and statistically significant above 10% level, indicating that the market responses negatively to the RPTs with controlling shareholder when the controlling shareholder conducts share pledging.

[1] We only include the RPTs with controlling shareholder since we aim to identify the tunnelling activities conducted by the controlling shareholder. In addition, since that RPTs are disclosed in annual financial statements and interim announcements, we only include the interim announcements for RPTs with controlling shareholders to eliminate other factors that affect the market response to the announcements of annual financial statements (Liu and Tian, 2012).

[2] Following Cheung, Rau, Stouraitis (2006), we estimate the abnormal returns using the market model with an estimation period of 150 trading days spanning from day -180 to day -31 relative to the date of the RPTs announcement.

The results are consistent with those we document previously.

Table 2. 15
Results from alternative dependent variables

This table reports the impact of share pledging on tunnelling by using alternative tunneling proxies for tunnelling. All the model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and are calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	CAR [-1, +1] *of RPTs*	*CAR* [-1, +1] *of RPTs*	*CAR* [-3, +3] *of RPTs*	*CAR* [-3, +3] *of RPTs*	*CAR* [-5, +5] *of RPTs*	*CAR* [-5, +5] *of RPTs*
	(1)	(2)	(3)	(4)	(5)	(6)
PledgeDum	-0.111***		-0.082**		-0.063**	
	(-3.752)		(-2.022)		(-2.221)	
PledgeRatio		-0.021***		-0.018**		-0.019*
		(-3.992)		(-2.118)		(-1.805)
Size	0.219**	0.228**	0.177	0.183	0.051	0.057
	(2.127)	(2.204)	(1.138)	(1.184)	(0.310)	(0.359)
Lev	-0.009	-0.009	-0.017	-0.018*	-0.011	-0.012
	(-1.046)	(-1.152)	(-1.606)	(-1.690)	(-1.016)	(-1.114)
ROA	0.006	0.007	0.008	0.009	0.023	0.024
	(0.271)	(0.328)	(0.263)	(0.308)	(0.626)	(0.673)
Growth	0.000	0.000	0.000	0.000	-0.001	-0.001
	(0.049)	(0.054)	(0.081)	(0.090)	(-0.334)	(-0.325)
Excess	-0.011	-0.011	-0.023	-0.023	-0.036	-0.036
	(-0.721)	(-0.754)	(-1.153)	(-1.162)	(-1.499)	(-1.505)
BoardSize	-0.045	-0.030	0.517	0.524	1.416	1.424
	(-0.070)	(-0.046)	(0.634)	(0.639)	(1.484)	(1.489)
IndSize	0.005	0.006	0.016	0.016	0.021	0.021
	(0.271)	(0.302)	(0.594)	(0.587)	(0.689)	(0.677)
Dual	-0.087	-0.086	-0.272	-0.281	-0.109	-0.120
	(-0.246)	(-0.244)	(-0.628)	(-0.653)	(-0.253)	(-0.280)
Big4	-0.180	-0.160	-0.077	-0.056	-0.124	-0.100
	(-0.475)	(-0.417)	(-0.157)	(-0.113)	(-0.241)	(-0.192)
AgencyCost	-0.009	-0.005	0.039	0.043	0.051	0.056
	(-0.287)	(-0.161)	(0.842)	(0.908)	(0.967)	(1.038)
Top1	-0.009	-0.012	-0.018	-0.020	-0.023	-0.024
	(-0.975)	(-1.238)	(-1.562)	(-1.592)	(-1.546)	(-1.575)
Institute	0.042*	0.041*	0.100***	0.100***	0.112***	0.111***
	(1.932)	(1.890)	(3.465)	(3.442)	(3.285)	(3.282)
NonSOE	-0.279	-0.182	-0.626*	-0.502	-0.675	-0.529
	(-0.938)	(-0.617)	(-1.795)	(-1.327)	(-1.454)	(-1.032)
Group	-0.289	-0.309	-0.345	-0.369	0.062	0.035
	(-1.065)	(-1.127)	(-0.770)	(-0.817)	(0.116)	(0.064)
_cons	-2.425	-2.583	0.170	0.054	-1.243	-1.372
	(-1.026)	(-1.082)	(0.046)	(0.015)	(-0.316)	(-0.352)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,526	2,526	2,526	2,526	2,526	2,526
Adjusted-R^2	0.024	0.025	0.024	0.024	0.022	0.022

2.6 Conclusion

In Chinese capital market, shareholders can pledge their shares as collaterals to obtain loans from financial institutions. Minority shareholders and creditors who have no control over the firms will bear all the related risks, as we argue that share pledging enables the controlling shareholders to create deviation between control rights and cash flow rights, to reclaim investment in advance, and to transfers share price cash risk to the creditors and minority shareholders, which in turn provide the controlling shareholders with incentives to tunnel the listed firms.

In this study, we examine the association between share pledging and tunnelling. We find that share pledging is positively associated with tunnelling, suggesting that share pledging exacerbates

tunnelling. We also find that the exacerbating effect of share pledging on tunnelling is stronger in non-SOEs (group-affiliated firms) than that in SOEs (non-group-affiliated firms). However, better internal and external governance mechanisms help mitigate this exacerbating effect. Specifically, the positive association between share pledging and tunnelling is weaker in firms with stronger bargaining power of MLS, higher analysts' coverage, and stronger institutional environment. Further, we empirically show that, overall, there is a negative market reaction to share pledging activities. These results suggest that the market anticipates and penalizes the tunnelling activities induced by share pledging. Moreover, we find that share pledging is negatively associated with ROA and Tobin's q ratio, suggesting that share pledging impairs firm's accounting and market performance, which further supports our hypothesis that share pledging exacerbates tunnelling conducted by controlling shareholders.

Appendix A. Variable definition and Sources

Variables	Definition
Tunnelling measures	
Tunnelling	The ratio of other receivables to total assets (Lee, Jiang, and Yue, 2010; Liu and Tian, 2012; Jiang, Rao, and Yue, 2015)
CAR[-1,+1] *of RPTs*	Cumulative abnormal returns around the announcements of related party transactions with controlling shareholder from day −1 to day +1 (Cheung, Rau, Stouraitis, 2006; Cheung, Jing, Lu, Rau, and Stouraitis, 2009; Liu and Tian, 2012)
CAR[-3,+3] *of RPTs*	Cumulative abnormal returns around the announcements of related party transactions with controlling shareholder from day −3 to day +3
CAR[-5,+5] *of RPTs*	Cumulative abnormal returns around the announcements of related party transactions with controlling shareholder from day −5 to day +5
Controlling shareholder share pledging measures	
PledgeDum	A dummy variable that that equals one for a firm with controlling shareholder share pledging, and zero for a firm without controlling shareholder share pledging (Meng, Ni, and Zhang, 2018; Ouyang, Wang, and Chan, 2018; DeJong, Liao, and Xie, 2019)
PledgeRatio	The ratio of controlling shareholders' pledged shares to the total shares of a listed firm (Meng, Ni, and Zhang, 2018)
Market response of share pledging annoucements	
CAR[-1,+1]	Cumulative abnormal returns around the announcements of shareholder (including controlling shareholders and other shareholders) share pledging from day −1 to day +1
CAR[-3,+3]	Cumulative abnormal returns around the announcement of shareholder (including controlling shareholders and other shareholders) share pledging from day −3 to day +3
CAR[-5,+5]	Cumulative abnormal returns around the announcement of shareholder (including controlling shareholders and other shareholders) share pledging from day −5 to day +5
Firm level characteristics	
Size	The natural logarithm of total assets
Lev	The ratio of total liability to total assets
ROA	The return on assets defined as the ratio of net income to total assets
Growth	The growth rate of sales
TobinQ	The ratio of a firm's market value to total assets
Excess	The difference of the ultimate controlling shareholder's control rights and cash flow rights (Claessens, Djankov, and Lang, 2000)
BoardSize	The natural logarithm of the number of board directors
IndSize	The ratio of the number of independent directors to the number of total board directors
Dual	A dummy variable that equals one if the chairman of the board is also the CEO, and zero otherwise.
Big4	A dummy variable that equals one if the listed firms are audited by one of the big four auditing firms, and zero otherwise
AgencyCost	The ratio of the General and Administrative Expenses to the total assets
Top1	The holding percentage of the largest shareholders
Institute	The holding percentage of institutional investors

Non-SOEs	A dummy variable that equals one for non-state-owned enterprises, and zero for state-owned enterprise
Group	A dummy variable that equals one for group-affiliated firms, and zero for non-group-affiliated firms
MLSDum	A dummy variable that equals one if there exists at least one large shareholder (excluding the controlling shareholder) with at least 10% of voting rights, and zero otherwise (Faccio, Lang, and Young, 2001; Maury and Pajuste, 2005)
Vote231	The ratio of total voting rights of the second and third largest shareholders to the voting rights of the largest shareholders (Mishra, 2011; Attig, El Ghoul, Guedhami, and Rizeanu, 2013).
HighPower	A dummy variable that equals one if *Vote231* is above the sample median, and zero otherwise.
AnalystCoverage	The natural logarithm of the number of analysts that cover a listed firm.
HighCoverage	A dummy variable that equals one if *AnalystCoverage* is above the sample median, and zero otherwise
Province level characteristic	
MarketizationIndex	A proxy for a province's institutional environment relative other provinces that uses a 0 to 10 scale for each province (Wang, Fan, and Yu, 2016)
SrongIE	A dummy variable that equals one if *MarketizationIndex* is above the sample median, and zero otherwise.
FinaInst	The natural logarithm of the number of financial institutions located in a firm's incorporation province

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CHAPTER THREE

(Paper Two)

CONTROLLING SHAREHOLDER SHARE PLEDGING AND CORPORATE DISCLOSURE QUALITY: EVIDENCE FROM CHINA

Abstract

We investigate the effect of controlling shareholder share pledging (share pledging for short henceforth) on corporate disclosure quality. Using a large sample of share pledging in Chinese listed firms, we document a negative relation between share pledging and corporate disclosure quality. Moreover, this negative relation between share pledging and corporate disclosure quality in non-state-owned enterprises is stronger than that in state-owned enterprises. These results suggest that the margin call pressure and the related risk of losing control rights resulted from share pledging provides controlling shareholders with incentives to manipulate corporate disclosure. Further, we have explored the channels that controlling shareholders use to manipulate corporate disclosure. We show that share pledging leads to up-ward earnings management, optimistic management forecasts, and decreased conditional accounting conservatism. Finally, we find that, as corporate disclosure quality decreases, share pledging exerts an incremental negative effect on firm value.

Key Words: controlling shareholder share pledging, corporate disclosure quality, margin call pressure, earnings management, management forecasts, conditional accounting conservatism

3.1. Introduction

The practice that insiders pledge their shares of listed firms as collaterals to secure loans from financial institutions is pervasive across the global capital market. Although insider share pledging becomes pervasive and raises concerns among regulators and investors across globe[1], there is a lack of studies exploring its impact on corporate decisions. While extant studies have extensively investigated the valuation effect related to insider share pledging (Wang and Chou, 2018; Singh, 2018; Dou, Masulis, and Zein, 2019), to the best of our knowledge, only a few studies have investigated how controlling shareholder share pledging affects corporate decisions, such as corporate risk taking (Meng, Ni, and Zhang, 2018), earnings management (DeJong, Liao, and Xie, 2019). In this study, we fill this gap by exploring whether and how controlling shareholder share pledging (share pledging for short henceforth) affects corporate disclosure policy.

In order to secure loans, controlling shareholders tend to utilize their equity holdings as collaterals. The lenders, such as banks, stock brokerages, trust companies or assets management companies, are readily to accept such collaterals due to the high liquidity of the pledged shares. After pledging their shares, the controlling shareholders are subject to margin call pressure when there is negative shock to stock price (Chan, Chen, Hu, Liu, 2018). As long as the stock price drop to the maintenance margin ratio, an actual margin call will be initiated by the lender. If the pledger is unable to pledge more shares or pay down the loan, the lender has the right to conduct a forced sale which in turn results in the controlling shareholders to lose the control rights.

We consider two competing hypotheses that may explain the effect of the marginal call pressure on corporate disclosure behaviour, given that corporate insiders weight the potential benefits and losses of doing so. These two views predict opposite effects of share pledging. The first one is the *creditor monitoring view*. Asija, Marisetty, Rangan (2014) document that insider share pledging is negatively related to the likelihood of accrual-based earnings management, they argue that this is due to the increased creditor monitoring resulted from the share pledging contract. Meng, Ni, and Zhang (2018) find that share pledging constrains insiders' excessive risk-taking and improves the investment efficiency of risky projects. They argue that, on the one hand, pledged shares, serving as a type of loan collaterals, help creditors learn about firms' performance and restrict insiders' risk-shifting incentives. On the other hand, large stock price drops trigger margin calls from creditors, which leads insiders who have pledged shares to forgoing risky investment project in order to keep their control rights of the firm.

[1] According to a survey (Larcker and Tayan, 2010), about 25% of firms allow directors or executive officers to pledge shares in the United States during 2006-2009. Anderson and Puleo (2015) show that 26% of their randomly drawn samples from S&P publicly listed firms have insider share pledging. Singh (2018) reports that controlling shareholders of around half listed firms in India pledged their shares at least once from year 2009 to 2014. In china, according to data provided by CSMAR, controlling shareholder share pledging accounts for around 40% of Chinese non-financial listed firms. In August 2006, Securities and Exchange Commission (SEC) mandates footnote disclosure in firms' proxy statement of any outstanding shares pledged by directors or named executive officers. Given the pervasiveness and its potential issues regarding to corporate governance. The authorities across the global issues regulations for insider share pledging. Financial Services Authority (FSA) in U.K have implemented pledging disclosure requirements in January 2009, and have required that directors must get clearance from chairman or other designated director if they pledge shares of the firm. In January 2007, the Financial Supervisory Commission in Taiwan issued a new regulation that limits the amount of a bank loan backed by board members' pledged shares in listed firms to up to 60% of the market value of the pledged shares. In October 2011, the Legislative Yuan in Taiwan passed amendment to Article 197–1 of the Company Act, which prohibits the exercise of voting rights of "excessive pledged shares", defined as those that exceed half of the shares held by a director on election. In January 2009, the Securities Exchange Board of India (SEBI) issued a new regulation that requires publicly listed firms to mandatorily disclose the number of insiders' pledged shares.

We propose an alternative *incentive view*. Given the private benefits of control (Dyck and Zingales, 2004), the risk of losing control rights of a listed firm provides the controlling shareholders with incentives to defend the firm's stock price and to avoid a forced sale initiated by the lenders. Therefore, the margin call pressure might incentivize controlling shareholders who have pledged shares to manipulate corporate disclosure in order to maintain or increase stock price. Recently, DeJong, Liao, and Xie (2019) find that, compared to firms without share pledging, firms with share pledging exhibit higher level of up-ward accrual and real earnings management, suggesting that firms with share pledging have more incentives to manipulate accounting numbers to avoid margin call pressure.

Given these competing predications, the question of whether share pledging encourages or restrains disclosure manipulation is an empirical one. China is an appropriate setting to investigate the impact of share pledging on corporate decision due to its unique institutional environment. First, in China, share pledging is pervasive, and raises concerns among regulators and investors. The strict disclosure requirements for share pledging offer us an access to comprehensive data sets of share pledging activities, which allows us to deeply explore the association between the share pledging and corporate disclosure quality. Second, China has a highly concentrated ownership structures, and the majority of Chinese listed firms have controlling shareholders who hold more than one-third of total shares (Jiang and Kim, 2015). Due to the relative weak institutional environment, the agency conflict between controlling shareholder and minority shareholders is still severe (Jiang, Lee, and Yue, 2010; Jiang and Kim, 2015; Jiang, Rao, and Yue, 2015). Given the private benefits of control (Dyck and Zingales, 2004) and the large value of the listed "shells" (the listing status of listed firms) (Lee, Qu and Shen, 2017), the risk of losing control rights provides controlling shareholders with incentives to defend the listed firm's stock price by manipulating corporate information discourse.

To test how share pledging affects corporate disclosure policy, we first create an indicator variable and a continuous variable to measure the share pledging activities conducted by controlling shareholders, over the year 2003-2017. Next, following prior studies (Kim and Verrecchia, 2001; Ascioglu, Hegde and McDermott, 2005; Reeb and Zhao, 2013), we use the Kim and Verrecchia (2001) measure (KV measure for short henceforth) as a proxy for corporate disclosure quality.[1] For the convenience of interpretation, we calculate the inverse of KV measure denoted by *KV_Beta* which indicates that the disclosure quality increases as the value gets larger. In the empirical tests, we include a set of control variables that are known to affect corporate disclosure quality, and we also include industry and year fixed effects to control for the omitted variables that may affect corporate disclosure quality in the same industry during any given year. When we use the indicator variable to measure the presence of share pledging, our base line results show a negative association between share pledging

[1] Share pledging, as we argue in this study, provides controlling shareholders with incentives to sustain or increase share price. KV measure is a market-based measure for corporate disclosure quality and it indicates that a firm adopts a timely disclosure policy for current performance when the performance is favourable but defers the disclosure when the performance is adverse. This characteristic makes KV measure an ideal proxy for corporate disclosure quality in our setting.

and corporate disclosure quality. Specifically, the presence of share pledging leads to 5.56 times decrease in disclosure quality. In addition, when we use the ratio of controlling shareholders' pledged shares to a firm's total shares as independent variable, our results show a negative association between pledging ratio and disclosure quality. Moreover, we find that the negative association between share pledging and disclosure quality is stronger in non-SOEs than that in SOEs.

Next, we conduct a set of additional analyses to explore how controlling shareholders who have pledged shares manipulate corporate disclosure to defend stock price. First, we examine whether and how controlling shareholders manipulate accounting numbers to sustain or increase stock price. We find that share pledging is positively associated with upward accrual-based earnings management and negatively associated with downward accrual-based earnings management. We also find that share pledging is positively associated with real earnings management. These results suggest that controlling shareholders manage earnings upward to sustain or increase stock price, which in turn decreases disclosure quality. Second, we examine whether and how controlling shareholders manipulate forward-looking information disclosure to defend stock price. We find that share pledging is positively associated with the optimistic bias of management forecast and negatively associated with management's willingness to disclose bad news. These results suggest that controlling shareholders manipulate management forecasts by increasing optimistic bias and decreasing bad news disclosure to sustain or increase stock price, which in turn decreases disclosure quality. Third, we examine whether and how controlling shareholders change accounting policy (measured by accounting conservatism) to defend stock price. We find that share pledging is negatively associated with conservatism, suggesting that controlling shareholders increase the timeliness of good news recognition and decrease the timelines of bad news recognition to sustain or increase stock price, which in turn decreases disclosure quality. Further, we examine whether the interaction of share pledging and disclosure manipulation decreases outside shareholders' wealth. We find that, as corporate disclosure quality decreases, share pledging exerts an incremental negative effect on firm value.

Given the endogenous concerns regarding reverse causality and unobservable omitted variables, we rerun the base line specifications by using firm fixed-effect model (FE), propensity score matched samples (PSM) analysis, instrumental variable approach, and lead-lag change analysis. Finally, we examine whether our results are robust across different subsamples. We obtain consistent results, which lends robustness to our findings.

We contribute to the corporate governance literature in the following ways. First, despite the prevalence of share pledging activities, only a few studies have payed attention to this issue. Recent studies have examined the impact of share pledging on firm value or shareholder wealth (Wang and Chou, 2018; Dou, Masulis, and Zein, 2019), earnings management (Asija, Marisetty, Rangan, 2014; DeJong, Liao, and Xie, 2019), corporate repurchasing (Chan, Chen, Hu, and Liu, 2018), corporate risk taking (Meng, Ni, and Zhang, 2018). These studies show that the risk of losing control rights provides

controlling shareholders with incentives to change corporate decisions. We extent this line of literature by examining the impact of share pledging on corporate disclosure policy.

Second, prior studies find that corporate disclosure quality is determined by capital market transactions, corporate control contests, shareholder litigation, proprietary costs, and corporate governance (Healy and Palepu,2001; Eng and Mak,2003). We extend the disclosure literature by exploring the relation between share pledging and disclosure quality.

Third, the corporate governance literature shows that family ownership affects disclosure quality and proposes two competing hypotheses regarding how concentrated ownership affects corporate disclosure: the entrenchment hypothesis and alignment hypothesis (Wang, 2006). Our evidence further shows that ownership structure shapes corporate disclosure strategy and our findings lend evidence for the entrenchment hypothesis in emerging markets like China.

The remainder of this paper proceeds as follows. Section 2 presents hypothesis development. Section 3 describes data and methodology. Section 4 reports empirical results. Section 6 concludes this paper.

3.2. Hypothesis Development

3.2.1 share pledging and corporate disclosure quality

Before the share splitting reform in 2005, the ownership of the largest shareholders in Chinese listed firms was more than 40% (Allen, Qian, Qian, 2005). While Chinese listed firms experience a decline in ownership concentration during the last decades, they still have highly concentrated ownership (Liu, Uchida, and Yang, 2014). For example, the ownership of controlling shareholders is more than 17 times large than the ownership of the second largest shareholders, and approximate 5 times large than the sum of ownership of the second to the tenth largest shareholders (DeJong, Liao, and Xie, 2019). More importantly, controlling shareholders in Chinese listed firms can exert huge influence on management decisions. Although CEOs are in charge of firm's daily operations in name, the board chairs are the actual decision makers since CEOs are appointed by the board or board chairs also serve as CEOs. However, in firms that have controlling shareholders, board chairs are usually appointed by the controlling shareholders or the controlling shareholders themselves sit on the board and take the position as board chairs. Hence, controlling shareholders are the persons who are actually responsible for corporate decisions making. Further, the external legal system for minority shareholder protection and the internal corporate governance in Chinese listed firms are weak, and hence the power of controlling shareholders is not checked properly. For example, the average proportion of independent directors on board is about one-third, which is just meeting the regulation requirement, and hence the independent directors in China do not monitor insiders (Jiang and Kim, 2015).

Due to external financing constraint, controlling shareholders use their shares as collaterals to secure loans from financial institutions, such as commercial banks, brokerage houses, trust firms, and asset management companies. The financial institutions are readily granting share pledging loans

because of the high liquidity of the pledged shares. The major attractiveness of share pledging for controlling shareholders is that they can secure loans without selling their shares and keep the control rights. However, the controlling shareholders who have pledged shares are exposed to the risk of market downturn. When the price of firms' stocks falls in the secondary market, the market value of pledged shares will decrease. The controlling shareholders who have pledged shares will face a margin call when the market value of the pledged shares drops down to the maintenance margin ratio[1]. In this case, the controlling shareholders have to pledge more shares as collaterals or pay down the debt, otherwise, the pledgees (lenders) are entitled to sell the pledged shares and close the position. Thus, share pledging exposes the controlling shareholders to the risk of losing control rights of the listed firms. We argue that the risk of losing control rights makes controlling shareholders more sensitive to stock price and provides controlling shareholders with incentives to defend the listed firms' stock price for two reasons. First, controlling shareholders are reluctant to relinquish the private benefits of control. Dyck and Zingales (2004) find that private benefits of control are large in countries with concentrated ownership structures, but strong legal protection for minority shareholders and law enforcement help curb private benefit consumption. Given that the ownership in Chinese listed firms is highly concentrated and institutional environment is weak (Jiang and Kim, 2015), the cost of losing the control rights is large for controlling shareholders. Second, controlling shareholders are not likely to relinquish the valuable public listing status of listed firms (the listed "shells"). Initial public offerings (IPOs) in Chinese capital market are strictly rationed and controlled by China Securities Commission (CSRS) who decides which and how many firms can go public. The approving rate of IPOs listing is quite low. For example, 185 firms applied IPOs listing in the year 2018, and only 111 firms were approved for going public (the approving rate of IPOs listing is only 60%)[2]. The strict regulatory rationing and control for IPOs listing leads to a high "shell value". For instance, by investigating comprehensive sample of reverse mergers (RMs) in China that were completed in January 2007 to April 2016, Lee, Qu and Shen (2017) estimate that unlisted firms paid an average of between 2.9 to 4.4 billion RMB (or more than 400 million USD) for each listed "shell". Given the large private benefits of control and "shell" value, the controlling shareholders are unlikely to relinquish the control rights, which in turn provides controlling shareholders with incentives to sustain or increase stock price. The sustained or increased stock price helps the controlling shareholders to maintain the margin and to avoid the potential margin call risk.

There are several options for controlling shareholders who have pledged shares to sustain or increase stock price. For example, Chan, Chen, Hu, and Liu (2018) find that controlling shareholder of Taiwanese listed firms initiate corporate repurchase to sustain stock price, and hence to avoid potential margin calls and the risk of losing control rights. In this study, we argue that the controlling shareholders of Chinese listed firms are likely to manipulate corporate disclosure to affect stock price due to the

[1] The maintenance margin ratio is usually between 130% and 160%.
[2] For detailed information, please see http://news.hexun.com/2018-12-28/195695088.html

relative low cost of opportunistic disclosure. While prior literature suggests that the risk of shareholder litigation for inadequate or untimely disclosure encourages managers to increase disclosure quantity and quality (Skinner, 1994, 1997; Field, Lowry, and Shu, 2005), the weak legal system for investor protection in Chinese capital market makes controlling shareholder opportunistic disclosure less costly. During the past decade, China has issued many securities laws or regulations; however, these laws or regulations are not well enforced, the legal system in China is still weak in protecting minority shareholders (Jiang and Kim, 2015). In addition, fines and punishment for violations of securities laws or regulations are light (Jiang and Kim, 2015). Thus, the weak legal environment for investor protection and light punishment for violations lead to low costs of disclosure manipulation in Chinese capital market. Therefore, the margin call pressure motivates controlling shareholders who have pledged shares to manipulate corporate disclosure policy to sustain or increase stock price. Accordingly, we formulate our first hypothesis as follows:

H1: Ceteris paribus, relative to firms without share pledging, firms with share pledging have a lower disclosure quality.

3.2.2 Share pledging, state ownership and corporate disclosure quality

As an emerging market in a transitional economy, the Chinese stock market exhibits an import feature that the sate-owned enterprises (SOEs) play an influential role in Chinese economy. At the beginning of establishment of China's stock exchange (Shanghai Stock Exchange and Shenzhen Stock Exchange) in the early 1990s, the majority of firms going public were SOEs since the initial motivation of establishing stock exchange was to provide SOEs with opportunities to raise external funds. Although non-state-owned enterprises (non-SOEs) are growing in numbers and contribute a large portion of Chinese economic growth during the past three decades, listed SOEs still account for approximate half of the total listed firms in Chinese stock market and even dominate certain industries such as natural resources, civil aviation, real estate, and finance. The shares owned by the government are held by the government asset management companies or other agents who report to the Bureau of State Asset Administration (BSAA), a special branch of the government.

We argue that the risk of losing control right induced by share pledging in SOEs is lower than that in non-SOEs for the following two reasons. First, the regulations for SOEs' share pledging and its potential control rights transfer are stricter than that for non-SOEs'. The Ministry of Finance of the People's Republic of China issued *Notice on the Relevant Issues Regarding State-owned Shares Pledging* (The *Notice* henceforth) on 25th October 2001. The key terms in the *Notice* are as follows: (1) the state-owned shares pledged by the authorized agents shall not exceed 50% of the total state-owned shares in the listed firm, (2) before pledging state-owned shares, the authorized agents must conduct sufficient feasibility analysis, clarify the use of funds, formulate repayment plans. Finally, the share pledging proposal must be approved by the board, (3) When the pledged state-owned shares are liquidated, the transfer of state-owned shares or the state control rights shall be reported to the Ministry

of Finance for approval. Moreover, the *Law of the People's Republic of China on State-owned Assets* stipulates that the transfer of state-owned assets is decided by the the authorized agents. When the transfer leads the state-owned shareholders to losing the control rights, the agents must report the transfer transaction to the government for approval. These regulations indicate that the pledging of state-owned shares is unlikely to result in the losing of state control rights in listed firms.

Second, SOEs have more options to meet the potential margin call than do non-SOEs. While private investors are generally concerned with wealth maximization, government owners can induce firms to pursue socially desirable and/or politically expedient objectives (Shleifer, 1998). In China, an important role of SOEs is to help government accomplish social and political goals such as employment, fiscal health, regional development, and social responsibility (Chen, Sun, Tang, and Wu, 2011). In return, the government provides SOEs with favorable financing terms since the Chinese government controls most of resources, such as bank loans, IPOs rationing (Li, Meng, Wang, and Zhou, 2008). In addition, since the government realizes its social and political goal through SOEs, it would not allow SOEs to fail or relinquish the control rights. SOEs are usually politically favored and supported by the government, even they run into financial trouble, investors perceive the largest shareholder (i.e., the government) as the ''deep pocket'' for SOEs (Chen, Chen, Lobo, and Wang, 2011). Thus, investors perceive the government support as the implicit guarantee for SOEs. Given the external financing facilities and government's implicit guarantee, when facing a margin call, SOEs' controlling shareholders (BSAA or its agents) who have pledged shares can easily raise funds from other channels to meet the margin call or pay down the debts. Thus, when facing margin calls, the controlling shareholders in SOEs are subject to lower risk of losing control rights than those in non-SOEs.

Therefore, relative to the controlling shareholders in SOEs, the controlling shareholders in non-SOEs have more incentives to manipulate corporate disclosure to defend stock price as they are subject to higher risk of losing control rights. We formulate our second hypothesis as follows:

H2: Ceteris paribus, the negative association between share pledging and corporate disclosure quality is stronger in non-SOEs than that in SOEs.

3.3. Data and Methodology

3.3.1 Data and sample selection

We adopt annual data of Chinese A-share listed firms spanning from the year 2003 to 2017. The initial data is obtained from the Chinese Stock and Market Accounting Research (CSMAR) database. Specifically, we first collect the data of share pledging from the Shareholder subset which discloses information on share pledging by the top 10 largest shareholders. Then, we select financial data of listed firms from the Financial Statements subset, and the data of stock price and trading volume from the China Stock Market Series subset. Besides, the State-Owned Enterprise (SOEs) information is collected from the data base of China Centre for Economic Research (CCER), provided by SinoFin Information Services. Our research period start with the year 2003 because since then: (1) all Chinese listed firms

have been required by the CSRC to disclose the identities of their ultimate owners as well as the controlling chains in financial statement, (2) all listed firms have been required by the CSRC to disclose their top ten shareholder share status, including the number of pledged shares, in financial statement, (3) some of the key control variables, such as the identity of the controlling shareholders, begin to be disclosed in financial statement.

To construct firm-year observations for empirical analysis, we first exclude observations from the financial industry as these firms are fundamentally different from non-financial firms. Thus, we start the data process with 30,097 firm-year observations (non-financial firms) of share pledging. Then, we merge share pledging with data for each firm's characteristics and obtain 25,924 firm-year observations. We exclude 4,047 observations whose key variable data are missing. To alleviate the impact of outliers, we winsorize all continuous variables at 1% and 99% percentiles. After these screening procedures, the final sample consists of 3,016 unique firms and 21,877 firm-year observations spaning from the year 2003 to 2017.

3.3.2 Measuring variables

Proxy for disclosure quality

We use the approach proposed by Kim and Verrecchia (2001) to create a measure as the proxy for the disclosure quality (KV measure henceforth). Kim and Verrecchia (2001) construct a model in which a firm adopts a timely disclosure policy for current performance when the performance is favourable and defers the disclosure when the performance is adverse. They show that when the firm defers the disclosure, the market uses trading volume to infer the private information held by better-informed investors; in contrast, when the firm discloses performance in a timely fashion, the market use the disclosure itself as a source of information rather than the trading volume as an alternative source of information. To facilitate empirical analysis, Kim and Verrecchia (2001) regress log absolute returns on abnormal volumes, and they show that the slope coefficient on volume can be used as a proxy for corporate disclosure quality[1]. The slope coefficient on volume decreases (increases) for increased (decreased) disclosure. The slope coefficient is constructed by the following ordinary least squares regression:

$$Ln\left|\frac{P_t - P_{t-1}}{P_{t-1}}\right| = \alpha + \beta(VOL_t - AVGVOL_t) + \varepsilon_t \quad (1)$$

Where P_t is the closing price on day *t*, VOL_t is the daily trading volume of stock in thousands of shares, and $AVGVOL_t$ is the average daily stock trading volume within the previous 6 months in thousands of shares. For the convenience of interpretation, following Ascioglu, Hegde and McDermott (2005), we scale β by 10,000[2].

[1] Kim and Verrecchia (2001) suggest that although they model the decision of a firm to commit to a timely disclosure policy for a broad range of performance, one can interpret this notion as disclosure in general.
[2] The scaling is arbitrary.

We run time series regression in equation (1) by using the daily stock price and trading volume of the listed firms in the CSMAR database over the years 2003 to 2017. For each firm year, we obtain one estimate of β as the proxy for its disclosure quality. To control for the impact of industry effect on firm disclosure quality, we subtract the industry median of β from the raw β (Reeb and Zhao, 2013). When a firm disclose more, the industry-adjusted β is lower because the markets relies more on the increased disclosure as information source and less on the trading volume as an alternative information source. Given that the industry-adjusted β is an inverse measure of disclosure quality, for the convenience of interpretation, following Reeb and Zhao (2013), we use the inverse of the industry-adjusted β as our measure of corporate disclosure quality, denoted by *KV_Beta*, which indicates a higher disclosure quality as the value of *KV_Beta* gets larger. An important advantage in using *KV_Beta* in this study is that it is a market-based measure for overall disclosure quality. In addition, *KV_Beta* indicates that a firm adopts a timely disclosure policy for current performance when the performance is favourable but defers the disclosure when the performance is adverse. This characteristic makes KV measure an ideal proxy for corporate disclosure quality in our setting because share pledging, as we argue in this study, provides controlling shareholders with incentives to sustain or increase stock price.

Share pledging

Following prior researches (e.g., Meng, Ni, and Zhang, 2018; Ouyang, Wang, and Chan, 2018; DeJong, Liao, and Xie, 2019), we define a dummy variable *PledgeDum* that equals one for a firm with share pledging in a given year, and zero otherwise. In addition, in order to capture the variation of the number of controlling shareholders' pledged shares, we create a continuous variable *PledgeRatio* defined as the ratio of a controlling shareholder's pledged shares to a listed firm's total shares. These two variables serve as independent variables in this study.

3.3.3 Regression models

In this study, we set the following equation as base line regression model:

$$KV_{Beta_{i,t}} = \alpha_0 + \alpha_1 PledgeDum_{i,t}\left(PledgeRt_{i,t}\right) + \boldsymbol{\beta} * \boldsymbol{Controls} + Year + Industry + \varepsilon_{i,t} \quad (2)$$

Where the dependent variable is *KV_Beta* and the independent variables are *PledgeDum* and *PledgeRatio*, which are defined above. ***Controls*** is a vector consisting of all control variables. Following prior studies, we include control variables in our regression analysis as follows. First, we control firm characteristics such as firm size (*Size*) and firm leverage (*Leverage*) (Lang and Lundholm, 1993; Kasznik and Lev, 1995). Larger firms may attract more media attention and more intensive market scrutiny such as analysts' coverage, which compels firms to keep higher level of disclosure quality. Thus, we expect firm size is positively related to disclosure quality. Although higher leverage firms may have higher disclosure quality due to the monitoring role of debtholders, higher leverage firms may have lower disclosure quality due to manager's incentives to hold bad news regarding firms' financial status. Thus, the relation between firm leverage and disclosure quality is ambiguous. Second, firm

performance may affect disclosure quality, firms with better performance may have higher disclosure quality. Thus, we control for return on total assets (*ROA*) and sales growth rate (*Growth*) (e.g., Miller, 2002; Chen, Matsumoto, and Rajgopal, 2011). Third, we control a set of governance variables (Eng and Mak, 2003). Specifically, we include board size (*BoardSize*) and board independence (*BoardIndp*) to control the impact of board characteristics on disclosure quality. Larger board size and higher board independence play a more effective monitoring role (Forker, 1992; Chen and Jaggi, 2000), and thus we expect that *BoardSize* and *BoardIndp* are positively associated with disclosure quality. Management ownership is an effective way to abate the agency conflicts between shareholders and management. Thus, we control for management share-holding percentage (*ExcuHold*) and expect a positive relation between *ExcuHold* and disclosure quality. However, management power may facilitate management entrenchment (Finkelstein, D'aveni, 1994) and in turn worsen firm's information environment. Thus, we control for management power measured by CEO and Board Chairman duality (*Dual*), and expect that *Dual* is negatively related to disclosure quality. Institutional investors play as monitors in firms' disclosure practice, thus, we control the share-holding percentage of institutional investors (*Institute*) (Ajinkya, Bhojraj, and Sengupta, 2005; Karamanou and Vafeas, 2005; Li, 2010), and expect a positive relation between *Institute* and disclosure quality. At last, we control for the competition within the same industry, which is measured by a Herfindahl-Hirschman Index based on sales (*HHI*). Although higher product market competition generates higher proprietary cost related to disclosure, product market competition constrains management's opportunistic behaviour in information disclosure. Thus, the relation between *HHI* and disclosure quality is ambiguous. At last, to account for omitted variables that may affect disclosure quality in the same industry during a given year, we control year and industry fixed effects. To account for the within-industry correlation among different observations, we cluster the robust standard errors at the industry level.

The detailed definition of all control variables, please see appendix A.

3.3.4 Summary statistics

Panel A Table 3.1 presents descriptive statistics for variables that are used to examine our hypothesis. The results in Panel A show that the mean value of *KV_Beta* is -0.040, which is similar as that reported in prior research (e.g., Ascioglu, Hegde and McDermott, 2005). The mean value of *PledgeDum* is 0.372, indicating that share pledging is prevalent in China in recent years. As to the percentage of controlling shareholder pledged shares, the mean value of *PledgeRatio* is 7.032%. These results are similar with those reported by prior studies for Chinese market (Meng, Ni, and Zhang, 2018; Ouyang, Wang, and Chan, 2018; DeJong, Liao, and Xie, 2019).

For the firm's characteristic variables, the average total assets (*Size*) is 21.911 in natural logarithm (approximate 3,279.6 million RMB), and the leverage (*Leverage*) has a mean value of 45.699%. For the firm's performance measures, the return on assets (*ROA*) has a mean value of 3.934%. Sales growth (*Growth*) has a mean value of 23.074%.

For the governance variables, the average number of board members (*BoardSize*) is 2.164 in natural logarithm (approximate 9 persons), and the proportion of independent directors (*BoardIndp*) is 36.838%, which is around the mandatory threshold of 33%, indicating that the number of independent directors in China is just for meeting the regulation requirement rather for monitoring insiders. The mean holding percentage of executives (*ExcuHold*) is 5.088%, indicating that executives have stake in firms. The mean value of holding percentage of institutional investors (*Institute*) is 4.460%, indicating that institutional investors may have ability to exert influence on the boards. The mean value of duality of CEO and chief director (*Dual*) is 0.222, suggesting that COE and board chair duality is quite common in China. The mean value of Herfindahl index based on sales (*HHI*) is 0.105.

Meanwhile, we use T tests and Pearson chi-squared test to test the equality of means and medians, respectively, between the two groups defined by *PledgeDum*. Panel B of Table 3.1 presents the results of univariate tests. The firms with share pledging (*PledgeDum*=1) has a mean (median) value of *KV_Beta* of -0.129 (-0.330), which is significantly lower than the 0.012 (-0.264) reported by firms without share pledging (*PledgeDum*=0). This pattern provides initial evidences that support H1, which argues that share pledging is negatively associated with corporate disclosure quality.

Table 3. 1
Summary statistics and univariate test of disclosure quality

This table reports summary statistics for the variables of interest and univariate test of dependent variable *KV_Beta* for Chinese A-share non-financial firms over the years 2003 to 2017 which includes 21,877 firm-year observations. Panel A reports summary statistics for variables of interest. In Panel B, T test (Chi-squared test) is used to examine the equality of means (medians) between the firms with and without controlling shareholder share pledging. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

Panel A Summary statistics for dependent, independent and control variables

variable	Obs	mean	sd	min	median	max
KV_Beta	21,877	-0.040	1.193	-2.161	-0.291	5.738
PledgeDum	21,877	0.372	0.483	0.000	0.000	1.000
PledgeRatio	21,877	7.032	11.639	0.000	0.000	48.866
Size	21,877	21.911	1.265	19.203	21.759	25.744
Leverage (%)	21,877	45.699	21.577	5.062	45.639	106.166
ROA(%)	21,877	3.934	5.965	-22.237	3.636	21.356
Growth(%)	21,877	21.927	54.473	-63.103	12.573	380.822
BoardSize	21,877	2.164	0.203	1.099	2.197	2.944
BoardIndp(%)	21,877	36.838	5.434	0.000	33.333	80.000
ExcuHold(%)	21,877	5.088	12.120	0.000	0.006	58.025
Dual	21,877	0.222	0.416	0.000	0.000	1.000
Institute (%)	21,877	4.460	4.933	0.000	2.778	22.333
HHI	21,877	0.105	0.109	0.015	0.068	0.667

Panel B Univariate test of corporate disclosure quality (*KV_Beta*)

	PledgeDum=0	PledgeDum=1	Difference	T-value (Chi-squared value)
	(1)	(2)	(3) = (1) - (2)	(4)
Mean	0.012	-0.129	0.141	8.443***
Median	-0.264	-0.330	0.066	48.252***

3.4. Empirical Results

3.4.1 Share pledging and corporate disclosure quality

We start our main analysis by examining how share pledging affects corporate disclosure quality. Table 3.2 presents the multi-regression results. We run two sets of regressions, one for the indicator independent variable *PledgeDum*, reported in column (1), and the other for the continuous independent

variable *PledgeRatio*, reported in column (2). The result in column (1) shows that the presence of share pledging is negatively associated with the corporate disclosure quality. The economic magnitude is also meaningful. Given that the sample mean of corporate disclosure quality (*KV_Beta*) is -0.040, the coefficient estimates on *PledgeDum* in column (1) is -0.226, indicating that the presence of share pledging leads to a 5.65 times (=-0.226/-0.040) decrease in corporate disclosure quality.

The result in column (2) shows that the more shares a controlling shareholder pledges, the lower the corporate disclosure quality is. To compute the economic significance of share pledging ratio (*PledgeRatio*) in column (2), we compare the difference in *PledgeRatio* for firms without share pledging to the average firm with share pledging. The average firm with share pledging has a *PledgeRatio* of 18.898 percentage. Since *PledgeRatio* takes the value of zero for firms without share pledging, the coefficient estimates on *PledgeRatio* in column (2) implies that the difference in corporate between these two types of firms is -0.094 (=-0.005*18.898), which is 2.35 (=-0.094/-0.040) times larger than the sample mean of corporate disclosure quality. For the remainder of this study, we only calculate the economic significance of the dummy variable *PledgeDum* that identifies the presence of share pledging.

Overall, the results in Table 3.2 confirm H1, that is, share pledging is negatively associated with corporate disclosure quality.

Table 3. 2
Share pledging and corporate disclosure quality

This table reports the impact of share pledging on corporate disclosure quality. All the model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and are calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	KV_Beta	*KV_Beta*
	(1)	(2)
PledgeDum	-0.226***	
	(-6.731)	
PledgeRatio		-0.005***
		(-3.677)
Size	0.363***	0.360***
	(12.877)	(12.662)
Levereage	0.002	0.002
	(1.357)	(1.205)
ROA	0.028***	0.028***
	(9.072)	(9.191)
Growth	0.001***	0.001***
	(3.640)	(3.569)
BoardSize	-0.004	0.005
	(-0.043)	(0.056)
BoardIndp	0.002	0.003
	(0.795)	(0.806)
ExcuHold	0.016***	0.015***
	(10.141)	(9.870)
Dual	-0.065**	-0.072**
	(-2.328)	(-2.490)
Institute	0.026***	0.025***
	(6.911)	(6.736)
HHI	0.268	0.285
	(1.550)	(1.585)
_cons	7.643***	7.537***
	(10.474)	(10.284)
Year	Yes	Yes
Industry	Yes	Yes
Observations	21,877	21,877

Adjusted-R^2	0.106	0.103

3.4.2 Share pledging, state-ownership and corporate disclosure quality

Table 3.3 presents the results of how state-ownership affects the association between share pledging and corporate disclosure quality. The results in columns (1) and (2) show that the coefficient estimates on *PledgeDum* are -0.277 and -0.142 in Non-SOEs and SOEs, respectively, and both are statistically significant at 1% level. However, the absolute value of coefficient estimate on *PledgeDum* in non-SOEs is significantly larger than that in SOEs (empirical p-value is less than 1%), suggesting that the decreased disclosure quality induced by share pledging in the Non-SOEs is more severe than that in the SOEs. The results in column (3), (4) show that the coefficient estimates on *PledgeRatio* are -0.005 and -0.003 in Non-SOEs and SOEs, respectively. The coefficient estimates in Non-SOEs is statistically significant at 1% level but that in SOEs (*SOE*=1) is insignificant. Moreover, the absolute value of coefficient estimates in the Non-SOEs is significantly larger than that in the SOEs (empirical p-value is less than 1%), suggesting that the negative association between share pledging ratio and disclosure quality in the Non-SOEs is stronger than that in the SOEs. thus, the results in Table 3 confirm H2.

Table 3. 3
Share pledging, state-ownership and corporate disclosure quality

This table reports the impact of how state-ownership affects the association between share pledging and tunnelling. We use Fisher's Permutation test to examine the differences of coefficient estimates on *PledgeDum* and *PledgeRatio* between Non-SOEs and SOEs. We construct empirical sample by bootstrap sampling with 1000 repetition, and then calculate empirical p values. All the model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and are calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	Non-SOEs	*SOEs*	*Non-SOEs*	*SOEs*
Variables	(1)	(2)	(3)	(4)
PledgeDum	-0.277***	-0.142***		
	(-7.865)	(-2.744)		
PledgeRatio			-0.005***	-0.003
			(-3.334)	(-0.979)
Size	0.403***	0.328***	0.406***	0.328***
	(12.360)	(10.200)	(12.552)	(10.105)
Leverage	-0.001	0.005***	-0.001	0.005**
	(-0.643)	(2.771)	(-0.991)	(2.625)
ROA	0.030***	0.026***	0.031***	0.026***
	(9.689)	(5.097)	(9.880)	(5.179)
Growth	0.001***	0.001***	0.001***	0.001***
	(3.299)	(2.723)	(3.180)	(2.745)
BoardSize	-0.145	0.078	-0.134	0.076
	(-1.206)	(0.601)	(-1.124)	(0.575)
BoardIndp	0.001	-0.000	0.001	-0.000
	(0.317)	(-0.117)	(0.363)	(-0.145)
ExcuHold	0.014***	0.031**	0.014***	0.031**
	(9.349)	(2.185)	(9.316)	(2.183)
Dual	-0.107***	-0.004	-0.110***	-0.005
	(-3.222)	(-0.081)	(-3.224)	(-0.101)
Institute	0.031***	0.023***	0.030***	0.023***
	(6.393)	(4.556)	(6.192)	(4.525)
HHI	0.281*	0.271	0.304*	0.270
	(1.737)	(1.174)	(1.874)	(1.172)
_cons	10.191***	6.355***	10.196***	6.345***
	(10.861)	(7.237)	(10.815)	(7.166)
Year	Yes	Yes	Yes	Yes

Industry	Yes	Yes	Yes	Yes
Observations	11,228	10,649	11,228	10,649
Adjusted-R^2	0.136	0.076	0.130	0.075
Empirical p-value	0.000***		0.000***	

3.4.3 Channels

The results thus far indicate that the disclosure quality is lower in firms with share pledging than that in firms without share pledging. We next explore the channels that controlling shareholders use to manipulate corporate disclosure. We show that the share pledging leads to lower disclosure quality through the channels: (1) up-ward earnings management, (2) strategic management forecasts, and (3) decreased conditional accounting conservatism.

3.4.3.1 Earnings management

In this section, we examine whether share pledging is related to increased accrual-based earnings management and real earnings management. Our accrual-based earnings management is computed from the modified Jones model (Jones,1991) as described in Dechow, Sloan, and Sweeney (1995). To construct the discretionary accruals, denoted by *DA*, in modified Jones model, we first estimate following model (original Jones model) by using OLS regression for each industry[1] and fiscal year combination:

$$\frac{TA_{i,t}}{A_{i,t-1}} = \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_1 \frac{\Delta REV_{i,t}}{A_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t} \quad (3)$$

Where *i* indexes firms and *t* indexes fiscal year. $TA_{i,t}$ is total accruals in year *t*. $A_{i,t-1}$ is the total assets in year *t*-1. $\Delta REV_{i,t}$is the change in revenues from period *t*-1 to period *t*. $PPE_{i,t}$ is gross value of property, plant, and equipment in year t. After estimating the coefficients α_1, α_1, α_3, we calculate non-discretionary accruals, denoted by *NDA*, as follows:

$$NDA_{i,t} = \widehat{\alpha_1} \frac{1}{A_{i,t-1}} + \widehat{\alpha_2} \frac{(\Delta REV_{i,t} - \Delta AR_{i,t})}{A_{i,t-1}} + \widehat{\alpha_3} \frac{PPE_{i,t}}{A_{i,t-1}} \quad (4)$$

Where $\Delta AR_{i,t}$ is the change in accounts receivables from period *t*-1 to period *t*. Our measure of discretionary accruals is defined as the difference between $DA_{i,t} = TA_{i,t} / A_{i,t} - NDA_{i,t}$.

To capture both downward and upward earnings management, we proxy the general accrual-based earnings management with the absolute value of *DA* denoted by *ABS_DA*, upward accrual-based earnings management with positive *DA* denoted by *Positive_DA*, and downward accrual-based earnings management with negative *DA* denoted by *Negative_DA*.

Following prior works (e.g., Roychowdhury,2006; Cohen, Dey, and Lys,2008), we use abnormal cash flow from operations (*ACFO*), abnormal discretionary expenses (*ADISEXP*), and abnormal production costs (*APROD*) as proxy for real earnings management. *ACFO*, *ADISX* and *APROD* are the residuals derived from the following models:

[1] To construct both accrual-based and real earnings management, we use Industry Classification carried out by China's Securities Regulatory Commission's Guidelines in the year 2012. When conducting the industry-year regression, following Roychowdhuryw (2006), we remove the industry observations that have less than 15 firms in a given year.

$$\frac{CFO_{i,t}}{A_{i,t-1}} = \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{Sales_{i,t}}{A_{i,t-1}} + \beta_3 \frac{\Delta Sales_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t} \quad (5)$$

$$\frac{PROD_{i,t}}{A_{i,t-1}} = \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{Sales_{i,t}}{A_{i,t-1}} + \beta_3 \frac{\Delta Sales_{i,t}}{A_{i,t-1}} + \beta_4 \frac{\Delta Sales_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t} \quad (6)$$

$$\frac{DISEXP_{i,t}}{A_{i,t-1}} = \beta_2 \frac{1}{A_{i,t-1}} + \beta_2 \frac{Sales_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t} \quad (7)$$

Where $CFO_{i,t}$ is the net operating cash flow in year *t*. $Sales_{i,t}$ and $\Delta Sales_{i,t}$ are sales in year *t* and change in sales from year *t*-1 to year *t*, respectively. $PROD_{i,t}$ is production cost , defined as the sum of goods sold plus the change in inventory in year *t*. $DISEXP_{i,t}$is discretionary expense, defined as the sum of SG&A expenses on the income statement in year *t*.

Given a certain sales level, firms that conduct upward real earnings management are likely to have unusually low cash flow from operations, and/or unusually low discretionary expenses, and/or unusually high production costs. Thus, the magnitude of real earnings management is negatively related to abnormal cash flow from operations (*ACFO*), abnormal discretionary expenses (*ADISEXP*), and positively replated to abnormal production costs (*APROD*). We also construct an aggregate measure by combining the three individual real earnings management measures. Specifically, we define the sum of *ACFO*, *ADISEXP*, and (-1) ×*APROD* as *REM*, which is negatively related to upward real earnings management. To investigate the relation between share pledging and earnings management, we estimate the following equation by using OLS regression:

$$Y_{i,t} = \alpha_0 + \alpha_1 PledgeDum_{i,t}\left(PledgeRt_{i,t}\right) + \boldsymbol{\beta} * \boldsymbol{Controls} + Year + Industry\ \varepsilon_{i,t} \quad (8)$$

Where *Y* denotes the dependent variables that proxy accrual-based and real earnings management. *PledgeDum* and *PledgeRatio* are the independent variables. ***Controls*** is a vector consisting of all control variables. Following prior literature that uses both measures of accrual-based earnings management and real earnings management as dependent variables (e.g., Cohen, Dey, and Lys, 2008; Zang, 2012; Irani, and Oesch, 2016), we control firm size (*Size*), leverage (*Leverage*), return on total assets (*ROA*), sales growth rate (*Growth*), market-to-book ratio (*MTB*), analysts' coverage (*AnalystCoverag*), firm age (*Age*), auditors' independence (*Big4*), board size (*BoardSize*), the proportion of independent directors (*BoardIndp*), the duality of CEO and board chairman (*Dual*).

Table 3.4 report the estimation results of equation (8). Columns (1) and (2) in Panel A show a positive relation between share pledging (*PledgedDum*, *PledgedRatio*) and accrual-based earnings management (*ABS_DA*), and this relation is statistically significant at 1% level. Column (3) - (6) in Panel A show that share pledging (*PledgedDum*, *PledgedRatio*) is positively related to upward accrual-based earnings management (*Positive_DA*) and negatively related to downward accrual-based earnings management (*Negative_DA*), suggesting that controlling shareholders manage earnings upward to

sustain or increase stock price, and thus avoid potential margin call risk which is directly related to the risk of losing control rights.

Column (1) and (2) in Panel B show a positive relation between share pledging and real earnings management (*REM* is an inverse measure of up-ward real earnings management), and this relation is statistically significant above 5% level. Column (3), (4), (8) in Panel B show that share pledging is negatively related to abnormal net operating cash flow (*ACFO*) and abnormal discretionary expenses (*ADISEXP*), however, Column (5), (6) in Panel B show that share pledging is not related to abnormal production costs (*APROD*). These results suggest that, in order to increase current reported earnings and sustain or increase stock price, controlling shareholders accelerate the timing of sales through increased discount or more credit, and decrease discretionary expense, such as advertising expense, R&D, and SG&A, which in turn decreases firms' disclosure quality.

Table 3. 4

Manipulating corporate disclosure through earnings management

This table reports the impact of how share pledging affects earnings management. Panel A reports the results of how share pledging affects accrual-based earnings management, and Panel B reports the results of how share pledging affects real earnings management. All the model specifications include industry and year fixed effects. Robust t-statistics are reported in parenthesis and are calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

Panel A Share pledging and accrual earnings management						
	ABS_DA	*ABS_DA*	*Positive_DA*	*Positive_DA*	*Negative_DA*	*Negative_DA*
	(1)	(2)	(3)	(4)	(5)	(6)
PledgeDum	0.009***		0.009***		-0.009***	
	(3.354)		(3.108)		(-3.129)	
PledgeRatio		0.037***		0.032***		-0.040***
		(3.433)		(3.442)		(-3.249)
Size	-0.001	-0.001	0.008**	0.007**	0.011***	0.011***
	(-0.196)	(-0.251)	(2.543)	(2.493)	(3.487)	(3.505)
Lev	0.016	0.015	-0.047***	-0.047***	-0.063***	-0.062***
	(1.689)	(1.585)	(-4.171)	(-4.195)	(-7.374)	(-7.022)
ROA	-0.096**	-0.099**	0.050	0.047	0.168***	0.171***
	(-2.494)	(-2.590)	(1.461)	(1.369)	(3.915)	(3.998)
Growth	0.074***	0.075***	0.059***	0.059***	-0.054***	-0.054***
	(10.366)	(10.396)	(9.389)	(9.419)	(-8.144)	(-8.129)
MTB	0.010***	0.010***	0.007***	0.007***	-0.008***	-0.008***
	(6.977)	(6.892)	(4.111)	(4.064)	(-6.018)	(-5.912)
AnalystCoverag	-0.003	-0.002	-0.008***	-0.007***	-0.003*	-0.004**
	(-1.557)	(-1.347)	(-3.206)	(-3.060)	(-1.789)	(-2.033)
Age	0.001***	0.001***	0.001***	0.001***	-0.000	-0.000
	(3.039)	(2.964)	(3.427)	(3.286)	(-0.221)	(-0.144)
Big4	-0.002	-0.002	0.001	0.001	0.000	0.001
	(-0.397)	(-0.442)	(0.196)	(0.111)	(0.091)	(0.123)
BoardSize	-0.020***	-0.020***	-0.019**	-0.018**	0.017**	0.016**
	(-3.039)	(-2.951)	(-2.629)	(-2.564)	(2.718)	(2.588)
BoardIndp	-0.005	-0.004	-0.005	-0.004	0.000	-0.000
	(-0.573)	(-0.462)	(-0.406)	(-0.332)	(0.058)	(-0.069)
Dual	0.004	0.004*	0.005	0.005	-0.002	-0.003
	(1.680)	(1.715)	(1.638)	(1.663)	(-0.935)	(-1.010)
_cons	0.134**	0.132**	-0.006	-0.006	-0.311***	-0.309***
	(2.095)	(2.070)	(-0.067)	(-0.071)	(-4.943)	(-4.940)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,819	14,819	6,961	6,961	7,858	7,858
Adjusted-R^2	0.143	0.143	0.154	0.154	0.148	0.148

Panel B Share pledging and real earnings management								
	REM	*REM*	*ACFO*	*ACFO*	*APROD*	*APROD*	*ADISEXP*	*ADISEXP*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

PledgeDum	-0.005**		-0.004***		0.000		-0.000	
	(-2.381)		(-2.678)		(0.224)		(-0.310)	
PledgeRatio		-0.035***		-0.017***		0.005		-0.010**
		(-4.002)		(-2.810)		(0.571)		(-2.300)
Size	0.004***	0.004***	0.003***	0.003***	-0.002	-0.002	-0.001	-0.001
	(2.945)	(2.953)	(2.695)	(2.785)	(-1.312)	(-1.308)	(-1.334)	(-1.396)
Lev	0.027***	0.029***	-0.023***	-0.023***	-0.058***	-0.058***	-0.008*	-0.007*
	(3.749)	(4.029)	(-4.421)	(-4.328)	(-7.652)	(-7.681)	(-1.922)	(-1.676)
ROA	-0.145***	-0.144***	0.456***	0.457***	0.656***	0.656***	0.026	0.026
	(-5.555)	(-5.528)	(23.733)	(23.795)	(23.364)	(23.367)	(1.615)	(1.607)
Growth	0.020***	0.020***	-0.010***	-0.010***	-0.001	-0.001	0.033***	0.033***
	(5.264)	(5.295)	(-4.345)	(-4.365)	(-0.345)	(-0.352)	(17.394)	(17.460)
MTB	-0.001	-0.001	0.003***	0.003***	0.006***	0.006***	0.001	0.001
	(-1.402)	(-1.332)	(4.678)	(4.702)	(5.874)	(5.859)	(1.433)	(1.486)
AnalCover	0.001	0.001	0.003**	0.003**	0.017***	0.017***	0.015***	0.015***
	(0.850)	(0.687)	(2.459)	(2.311)	(9.763)	(9.790)	(15.981)	(15.926)
Age	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000
	(1.230)	(1.306)	(0.513)	(0.587)	(-1.256)	(-1.264)	(-0.840)	(-0.829)
Big4	0.005	0.005	0.007***	0.007***	0.010**	0.010**	0.008***	0.008***
	(1.526)	(1.467)	(2.807)	(2.843)	(2.497)	(2.513)	(3.064)	(2.988)
BoardSize	-0.003	-0.004	0.006	0.005	0.015***	0.015***	0.006*	0.005
	(-0.504)	(-0.739)	(1.488)	(1.390)	(2.707)	(2.740)	(1.803)	(1.642)
BoardIndp	-0.005	-0.006	-0.000	-0.001	0.016**	0.016**	0.011**	0.010**
	(-0.671)	(-0.814)	(-0.055)	(-0.142)	(1.967)	(1.987)	(2.386)	(2.304)
Dual	-0.001	-0.001	0.002	0.001	0.005**	0.005**	0.003*	0.003*
	(-0.400)	(-0.317)	(0.908)	(0.884)	(2.186)	(2.168)	(1.820)	(1.921)
_cons	-0.067*	-0.060	-0.049	-0.048	-0.046	-0.048	-0.046*	-0.042*
	(-1.706)	(-1.525)	(-1.614)	(-1.579)	(-1.057)	(-1.093)	(-1.894)	(-1.740)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,592	14,592	14,592	14,592	14,592	14,592	14,592	14,592
Adjusted-R^2	0.033	0.034	0.116	0.116	0.157	0.157	0.134	0.135

3.4.3.2 Management forecasts

Management forecast is one of the key channels for voluntary disclosure [1]that management use to alter market earnings expectations (Hirst, Koonce, Venkataraman, 2008), which has been documented to affect stock prices (Pownall, Wasley, Waymire, 1993). In Chinese capital market, the largest shareholders hold approximate one third of the total shares in listed firms (Jiang and Kim, 2015), they impose huge influence on firms' corporate decision. After pledging shares, in order to sustain or increase stock prices, controlling shareholders can manipulate management earnings forecasts to guide market earnings expectation.

Following prior research (e.g., Ajinkya, Bhojraj, Sengupta, 2005; Karamanou and Vafeas, 2005; Ng, Tuna, and Verdi, 2013), we define *Optimism* to capture management forecast optimism. *Optimism* is set to one if managements' forecast earnings are large than the actual earnings, and zero otherwise. In addition, we define *BadNews* to capture the willingness of managements to disclose bad news. *BadNews* is set to one if management forecast reports a loss or earnings decrease, and zero otherwise. To investigate the relation between share pledging and management forecast strategy, we estimate the following equation by using Logistic regression:

[1] Although China Security Regulatory Commission requires to issue management forecasts if management anticipates at least 50% earnings increase or decrease from prior year, a loss, or a profit after reporting a loss in the prior year, the listed firms can issue management forecasts voluntarily in other circumstances (Huang, Li, Tse, Tucker,2018). Thus, management earnings forecast is still one of the key mechanisms for voluntary disclosure.

$$P(Y_{i,t} = 1) = \alpha_0 + \alpha_1 PledgeDum_{i,t}(PledgeRt_{i,t}) + \boldsymbol{\beta} * \boldsymbol{Controls} + Year + Industry + \varepsilon_{i,t} \quad (9)$$

Where *Y* denotes the dependent variables *Optimism* and *BadNews*. *PledgeDum* and *PledgeRatio* are the independent variables. ***Controls*** is a vector consisting of all control variables. Following prior research (e.g., Ajinkya, Bhojraj, Sengupta, 2005; Karamanou, Vafeas, 2005; Li, 2010; Baik, Farber, and Lee, 2011), we control factors that are documented to affect management forecast including *Size*, *Leverage*, *ROA*, *Growth*, *BoardSize*, *BoardIndp*, *Dual*, *ExcuHold*, *Institute*, *HHI*, which are defined the same as those in the base line models.

Table 3.5 report the results. Columns (1) and (2) show a positive relation between share pledging (*PledgedDum*, *PledgedRatio*) and the optimistic bias of management forecast (*Optimism*), and this relation is statistically significant at 5% level in column (1). Column (3) and (4) show that share pledging (*PledgedDum*, *PledgedRatio*) is negatively related to management's willingness to disclose bad news (*BadNews*), and this relation is statistically significant at 1% level. These results suggest that controlling shareholders strategically issue management forecasts to sustain or increase stock price, which in turn decreases firms' disclosure quality.

Table 3. 5
Manipulating corporate disclosure through management forecasts

This table reports the impact of how share pledging affects management forecast. All the model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and are calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	Optimism	*Optimism*	*BadNews*	*BadNews*
	(1)	(2)	(3)	(4)
PledgeDum	0.121**		-0.167***	
	(2.210)		(-3.270)	
PledgeRatio		0.146		-0.434***
		(0.789)		(-2.578)
Size	-0.183***	-0.186***	0.012	0.014
	(-5.805)	(-5.929)	(0.321)	(0.383)
Lev	0.575***	0.594***	-2.175***	-2.186***
	(4.581)	(4.716)	(-11.715)	(-11.700)
ROA	3.317***	3.298***	-39.765***	-39.745***
	(6.219)	(6.190)	(-22.415)	(-22.518)
Growth	0.376***	0.380***	-0.994***	-0.998***
	(14.246)	(14.448)	(-5.871)	(-5.843)
BoardSize	0.041	0.027	0.275*	0.280**
	(0.320)	(0.213)	(1.932)	(1.983)
BoardIndp	-0.297*	-0.301*	-0.080	-0.078
	(-1.734)	(-1.753)	(-0.383)	(-0.375)
ExcuHold	0.073	0.098	0.803***	0.781***
	(0.417)	(0.553)	(3.538)	(3.421)
Dual	0.046	0.053	-0.134***	-0.139***
	(0.776)	(0.876)	(-2.680)	(-2.711)
Institute	-0.777	-0.728	-1.889***	-1.949***
	(-1.635)	(-1.536)	(-3.242)	(-3.321)
HHI	-0.065	-0.074	0.215	0.217
	(-0.167)	(-0.186)	(0.863)	(0.860)
_cons	0.961	1.071	1.018	0.940
	(0.904)	(1.013)	(0.891)	(0.835)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Observations	21,426	21,426	14,419	14,419
Adjusted-R^2	0.106	0.106	0.373	0.372

3.4.3.3 Share pledging and accounting conditional conservatism

Accounting conditional conservatism (conservatism henceforth) refers to the tendency that a firm recognises bad news in a timelier manner than good news (Basu, 1997). When a firm's accounting policy (or financial reporting) is conservative, the recognition of positive shocks as gains require higher degree of verification than does the recognition of negative shocks as losses. Given that controlling shareholders have incentives to sustain or increase share price after pledging shares, they might report good news in a timelier manner than bad news, which in turn reduces firms' conservatism.

Following Khan and Watts (2009), we construct the firm-year measure of conservatism denoted by *C_Score*, which estimates the sensitivity of earnings to bad news in the cross-section. The estimation of *C_Score* starts with Basu (1997) model in which the annually cross-sectional regression is specified as follows[1]:

$$X_{i,t} = \beta_{1,t} + \beta_{2i,t}D_{i,t} + \beta_{3i,t}R_{i,t} + \beta_{4i,t}D_{i,t}R_{i,t} + \varepsilon_{i,t} \quad (10)$$

where *X* is earnings, *R* is returns, *D* is a dummy variable that equals to 1 for $R < 0$, and 0 otherwise. β_3 captures the good news timeliness, β_4 captures the incremental timeliness for bad news over good news or the conservatism. Then, the firm-year coefficient $\beta_{3i,t}$ ($G\_Score_{i,t}$) and $\beta_{4i,t}$ ($C\_Score_{i,t}$) are expressed as the following linear function of firm-year-specific characteristics that are related to timeliness of good news and conservatism:

$$G\_Score_{i,t} = \beta_{3i,t} = \mu_{1,t} + \mu_{2,t}MKV_{i,t} + \mu_{3,t}MB_{i,t} + \mu_{4,t}LEV_{i,t} \quad (11)$$

$$C\_Score_{i,t} = \beta_{4i,t} = \lambda_{1,t} + \lambda_{2,t}MKV_{i,t} + \lambda_{3,t}MB_{i,t} + \lambda_{4,t}LEV_{i,t} \quad (12)$$

where *MKV* is natural log of total market value, *MB* is the ratio of market-to-book equity ratio, and *LEV* is the debt-to equity ratio. $C\_Score_{i,t}$ is the firm-year measure of conservatism. The coefficients $\mu_{j,t}$ and $\lambda_{j,t}$ (j=1-4) are constants across firms but vary over time. Replacing $\beta_{3i,t}$ and $\beta_{4i,t}$ in equation (10) by equation (11) and (12), respectively, yields the following empirical model:

$$\begin{aligned} X_{i,t} = \beta_{1,t} + \beta_{2i,t}D_{i,t} + R_{i,t}\left(\mu_{1,t} + \mu_{2,t}MKV_{i,t} + \mu_{3,t}MB_{i,t} + \mu_{4,t}LEV_{i,t}\right) + D_{i,t}R_{i,t}\left(\lambda_{1,t} + \right. \\ \left. \lambda_{2,t}MKV_{i,t} + \lambda_{3,t}MB_{i,t} + \lambda_{4,t}LEV_{i,t}\right) + \left(\delta_{1,t}MKV_{i,t} + \delta_{2,t}MB_{i,t} + \delta_{3,t}LEV_{i,t} + \right. \\ \left. \delta_{4,t}D_{i,t}MKV_{i,t} + \delta_{5,t}D_{i,t}MB_{i,t} + \delta_{6,t}D_{i,t}LEV_{i,t}\right) + \varepsilon_{i,t} \end{aligned} \quad (13)$$

we calculate *C_Score* using the estimated coefficients $\mu_{j,t}$ and $\lambda_{j,t}$ (j=1-4) from equation (13). Following Khan and Watts (2009), we also construct *C_Score_Rank* by sorting firms on their *C_Score* and placing them in *C_Score* deciles each year. Higher value of *C_Score* or *C_Score_Rank* indicates higher level of conservatism.

To examine the relation between share pledging and conservatism, we construct the following model:

[1] Following Khan and Watts (2009), when calculating *C_Score*, we delete firm-year observations with missing data for any variables used in estimation, and firm-year observations with negative total assets or book value of equity.

$$Y_{i,t} = \alpha_0 + \alpha_1 PledgeDum_{i,t}\left(PledgeRt_{i,t}\right) + \boldsymbol{\beta} * \boldsymbol{Controls} + Year + Industry + \varepsilon_{i,t} \quad (14)$$

Where *Y* denotes the dependent variables *C_Score* or *C_Score_Rank*. *PledgeDum* and *PledgeRatio* are the independent variables. ***Controls*** is a vector consisting of all control variables. Following prior research (e.g., Dhaliwal, Huang, Khurana, and Pereira, 2014; Francis, Hasan, Park, and Wu, 2015; Kim and Zhang, 2016), we control the factors that are known to affect the decision of management forecast including firm size (*Size*), leverage (*Leverage*), return on total assets (*ROA*), sales growth rate (*Growth*), the ratio of cash holding to total assets (*CashHold*), female CFO (*FemaleCFO*), the proportion of female executives in the top management team (*MGD*), and the proportion of female directors in the boardroom (*BGD*), board size (*BoardSize*), the proportion of independent directors (*BoardIndp*), the duality of CEO and board chairman (*Dual*), the share-holding percentage of institutional investors (*Institute*), and product market competition (*HHI*). we also control year and industry level fixed effect.

Table 3.6 report the regression results of equation (14). The results in column (1- (4) show that share pledging is negatively related to conservatism, and this negative relation is statistically significant at 1% level. These results suggest that controlling shareholders increase the timeliness of good news recognition and decrease the timelines of bad news recognition to sustain or increase stock price, which in turn decreases firms' disclosure quality.

Table 3. 6
Manipulating corporate disclosure through accounting conservatism
This table reports the impact of how share pledging affects conservatism. All the model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and are calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	C_Score	*C_Score*	*C_Score_Rank*	*C_Score_Rank*
	OLS	OLS	Ordered Logit	Ordered Logit
	(1)	(2)	(3)	(4)
PledgeDum	-0.155***		-0.124***	
	(-3.515)		(-3.603)	
PledgeRatio		-0.564***		-0.448***
		(-3.625)		(-3.732)
Size	-0.226***	-0.224***	-0.205***	-0.203***
	(-6.895)	(-6.866)	(-5.972)	(-5.957)
Lev	4.042***	4.051***	3.417***	3.423***
	(17.673)	(17.429)	(15.837)	(15.684)
ROA	-4.164***	-4.161***	-3.623***	-3.620***
	(-6.227)	(-6.242)	(-7.039)	(-7.029)
Growth	-0.081*	-0.082*	-0.083**	-0.084**
	(-1.810)	(-1.833)	(-2.512)	(-2.531)
CashHold	-0.010***	-0.010***	-0.007***	-0.007***
	(-6.455)	(-6.368)	(-5.823)	(-5.786)
FemaleCFO	-0.075**	-0.076**	-0.042*	-0.043*
	(-2.173)	(-2.231)	(-1.670)	(-1.744)
MGD	-0.001	-0.001	-0.001	-0.001
	(-0.904)	(-0.935)	(-0.949)	(-0.975)
BGD	-0.001	-0.001	-0.001	-0.001
	(-0.794)	(-0.757)	(-0.895)	(-0.851)
BoardSize	-0.013	-0.020	0.019	0.013
	(-0.108)	(-0.157)	(0.202)	(0.146)
BoardIndp	0.191	0.188	0.142	0.139
	(1.151)	(1.123)	(1.244)	(1.208)
ExcuHold	-0.754***	-0.784***	-0.484***	-0.508***
	(-3.778)	(-3.916)	(-3.412)	(-3.573)

Dual	-0.050	-0.051	-0.031	-0.032
	(-0.911)	(-0.920)	(-0.756)	(-0.761)
Institute	-2.391***	-2.441***	-1.826***	-1.876***
	(-4.703)	(-4.824)	(-4.244)	(-4.385)
HHI	0.181	0.188	0.134	0.136
	(0.348)	(0.360)	(0.319)	(0.323)
_cons	7.865***	7.846***		
	(9.578)	(9.553)		
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Observations	17,772	17,772	17,772	17,772
Adjusted-R^2	0.352	0.352		
Pseudo-R^2			0.148	0.148

3.4.4 Share pledging, disclosure quality, and firm value

The results thus far indicate that the controlling shareholders who pledge shares manipulate information disclosure to sustain or increase stock price. In this section, we further investigate how the interaction of share pledging and disclosure manipulation affects firm value by estimating the following equation:

$$TobinQ_{i,t} = \alpha_0 + \alpha_1 PledgeDum_{i,t-1}\left(PledgeRatio_{i,t-1}\right) + \alpha_2 PoorDisc_{i,t-1} + \alpha_3 PledgeDum\_PoorDisc_{i,t-1}(PledgeRatio\_PoorDisc_{i,t-1}) + \beta Controls_{i,t-1} + Year + Industry + \varepsilon_{i,t-1} \quad (15)$$

where *Tobin's q* is Tobin's q ratio defined as the ratio of a firm's market value to total assets, and *PledgeDum* and *PledgeRatio* measure share pledging. *PoorDisc* is a dummy variable that is set to one if *KV_Beta* is below sample median, and zero otherwise. *PledgeDum_PoorDisc* and *PledgeRatio_PoorDisc* are the interactions between *PoorDisc* and *PledgeDum*, *PledgeRatio*, respectively. The variable of interests are the interactions. We include the same control variables as the base line models.

Table 3.7 report the results. The coefficients estimate on the stand-alone *PoorDisc* (α_2) and on the stand-alone *PledgeDum* and *PledgeRatio* (α_1) are significantly negative, indicating that investors place discounts on poor corporate disclosure or share pledging, which is consistent with the finding in prior research showing that share pledging destroys firm value (e.g., Wang and Chou, 2018;Dou, Masulis, and Zein, 2019). Moreover, the coefficient estimates on the interaction terms *PledgeDum_PoorDisc* and *PledgeRatio_PoorDisc* are significantly negative, indicating that, as corporate disclosure quality decreases, share pledging exerts an incremental negative impact on firm performance. Therefore, these results suggest that firm value deteriorates in firms with share pledging as corporate disclosure quality decreases.

Table 3. 7
Share pledging, disclosure quality, and firm value
This table report the impact of the interaction of share pledging and disclosure manipulation on firm value. All the model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and are calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	Tobin's q_t	*Tobin's* q_t
	(1)	(2)
PledgeDum $_{t-1}$	-0.044*	

	(-1.761)	
PledgeDum_PoorDisc $_{t-1}$	-0.037**	
	(-2.105)	
PledgeRatio $_{t-1}$		-0.003**
		(-2.253)
PledgeRatio_PoorDisc $_{t-1}$		-0.001***
		(-2.885)
PoorDisc $_{t-1}$	-0.008***	-0.012***
	(-3.378)	(-2.618)
Tobin's q$_{t-1}$	0.611***	0.611***
	(101.705)	(102.060)
Size $_{t-1}$	-0.184***	-0.184***
	(-23.041)	(-23.046)
Lev $_{t-1}$	-0.001**	-0.001**
	(-2.223)	(-2.362)
ROA $_{t-1}$	-0.004**	-0.004**
	(-2.557)	(-2.527)
Growth $_{t-1}$	-0.001***	-0.001***
	(-5.245)	(-5.280)
BoardSize $_{t-1}$	-0.093**	-0.086**
	(-2.127)	(-1.978)
BoardIndp $_{t-1}$	0.004***	0.004***
	(2.767)	(2.814)
ExcuHold $_{t-1}$	-0.004***	-0.004***
	(-5.389)	(-5.334)
Dual $_{t-1}$	0.046**	0.044**
	(2.225)	(2.127)
Institute $_{t-1}$	0.005***	0.005***
	(3.181)	(3.239)
HHI $_{t-1}$	0.115	0.115
	(1.241)	(1.246)
_cons	4.939***	4.917***
	(24.825)	(24.678)
Year	Yes	Yes
Industry	Yes	Yes
Observations	17,333	17,333
Adjusted-R^2	0.507	0.508

3.5. Robustness tests

3.5.1 Endogeneity

Endogeneity and reverse causality might affect the results in this study. First, unobservable economic changes contemporaneous with share pledging could also affect corporate disclosure policy. Second, the controlling shareholders in firms with high level of disclosure manipulation might pledge shares in order to utilize market mispricing, suggesting that current low disclosure quality could be positively related to share pledging in the next period, which in turn generates reverse causality concerns. To examine the impact of endogeneity and reverse causality on our results, we conduct regressions by adding firm and industry-by-year fixed effects, performing propensity score matched (PSM) sample analysis, and conducting instrumental variable regression and lead-lag analysis.

3.5.1.1 Adding fixed effects

To account for the potential unobservable omitted variables that might affect both share pledging and corporate disclosure quality, we control for the factors that are time-invariant across firms and that are time changing within industry by adding firm level fixed effects and industry-by-year fixed effects in the base line models. Table 3.8 report the results which show that share pledging is positively associated with low disclosure quality and statistically significant at 1% level.

Table 3. 8

Adding fixed effects

This table rerun the base line models by adding fixed effects. Robust *t*-statistics are reported in parenthesis and are calculated using standard errors clustered at firm level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	KV_Beta	*KV_Beta*	*KV_Beta*	*KV_Beta*	*KV_Beta*	*KV_Beta*
	(1)	(2)	(3)	(4)	(5)	(6)
PledgeDum	-0.273***		-0.264***		-0.250***	
	(-8.039)		(-7.916)		(-7.623)	
PledgeRatio		-0.007***		-0.007***		-0.007***
		(-3.729)		(-3.892)		(-4.045)
Size	0.305***	0.314***	0.316***	0.326***	0.311***	0.319***
	(8.728)	(9.116)	(9.337)	(9.698)	(8.973)	(9.263)
Lev	0.003**	0.003**	0.002**	0.002*	0.002	0.002
	(2.169)	(2.092)	(1.970)	(1.905)	(1.409)	(1.354)
ROA	0.011***	0.011***	0.010***	0.010***	0.010***	0.010***
	(4.704)	(4.647)	(4.194)	(4.124)	(4.148)	(4.099)
Growth	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(3.991)	(3.952)	(4.034)	(3.994)	(4.696)	(4.686)
BoardSize	0.060	0.063	0.059	0.064	0.035	0.040
	(0.512)	(0.540)	(0.513)	(0.550)	(0.301)	(0.341)
BoardIndp	0.007**	0.007**	0.007*	0.007*	0.006	0.006
	(1.962)	(1.999)	(1.906)	(1.931)	(1.530)	(1.569)
ExcuHold	0.015***	0.016***	0.015***	0.016***	0.014***	0.014***
	(5.923)	(6.143)	(5.860)	(6.078)	(5.656)	(5.802)
Dual	-0.047	-0.052	-0.048	-0.052	-0.039	-0.043
	(-1.159)	(-1.278)	(-1.181)	(-1.291)	(-0.957)	(-1.046)
Institute	0.028***	0.028***	0.028***	0.028***	0.028***	0.028***
	(10.174)	(10.012)	(10.353)	(10.195)	(10.008)	(9.862)
HHI	0.398**	0.426**	0.559**	0.590**	0.592**	0.617**
	(2.234)	(2.387)	(2.204)	(2.332)	(1.987)	(2.065)
_cons	6.370***	6.524***	6.413***	6.561***	6.304***	6.418***
	(6.923)	(7.169)	(6.992)	(7.208)	(4.506)	(4.520)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry			Yes	Yes	Yes	Yes
Year×Industry					Yes	Yes
Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21,877	21,877	21,877	21,877	21,877	21,877
Adjusted-R^2	0.051	0.048	0.055	0.052	0.107	0.104

3.5.1.2 Propensity score matched sample analysis

Controlling shareholders' choice of pledging shares might not be random, firms with and without share pledging might be systematically different. To mitigate the concern that the documented negative relation between share pledging and disclosure quality is caused by cross-sectional or time-series factors that affect both the decision of share pledging and the manipulation of corporate disclosure, we construct matched samples by employing the propensity-score matching strategy to correct for any endogenous selection on observed variables (Rosenbaum and Rubin, 1983; Dehejia and Wahba, 2002).

To conduct PSM analysis, we first choose firm size (*Size*), leverage ratio (*Levereage*), return on assets (*ROA*), sales growth rate (*Growth*), board size (*BoardSize*), the proportion of independent directors (*BoardIndp*), CEO and board chairman duality (*Dual*), the holding percentage of management (*ExcuHold*), the holding percentage of institutional investors (Institute), and Herfindahl-Hirschman Index in product market competition (*HHI*), stock turnover rate (*Turnover*), stock return adjusted by

industry (*AdjReturn*) and the standard deviation of stock return (*StdReturn*) as matching variables[1]. Using Logit Regression model, we regress the indicator variable *PledgeDum* on the matching variables and estimate the probability (i.e., the propensity score) that controlling shareholders in the listed firms pledge shares to for loans. Column (1) in Panel A of Table 3.9 reports the results of logistic regression. Next, we match each firm with share pledging to a firm without share pledging with the closest propensity score. We match without replacement and require the propensity scores for each matched pair within ±1% of each other.[2] The resulting samples consist of 7,539 firm-year observations with share pledging matched to 7,539 firm-year observations without share pledging. Then, we estimate the base line models by using the PSM samples.

Following Fang, Tian, and Tice (2014), and Dhaliwal, Judd, Serfling, and Shaikh (2016), we perform several diagnostic tests to evaluate the successfulness of our matching procedure. If the matching procedure is successful, we should find: (1) the matching variables in the matched samples do not explain any variation in the likelihood that controlling shareholders in the listed firms pledge their shares for loans, (2) the difference in the propensity scores of firms with share pledging and firms without share pledging is negligible, (3) the means of the matching variables are not statistically different between firms with and without share pledging.

We test these predictions in three ways. First, we rerun the same model specification as in column (1) of Panel A for the matched samples and report the results in column (2). The results show that all of the matching variables are not statistically significant, and the pseudo-R^2 drops down to 0.000, indicating that the matching variables in the matched samples do not explain any variation in the likelihood that controlling shareholder pledge their shares for loans. Second, we examine the difference of the propensity scores between firms with and without share pledging in the PSM samples and tabulate the results in Panel B of Table 3.9. The results show that the mean difference is insignificantly less than 0.001 and therefore trivial. Third, we compare the mean value of matching variables between firms with and without share pledging in the PSM samples. Panel C report the univariate tests. The results show that the matching variables are not significantly different across firms with and without share pledging in the PSM samples. Taking together, these diagnostic tests suggest that our matching procedure are successful.

Panel D reruns the base line models by using the PSM samples. The results show that firms with share pledging have a higher level of tunnelling, which is consistent with the findings documented in Table 3.2.

Table 3. 9
Propensity score matched sample analysis

[1] Except for the control variables used in the base line models, we also choose stock turnover rate (*Turnover*), stock return adjusted by industry (*AdjReturn*) and the standard deviation of stock return (*StdReturn*) as matching variables, since the anecdotal evidence suggests that financial institutions are more willing to accept stocks with high liquidity and stable returns as collaterals. Thus, stock turnover rate, stock return and the standard deviation of stock return are likely to be related to the probability that controlling shareholders pledge their shares for loans.
[2] We use the ±1% cut-off so that the matched firms are very similar. We also use ±0.5%, ±2.5%, ±5% as cut-off, the results are consistent.

This table reports the results of how share pledging affects corporate disclosure quality by using PSM sample. All the model specifications in Panel A and D include industry and year fixed effects. In Panel A, the robust z-statistics are reported in parenthesis. In Panel D, Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

Panel A Pre-match propensity score regression and post-match diagnostic regression

	PledgeDum	*PledgeDum*
	Pre-match regression	Post-match regression
	(1)	(2)
Size	0.103***	-0.003
	(6.040)	(-0.219)
Leveargе	1.159***	-0.089
	(12.091)	(-0.940)
ROA	-0.972***	0.147
	(-3.094)	(0.454)
Growth	0.150***	-0.007
	(5.143)	(-0.244)
BoardSize	-0.865***	0.086
	(-9.191)	(0.879)
BoardIndp	-0.356***	0.142
	(-2.741)	(1.061)
ExcuHold	0.894***	-0.096
	(6.144)	(-0.626)
Dual	0.307***	0.009
	(7.649)	(0.226)
Institute	0.011***	-0.002
	(3.245)	(-0.673)
HHI	-0.368*	0.034
	(-1.722)	(0.207)
TurnOver	-0.007	-0.003
	(-1.342)	(-0.534)
AdjRtrn	0.033	0.008
	(0.876)	(0.200)
StdReturn	25.774***	1.941
	(7.508)	(0.942)
_cons	3.208***	-0.768
	(4.881)	(-1.197)
Year	Yes	Yes
Industry	Yes	Yes
Observations	21,406	15,078
Pseudo R^2	0.114	0.000

Panel B Estimated propensity score distribution for the PSM samples

	N	mean	sd	min	P25	P50	P75	max
PledgeDum=0	7,539	0.3914	0.104	0.115	0.130	0.374	0.452	0.812
PledgeDum=1	7,539	0.390	0.102	0.114	0.318	0.374	0.452	0.805
Mean Difference	--	0.001	--	--	--	--	--	--
T-value	--	(0.660)	--	--	--	--	--	--

Panel C Mean differences of the matching variables for the PSM samples

	PledgeDum=0 (obs.7,992)	*PledgeDum*=1 (obs.7,992)	Difference	T-value
	Mean	Mean		
	(1)	(2)	(3) = (1) - (2)	(4)
Size	21.896	21.898	-0.002	-0.101
Leverage	0.4666	0.463	0.003	0.949
ROA	0.035	0.036	-0.001	-0.729
Growth	0.236	0.235	0.001	0.145
BoardSize	2.137	2.138	-0.001	-0.332
BoardIndp	3.602	3.603	-0.001	-0.739
ExcuHold	0.056	0.056	0 .000	0.254
Dual	0.258	0.259	-0.001	-0.093
Institute	4.533	4.499	0.034	0.417
HHI	0.098	0.098	-0.000	-0.183
TurnOver	5.746	5.744	0.002	0.019
AdjRtrn	0.004	0.006	-0.002	-0.283
StdReturn	0.031	0.031	-0.000	-0.687

Panel D Regression results of the base line models by using PSM samples

	KV_Beta	*KV_Beta*

	(1)	(2)
PledgeDum	-0.204***	
	(-7.198)	
PledgeRatio		-0.358***
		(-3.047)
Size	0.344***	0.339***
	(13.657)	(13.257)
Lev	0.215*	0.201
	(1.724)	(1.571)
ROA	2.563***	2.523***
	(9.838)	(9.535)
Growth	0.084***	0.085***
	(3.443)	(3.567)
BoardSize	0.054	0.023
	(0.712)	(0.301)
BoardIndp	0.209*	0.201
	(1.726)	(1.621)
ExcuHold	1.658***	1.665***
	(10.795)	(10.887)
Dual	-0.064**	-0.061**
	(-2.361)	(-2.225)
Institute	0.027***	0.027***
	(7.677)	(7.549)
HHI	0.238	0.225
	(1.396)	(1.304)
_cons	5.881***	5.818***
	(9.416)	(8.942)
Year	Yes	Yes
Industry	Yes	Yes
Observations	15,078	15,078
Adjusted-R^2	0.146	0.141

3.5.1.3 Instrumental variable approach

Although the previous analysis helps alleviate the endogeneity concerns, our results are subject to the endogenous problem arising from the unobservable omitted variables. For instance, we are unable to observe the macro economic factors, for example the business cycles, which possibly affect share pledging and corporate disclosure policy simultaneously. Thus, we next examine the robustness of our findings by using instrumental variables approach.

Instrumental variables approach assumes that the instrumental variables are correlated with the endogenous variable but unrelated with the dependent variable. Specifically, instrumental variables must satisfy tow conditions to be consider valid instruments. First, the relevance condition requires that the instruments are correlated with our measures of share pledging (*PledgeDum*, *PledgeRatio*) after controlling for the set of control variables in our base line models. Second, the exclusion restriction requires that the instruments are correlated with disclosure quality only through their correlation with measures of share pledging after controlling for the set of control variables. According to these two conditions, we select the natural logarithm of the number of financial institutions (*FinaInst*) located in a firm's incorporation province as an instrumental variable. The controlling shareholders of listed firms pledge shares to financial institutions such as commercial banks, security companies, funds, trust companies, assets management companies, which are qualified pledgees. In the area where a listed firm is located, larger number of qualified pledgees provides more availabilities for controlling shareholder to take share pledging loans. Thus, the number of qualified pledgees is positively related to share

pledging activities in the same area. Meanwhile, there are no theories or empirical evidences show that the number of qualified pledgees is directly related to corporate disclosure decision. Therefore, these two properties of *FinaInst* make it an ideal instrumental variable.

Table 3.10 presents the results from instrumental variable regression by using two stage least square method (2SLS). According to the above arguments, we expect that *FinaInst* is positively related to *PledgeDum* and *PledgeRatio*. The first stage results of 2SLS in column (1) and (2) show that the coefficient estimates on of *FinaInst* are significantly positive at 1% and 5% level, respectively, suggesting that the instrumental variable is positively related to the endogenous variable, indicating that the selected instrumental variable meets the relevance condition. Further, we perform various tests, the results suggest that our selected instrumental variables are valid. Specifically, the Dubin-Wu-Hausman test rejects the null hypothesis that our share pledging measures are exogenous. The high *F*-statistics and partial R^2 of our instruments imply that our results do not suffer from the problem of weak instruments.

Finally, the second stage results in column (3) and (4) show that the coefficient estimates on *PledgeDum* and *PledgeRatio* are significantly positive at 5% level, respectively, indicating that greater share pledging casually decreases corporate disclosure quality. Thus, the results in Table 3.10 suggest that, after controlling for endogeneity, our main results still hold.

Table 3. 10

Instrumental variable approach

This table reports the results of how share pledging affects corporate disclosure quality by using an instrumental variable approach. All model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	PledgeDum	*PledgeRatio*	*KV_Beta*	*KV_Beta*
	First Stage	First Stage	Second Stage	Second Stage
	(1)	(2)	(3)	(4)
FinaInst	0.019***	0.006***		
	(3.626)	(4.610)		
PledgeDum			-0.964**	
			(-2.230)	
PledgeRatio				-3.074**
				(-2.278)
Size	-0.028***	-0.006***	0.286***	0.296***
	(-9.030)	(-7.361)	(12.032)	(18.392)
Lev	0.274***	0.078***	0.429*	0.404**
	(15.777)	(18.144)	(1.955)	(2.101)
ROA	-0.007	-0.003	-0.446***	-0.449***
	(-0.270)	(-0.456)	(-6.315)	(-6.580)
Growth	0.033***	0.007***	-0.087***	-0.096***
	(5.864)	(5.323)	(-2.836)	(-4.059)
BoardSize	-0.171***	-0.057***	-0.211	-0.222
	(-9.454)	(-12.832)	(-1.472)	(-1.519)
BoardIndp	-0.057**	-0.022***	-0.120	-0.131
	(-2.271)	(-3.477)	(-1.408)	(-1.505)
ExcuHold	0.183***	0.001	-1.371***	-1.543***
	(6.042)	(0.180)	(-8.007)	(-18.582)
Dual	0.065***	0.016***	0.131**	0.118***
	(7.843)	(7.896)	(2.313)	(2.595)
Institute	0.193***	-0.011	-2.657***	-2.876***
	(2.992)	(-0.678)	(-11.052)	(-16.229)
HHI	-0.068*	0.002	-0.361***	-0.289***

	(-1.714)	(0.238)	(-2.898)	(-2.678)
_cons	1.173***	0.305***	-4.675***	-4.870***
	(9.039)	(9.513)	(-4.249)	(-5.314)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Observations	21,875	21,875	21,875	21,875
Adjusted-R^2	0.140	0.098	0.041	0.024
Test of endogeneity, weak instruments				
DWH *F*-statistics	7.56	7.74		
	(p < 0.005)	(p < 0.005)		
F-statistics	49.92	33.23		
	(p < 0.000)	(p < 0.000)		
Partial R^2	0.133	0.182		

3.5.1.4 lead-lag change analysis

To examine whether reverse causality exists in our setting, following Chen, Li and Zou (2016), we investigate the association between a change in share pledging and a change in the lead or lag measures of disclosure quality. The changes in share pledging in year *t*, denoted by $\triangle PledgeDum_t$ and $\triangle PledgeRatio_t$, are defined as the changes in *PledgeDum* and *PledgeRatio* from year *t*-1 to year *t*. The change in the *lead* disclosure quality, denoted by $\triangle KV\_Beta_{t+1}$, is the change in *KV_Beta* from year *t* to year *t*+1. The change in the *lagged* disclosure quality, $\triangle KV\_Beta_{t-1}$, is the change in *KV_Beta* from year *t*-2 to year *t*-1.

Table 3.11 reports results in the lead-lag analysis. We document a significantly positive association between$\triangle PledgeDum_t$, $\triangle PledgeRatio_t$ and $\triangle KV\_Beta_{t+1}$ in column (1) and (2), but the associations between $\triangle PledgeDum_t$, $\triangle PledgeRatio_t$ and $\triangle KV\_Beta_{t-1}$ are insignificant in column (3) and (4). In column (5) and (6), we lag the change in disclosure quality by two years and the relation remains insignificant. These results suggest that a change in disclosure quality follows a change in share pledging, rather than the other way around.

Table 3. 11
lead-lag change analysis

This table reports the lead-lag change analysis. The model specifications are set the same as those in base line models but with lag or lead of variables. All model specifications include industry and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

$\triangle KV\_Beta[t+\tau]$	τ=1	τ=1	τ=-1	τ=-1	τ=-2	τ=-2
	(1)	(2)	(3)	(4)	(5)	(6)
$\triangle PledgeDum[t]$	-0.072***		-0.043		-0.047	
	(-2.997)		(-0.919)		(-1.130)	
$\triangle PledgeRatio[t]$		-0.003***		-0.002		-0.003
		(-2.875)		(-0.781)		(-1.510)
$\triangle Size[t+\tau]$	0.053	0.053	0.095**	0.094**	0.068	0.067
	(1.351)	(1.348)	(2.246)	(2.241)	(1.618)	(1.615)
$\triangle Lev[t+\tau]$	-0.002*	-0.002*	-0.000	-0.001	0.000	0.000
	(-1.969)	(-1.993)	(-0.470)	(-0.494)	(0.062)	(0.051)
$\triangle ROA[t+\tau]$	-0.001	-0.001	0.003	0.003	0.003	0.003
	(-0.905)	(-0.907)	(1.299)	(1.293)	(1.200)	(1.206)
$\triangle Growth[t+\tau]$	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(3.390)	(3.403)	(2.861)	(2.863)	(3.174)	(3.179)
$\triangle BoardSize[t+\tau]$	-0.036	-0.038	-0.080	-0.082	-0.133	-0.131
	(-0.410)	(-0.439)	(-1.049)	(-1.065)	(-1.563)	(-1.537)
$\triangle BoardIndp[t+\tau]$	0.003	0.003	0.002	0.002	0.003	0.003
	(1.476)	(1.437)	(0.850)	(0.841)	(1.197)	(1.184)

$\triangle ExcuHold[t+\tau]$	0.002	0.002	0.004	0.004	0.000	0.000
	(1.006)	(1.005)	(0.999)	(1.013)	(0.046)	(0.045)
$\triangle Dual[t+\tau]$	0.034	0.033	0.021	0.021	0.002	0.003
	(1.290)	(1.267)	(0.428)	(0.430)	(0.034)	(0.038)
$\triangle Institute[t+\tau]$	0.027***	0.027***	0.028***	0.028***	0.030***	0.030***
	(9.833)	(9.889)	(7.909)	(7.915)	(7.133)	(7.125)
$\triangle HHI[t+\tau]$	0.092	0.091	0.169	0.170	0.210	0.205
	(0.305)	(0.300)	(0.797)	(0.803)	(0.786)	(0.763)
_cons	-0.133	-0.134	-0.301	-0.301	-0.523*	-0.523*
	(-0.639)	(-0.643)	(-1.418)	(-1.421)	(-1.976)	(-1.979)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,793	13,793	13,793	13,793	10,989	10,989
Adjusted-R^2	0.029	0.029	0.015	0.015	0.015	0.015

3.5.2 Using alternative subsamples

Prior to the year 2005, approximate two thirds of the stocks in Chinese stock market are non-tradable shares (NTS). In the year 2005, the China Securities Regulatory Commission (CSRC) announced a reform aiming at eliminating NTS. By the end of 2007, the total market value of the firms completed the reform accounts for 97% of the total Chinese A-share market capitalization (Li, Wang, Cheung, and Jiang, 2011). After the reform, the pre-reform non-tradable shares can be traded the stock market, which may lead to a substantial increase in the number of shares that controlling shareholder could pledge for loans. Thus, our main results may be affected by the Split Share Structure Reform. In addition, in the year 2006, the Ministry of Finance of the People's Republic of China issued new version of Accounting Standards for Business, which is put into practice in the year 2007. The new version of accounting standards are convergent to the international accounting standards, which could affect corporate disclosure quality. To rule out the impact of Split Share Structure Reform and accounting standards changes, we restrict the samples after the year 2007. Table 3.12 presents results from the subsamples of year 2007-2017. The results in column (1) and (2) show that the coefficients of *PledgeDum* and *PledgeRatio* are statistically negative, which is consistent with the results reported in base line model in Table 3.2.

Table 3. 12
Results from the subsamples after the year 2007

This table rerun the base line models by using the subsamples after the year 2007. Robust *t*-statistics are reported in parenthesis and are calculated using standard errors clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	KV_Beta	*KV_Beta*
	(1)	(2)
PledgeDum	-0.204***	
	(-6.700)	
PledgeRatio		-0.005***
		(-3.600)
Size	0.303***	0.300***
	(11.400)	(11.224)
Lev	0.000	0.000
	(0.158)	(0.004)
ROA	0.026***	0.026***
	(10.306)	(10.398)
Growth	0.001***	0.001***
	(3.644)	(3.609)
BoardSize	-0.062	-0.055

	(-0.926)	(-0.803)
BoardIndp	0.001	0.001
	(0.456)	(0.445)
ExcuHold	0.017***	0.016***
	(10.683)	(10.484)
Dual	-0.063**	-0.069**
	(-2.509)	(-2.686)
Institute	0.027***	0.026***
	(7.693)	(7.500)
HHI	0.119	0.132
	(0.675)	(0.713)
_cons	6.293***	6.185***
	(11.535)	(11.165)
Year	Yes	Yes
Industry	Yes	Yes
Observations	18,426	18,426
Adjusted-R^2	0.140	0.136

3.6 Conclusion

Insider share pledging has become a global financial phenomenon. Although insider share pledging appears the insiders' personal financial activity, it can adversely affect the listed firms' corporate disclosure policy. To test whether and how insider share pledging changes corporate disclosure policy, we use a comprehensive data set to examine the relation between share pledging and corporate disclosure quality. We show that, compared to firms without share pledging, firms with share pledging have lower disclosure quality, and the more shares the controlling shareholders pledge, the lower the disclosure quality is. Moreover, we find that the negative association between share pledging and disclosure quality is stronger in non-SOEs than that in SOEs.

We also explore how controlling shareholders manipulate disclosure to sustain or increase stock price. We find that share pledging are positively associated with upward accrual earnings management, real earnings management, the optimistic bias of management forecast, and negatively associated with downward accrual earnings management, management's willingness to disclose bad news, and accounting conservatism. These results suggest that controlling shareholders manipulate accounting numbers, forward-looking information disclosure, and accounting policy to defend stock price, which in turn decreases firms' disclosure quality. By further investigation, we find that, as corporate disclosure quality decreases, share pledging exerts an incremental negative effect on firm value. At last, by adding firm, industry-by-year fixed-effects, performing propensity score matched sample analysis, conducting instrumental variable regression, and performing lead-lag change analysis, we obtain similar results.

Appendix A. Variable definition and Sources

Variables	Definition
Corporate disclosure quality measures	
KV_Beta	A proxy for corporate disclosure quality defined as the inverse of the slope coefficient constructed by Kim and Verrecchia (2001). Larger value of *KV_Beta* indicates poor disclosure quality (Ascioglu, Hegde and McDermott, 2005; Reeb and Zhao, 2013)
Share pledging measures	
PledgeDum	A dummy variable that that equals one for a firm with share pledging, and zero for a firm without share pledging (Meng, Ni, and Zhang, 2018; Ouyang, Wang, and Chan, 2018; DeJong, Liao, and Xie, 2019)
PledgeRatio	The ratio of controlling shareholders' pledged shares to the total shares of a listed firm (Meng, Ni, and Zhang, 2018; Ouyang, Wang, and Chan, 2018; DeJong, Liao, and Xie, 2019)
Firm level variables	
Size	The natural logarithm of Total assets
Leverage	is the ratio of a firm's total liability to total assets
ROA	The return on assets defined as the ratio of net income to total assets
Growth	The growth rate of sales
BoardSize	The natural logarithm of the number of board directors
BoardIndp	The ratio of the number of independent directors to the number of total board directors
ExcuHold	The holding percentage of management
Dual	A dummy variable that is set to one if the CEO is also the chairman of the board, and zero otherwise.
Institute	The holding percentage of institutional investors
HHI	Herfindahl-Hirschman Index, a proxy for product market competition, calculated by squaring the market share of each firm competing in the same industry and then summing the resulting numbers
CashHold	is the ratio of cash holding to total assets
FemaleCFO	A dummy variable that is set to one if CFO is female and zero otherwise
MGD	The proportion of female executives in the top management team
BGD	The proportion of female directors in the boardroom
MTB	The ratio of market capitalization to book value
AnalystCoverag	The natural logarithm of the number of following analysts plus one
Age	The natural logarithm of firm age
ABS_DA	A proxy for accrual-based earnings management, defined as the absolute value of discretionary accruals derived from the modified Jones model (Jones,1991; Dechow, Sloan, and Sweeney; 1995)
Positive_DA	A proxy for upward earnings management, defined as the positive discretionary accruals derived from the modified Jones model (Jones,1991; Dechow, Sloan, and Sweeney; 1995)
Negative_DA	A proxy for downward earnings management, defined as the negative discretionary accruals derived from the modified Jones model (Jones,1991; Dechow, Sloan, and Sweeney; 1995)
ACFO	Abnormal cash flow from operations (Roychowdhury,2006; Cohen, Dey, and Lys,2008)
ADISEXP	A proxy for real earnings management, defined as abnormal discretionary expenses (Roychowdhury,2006; Cohen, Dey, and Lys,2008)

APROD	A proxy for real earnings management, defined as abnormal production costs (Roychowdhury,2006; Cohen, Dey, and Lys,2008)
Optimism	A dummy variable that is set to one if managements' forecast earnings are large than the actual earnings and zero otherwise.
BadNews	A dummy variable that is set to one if management forecast reports loss or earnings decrease and zero otherwise
C_Score	A firm-year measure of accounting conditional conservatism (Khan and Watts, 2009)
C_Score_Rank	A firm-year measure of accounting conditional conservatism estimated by sorting firms on their *C_Score* and placing them in *C_Score* deciles each year
PoorDisc	A proxy for poor disclosure, defined as the inverse value of KV_Beta. The large value of *PoorDisc* indicates poorer disclosure quality
Non-SOEs	A dummy variable that is set to one for non-state-owned enterprises and zero otherwise
Province level variables	
WeakInstEnvi	A dummy variable that is set to one if the *Overall Marketization Index* is below the sample median, and zero otherwise. *Overall Marketization Index* is the marketization indexes constructed by the National Economic Research Institute (NERI) to measure the quality of regional/provincial institutional environment across provinces (Wang, Fan, and Yu, 2017).
FinaInst	The natural logarithm of the number of financial institutions located in a firm's incorporation province

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CHAPTER FOUR

(Paper Three)

CONTROLLING SHAREHOLDER SHARE PLEDGING AND COST OF EQUITY CAPITAL: EVIDENCE FROM CHINA

Abstract

We investigate the effect of controlling shareholder share pledging (share pledging for short henceforth) on the listed firms' cost of equity capital. By using a sample of share pledging in Chinese listed firms, we document a positive association between share pledging and cost of equity capital. Firms with share pledging have a cost of equity that is 24.6 basis points higher than do firms without share pledging, which translates into an additional annual cost of 14.7 million RMB for an average firm with share pledging to finance with equity. We further find that the positive association between share pledging and cost of equity is more pronounced in firms with high level of information asymmetry, Non-SOEs, firms with weak monitoring of multiple large shareholders, and firms with weak regional institutional environment. By further investigation, we document a positive association between share pledging and firms' systematic risk, suggesting that the information risk and agency conflicts related to share pledging is non-diversifiable. Our further analysis also shows that share pledging increases the listed firms' cost of debt. Overall, our results suggest that share pledging deteriorates information asymmetry and agency conflicts, which in turn increases cost of capital in emerging markets.

Keywords: controlling shareholder share pledging, cost of equity capital, information risk, agency conflicts, cost of debt

4.1. Introduction

The practice that controlling shareholders pledge their shares as collaterals to secure loans from financial institutions is pervasive across the global capital market (Dou, Masulis, and Zein, 2019). Since controlling shareholders who have pledged their shares of a listed firm still keep the voting rights of the pledged share, they have incentives to extract private benefit at the expenses of outside shareholders. The pervasiveness of controlling shareholder share pledging (share pledging for short henceforth) raises concerns among regulators and outside investors. To cope with the agency issues related to insider share pledging in October 2011, the Legislative Yuan in Taiwan passed amendment to Article 197–1 of the Company Act, which prohibits the exercise of voting rights of "excessive pledged shares", defined as those that exceed half of the shares held by a director on election. While the pervasiveness of share pledging and its related potential risks, few studies explore whether and how investors perceive share pledging and whether investors price these risks. To the best of our knowledge, only two studies have investigated the market reaction of share pledging and how share pledging affects shareholder wealth (Wang and Chou, 2018; Dou, Masulis, and Zein ,2019). We fill this gap by investigating the association between share pledging and cost of equity capital to show whether and how investors price the potential risks related to share pledging.

In addition to the scarcity of empirical work on the link between share pledging and the cost of equity capital, our interest in firms' equity financing costs is motivated by the following consideration. First, the cost of equity capital is the discount rate that the market applies to a firm's future cash flows to determine the firm's current market value. This discount rate is tantamount to the required rate of return or risk premium that investors demand for their perception of a firm's risks. If share pledging affects investors perceived risks of a firm, as we argue below, then the cost of equity capital should vary among firms with share pledging and firms without share pledging. Second, prior studies suggest that effective corporate governance and high-quality disclosure lowers firms' cost of capital by reducing agency conflict and information asymmetry (Botosan, 1997; Hail and Leuz, 2006; Chen, Chen, and Wei, 2009; Chen, Chen, and Wei, 2011). As we argue later, agency conflict and information asymmetry are the channels through which share pledging affects the cost of equity capital. Third, cost of equity capital is the central theme in finance and accounting literature, and the dominance of controlling shareholders in board concerns regulators and outside investors in the emerging market. We confirm these concerns by examining whether and how controlling shareholders' personal financial activities affect firms' cost of equity capital.

To test the relation between share pledging and cost of equity capital, we create an indicator variable and a continuous variable to measure share pledging activities, over the years 2008-2017. Next, we follow prior research and measure cost of equity capital as the mean of the four commonly used implied cost of equity estimates (Gode, Mohanram, 2003; Easton, 2004; Gebhardt, Lee, Swaminathan, 2001; Claus and Thomas, 2001). In our empirical tests, we control for a set of control variables that are shown to affect cost of equity capital, and we also control for firm and year fixed effects. Our base line

results show a positive relation between share pledging and cost of equity capital. Specifically, our findings show that a firm with share pledging has a 24.6 basis points higher cost of equity capital than does a firm without share pledging, which translates into an additional cost of 14.7 million RMB for an average firm with share pledging to finance with equity.

Next, we explore the potential channels through which share pledging affects firms' cost of equity capital. We use corporate disclosure quality and controlling shareholders' tunnelling activities as proxies for firm's information risk and agency conflicts between controlling shareholder and minority shareholders, respectively. Our results show that share pledging deteriorates corporate disclosure quality and aggravates the agency conflicts. These findings suggest that share pledging increases firms' cost of equity capital by inducing information risks and agency conflicts.

To further identify the channels through which share pledging affects firms' cost of equity capital, we conduct cross-sectional tests in settings that provide variation in the magnitude of information risks and agency conflicts related to share pledging. Our results show that, share pledging has a stronger effect on the cost of equity capital in firms with high level of information asymmetry, Non-SOEs, firms with weak monitoring of multiple large shareholders, and firms with weak institutional environment. These findings further suggest that information risks and agency conflicts are the two channels through which share pledging increases firms' cost of equity capital.

We also examine whether share pledging affects firms' systematic risk and cost of debt. First, we find that share pledging is positively related to firms' systematic risk, suggesting that the information risks and agency conflicts related to share pledging are non-diversifiable. Second, the results show that share pledging is positively related to the listed firms' cost of debt.

Our estimate of the effect of share pledging on a firm's cost of equity capital could suffer from an omitted variable bias. In particular, unobservable macro-economic factors, such as business cycles, credit supply, and the government's economic policies could affect both share pledging behavior and firms' cost of equity capital. Thus, we next examine the robustness of our main findings by controlling for the endogeneity using an instrumental variables approach. Also, controlling shareholder choice of pledging shares might not be random, firms with and without share pledging may be systematically different. To help alleviate these endogenous concerns, we add additional industry-by-year and province-by-year fixed effects in our base line model, perform propensity sore matched sample analysis, and conduct instrumental variable regression. The results from these analyses continue to show a positive association between share pledging and cost of equity capital, suggesting a causal link from share pledging to cost of equity capital.

Finally, we examine whether our results are robust across different cost of capital measures. We rerun the base line model using the individual four commonly used implied cost of equity estimates (Gode, Mohanram, 2003; Easton, 2004; Gebhardt, Lee, Swaminathan, 2001; Claus and Thomas, 2001), the earnings/price ratio (Houston, Lin, Xie, 2018), and the expected cost of equity capital (Barth,

Konchitchki, Landsman, 2013) as dependent variables. The results from these robust tests are consistent with the previous findings that share pledging is positively associated with cost of equity capital.

We contribute to the finance and accounting literature in the following ways. First, our analysis adds to an emerging literature examining the economic consequences of share pledging in the equity capital markets. Prior studies mainly examine the impact of share pledging on earnings management (DeJong, Liao, and Xie, 2019), bond yield spread (Ouyang, Wang, and Chan, 2018), firm value (Singh, 2018), corporate risk taking (Meng, Ni, and Zhang,2018). Although Wang and Chou (2018), Dou, Masulis, and Zein (2019) examine the equity market reaction to firms' insider share pledging, they do not link insider share pledging to firms' cost of equity capital.

Second, our study also complements to the literature on the sources of risks that drive firms' cost of capital. Prior work predominantly focuses on how various information risks and business risks that stem from the operating environment and business model affect firms' cost of capital (e.g., Modigliani and Miller, 1958; Armstrong, Core, Taylor, and Verrecchia, 2011; Lambert, Leuz, and Verrecchia, 2011; Ng and Rezaee, 2015; Johnstone, 2016; Dhaliwal, Judd, Serfling, and Shaikh, 2016; Konchitchki, Luo, Ma, and Wu, 2016). However, very little is known about how the personal borrowing by insider-owners, for example share pledging, affects firms' cost of capital. Our work explores this research question by investigating the relation between share pledging and firms' cost of equity capital. Therefore, the findings in this paper contribute to the literature regarding the determinants of firms' cost of capital.

The remainder of this paper proceeds as follows. Section 2 presents hypothesis development. Section 3 describes data and methodology. Section 4 reports empirical results. Section 5 conducts robust tests. Section 6 concludes this paper.

4.2. Hypothesis Development

The cost of equity capital is the required premium that investors demand for various potential risks. Information/estimation risk is one of the important sources of risks that drive firms' cost of capital. Easley, Hvidkjaer, O'hara (2002) find that stocks with higher probability of information-based trading have higher expected returns, suggesting that cost of capital increases with the degree of information uncertainty and asymmetry. Easley and O'Hara (2004), and He, Lepone, and Leung (2013) directly investigates how information affects firms' cost of capital and show that information asymmetry is positively associated with firms' cost of capital. Further, Lambert, Leuz, Verrecchia (2011) find that imperfect capital market's competition increases market illiquidity, which in in turn raises the cost of capital. Given that information asymmetry negatively affects cost of capital, firms that reduce information asymmetry through high quality corporate disclosure can enjoy a low cost of capital (Diamond and Verrecchia, 1991; Botosan, 1997; Baginski and Rakow, 2012, Cao, Myers, Tsang, and Yang, 2017). For example, Baginski and Rakow (2012), Cao, Myers, Tsang, and Yang (2017) find that the issuance, frequency, precision and disaggregation of management earnings forecasts are negatively

associated with cost of capital, which suggests that high quality voluntary disclosure lowers cost of capital by reducing information asymmetry between insiders and outside investors.

However, the findings documented by prior studies suggest that controlling shareholder who have pledged shares have incentives to manipulate corporate disclosure to sustain or increase stock price (e.g., Asija, Marisetty, and Rangan, 2014; DeJong, Liao, and Xie, 2019), which in turn increases outside investors' information/estimation risk. On the one hand, during the pledging period, controlling shareholders lose the cash flow rights to the pledgees (the creditors) but they still keep the control rights. On the other hand, the potential cost induced by share pledging for controlling shareholders is the exposure to the risk of market downturn. The controlling shareholders will face a margin call when the market value of the pledged shares drops down to the maintenance margin ratio[1]. If the controlling shareholders fail to pledge more shares as collaterals or pay down the debt, the pledgees (the creditors) are entitled to sell the pledged shares and close the position. As a result, share pledging exposes controlling shareholders to the risk of losing control rights. Due to a large private benefit of control rights (Dyck and Zingales, 2004) and a high "shell value" of a listed firm in Chinese capital market (Lee, Qu and Shen, 2017), the cost of losing the control rights is large for controlling shareholders. In addition, the weak legal system for investor protection in Chinese capital market makes controlling shareholders' opportunistic disclosure less costly (Jiang and Kim, 2015). Consequently, controlling shareholders who have pledged shares have incentives to manipulate corporate disclosure to sustain or increase stock price. Consistent with these arguments, prior studies suggest that share pledging deteriorates firms' financial report quality, which increases the degree of information asymmetry between insiders and outside investors. For example, DeJong, Liao, and Xie (2019) find that firms with share pledging have higher level of accruals-based earnings management and real earnings management. Therefore, share pledging is expected to increase firm's cost of equity by deteriorating corporate disclosure quality.

Agency conflicts is another important source of risk that drives firms' cost of capital. Empirical evidence shows that agency conflicts and weak corporate governance affect investors' perceived risks, and hence the cost of capital (Chen, Chen, Wei, 2009; Guedhami and Mishra, 2009; Boubakri, Guedhami, Mishra, 2010; Chen, Li, Zou, 2016; Taylor, Richardson, Al-Hadi, and Obaydin, 2018; Houston, Lin, Xie, 2018). For example, the managerial rent extraction related to the utilization of tax heavens (Taylor, Richardson, Al-Hadi, and Obaydin, 2018) and the weakened investors' litigation rights induced by the passage of universal demand (UD) laws (Houston, Lin, Xie, 2018) aggravate agency conflicts between insiders and outside investors, which in turn leads investors to demanding a higher risk premium. As agency problem induces a high cost of capital, researchers argue that strong corporate governance, such as U.S. cross listing (Hail and Leuz, 2009), high auditing quality (Chen, Chen, Lobo,

[1] The maintenance margin ratio is usually between 130% and 160%.

Wang, 2011), risk committee in the board (Al-Hadi, Hussain, Al-Yahyaee, Al-Jabri, 2018), can reduce investors' perceived risks.

However, share pledging aggravates the agency conflicts between insiders and outside investors. As a typical transitional economy, the legal institutional environment for investors' protection in Chinese capital market is weak, and controlling shareholders averagely owns more than one-third of the ownership of Chinese listed firms (Jiang and Kim, 2015), which provides controlling shareholders who have pledged shares with opportunities to expropriate the listed firms. In the meantime, share pledging create deviation between control rights and cash flow rights. The Article 68 of *The Guaranty Law of the People's Republic of China* and the Article 213 of *The Property Law of the People's Republic of China* stipulate that, during the pledging period, the derivatives, such as stock dividends and cash dividends shall be pledged with the original collaterals. Thus, during the pledging period, the cash flow rights of the pledged shares do not belong to the pledgor. The Article 51 of *The Regulations for Pledged Share Repurchase and Registration* stipulates that, during the pledging period, the pledgors keep the rights to attend shareholders' meetings, to put forth proposals, and to vote on the board. In another word, during the pledging period, while losing the cash flow rights of the pledged shares, the pledgors still keep the control rights of the listed firms. Previous studies suggest that share pledging creates deviation between control rights and cash flow rights, which aggravates the agency conflicts between large shareholders and minority shareholders (Kao, Chiou, and Chen, 2004; Chen, Kao, and Chen, 2007). Given agency conflicts is an important source of risk that drives firms' cost of capital, investors require a higher rate of return for holding shares in the firms with share pledging than do thoes in the firms without share pledging.

In sum, share pledging increases investors' perception of information risks and agency conflicts to hold shares, which in turn leads investors to demanding a higher risk premium. We therefore propose the hypothesis as follows:

H1. Ceteris paribus, share pledging is positively associated with the cost of equity capital.

4.3. Data and Methodology

4.3.1 Data source and sample selection

We collect annual data of Chinese A-share listed firms spanning from the year 2008 to 2017 as samples. The initial data is obtained from the Chinese Stock and Market Accounting Research (CSMAR) database. Specifically, we first collect the data of share pledging from the Shareholder subset which discloses information regarding the share pledging activities by the top 10 shareholders. Then, we collect stock return data and accounting numbers in the Stock Trading subset and Financial Statements subset, respectively. Our research period starts with the year 2008 because we need previous fifteen years data to calculate the measure of cost of equity capital for a given year. We will provide further information about the measurement of each variable in the following section.

To construct firm-year observations for our empirical analysis, we start the data processing with 22,950 firm-year observations of share pledging in non-financial firms, and we then merge share pledging with data for each firm's cost of equity capital measure and characteristics, we obtain 21,241 firm-year observations. We exclude 2,855 observations with missing values for key variables. To alleviate the impact of outliers, we winsorize all continuous variables at 1% and 99% level. After these screening procedures, the final sample consists of 2,920 unique firms and 18,386 firm-year observations.

4.3.2 Measuring Variables

Share pledging

Following prior researches (e.g., Meng, Ni, and Zhang, 2018; Ouyang, Wang, and Chan, 2018; DeJong, Liao, and Xie, 2019), we define a dummy variable *PledgeDum* that equals one for a firm with share pledging in a given year, and zero otherwise. In addition, in order to capture the variation of the number of controlling shareholders' pledged shares, we create a continuous variable *PledgeRatio* defined as the ratio of a controlling shareholder's pledged shares to a listed firm's total shares. These two variables serve as independent variables in this study.

Proxy for implied cost of equity capital

Implied cost of capital (denoted by *ICOC*) is the discount rate that equates current stock price to the present value of expected future dividends/returns. Li and Mohanram (2014) propose a new model based on the residual income valuation models in Ohlson (1995), Feltham and Ohlson (1995, 1996) to estimate future earnings (RI model henceforth). Following Li and Mohanram (2014), we compute *ICOC* by using the estimated future earnings derived from RI model. The RI model is specified as:

$$E_{t+\tau} = \alpha_0 + \alpha_1 * NegE_t + \alpha_2 * E_t + \alpha_3 * NegE_t * E_t + \alpha_4 * B_t + \alpha_5 * TACC_t + \varepsilon \qquad (1)$$

Where $E_{t+\tau}$ is earnings in year $t + \tau$ (τ =1 to 5), $NegE_t$ is an indicator variable for loss firms, E_t is earnings in year *t*, B_t is book value in year *t*, $TACC_t$ is total accruals derived from Richardson, Sloan, Soliman, and Tuna (2005), $NegE_t * E_t$ is the interaction between $NegE_t$ and E_t. The regression is estimated by using the previous 10 years' data. Earnings for the future 5 years are estimated by using the coefficients from the above regressions and the year *t* data. Specifically, for each year between 2008-2012, we estimate the cross-sectional model (1) by using all available observations over the past 10 years. For example, if 2008 is the year *t*, we use data from 1998 to 2007 to estimate the coefficients that will be used to compute the earnings of 2009 (year *t* +1). Similarly, we use data from 1997 to 2006 to estimate the coefficients that will be used to compute the earnings of 2010 (year *t* + 2). This procedure ensures that the earnings forecasts are strictly out of sample. For each firm and each year t in our sample, we compute earnings forecasts for year *t* + 1 to year *t* + 5 by multiplying the independent variables in year *t* with the pooled regression coefficients estimated using the previous 10 years of data. This method only requires that a firm has non-missing independent variables in year *t* to estimate its future earnings. As a result, the survivorship bias is kept to a minimum level (Li and Mohanram, 2014).

After estimating earnings forecasts for earnings in year $t + \tau$ (τ =1 to 5), we estimate *ICOC* by using the average of four measures derived from Gode, Mohanram (2003) ($ICOC_{GM}$); Easton (2004) ($ICOC_{MPEG}$); Gebhardt, Lee, Swaminathan (2001) ($ICOC_{GLS}$); Claus and Thomas (2001) ($ICOC_{CT}$). These measures are briefly described in appendix A.

4.3.3 Regression models

$$ICOC_{i,t} = \alpha_0 + \alpha_1 PledgeDum_{i,t}\left(PledgeRt_{i,t}\right) + \boldsymbol{\beta} * \boldsymbol{Controls} + Year + Firm + \varepsilon_{i,t} \quad (2)$$

Where the dependent variable is *ICOC* and the independent variables are *PledgeDum* and *PledgeRatio*. ***Controls*** is a vector consisting of all control variables.

Following prior studies, we include control variables in our regression analysis as follows. First, we control for several factors that are related to risk, such as firm size (*Size*), leverage (*Leverage*), book-to-market ratio (*BM*), systematic risk (*Beta*), idiosyncratic risk (*IdioRisk*), growth rate (Growth). Lower information asymmetry is related to lower the risk premium (Diamond, Verrecchia, 1991), and larger firms are associated with better information environment (Mohanram, 2000). Thus, we control firm size (*Size*) defined as the logarithm of the market value of common equity. We expect a negative association between firm size (*Size*) and the implied cost of capital (*ICOC*). Modigliani and Miller (1958) argues that the cost of equity increases with leverage, and Fama and French (1992) find that ex post returns is positively associated with leverage (*Leverage*). Thus, we also control for the leverage ratio (*Leverage*) estimated as the ratio of interest-bearing long-term and short-term debts to total assets. We expect a positive association between leverage (*Leverage*) and the implied cost of capital (ICOC). Chen, Chen, and Wei (2011) show that systematic risk and idiosyncratic risk are positively associated with cost of capital (ICOC). Thus, we control firms' systematic risk (*Beta*) and idiosyncratic risk (*IdioRisk*) which are estimated by market model using daily returns over the fiscal year. We predict a positive association between *Beta*, *IdioRisk* and implied cost of capital (*ICOC*). Higher book-to-market ratio indicates lower growth opportunities or higher perceived risk (Fama and French, 1992; Gode and Mohanram, 2003). Thus, we control book-to-market ratio (*BM*) defined as the ratio of book value of equity to the market value of equity. We expect a positive association between book-to-market ratio (*BM*) and implied cost of capital (*ICOC*). Firms with high growth face more uncertainties and hence are more risks (Cao, Myers, Myers, Omer, 2015), Thus we control firms' sales growth (*Growth*) and expect a positive association between growth (*Growth*) and the implied cost of capital (*ICOC*).

Second, we control firm performance measured by return on assets (*ROA*). Better performance reduces investors' risk premium (Ferris, Javakhadze, Rajkovic, 2017). Thus, we expect for a negative association between return on assets (*ROA*) and implied cost of capital (*ICOC*). In addition, we include firm and year fixed effects to account for the heterogeneity across firms in a given year. The standard errors are clustered at firm level to account for the potential correlations among the observations within the same firm in different periods. The detailed definition of all control variables, please see appendix C.

4.3.4 Summary statistics

Table 4.1 presents descriptive statistics for variables that are used to examine our hypothesis. The average firm has a cost of capital (*ICOC*) of 6.256%. The mean of *PledgeDum* is 0.390, indicating that around 40% controlling shareholders in A-share firms in Chinese stock market have pledged their shares to financial institutions for loans. As to the percentage of controlling shareholders' pledged shares, the mean value of *PledgeRatio* is 6.162%. These results are similar with those reported by prior studies (Meng, Ni, and Zhang, 2018; Ouyang, Wang, and Chan, 2018; DeJong, Liao, and Xie, 2019; Li, Liu, and Wang, 2019).

For the firm's characteristic variables, the mean value of market value (*Size*) is 22.510 in natural logarithm (approximate 5,969.9 million RMB). The ratio of interests bearing debts to total assets (*Leverage*) has a mean of 18.516%. The mean value of book-market-ratio (*BM*) is 0.406. For the firm risk measures, the means of systematic risk (*Beta*) and idiosyncratic risk (*IdioRisk*) are 1.101and 0.024, respectively. For the firm's performance measures, the means of return on assets (*ROA*) and sales growth rate (*Growth*) are 4.402% and 21.247%, respectively.

Then, we use T-test and Pearson Chi-squared test to examine the equality of means and medians of *ICOC*, respectively, between the two groups defined by *PledgeDum*. Panel B of Table 4.1 presents the results of univariate tests. The firms with share pledging (*PledgeDum*=1) has a mean (median) of *ICOC* of 6.516% (5.688%), which is significantly higher than the 5.849% (4.896%) reported by firms without share pledging (*PledgeDum*=0). This pattern provides initial evidences that support H1, which argues that share pledging is positively associated with cost of equity capital.

Table 4. 1
Summary statistics

This table reports summary statistics for the variables of interest and univariate test of dependent *ICOC* for Chinese A-share non-financial firms over the years 2008 to 2017 which includes 18,386 firm-year observations. Panel A reports summary statistics for dependent, independent and control variables. Panel B presents the results of univariate test of the implied cost of capital (*ICOC*). We use T test and Pearson chi-squared test to test the equality of the mean and median for *ICOC*, respectively, between the two groups defined by *PledgeDum*. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

Panel A Summary statistics for dependent, independent and control variables

variable	N	mean	sd	min	p50	max
ICOC (%)	18,386	6.256	3.709	1.143	5.361	17.002
PledgeDum	18,386	0.390	0.488	0.000	0.000	1.000
PledgeRatio (%)	18,386	6.162	9.041	0.000	0.000	24.190
Size	18,386	22.510	0.976	20.495	22.437	25.358
Leverage	18,386	18.516	16.315	0.000	15.763	63.961
Beta	18,386	1.101	0.264	0.459	1.100	1.884
IdioRisk	18,386	0.024	0.008	0.010	0.023	0.049
BM	18,386	0.406	0.271	0.016	0.343	1.424
ROA (%)	18,386	4.402	5.581	-16.581	3.914	22.059
Growth (%)	18,386	21.247	52.98	-56.725	11.897	373.438

Panel B Univariate test of implied cost of capital (*ICOC*)

	PledgeDum=0	PledgeDum=1	Difference	T-value (Chi-squared value)
	(1)	(2)	(3) = (1) - (2)	(4)
Mean	5.849	6.516	-0.667	-11.935***
Median	4.896	5.688	-0.792	-138.009 ***

4.4. Empirical Results

4.4.1 Share pledging and the implied cost of capital: base line results

We start our main analysis by examining how share pledging affects firms' cost of equity capital. Table 4.2 presents the results of this analysis. The results in column (1) and (2) show that share pledging is positively related to the cost of equity capital. The economic magnitude is also meaningful. The coefficient estimates on *PledgeDum* in column (1) implies that firms with share pledging have a cost of equity capital that is 24.6 basis points higher than do firms without share pledging. Given that the sample mean value of the cost of equity capital is 6.256%, this 24.6 basis points increase translates into a 3.9% (=0.246%/6.256%) rise in the cost of equity capital relative to the sample mean for the firms with share pledging. In addition, given that an average firm has an outstanding equity of 5,969.9 million in RMB, a 24.6 basis point increase in the cost of capital implies an additional annual cost of 14.7 (=0.246%*5969.9) million RMB for an average firm with share pledging to finance with equity.

To compute the economic significance of share pledging measured by the ratio of the number of pledged shares to the total shares of a listed firm (*PledgeRatio*) in column (2), we compare the difference in *PledgeRatio* for firms without share pledging to the average firm with share pledging. The average firm with share pledging has a *PledgeRatio* of 15.794%. Since *PledgeRatio* takes the value of zero for firms without share pledging, the coefficient estimates on *PledgeRatio* in column (2) implies that the difference in cost of capital between these two types of firms is 17.4 (=0.011*15.794) basis points.[1] For the remainder of this study, we only report the economic significance of the dummy variable *PledgeDum* that identifies the presence of share pledging.

Table 4. 2
Share pledging and implied cost of capital: base line results

This table reports the results of how share pledging affects the implied cost of capital. All the model specifications include firm and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at firm level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	ICOC	*ICOC*
	(1)	(2)
PledgeDum	0.246***	
	(3.136)	
PledgeRatio		0.011**
		(2.389)
Size	-1.481***	-1.472***
	(-17.702)	(-17.637)
Leverage	0.004	0.004
	(1.258)	(1.281)
Beta	0.269**	0.272**
	(2.469)	(2.494)
IdioRisk	7.324	7.231
	(1.368)	(1.350)
BM	1.707***	1.711***
	(7.107)	(7.125)
ROA	0.002	0.002
	(0.249)	(0.237)
Growth	0.001**	0.001**
	(2.511)	(2.521)

[1] *PledgeRatio* is not a strict contiguous variable because when a firms does not have share pledging, *PledgeRatio* is defined as zero. Therefore, when using *PledgeRatio* as an independent variable, following Dhaliwal, Judd, Serfling, and Shaikh (2016), we compare the difference of *Tunnelling* (the dependent variable) between firms with and without controlling shareholder share pledging.

_cons	38.411***	38.238***
	(20.913)	(20.857)
Firm	Yes	Yes
Year	Yes	Yes
Obervations	18,386	18,386
Adjusted-R^2	0.184	0.184

4.4.2 Potential channels

Previously, we argue that share pledging leads to a high level of information risk and agency conflicts. We next examine whether share pledging affects a firm's cost of equity capital through these two channels.

4.4.2.1 Information risk channel

Increases in the cost of equity capital induced by share pledging may stem from a deterioration in the corporate disclosure quality which results in a high level of information risk for outside investors. To shed light on this channel, we explore whether share pledging directly affects corporate disclosure quality. To examine the information risk channel, we utilize two commonly used measures to capture corporate disclosure quality (1) the market-based measure, namely, the *KV_Beta* proposed by Kim and Verrecchia (2001), which is a proxy for the general corporate disclosure quality, (2) the accounting-based measure, namely, the accrual earnings management from Modified Jone's Model (Jones,1991; Dechow, Sloan, and Sweeney, 1995).

First, we use the *KV_Beta* constructed by Kim and Verrecchia (2001) to measure the general corporate disclosure quality. Kim and Verrecchia (2001) propose a model in which a firm adopts a timely disclosure policy for current performance when the performance is favourable and defers the disclosure when the performance is adverse. They show that when the firm defers the disclosure, the market uses trading volume to infer the private information held by better-informed investors; in contrast, when firms disclose performance in a timely fashion, the market uses the disclosure itself as a source of information rather than the trading volume as an alternative source of information. To facilitate empirical analysis, Kim and Verrecchia (2001) regress log absolute returns on abnormal volumes, and they show that the slope coefficient on volume can proxy disclosure quality[1]. The slope coefficient on volume decreases (increases) for increased (decreased) disclosure. The slope coefficient is estimated from the ordinary least squares regression:$Ln\left|\frac{P_t-P_{t-1}}{P_{t-1}}\right| = \alpha + \beta(VOL_t - AVGVOL_t) + \varepsilon_t$, where P_t is the closing price on day *t*, VOL_t is the daily trading volume of stock in thousands of shares, and $AVGVOL_t$ is the average daily stock trading volume within the previous 6 months in thousands of shares. For the convenience of interpretation, following Ascioglu, Hegde and McDermott (2005), we scale the β by 10,000[2]. We run time series regression described above by using the daily stock price and trading volume of the listed firms in the CSMAR database from the year 2003 to 2017. For each

[1] Kim and Verrecchia (2001) suggest that although they model the decision of a firm to commit to a timely disclosure policy for a broad range of performance, one can interpret this notion as disclosure in general.
[2] The scaling is arbitrary.

firm-year, we obtain one estimate of β as the proxy for corporate disclosure quality. To control for the impact of industry effect on firm disclosure quality, following Reeb and Zhao (2013), we subtract the industry median of β from the raw β. When a firm disclose more, the industry-adjusted β is lower because traders relies more on the increased disclosure as information sources and less on the trading volume as an alternative information source. Thus, the industry-adjusted β is an inverse measure of corporate disclosure quality, which is decreasing as the number gets larger. For the convenience of interpretation, following Reeb and Zhao (2013), we take the inverse of industry-adjusted β as the proxy for corporate disclosure quality denoted by *KV_Beta*, which indicates a higher disclosure quality as the value gets larger.

Second, we use accrual-based earnings management as a proxy for corporate disclosure quality, which is computed from the Modified Jones Model (Jones, 1991) as described in Dechow, Sloan, and Sweeney (1995)[1]. To construct the discretionary accruals, denoted by *DA*, in modified Jones model, we first estimate original Jones Model by using OLS regression for each fiscal year and industry[2] combination: $\frac{TA_{i,t}}{A_{i,t-1}} = \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_1 \frac{\Delta REV_{i,t}}{A_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t}$, where *i* indexes firms and *t* indexes fiscal year. $A_{i,t-1}$ is the total assets in year *t*-1. $TA_{i,t}$ is the total accruals defined by Sloan (1996). $\Delta REV_{i,t}$ is the change in revenues from period *t*-1 to period *t*. $PPE_{i,t}$ is gross value of property, plant, and equipment in year *t*. After estimating the coefficients α_1, α_1, α_3, we calculate non-discretionary accruals, denoted by *NonDA*: $NonDA_{i,t} = \widehat{\alpha_1} \frac{1}{A_{i,t-1}} + \widehat{\alpha_2} \frac{\Delta REV_{i,t} - \Delta AR_{i,t}}{A_{i,t-1}} + \widehat{\alpha_3} \frac{PPE_{i,t}}{A_{i,t-1}}$, where $\Delta AR_{i,t}$ is the change in accounts receivables from period *t*-1 to period *t*. Then, we defined discretional accruals as the difference between total accruals and non-discretional accruals: $DA_{i,t} = TA_{i,t} / A_{i,t} - NonDA_{i,t}$. The accrual-based earnings management is measured with the absolute valued of *DA*, denoted by *ABS_DA*. Further, we proxy upward accrual-based earnings management (denoted by *PDA*) with positive, and downward accrual-based earnings management (denoted by *NDA*) with negative *DA*. A larger value of *ABS_DA* and *PDA* indicate higher earnings management and hence lower disclosure quality. Thus, *ABS_DA*, and *PDA* are inverse measure for corporate disclosure. However, a smaller value of *NDA* indicates higher down-ward earnings management and hence lower disclosure quality.

Table 4.3 reports the results of how share pledging affects these market-based, accounting-based measures of corporate disclosure quality. The results in columns (1) and (2) show a significantly negative association between share pledging and corporate disclosure quality (i.e., *KV_Beta*), suggesting that share pledging decreases corporate disclosure quality. In addition, the results in column (3) - (8) suggest that controlling shareholders manipulate corporate disclosure by managing earnings upward after pledging shares.

[1] We also use the original Johns model (Jones, 1991)

[2] We use Industry Classification carried out by China's Securities Regulatory Commission's Guidelines in the year 2012. When conducting the industry-year regression, by following Roychowdhuryw (2006), we remove the industry observations that have less than 15 firms in a given year.

Table 4. 3
Share pledging and corporate disclosure quality

This table reports the effects of share pledging on corporate disclosure quality. We estimate the coefficients in columns (1)-(8) by using OLS regression and estimate the coefficients in column (9)-(10) by using Logistic regression. The model specifications in columns (1)-(8) include firm and year fixed effects, and the model specifications in columns (9)-(10) include industry and year fixed effects. Robust t-statistics are reported in parenthesis. The standard errors in column (1)-(8) are clustered at firm level, and those in columns (9)-(10) are clustered at industry level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	KV_Beta	*KV_Beta*	*ABS_DA*	*ABS_DA*	*PDA*	*PDA*	*NDA*	*NDA*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PledgeDum	-0.234***		0.013*		0.043*		-0.000	
	(-9.137)		(1.939)		(1.717)		(-0.076)	
PledgeRatio		-0.009***		0.001**		0.004**		0.000
		(-6.359)		(2.380)		(2.227)		(0.815)
Size	0.154***	0.164***	0.049***	0.050***	0.040	0.042	-0.017***	-0.017***
	(6.031)	(6.385)	(4.893)	(4.924)	(0.992)	(1.006)	(-2.940)	(-2.984)
Leverage	-0.005***	-0.006***	0.000	0.000	-0.001	-0.001	-0.000	-0.000
	(-6.122)	(-6.265)	(0.207)	(0.303)	(-1.478)	(-1.378)	(-1.301)	(-1.377)
Beta	-0.549***	-0.552***	-0.012	-0.012	-0.043	-0.044	-0.001	-0.001
	(-15.790)	(-15.826)	(-1.017)	(-1.041)	(-1.219)	(-1.239)	(-0.203)	(-0.179)
IdioRisk	-28.979***	-28.852***	1.213*	1.202*	4.782*	4.681*	-0.226	-0.227
	(-18.293)	(-18.179)	(1.886)	(1.870)	(1.913)	(1.870)	(-0.574)	(-0.578)
BM	-0.650***	-0.655***	0.087***	0.087***	0.033	0.033	0.005	0.004
	(-11.092)	(-11.105)	(2.773)	(2.778)	(0.371)	(0.378)	(0.309)	(0.297)
ROA	0.013***	0.013***	-0.001*	-0.001*	-0.000	-0.001	0.002***	0.002***
	(7.017)	(7.044)	(-1.672)	(-1.661)	(-0.235)	(-0.264)	(3.571)	(3.540)
Growth	0.001***	0.001***	0.002***	0.002***	0.003***	0.003***	-0.001***	-0.001***
	(5.490)	(5.464)	(11.047)	(11.052)	(5.646)	(5.651)	(-9.878)	(-9.869)
_cons	5.407***	5.600***	-1.037***	-1.029***	-0.882	-0.863	0.260**	0.264**
	(9.642)	(9.925)	(-4.425)	(-4.409)	(-0.960)	(-0.920)	(2.046)	(2.078)
Firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	No	No	No	No	No	No	No	No
Observations	18,350	18,350	16,324	16,324	7,683	7,683	8,641	8,641
Adjusted R^2	0.109	0.106	0.158	0.158	0.134	0.135	0.102	0.102
Pseudo R^2								

4.4.2.2 Agency conflicts channel

We now assess the second channel through which share pledging affects firms' cost of equity capital, that is, the aggravated agency conflicts between controlling shareholders and minority shareholders. As mentioned earlier, share pledging aggravates the agency conflicts between insiders and outsiders. Given that agency conflicts between insiders and outsiders is an important source of risk that drive firms' cost of capital, investors will require a higher rate of return for holding shares in the firms with share pledging than that in the firms without share pledging. To shed light on this channel, we use controlling shareholders' tunnelling activities to proxy for the agency conflict between controlling shareholders and minority shareholders. Then, we examine whether share pledging directly affect controlling shareholders' tunnelling activities. Following the tunnelling literature, we use the ratio of other receivables to total assets to measure tunnelling (Jiang, Lee, and Yue, 2010; Liu and Tian, 2012; Jiang, Rao, and Yue, 2015).

Table 4.4 reports the results of how share pledging affects agency conflicts between controlling shareholders and minority shareholders The results in column (1) and (2) show a significantly positive relation between share pledging and controlling shareholders' tunnelling activities, suggesting that the agency conflicts between controlling shareholders and minority shareholders is deteriorated after controlling shareholders pledge their shares.

Table 4. 4
Share pledging and the agency conflicts between controlling shareholders and minority shareholders

This table reports the impact of share pledging on the extent of the agency conflicts between controlling shareholders and minority shareholders measured by controlling shareholders' tunnelling activities. All the model specifications include firm and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at firm level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	Tunnelling	*Tunnelling*
	(1)	(2)
PledgeDum	0.190*	
	(1.744)	
PledgeRatio		0.013**
		(1.976)
Size	-0.208***	-0.205***
	(-2.884)	(-2.850)
Leverage	-0.008	-0.008
	(-1.486)	(-1.561)
Beta	-1.168***	-1.159***
	(-4.971)	(-4.937)
IdioRisk	-8.369	-8.446
	(-1.130)	(-1.140)
BM	-2.964***	-2.956***
	(-8.224)	(-8.185)
ROA	-0.145***	-0.145***
	(-8.357)	(-8.321)
Growth	0.001	0.001
	(1.026)	(1.026)
_cons	11.995***	11.927***
	(6.782)	(6.744)
Firm	Yes	Yes
Year	Yes	Yes
Observations	14,243	14,243
Adjusted R^2	0.125	0.125

4.4.3 Cross-sectional tests of share pledging and the implied cost of equity capital

We next conduct cross-sectional tests that exploit settings that provide variation in the magnitude of information risk and agency conflicts related to share pledging. Specifically, we examine whether the effect of share pledging on the cost of equity capital varies with (1) information environment, (2) state ownership, (3) multiple large shareholders, (4) regional institution environment. These cross-sectional tests further shed light on the economic mechanisms behind our main results.

4.4.3.1 Information environment

In the previous sections, the empirical results suggest that controlling shareholder have incentives to manipulate corporate disclosure after pledging shares, which in turn increases firms' cost of equtity capital. If there indeed exists such information risk related to share pledging for outside investors, we should observe a stronger positive association between share pledging and cost of equity capital in firms with a high level of information asymmetry. To test this prediction, following prior studies (e.g., Krishnaswami and Subramaniam, 1999; Flannery, Kwan, Nimalendran, 2004), we use analyst forecast error and dispersion to proxy for information asymmetry. We estimate analyst forecast error (*Analyst Forecast Error*) as the absolute difference between the forecast earnings and the actual earnings per share, scaled by the price at the beginning of the year. Higher analyst forecast errors indicate that firms have a higher level of information asymmetry between insiders and the market. We estimate analyst forecast dispersion (*Analyst Forecast Dispersion*) as the standard deviation of the forecasts, scaled by the price at the beginning of the year. High level of analyst forecast dispersion indicates that firms lack available information for the market. Then, we create indicator variable *HighError* that is set one if analyst forecast error is above the sample median and zero otherwise, and an indicator variable *HighDispersion* that is set to one if analyst forecast dispersion is above the sample median and zero otherwise. Finally, we interact these indicators with our share pledging measures (*PledgeDum*, *PledgeRatio*). The variables of interest are the interactions *PledgeDum*×*HighError*, *PledgeRatio*×*HighError*, *PledgeDum*×*HighDispersion*, *PledgeRatio*×*HighDispersion*.

Table 4.5 reports the results of how information asymmetry affects the relation between share pledging and cost of equity capital. The results in columns (1) and (2) show that, firms with share pledging and high level of information asymmetry have a significantly higher cost of capital than do firm with share pledging and a low level of information asymmetry. Further, the joint significance of share pledging measures (*PledgeDum*, *PledgeRatio*) and the interaction terms (*PledgeDum*×*HighError*, *PledgeRatio*×*HighError*) are statistically significant at the 1% level. In terms of the economic significance, the coefficient estimates on *PledgeDum*×*HighError* in column (1) implies that, relative to firms with share pledging and a low level of information asymmetry, firms with share pledging and a high level of information asymmetry have a 22.6 basis point higher cost of equity capital. Columns (3) and (4) show similar results as those reported in columns (1) and (2). Overall, the results in table 5 are consistent with the prediction that share pledging have a larger effect on firms' cost of equity capital in

firms with a high level of information asymmetry than does that in firms with a low level of information asymmetry.

Table 4. 5
The effect of information environment
This table reports the results of how information asymmetry affects the association between share pledging and cost of equity capital. All the model specifications include firm and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at firm level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	ICOC	*ICOC*	*ICOC*	*ICOC*
	(1)	(2)	(1)	(2)
PledgeDum	0.133		0.193**	
	(1.444)		(2.131)	
PledgeRatio		0.007		0.010*
		(1.223)		
HighError	-0.250***	-0.242***		
	(-3.675)	(-3.809)		
PledgeDum_ HighError	0.226**			
	(2.349)			
PledgeRt_ HighError		0.013**		
		(2.521)		
Dispersion			-0.170**	-0.169***
			(-2.558)	(-2.724)
PledgeDum × HighDispersion			0.111**	
			(2.126)	
PledgeRatio × HighDispersion				0.007**
				(2.433)
Size	-1.516***	-1.509***	-1.522***	-1.514***
	(-16.801)	(-16.759)	(-16.883)	(-16.809)
Leverage	0.000	0.000	0.000	0.000
	(0.073)	(0.026)	(0.097)	(0.062)
Beta	0.224**	0.230**	0.222**	0.227**
	(1.982)	(2.041)	(1.963)	(2.009)
IdioRisk	13.889**	13.783**	14.179**	14.155**
	(2.458)	(2.438)	(2.511)	(2.505)
BM	1.730***	1.736***	1.707***	1.714***
	(6.655)	(6.683)	(6.558)	(6.593)
ROA	-0.002	-0.002	0.001	0.001
	(-0.214)	(-0.207)	(0.095)	(0.098)
Growth	0.001*	0.001*	0.001**	0.001**
	(1.943)	(1.945)	(1.991)	(2.005)
_cons	39.321***	39.170***	39.428***	39.251***
	(19.746)	(19.697)	(19.801)	(19.722)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	16,584	16,584	16,584	16,584
Adjusted R^2	0.190	0.190	0.189	0.189
F-statistic (*PledgeDum/PledgeRatio+ PledgeDum× HighError /PledgeRatio× HighError*)	7.27***	7.16***		
F-statistic (*PledgeDum/PledgeRatio+ PledgeDum× HighDispersion /PledgeRatio× HighDispersion*)			5.27***	4.93***

4.4.3.2 The effect of state ownership

On the one hand, we argue that the risk of losing control rights after pledging shares provides controlling shareholders with incentives to manipulate corporate disclosure to sustain or increase stock price, which in turn increases the implied cost of capital. However, losing control rights for the controlling shareholders in the state-owned enterprises is unlikely to occur. Firstly, the Chinese central

and regional governments rely on state-owned enterprises (SOEs) to realize their social and political goals such as as employment, fiscal health, regional development, social responsibility (Chen, Sun, Tang, and Wu, 2011), they would not allow SOEs to fail or relinquish the control rights. In addition, SOEs are usually politically favored and supported by the governments, even they run into financial trouble, the governments would bail out the SOEs (Chen, Chen, Lobo, and Wang, 2011). When facing a margin call, SOEs' controlling shareholders (the governments or their agents) can easily raise funds from other channels to meet the margin call or pay down the debts. Hence, the controlling shareholders in SOEs are subject to lower risk of losing control rights than are the controlling shareholders in non-SOEs.

On the other hand, share pledging creates deviation between control rights and cash flow rights and therefore the agency conflicts between controlling shareholders and minority shareholders, which in turn increase firms' cost of equity capital. Prior research shows that controlling shareholders' expropriation of minority shareholders is more likely to occur in Non-SOEs than in SOEs (Jiang and Kim, 2015). Since Non-SOEs have severer agency conflicts between controlling shareholders and minority shareholders than do SOEs, we predict that the positive association between share pledging and cost of equity capital is more pronounced in Non-SOEs than that in SOEs. We create an indictor variable *NonSOEs* that is set to one for Non-SOEs and zero otherwise. Then, we interact *NonSOEs* with our share pledging measures (*PledgeDum, PledgeRatio*). The variables of interest are the interactions *PledgeDum* × *NonSOE, PledgeRatio* × *NonSOE*.

Table 4.6 reports the results of how state ownership affects the relation between share pledging and cost of equity capital. The results in columns (1) and (2) show Non-SOEs with share pledging have a significantly higher cost of equity capital than do SOEs with share pledging. Further, the joint significance of share pledging measures (*PledgeDum*, *PledgeRatio*) and the interaction terms (*PledgeDum* × *NonSOE*, *PledgeRatio* × *NonSOE*) are statistically significant. In terms of the economic significance, the coefficient estimates on *PledgeDum* × *NonSOE* in column (1) implies that, relative to SOEs with share pledging, Non-SOEs with share pledging have a 36.5 basis point higher cost of equity capital. Therefore, the results in Table 4.6 are consistent with the prediction that share pledging has a larger effect on the cost of capital in Non-SOEs than does that in SOEs.

Table 4. 6
The effect of state ownership

This table reports the results of how state ownership affects the association between share pledging and the implied cost of capital. All the model specifications include firm and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at firm level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	ICOC	*ICOC*
	(1)	(2)
PledgeDum	0.021	
	(0.126)	
PledgeRatio		-0.001
		(-0.057)
NonSOE	0.011	0.013
	(0.045)	(0.053)
PledgeDum × *NonSOE*	0.365*	

	(1.862)	
PledgeRatio × NonSOE		0.020*
		(1.723)
Size	-1.846***	-1.840***
	(-19.559)	(-19.578)
Leverage	0.008**	0.008**
	(2.250)	(2.235)
Beta	-0.156	-0.153
	(-1.069)	(-1.056)
IdioRisk	10.556*	10.791*
	(1.666)	(1.703)
BM	0.485**	0.490**
	(2.032)	(2.050)
ROA	0.012	0.012
	(1.449)	(1.448)
Growth	0.001*	0.001*
	(1.679)	(1.711)
_cons	45.131***	45.021***
	(22.224)	(22.260)
Year	Yes	Yes
Firm	Yes	Yes
Observations	12,598	12,598
Adjusted R^2	0.149	0.149
F-statistic (*PledgeDum/PledgeRatio+ PledgeDum×High /PledgeRatio×High*)	6.13***	3.61**

4.4.3.3 The effect of multiple large shareholders

Recent studies show that multiple large shareholders (MLS) play a vital monitoring role in restraining the extraction of private benefit by controlling shareholders (Mishra, 2011; Attig, El Ghoul, Guedhami, and Rizeanu, 2013; Jiang and Kim, 2015). Therefore, we predict that the positive association between share pledging and cost of equity capital is more pronounced in firms with absence of MLS. To test this prediction, following prior studies (e.g., Faccio, Lang, and Young, 2001; Maury and Pajuste, 2005), we first create a dummy variable *NonMLS* that is set to one if a firm does not have a single large shareholder (excluding the controlling shareholder) with at least 10% of voting rights, and zero otherwise. We also create another dummy variable to proxy the barging power of MLS. We denote this indicator variable by *LowPower* that is set to one if the ratio of total voting rights of the second and third largest shareholders to the voting rights of the largest shareholders is below the sample median (Mishra, 2011; Attig, El Ghoul, Guedhami, and Rizeanu, 2013). Then, we interact these indicator variables (*NonMLS* and *LowPower*) with our share pledging measures (*PledgeDum*, *PledgeRatio*). The variables of interest are the interactions *PledgeDum* × *NonMLS*, *PledgeRatio*×*NonMLS*, *PledgeDum* × *LowPower*, *PledgeRatio*×*LowPower*.

Table 4.7 reports the results of how MLS affects the association between share pledging and the implied cost of capital. The coefficient estimates on *PledgeDum* × *NonMLS* and *PledgeRatio* × *NonMLS* in columns (1) and (2) suggest that firms with share pledging and the absence of MLS have a significantly higher cost of equity capital than do firms with share pledging and the presence of multiple large shareholders. Further, the joint significance of share pledging measures (*PledgeDum*, *PledgeRatio*) and the interaction terms (*PledgeDum* × *NonMLS*, *PledgeRatio*×*NonMLS*) are statistically significant at 5% level. In terms of the economic significance, the coefficient estimates on *PledgeDum* × *NonMLS*

in column (1) implies that, relative to firms with share pledging and presence of multiple large shareholders, firms with share pledging and the absence of multiple large shareholders have a 22.7 basis point higher cost of equity capital. Columns (3) and (4) show similar results as those reported in columns (1) and (2). Overall, the results in table 4.7 are consistent with the prediction that share pledging has a larger effect on cost of capital in firms with absence of MLS (weak bargaining of MLS) than does that in firms with presence MLS (strong bargaining power of MLS).

Table 4. 7
The effect of the bargaining power of multiple large shareholders

This table reports the results of how multiple large shareholders affect the association between share pledging and cost of equity capital. All the model specifications include firm and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at firm level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	ICOC	*ICOC*	*ICOC*	*ICOC*
	(1)	(2)	(3)	(4)
PledgeDum	-0.134		-0.063	
	(-1.623)		(-1.059)	
PledgeRatio		-0.004		-0.001
		(-0.853)		(-0.393)
NonMLS	-0.081	-0.060		
	(-1.231)	(-0.981)		
PledgeDum × NonMLS	0.227**			
	(2.245)			
PledgeRatio × NonMLS		0.011*		
		(1.935)		
LowPower			-0.139*	-0.134*
			(-1.916)	(-1.912)
PledgeDum × LowPower			0.318**	
			(2.454)	
PledgeRatio × LowPower				0.017***
				(2.614)
Size	0.283***	0.285***	0.287***	0.289***
	(8.059)	(8.107)	(8.175)	(8.215)
Leverage	0.016***	0.016***	0.016***	0.016***
	(7.973)	(7.809)	(7.951)	(7.801)
Beta	-0.674***	-0.671***	-0.671***	-0.669***
	(-6.456)	(-6.413)	(-6.421)	(-6.392)
IdioRisk	-9.598*	-9.887**	-9.859**	-10.166**
	(-1.937)	(-1.996)	(-1.995)	(-2.057)
BM	3.311***	3.320***	3.309***	3.318***
	(22.908)	(23.005)	(22.899)	(22.997)
ROA	0.031***	0.031***	0.031***	0.031***
	(4.625)	(4.605)	(4.587)	(4.573)
Growth	0.002***	0.002***	0.002***	0.002***
	(3.557)	(3.524)	(3.542)	(3.519)
_cons	0.451	0.395	0.364	0.329
	(0.544)	(0.476)	(0.442)	(0.398)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	18,386	18,386	18,386	18,386
Adjusted R^2	0.212	0.212	0.212	0.213
F-statistic (*PledgeDum/PledgeRatio+ PledgeDum×Low /PledgeRatio×Low*)	3.09**	3.54**	3.02**	3.76**

4.4.3.4 The effect of regional institution environment

Governance mechanisms help constrain firms' opportunistic financial reporting behaviour and protect the minority shareholders from being expropriated by the controlling shareholders. However, the effectiveness of corporate governance hinges on the overall institutional environment. Given that

China is a large country, the reform paces are different across areas/provinces, which in turn leads to a large variation in the institutional environment. For example, the institutional infrastructures, such as law enforcement, capital market development, product market completion in the eastern provinces, are better than those in the western provinces. Given that stronger institutional environment is associated with better investor protection (Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1998), we predict that the positive relation between share pledging and cost of equity capital is more pronounced in firms with a weaker institutional environment than that in firms with a stronger institutional environment. To test this prediction, we employ the marketization indexes constructed by the National Economic Research Institute (NERI) to measure the quality of regional institution environment across provinces (Wang, Fan, and Yu, 2017). NERI categorizes 19 indicators of institutional arrangements and policies into five main areas related to market-oriented reforms, which include (1) size of government in the regional economy, (2) growth of the non-state sectors, (3) product market development, (4) factor market development, (5) service sector and legal framework development. Then, NERI utilizes a weighting scheme to construct a broad index to measure the overall marketization and institutional environment. We denote this index as *Overall Marketization Index*, which measures a particular province's institutional environment relative to other provinces and use a 0 to 10 scale for each province. A smaller value of *Overall Marketization Index* indicates a weaker institutional environment. We create an indicator variable *WeakInstEnvi* that is set to one if *Overall Marketization Index* is below the sample median and zero otherwise. Then, we interact this indicator variable (*WeakInstEnvi*) with the share pledging measures (*PledgeDum, PledgeRatio*). The variables of interest are the interactions *PledgeDum*× *WeakInstEnvi*, *PledgeRatio*× *WeakInstEnvi*).

Table 4.8 reports the results of how regional institution environment affects the association between share pledging and cost of equity capital. The results in columns (1) and (2) show that firms with share pledging and a weak institutional environment have a significantly higher cost of capital than do firms with share pledging and a strong institutional environment. Further, the joint significance of share pledging measures (*PledgeDum, PledgeRatio*) and the interaction terms (*PledgeDum*× *WeakInstEnvi*, *PledgeRatio*× *WeakInstEnvi*) are statistically significant at 1% level. In terms of the economic significance, the coefficient estimate on *PledgeDum*× *WeakInstEnvi* in column (1) implies that, relative to firms with share pledging and a strong institutional environment, firms with share pledging and a weak institutional environment have a 36.8 basis point higher cost of equity capital. Overall, the results in table 4.8 are consistent with the prediction that share pledging has a larger effect on cost of capital in firms with weak institutional environment than does that in firms with strong institutional environment.

Table 4. 8
The effect of regional institution environment
This table reports the results of how regional institution environment affects the association between share pledging and the implied cost of capital. All the model specifications include firm and year fixed effects. Robust *t*-statistics are reported in

parenthesis and calculated using standard errors clustered at firm level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	ICOC	*ICOC*
	(1)	(2)
PledgeDum	-0.045	
	(-0.252)	
PledgeRatio		-0.003
		(-0.305)
WeakInstEnvi	-0.085	-0.063
	(-0.582)	(-0.441)
PledgeDum × *WeakInstEnvi*	0.368*	
	(1.951)	
PledgeRatio × *WeakInstEnvi*		0.018*
		(1.676)
Size	-1.488***	-1.478***
	(-17.815)	(-17.730)
Leverage	0.004	0.004
	(1.281)	(1.321)
Beta	0.275**	0.277**
	(2.523)	(2.541)
IdioRisk	7.257	7.220
	(1.356)	(1.348)
BM	1.711***	1.717***
	(7.121)	(7.144)
ROA	0.002	0.002
	(0.297)	(0.294)
Growth	0.001**	0.001**
	(2.499)	(2.521)
_cons	38.635***	38.414***
	(21.000)	(20.921)
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	18,372	18,372
Adjusted R^2	0.184	0.184
F-statistic (*PledgeDum/PledgeRatio+ PledgeDum× WeakInstEnvi /PledgeRatio× WeakInstEnvi*)	8.11***	4.65***

4.4.4 Additional analysis

4.4.4.1 Share pledging and firms' systematic risk

The asset pricing literature (e.g., Sharpe, 1964; Lintner, 1965; Lambert et al., 2007) suggests that, since investors can and should diversify away firm-specific risks, the risks related to share pledging would have to be related to the firms' systematic risk to be non-diversifiable and therefore priced into the cost of capital. Thus, to provide further evidence on whether the information risks and agency conflicts related share pledging are non-diversifiable, we examine the relation between the systematic risk and share pledging, and predict a positive relation between share pledging and systematic risk. Specifically, we regress the market beta of firms with share pledging on our share pledging measures (*PledgeDum, PledgeRatio*). We calculate the market beta by market model using the value-weighted daily market returns over the fiscal year.

Table 4.9 reports the results of how share pledging affects firms' systematic risks. The results in columns (1) and (2) show a statistically positive association between share pledging and systematic risk. As to the economic significance, given that the sample mean of *Beta* is 1.101, the coefficient estimates on *PledgeDum* suggest that the presence of share pledging leads to a 10.2% (=0.112/1.101) increase in

firms' systematic risk. In sum, the results in table 4.9 suggest that the information risk and agency conflicts related to share pledging are non-diversifiable.

Table 4. 9
Share pledging and firms' systematic risk

This table reports the results of how share pledging affects firms' systematic risk. All the model specifications include firm and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at firm level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	Beta	*Beta*
	(1)	(2)
PledgeDum	0.112**	
	(2.232)	
PledgeRatio		0.011**
		(2.156)
Size	-0.016***	-0.016***
	(-2.846)	(-2.831)
Leverage	-0.000	-0.000
	(-0.369)	(-0.400)
IdioRisk	9.260***	9.264***
	(24.533)	(24.546)
BM	0.095***	0.095***
	(6.988)	(6.988)
ROA	-0.000	-0.000
	(-0.743)	(-0.758)
Growth	-0.000***	-0.000***
	(-5.105)	(-5.084)
_cons	1.163***	1.160***
	(9.443)	(9.452)
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	18,386	18,386
Adjusted R^2	0.126	0.126

4.4.4.2 Share pledging and the cost of debt

Our arguments that share pledging increases firms' information risk and agency conflicts between controlling shareholders and minority shareholders also generate the empirical prediction of a positive relation between share pledging and firms' cost of debt. Following Zou and Adams (2008), Lim, Wang, and Zeng (2018), we define the cost of debt as the ratio of the sum of interest expenses and capitalized interests to the total interest-bearing debts, denoted by *COD*. The independent variables in columns (1) and (2) of Table 10 are *PledgeDum* and *PledgeRatio*, respectively. We follow prior studies by including several determinants of cost of debt. Petersen and Rajan (1994) find that larger firms generally have lower default risk, and therefore bear lower interest costs than smaller firms. Thus, we control for firm size (*Size*) defined as the natural logarithm of market equity. One the one hand, higher borrowings indicate that firms can raise funds with low cost of debt. On the other hand, higher borrowing is related to higher default risk and therefore higher cost of debt. Thus, we control for firm leverage (*leverage*) defined as the ratio of interest-bearing debts to total asset. Firms with more tangible assets are able to provide more collaterals, which reduces firms' default risks and therefore lowers cost of debt. Thus, we control for tangible assets (*Tangible*) defined as the sum of fixed assets and inventory scaled by total assets. Firms with higher interest coverage ratio (*InterestCoverage*) have higher capability to repay debts than the firms with lower interest coverage. Thus, we include interest coverage ratio (*Coverage*)

defined as the ratio of earnings before interest and tax (EBIT) to interest-bearing debts. Better firms' performance indicates that firms are more profitable and therefore lower firms' cost of debt. Thus, we control for return on assets (*ROA*). Corporate governance is also an important determinant for firms' cost of debt. For example, Anderson et al. (2004) find that board independence and board size reduce cost of debt by improving firms' transparency of financial information. Thus, we control for Board size (*BoardSize*) and board independence (*BoardIndp*). *BoardSize* is calculated as the natural logarithm of the number of board members, and *BoardIndp* is calculated as the proportion of independent directors on the board. On the one hand, state ownership exposes lenders to higher credit risks, and therefore the lenders may require a higher interest rate than normal. On the other hand, a government shareholder may use its influence to help a firm secure favorable bank loan. Hence, we control for state ownership (*SOE*). *SOE* is a dummy variable that is set to one for state-owned enterprises and zero otherwise. Finally, we control for firm and year fixed effects.

Table 4.10 presents the results relating share pledging and cost of debt. The results in columns (1) and (2) show that share pledging is positively related to the cost of debt. The coefficient estimates on *PledgeDum* in column (1) implies that firms with share pledging have a cost of debt that is 23.6 basis points higher than do firms without share pledging. Given that the sample mean of the cost of debt is 6.584%, this 23.6 basis point increase translates into a 3.7% (=0.236/6.423) rise in the cost of debt relative to the sample mean for the firms with share pledging. In addition, given that the average firm has a 3,060.7 million in RMB interest-bearing debt, a 23.6 basis point increase in the cost of debt implies an additional annual cost of 7.2 (=0.236%*3060.7) million RMB for an average firm with share pledging to finance with debts.

Table 4. 10
Share pledging and the cost of debt

This table reports the impact of how share pledging affects the cost of debt. All the model specifications include firm and year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at firm level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	COD	*COD*
	(1)	(2)
PledgeDum	0.236**	
	(1.961)	
PledgeRatio		0.017***
		(2.689)
Size	-0.626***	-0.630***
	(-4.761)	(-4.824)
Leverage	-0.077***	-0.077***
	(-13.479)	(-13.510)
Tangible	-0.011**	-0.011**
	(-2.177)	(-2.196)
Coverage	-0.003***	-0.003***
	(-8.379)	(-8.414)
ROA	-0.050***	-0.050***
	(-4.765)	(-4.745)
BoardSize	0.233	0.237
	(0.514)	(0.523)
BoardIndp	0.010	0.010
	(0.927)	(0.909)
SOE	-0.015	0.004
	(-0.045)	(0.012)

_cons	22.395***	22.469***
	(7.190)	(7.238)
Firm FE	Yes	Yes
Year FE	Yes	Yes
Observations	18,363	18,363
Adjusted R^2	0.077	0.077

4.5 Robustness Tests

4.5.1 Addressing potential endogeneity

The findings in this study may suffer from a potential endogenous concern regarding the omitted variable problem. For example, the unobservable macro-economic changes contemporaneous with share pledging could affect firms' cost of capital. To alleviate this endogenous concern, we conduct the following tests (1) including additional fixed effect, (2) performing propensity score matched sample analysis, (3) conducting instrumental variables regressions.

4.5.1.1 Including additional fixed effect

To account for the potential unobservable omitted variables that might affect both share pledging and cost of capital, we additionally include industry-by-year and province-by-year fixed effects in our base line model to account for the unobservable time-varying heterogeneity across industries and the incorporation provinces. Table 4.11 report the results with additional fixed effects. The results in columns (1) and (2) show that the coefficient estimates on the *PledgeDum* and *PledgeRatio* remain statistically significant above 5% level after including these additional fixed effects, suggesting that our main findings are not driven by the potential macro-economic changes in the incorporation provinces or trends in certain industries.

Table 4. 11
Including industry-by-year and province-by-year fixed effects
This table reports the results of how share pledging affects the implied cost of capital by including additional fixed effects (i.e., industry-by-year and province-by-year fixed effects). All the model specifications include firm, year, industry-by-year, and province-by-year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at firm level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

	ICOC	ICOC
	(1)	(2)
PledgeDum	0.250***	
	(3.172)	
PledgeRatio		0.011**
		(2.477)
Size	-1.502***	-1.496***
	(-17.372)	(-17.285)
Leverage	0.005	0.005
	(1.400)	(1.419)
Beta	0.296***	0.299***
	(2.652)	(2.679)
IdioRisk	7.632	7.613
	(1.341)	(1.337)
BM	1.620***	1.626***
	(6.554)	(6.580)
ROA	0.003	0.003
	(0.349)	(0.352)
Growth	0.001***	0.001***
	(2.631)	(2.637)
_cons	39.352***	39.207***
	(14.680)	(14.620)
Year	Yes	Yes

Firm	Yes	Yes
Industry-by-Year	Yes	Yes
Province-by-Year	Yes	Yes
Observations	18,372	18,372
Adjusted R^2	0.199	0.199

4.5.1.2 Performing propensity score matched sample analysis

Controlling shareholder choice of pledging shares might not be random, firms with and without share pledging may be systematically different. To mitigate the concern that our findings suffer from an omitted variable that is correlated both with share pledging and firms' cost of capital, we construct propensity score matched (PSM) samples to correct for any endogenous selection on observed variables (Rosenbaum and Rubin, 1983; Dehejia and Wahba, 2002).

To conduct PSM analysis, we first choose firm size (*Size*), leverage ratio (*Levereage*), systematic risk (*Beta*), idiosyncratic risk (*IdioRisk*), book-to-market ratio (*BM*), return on assets (*ROA*), sales growth (*Growth*), stock turnover rate (*Turnover*), stock return adjusted by industry (*AdjReturn*) and the standard deviation of stock return (*StdReturn*) as matching variables[1]. Using Logit Regression model, we regress the indicator variable *PledgeDum* on the matching variables and estimate the probability (i.e., the propensity score) that controlling shareholders in the listed firms pledge shares to for loans. Column (1) in Panel A of table 12 reports the results from the logistic regression. Next, we match each firm with share pledging to a firm without share pledging with the closest propensity score. We match without replacement and require the propensity scores for each matched pair within ±1% of each other.[2] The resulting samples consist of 6,816 firm-year observations with share pledging matched to 6,816 firm-year observations without share pledging. Then, we estimate the base line model by using the PSM samples.

Following Fang et al (2014), and Dhaliwal et al. (2016), we perform several diagnostic tests to evaluate the successfulness of our matching procedure. If the matching procedure is successful, we should find: (1) the matching variables in the matched samples do not explain any variation in the likelihood that controlling shareholders in the listed firms pledge their shares for loans, (2) the difference in the propensity scores of firms with share pledging and firms without share pledging is negligible, (3) the means of the matching variables are not statistically different between firms with and without share pledging.

We test these predictions in three ways. First, we rerun the same model specification as in column (1) of Panel A in Table 4.12 for the matched samples and report the results in column (2). The results show that all of the matching variables are not statistically significant, and the pseudo-R^2 drops down to 0.0%, indicating that the matching variables in the matched samples do not explain any variation in

[1] Except for the control variables used in the base line model, we also choose stock turnover rate (*Turnover*), stock return adjusted by industry (*AdjReturn*) and the standard deviation of stock return (*StdReturn*) as matching variables, since the anecdotal evidence suggests that financial institutions are more willing to accept stocks with high liquidity and stable returns as collaterals. Thus, stock turnover rate, stock return and the standard deviation of stock return are likely to be related to the probability that controlling shareholders pledge their shares for loans.

[2] We use the ±1% cut-off so that the matched firms are very similar. We also use ±0.5%, ±2.5%, ±5% as cut-off, the results are consistent.

the likelihood that controlling shareholder pledge their shares for loans. Second, we examine the difference of the propensity scores between firms with and without share pledging in the PSM samples and tabulate the results in Panel B. The results show that the mean difference is insignificantly less than 0.001 and therefore trivial. Third, we compare the means between firms with and without share pledging in the PSM samples. Panel C report the univariate tests. The results show that all of the matching variables are not significantly different across firms with and without share pledging in the PSM samples. Taking together, these diagnostic tests suggest that our matching procedure are successful.

Panel D presents the multivariate regression results from the base line model using the PSM samples. Consistent with the earlier findings, results show that firms with share pledging have a higher cost of capital than do firms without share pledging.

Table 4. 12

Propensity score matched sample analysis

This table reports the results of how share pledging affects the cost of equity capital by using PSM sample. Column (1) of Panel A shows the logistic regression to calculate the propensity scores. Column (2) in Panel A rerun the logistic regression in column (1) using the PSM samples. Panel B reports the distribution of the propensity scores estimated from the logistic regression in column (1) for the matched samples. Panel C reports the mean differences of matching variables for the PSM samples by using T-test. Panel D presents the results estimated from the base line model by using PSM samples. The model specifications in Panel A include year and industry fixed effects, and those in Panel D include year and firm fixed effects. In Panel A, the robust z-statistics are reported in parenthesis. In Panel D Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at firm level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

Panel A Pre-match propensity score regression and post-match diagnostic regression

	PledgeDum	*PledgeDum*
	Pre-match regression	Post-match regression
	(1)	(2)
Size	-0.188***	0.009
	(-7.801)	(0.450)
Leverage	0.026***	-0.001
	(20.122)	(-1.051)
Beta	-0.091	-0.004
	(-1.236)	(-0.056)
IdioRisk	34.135***	-0.002
	(7.192)	(-0.000)
BM	-0.817***	0.096
	(-9.252)	(1.128)
ROA	0.012***	-0.002
	(3.228)	(-0.483)
Growth	0.002***	0.000
	(5.554)	(1.111)
TurnOver	-0.009	-0.005
	(-1.591)	(-0.928)
AdjRetrun	0.019	-0.020
	(0.385)	(-0.423)
StdReturn	-0.548	0.328
	(-1.100)	(0.698)
_cons	1.735***	-0.223
	(3.164)	(-0.491)
Year	Yes	Yes
Industry	Yes	Yes
Observation	18,021	13,632
Pseudo R^2	0.119	0.000

Panel B Estimated propensity score distribution for the PSM samples

	N	mean	sd	min	P25	P50	P75	max
PledgeDum=0	6,816	0.414	0.096	0.107	0.352	0.413	0.474	0.763
PledgeDum=1	6,816	0.412	0.094	0.107	0.352	0.413	0.473	0.764
Mean Difference	--	0.001	--	--	--	--	--	--
T-tests	--	(0.890)	--	--	--	--	--	--

Panel C Mean differences of the matching variables for the PSM samples

	PledgeDum=0 (obs. 6,816)	*PledgeDum*=1 (obs. 6,816)	Difference	T-value
	Mean	Mean		
	(1)	(2)	(3) = (1) - (2)	(3)
Size	22.528	22.537	-0.009	-0.551
Leverage (%)	20.018	19.860	0.158	0.560
Beta	1.112	1.112	0.000	0.062
IdioRisk	0.025	0.025	0.000	0.231
BM	0.359	0.363	-0.004	-1.086
ROA (%)	4.186	4.189	-0.002	-0.025
Growth (%)	23.311	24.359	-1.048	-1.081
TurnOver	5.733	5.665	0.068	1.023
AdjRetrun	0.011	0.009	0.002	0.305
StdReturn	0.138	0.139	-0.000	-0.237

Panel D Regression results of the base line model by using PSM samples

	ICOC	ICOC
	(1)	(2)
PledgeDum	0.240***	
	(2.686)	
PledgeRatio		0.010*
		(1.940)
Size	-1.531***	-1.523***
	(-16.466)	(-16.401)
Leverage	0.008**	0.008**
	(2.304)	(2.274)
Beta	0.244*	0.243*
	(1.897)	(1.893)
IdioRisk	8.948	8.756
	(1.365)	(1.336)
BM	1.789***	1.807***
	(6.427)	(6.484)
ROA	0.004	0.004
	(0.461)	(0.465)
Growth	0.001*	0.001*
	(1.740)	(1.714)
_cons	39.045***	38.916***
	(19.243)	(19.187)
Year	Yes	Yes
Firm	Yes	Yes
Observations	13,632	13,632
Adjusted R^2	0.179	0.178

4.5.1.3 Instrumental variable regressions

While the previous analysis helps alleviate the endogeneity concerns, it still possible that the endogenous problem arising from the omitted variable remains. For instance, we are unable to observe (1) whether share pledging is affected by their financial constraints or the macro economic factors, such as business cycles, credit supply, and the government's economic policies. These factors are possible related to firms' cost of capital and therefore bias our findings. Thus, we next examine the robustness of our main findings by controlling for the endogeneity using an instrumental variables approach.

Instrumental variables approach assumes that the instrumental variables are correlated with share pledging but unrelated with firm's cost of capital. Specifically, instrumental variables must satisfy two conditions to be consider valid instruments. First, the relevance condition requires that the instruments are correlated with our measures of share pledging (*PledgeDum, PledgeRatio*) after controlling for the set of control variables in our base line model. Second, the exclusion restriction requires that the instruments are correlated with a firm's cost of capital only through their correlation with measures of share pledging after controlling for the set of control variables. According to these two conditions, we

first select the natural logarithm of the number of financial institutions (*FinaInst*) located in a firm's incorporation province as instrumental variable. The number of financial institutions should meet the relevance condition since it is correlated with share pledging activity.[1] Further, to the extent that, the number of financial institutions has no direct correlation with firms' risks and therefore no correlation with firm's cost of capital directly.

Table 4.13 presents the results using the number of financial institutions as instrumental variable (*FinaInst*). We obtain the first stage results by regression each share pledging measure on our selected instrumental variables and the set of control variables used on the base line model, and present the results in columns (1) and (2). We perform various tests that suggest that our selected instrumental variables are valid. Specifically, the Dubin-Wu-Hausman test rejects the null hypothesis that our share pledging measures are exogenous. The high *F*-statistics and partial R^2 of our instruments imply that our results do not suffer from the problem of weak instruments.

The results in columns (3) and (4) show a statistically positive association between share pledging and firms' cost of equity capital. Thus, the results in Table 13 suggest that greater share pledging casually increases firms' cost of equity capital.

Table 4. 13
instrumental variable approach

This table reports the results of how share pledging affects the implied cost of capital by using instrumental variables approach. All model specifications include year and industry fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at firm level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

Panel A Using the number of financial institutions as instrumental variable				
	PledgeDum	*PledgeRatio*	*ICOC*	*ICOC*
	First Stage	First Stage	Second Stage	Second Stage
	(1)	(2)	(3)	(4)
FinaInst	0.324***	4.751***		
	(6.358)	(5.389)		
PledgeDum			2.913**	
			(2.396)	
PledgeRatio				0.199**
				(2.360)
Size	0.123***	1.654***	-2.061***	-2.032***
	(11.026)	(8.065)	(-9.749)	(-9.970)
Leverage	0.003***	0.069***	-0.004	-0.008
	(6.243)	(6.561)	(-0.803)	(-1.177)
Beta	0.017	0.106	-0.003	0.025
	(1.210)	(0.404)	(-0.029)	(0.216)
IdioRisk	-1.540***	-42.106***	31.555***	35.427***
	(-3.390)	(-5.107)	(7.222)	(6.342)
BM	0.098***	1.406***	1.887***	1.894***
	(3.575)	(2.776)	(6.434)	(6.354)
ROA	-0.002*	-0.018	0.015*	0.013
	(-1.933)	(-1.015)	(1.784)	(1.573)
Growth	0.000	-0.000	0.001	0.001
	(0.238)	(-0.003)	(1.457)	(1.477)
Constant	-5.304***	-73.841***	49.994***	49.203***
	(-14.904)	(-11.908)	(11.284)	(11.693)
Year	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes
Observations	18,372	18,372	18,372	18,372
Adjusted-R^2	0.101	0.071	0.082	0.038

[1] More financial institutions that are qualified with the business of share pledging provide controlling shareholder more accesses to take share pledging loans.

Test of endogeneity, weak instruments		
DWH *F*-statistics	113.76 (p < 0.000)	113.91 (p < 0.000)
F-statistics	59.94 (p < 0.000)	39.35 (p < 0.000)
Partial R^2	0.343	0.256

4.5.2 Using alternative cost of capital measures

In the base line model, we use the mean of the commonly used implied cost of capital measures based on Gode, Mohanram (2003), Easton (2004), Gebhardt, Lee, and Swaminathan (2001), Claus and Thomas (2001) as dependent variable. In this section, to examine whether our results are robust across different cost of equity capital measures, we first use the individual four commonly used implied cost of capital (Gode, Mohanram, 2003; Easton, 2004, Gebhardt, Lee, and Swaminathan, 2001, Claus and Thomas, 2001) as dependent variable, respectively. Next, following Houston, Lin, Xie (2018), we rerun the base line model using the earnings/price ratio (i.e., the inverse of P/E ratio) as an alternative measure of the cost of equity capital. The earnings/price ratios, denoted by *EPRatio*, equals to earnings per share over the fiscal year divided by stock price at the end of the fiscal year. Intuitively, a typical valuation model with constant growth rate, the earnings/price ratio (*EPRatio*) is equivalent to the discount factor, and therefore the cost of equity capital. Thus, we expect a positive relation between share pledging and the earnings/price ratio (*EPRatio*). Finally, following Barth, Konchitchki, Landsman (2013), we calculate the expected cost of capital (*ECOC*) based on the Fama-French and momentum four-factor model[1], and rerun the base line model using the expected cost of capital (*ECOC*) dependent variable. The Fama-French model is an empirical factor-generating model, and previous studies (e.g., Lettau and Ludvigson, 2001; Petkova, 2006). Barth, Konchitchki, Landsman (2013) show that factor returns reflect empirically dimensions of risk identified by asset pricing models. For example, Barth, Konchitchki, Landsman (2013) show that factor returns reflect risk arising firm information asymmetry. Previously, we argue that information risk is one of the channels through which share pledging affect firms' cost of capital. Thus, we expect a positive relation between share pledging and the expected cost of capital (*ECOC*).

Panel A of table 4.14 reports regression results using four commonly used measures of implied cost of capital (i.e., $ICOC_{GM}$, $ICOC_{PEG}$, $ICOC_{GLS}$, $ICOC_{CT}$) as dependent variables. Panel B of table 4.14 reports the regression results using the earnings/price ratio (*EPRatio*) as dependent variable. Panel C of table 4.14 the regression results using the expected cost of capital (*ECOC*) as dependent variable. The results show that share pledging is positively associated with the four commonly used cost of capital measures ($ICOC_{GM}$, $ICOC_{PEG}$, $ICOC_{GLS}$, $ICOC_{CT}$), the earnings/price ratio (*EPRatio*), and the expected cost of capital (*ECOC*), and this association is statistically significant (except for the column (3) and (5) of Panel A. Thus, our findings are robust across different cost of capital measures.

Table 4. 14

[1] The detailed calculation procedure is presented in Appendix B.

Using alternative cost of equity capital measures

This table reports the regression results using different cost of capital measures as dependent variables. All the model specifications include firm, year fixed effects. Robust *t*-statistics are reported in parenthesis and calculated using standard errors clustered at firm level. *, **, and *** represent significant level at the 10%, 5%, and 1%, respectively.

Panel A use the four commonly used implied cost of capital as dependent variable, respectively.

	$ICOC_{GM}$	$ICOC_{PEG}$	$ICOC_{GLS}$	$ICOC_{CT}$	$ICOC_{GM}$	$ICOC_{PEG}$	$ICOC_{GLS}$	$ICOC_{CT}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PledgeDum	0.228**	0.331**	0.067	0.149**				
	(2.241)	(2.375)	(1.320)	(2.161)				
PledgeRatio					0.010	0.016**	0.006**	0.008**
					(1.577)	(1.983)	(2.478)	(1.964)
Size	-1.309***	-1.472***	-1.713***	-1.945***	-1.299***	-1.455***	-1.716***	-1.941***
	(-11.781)	(-8.943)	(-26.916)	(-23.662)	(-11.756)	(-8.898)	(-27.351)	(-23.647)
Leverage	0.008*	0.004	0.003	-0.000	0.009*	0.004	0.003	-0.000
	(1.738)	(0.724)	(0.979)	(-0.085)	(1.764)	(0.722)	(0.910)	(-0.103)
Beta	0.046	0.210	-0.104	0.045	0.047	0.212	-0.103	0.046
	(0.334)	(1.116)	(-1.483)	(0.497)	(0.345)	(1.125)	(-1.473)	(0.509)
IdioRisk	-0.908	-4.385	6.627**	12.264***	-0.987	-4.470	6.744**	12.235***
	(-0.134)	(-0.480)	(2.028)	(3.116)	(-0.145)	(-0.488)	(2.065)	(3.110)
BM	2.382***	1.152***	2.498***	2.040***	2.387***	1.166***	2.497***	2.042***
	(7.122)	(2.732)	(15.444)	(8.791)	(7.129)	(2.772)	(15.472)	(8.804)
ROA	0.105***	-0.032**	-0.014**	-0.022***	0.105***	-0.032**	-0.014**	-0.022***
	(9.208)	(-2.122)	(-2.123)	(-3.209)	(9.202)	(-2.117)	(-2.122)	(-3.207)
Growth	0.002**	0.000	0.000	0.002***	0.002**	0.000	0.000	0.002***
	(2.541)	(0.305)	(0.637)	(3.941)	(2.538)	(0.312)	(0.644)	(3.947)
_cons	33.367***	43.374***	41.305***	47.312***	33.165***	43.025***	41.350***	47.240***
	(13.554)	(11.838)	(30.432)	(26.421)	(13.538)	(11.804)	(30.866)	(26.415)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,250	11,690	18,210	15,899	14,250	11,690	18,210	15,899
Adjusted-R^2	0.190	0.278	0.452	0.340	0.190	0.278	0.452	0.340

Panel B Using EP ratio as a proxy for cost of capital

	EP_Ratio	*EP_Ratio*
	(1)	(2)
PledgeDum	0.095***	
	(2.598)	
PledgeRatio		0.008***
		(3.889)
Size	-0.062	-0.065
	(-1.396)	(-1.466)
Leverage	0.015***	0.015***
	(8.626)	(8.487)
Beta	-0.038	-0.037
	(-0.597)	(-0.580)
IdioRisk	18.268***	18.358***
	(6.553)	(6.585)
BM	2.147***	2.146***
	(17.934)	(17.915)
ROA	0.470***	0.471***
	(68.286)	(68.316)
Growth	0.004***	0.004***
	(8.725)	(8.720)
_cons	-1.762*	-1.714*
	(-1.831)	(-1.792)
Year	Yes	Yes
Firm	Yes	Yes
Observations	20,591	20,591
Adjusted-R^2	0.587	0.587

Panel C Using ECOC ratio as a proxy for cost of capital

	EP_Ratio	*EP_Ratio*
	(1)	(2)
PledgeDum	1.796***	
	(7.975)	
PledgeRatio		0.072***
		(5.916)
Size	-2.203***	-2.205***

	(-15.119)	(-15.107)
Leverage	-0.020***	-0.019***
	(-2.930)	(-2.772)
Beta	4.659***	4.683***
	(11.543)	(11.587)
IdioRisk	193.120***	194.718***
	(10.746)	(10.843)
BM	-4.261***	-4.307***
	(-9.606)	(-9.673)
ROA	-0.044**	-0.043**
	(-2.444)	(-2.388)
Growth	0.008***	0.008***
	(6.728)	(6.800)
_cons	60.019***	60.159***
	(18.258)	(18.266)
Year	Yes	Yes
Firm	Yes	Yes
Observations	14,580	14,580
Adjusted-R^2	0.655	0.653

4.6 Conclusion

It is prevalent in Chinese capital market that controlling shareholders pledge their shares to financial institutions to take loans. Although prior research suggests that controlling shareholders who pledge shares for loans suffer from margin call pressure which can lead controlling shareholders to manipulating accounting numbers and expropriating minority shareholders, whether these risks are priced a in firm's cost of equity is unclear. In this study, we find that share pledging increases cost of capital by deteriorating corporate disclosure quality and aggravating agency conflicts between controlling shareholders and minority shareholders. Our findings are robust to accounting for endogeneity concerns using a propensity score matched samples analysis and instrumental variables regression. To the extent that these robust tests alleviate endogenous concerns, our results can be interpreted as greater share pledging causally increasing a firm's cost of capital.

We also find cross-sectional variation in settings where information risks and agency conflicts related to share pledging are greater. Specifically, the positive association between share pledging and cost of capital is more pronounced in (1) firms with high level of information asymmetry, (2) Non-SOEs, (3) firms with absence or low bargaining power of multiple large shareholders, (4) firms with weak institutional environment. We also provide evidence that share pledging directly increases firms' systematic risk. Finally, we find that share pledging not only has a higher cost of equity but also a higher cost of debt. Overall, we argue that share pledging causes sever agency issue and information asymmetry and in turn higher cost of capital in emerging markets that are characterized by concentrated ownership structure and weak institutional environment.

Appendix A. Measurement of the Implied Cost of Equity Capital (ICOC)

We follow Li and Mohanram (2014) to compute ICOC as the average of four commonly used measures, namely, $ICOC_{GM}$, $ICOC_{PEG}$, $ICOC_{GLS}$, and $ICOC_{CT}$. We briefly describe how these measures are computed below.

A1. ICOC derived from Ohlson and Juettner-Nauroth Model: $ICOC_{GM}$, $ICOC_{PEG}$

Ohlson and Juettner-Nauroth (2005) show that the implied cost of capital can be expressed as:

$$r = A + \sqrt{A^2 + \frac{eps_1}{P_0} \times (g_2 - (\gamma - 1))}$$

Where $A \equiv \frac{1}{2}(\gamma - 1 + \frac{dps_1}{P_0})$; $g_2 = \frac{eps_2 - eps_1}{eps_1}$; *eps* is the forecasted *eps* derived from RI model; P_0 is current price per share.

To make the above model applicable, Gode and Mohanram (2003) make the following assumptions. First, they set $(\gamma - 1)$ to R_f -3% where R_f is the risk-free rate. In our setting, we set risk-free rate to the yield on 20-year Notes. Second, they use the average of analysts' short-term growth and long-term growth rate instead of g_2 to reduce the impact of outliers. Following Li and Mohanram (2014), we estimate forecast *eps* from residual income (RI) mode and set g_2 to the geometric mean of short-term growth rate ($\frac{eps_2 - eps_1}{eps_1}$) and long-term growth rate ($\sqrt[4]{\frac{eps_5}{eps_1}} - 1$) if short-term growth rate is greater than long-term growth rate, and set g_2 to long-term growth rate if short-term growth rate is less than long-term growth rate. Third, Gode and Mohanram (2003) set $dps_1 = k * eps_1$, where k is current payout ratio. If current earnings (eps_0) are positive, current dividends (dps_0) are divided by eps_0. If eps_0 are negative, dps_0 are divided by "normal earnings", which are assumed to be 6% of total assets. The measure *r* calculated by the above procedure is denoted as $ICOC_{GM}$

Easton (2004) estimate ICOC based on a simplified version of the Ohlson and Juettner-Nauroth model that ignores dividends. Following Easton (2004), we compute $ICOC_{PEG}$ as:

$$ICC_{PEG} = \sqrt{(eps_2 - eps_1)/P_0}$$

A2. ICOC derived from residual income valuation model: $ICOC_{GLS}$ and $ICOC_{CT}$

Gebhardt, Lee, Swaminathan (2001) use the residual income valuation model to estimate ICOC.

They equate current stock price to the sum of the current book value and the present value of future residual earnings. To estimate ICOC, they solve *r* in the following equation:

$$P_0 = B_0 + \sum_{\tau=1}^{12} \left(\frac{eps_\tau - r * B_{\tau-1}}{(1+r)^\tau} \right) + \frac{(eps_{12} - r * B_{11})}{(1+r)^{12}}$$

Where B_0 is current book value per share; and B_1 through B_{11} are expected future book values per share obtained through the clean surplus relation, setting payout to equal current payout. Current payout

is defined as above. Following Li and Mohanram (2014), we estimate forecasts explicitly for years 1 through 5 by using RI model and then apply ROE convergence.

Claus and Thomas (2001) also use the residual income valuation model to estimate the implied cost of equity. To estimate ICOC, they solve *r* in the following equation:

$$P_0 = B_0 + \sum_{\tau=1}^{5} \left(\frac{eps_\tau - r * B_{\tau-1}}{(1+r)^\tau} \right) + \frac{(eps_5 - r * B_4)(1+g)}{(1+r)^5}$$

where g is set to R_f - 3 %; other variables are defined as above.

Appendix B. Measurement of the expected Cost of Capital (ECOC)

For each firm, we first estimate the betas in following monthly time-series regression:

$$R_{i,m} - R_{f,m} = \alpha_i + \beta_{MRP,i} \times \left(R_{M,m} - R_{f,m}\right) + \beta_{SMB,i} \times SMB_m + \beta_{HML,i} \times HML_m + \beta_{MOM,i} \times MOM_m + \varepsilon_{i,m}$$

Where $R_{i,m} - R_{f,m}$ is the firm's monthly return in excess of the risk-free rate, $R_{M,m} - R_{f,m}$ is the monthly return of market in excess of the risk-free rate, SMB_m and HML_m are the monthly returns to the size and book-to-market factors (Fama and French, 1993), and MOM_m is the monthly return to the momentum factor (Carhart, 1997). We estimate the above equation using the most recent 60 months returns prior to the beginning of a firm's fiscal year. This procedure generates the estimated coefficients, $\hat{\beta}_{MRP,i}$, $\hat{\beta}_{SMB,i}$, $\hat{\beta}_{HML,i}$, $\hat{\beta}_{MOM,i}$, which are updated annually.

After estimating the factor loadings, $\hat{\beta}_{MRP,i}$, $\hat{\beta}_{SMB,i}$, $\hat{\beta}_{HML,i}$, $\hat{\beta}_{MOM,i}$, we calculate the expected cost of capital (ECOC) for year t+1 as of year t for each firm as following:

$$ECOC_{i,t} = \bar{R}_{f,t} + \hat{\beta}_{MRP,i,t} \times \left(\overline{R_M - R_f}\right)_t + \hat{\beta}_{SMB,i,t} \times \overline{SMB}_t + \hat{\beta}_{HML,i,t} \times \overline{HML}_t + \hat{\beta}_{MOM,i,t} \times \overline{MOM}_t$$

Where $\left(\overline{R_M - R_f}\right)_t$, $\overline{SMB}_t$, $\overline{HML}_t$, $\overline{MOM}_t$ are the expected annual Fama-French and momentum factor returns for year t+1. We estimate the expected annual factor returns by fist calculating each factor's average monthly return over the 60 months prior t month m, and then compounding the resulting average monthly returns over the twelve months prior to the beginning of firm I's fiscal year.

Appendix C. Variable definition and Sources

Variables	Definition
Cost of equity capital measures	
ICOC	the average of the four commonly used implied cost of capital measures derived from Gode, Mohanram (2003) ($ICOC_{GM}$); Easton (2004) ($ICOC_{MPEG}$); Gebhardt, Lee, Swaminathan (2001) ($ICOC_{GLS}$); Claus and Thomas (2001) ($ICOC_{CT}$).
EPRatio	The earnings/price ratios, denoted by *EPRatio*, equals to earnings per share over the fiscal year divided by stock price at the end of the fiscal year (Houston, Lin, Xie, 2018)
ECOC	The expected cost of capital derived from the Fama-French and momentum four-factor model. The detailed calculation procedure is presented in Appendix B (Barth, Konchitchki, Landsman, 2013)
cost of debt	
COD	The ratio of the sum of interest expenses and capitalized interests to the total interest-bearing debts (Zou and Adams, 2008; Lim, Wang, and Zeng, 2018)
Share pledging measures	
PledgeDum	A dummy variable that that equals one for a firm with controlling shareholder share pledging, and zero for a firm without controlling shareholder share pledging (Meng, Ni, and Zhang, 2018; Ouyang, Wang, and Chan, 2018; DeJong, Liao, and Xie, 2019)
PledgeRatio	The ratio of controlling shareholders' pledged shares to the total shares of a listed firm (Meng, Ni, and Zhang, 2018; Ouyang, Wang, and Chan, 2018; DeJong, Liao, and Xie, 2019)
Firm level variables	
Size	The natural logarithm of the market value of equity
Leverage	The ratio of interest-bearing debts to total assets
Beta	A proxy for a firm's systematic risk estimated by the market model using the daily returns over the fiscal year
IdioRisk	A proxy for a firm's idiosyncratic risk equals to the standard deviation of the residual daily returns derived form the market model over the fiscal year
BM	The ratio of the book value of equity to the market value of equity
ROA	The return on assets defined as the ratio of net income to total assets
Growth	The growth rate of sales
HighErro	A dummy variable that is set to one if *Analyst Forecast Error* is above the sample median and zero otherwise. *Analyst Forecast Error* is estimated as the difference between the forecast earnings and the actual earnings per share, scaled by the price at the beginning of the year (Krishnaswami and Subramaniam, 1999; Flannery, Kwan, Nimalendran, 2004)
HighDispersion	A dummy variable that is set to one if *Analyst Forecast Dispersion* is above the sample median and zero otherwise. *Analyst Forecast Dispersion* is estimated as the standard deviation of the forecasts, scaled by the price at the beginning of the year (Krishnaswami and Subramaniam, 1999; Flannery, Kwan, Nimalendran, 2004)
Non-SOEs	A dummy variable that equals one for non-state-owned enterprises, and zero otherwise
NonMLS	A dummy variable that is set to one if a firm does not have a single large shareholder (excluding the controlling shareholder) with at least 10% of

	voting rights and zero otherwise (Faccio, Lang, and Young, 2001; Maury and Pajuste, 2005)
LowPower	A dummy variable that is set to one if the ratio of total voting rights of the second and third largest shareholders to the voting rights of the largest shareholders is below the sample median (Mishra, 2011; Attig, El Ghoul, Guedhami, and Rizeanu, 2013).
InterestCoverage	The interest coverage ratio defined as earnings before interest and tax (EBIT) divided by the sum of interest expenses and capitalized interests
Tangible	The tangible assets intensity defined as the sum of fixed assets and inventory scaled by total assets
BoardSize	The natural logarithm of the number of board directors
BoardIndp	The ratio of the number of independent directors to the number of total board directors
MLSDum	A dummy variable that equals one if there exists at least one large shareholder (excluding the controlling shareholder) with at least 10% of voting rights, and zero otherwise (Faccio, Lang, and Young, 2001; Maury and Pajuste, 2005)
Province level variables	
WeakInstEnvi	A dummy variable that is set to one if the *Overall Marketization Index* is below the sample median, and zero otherwise. *Overall Marketization Index* is the marketization indexes constructed by the National Economic Research Institute (NERI) to measure the quality of regional/provincial institutional environment across provinces (Wang, Fan, and Yu, 2017).
FinaInst	The natural logarithm of the number of financial institutions located in a firm's incorporation province

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CHAPTER FIVE

CONCLUDING REMARKS

5.1 Introduction

The evidence provided in the three self-contained research papers included in this thesis adds to the literature regarding the economic consequences of controlling shareholder share pledging. Specifically, Paper 1 (Chapter Two) examines whether and how controlling shareholder share pledging affects firm tunnelling. Paper 2 (Chapter Three) examines whether and how controlling shareholder share pledging affects corporate disclosure quality. Paper 3 (Chapter Four) examines whether and how controlling shareholder share pledging affects firms' cost of equity capital.

The remainder of this chapter is organized as follows. The summary of findings from each of the three papers is presented in Section 5.2, followed by a discussion of the overall implications in Section 5.3. The limitations of the thesis together with suggestions for future research are discussed in Section 5.4.

5.2 Summary of Findings

5.2.1 Paper 1: Controlling Shareholder Share Pledging and Tunnelling: Evidence from China

Kao, Chiou, and Chen (2004), Chen, Kao, and Chen (2007) conjecture that share pledging is a new source of deviation between insiders' control rights and cash flow rights, which leads to agency conflicts between insiders and outsiders. Although Wang and Chou (2018), and Dou, Masulis, and Zein (2019) show that insider share pledging impairs firm valuation, extant studies do not provide direct evidence to corroborate the underlying assumption that insider share pledging results in agency conflicts between insiders and outsiders. This study fills this gap by exploring the association between controlling shareholder share pledging and firm tunnelling.

This study finds that share pledging is positively associated with tunnelling, suggesting that share pledging leads controlling shareholder to tunnel the listed firms. Although non-SOE ownership and group affiliation exacerbate the tunnelling behaviour induced by share pledging, better internal and external governance mechanisms help mitigate this the tunnelling behaviour. By further investigation, this study shows that, overall, there is a negative market reaction to share pledging activities, suggesting that the market anticipates and penalizes the tunnelling activities induced by share pledging. Moreover, this study finds that share pledging is negatively associated with ROA and Tobin's q ratio, suggesting that share pledging impairs firm's accounting and market performance, which lends more evidence supporting the hypothesis that share pledging provides controlling shareholder with incentives to tunnel the listed firms.

5.2.2 Paper 2: Controlling Shareholder Share Pledging and Corporate disclosure: Evidence from China

While extant studies have extensively investigated the valuation effect related to insider share pledging (Wang and Chou, 2018; Singh, 2018; Dou, Masulis, and Zein, 2019), few studies have investigated how controlling shareholder share pledging affects corporate decisions. This study fills this

gap by exploring whether and how controlling shareholder share pledging affect corporate disclosure policy.

This study documents a negative association between share pledging and disclosure quality, and this negative association is stronger in non-SOEs than that in SOEs. This study also explores how the controlling shareholders manipulate disclosure to sustain or increase stock price. The results show that share pledging are positively associated with earnings management and optimistic bias of management forecast, and negatively associated with management's willingness to disclose bad news and accounting conservatism. These results suggest that controlling shareholders manipulate accounting numbers, forward-looking information disclosure, and accounting policy to sustain or increase stock price, which in turn decreases firms' disclosure quality. By further investigation, this study finds that, as corporate disclosure quality decreases, the share pledging exerts an incremental negative effect on firm value. At last, by adding various fixed-effects, performing propensity score matched sample analysis, conducting instrumental variable regression, and performing lead-lag change analysis, this study obtains similar results.

5.2.3 Paper 3: Controlling Shareholder Share Pledging and Cost of Equity Capital: Evidence from China

Although prior research suggests that controlling shareholders who pledge shares for loans suffer from margin call pressure which can lead controlling shareholders manipulating accounting numbers and expropriating minority shareholders, whether these risks (i.e., the information risk and agency conflicts) are priced a firm's cost of equity capital is unclear. This study fills this gap by investigation how controlling shareholder share pledging affects firms' cost of equity capital.

The results show that share pledging is positively associated with cost of equity capital. The mechanism analyses suggest share pledging increases firms' cost of equity capital by inducing information risks and agency conflicts. The results also show that, the positive association between controlling shareholders share pledging and cost of capital is more pronounced in (1) firms with high level of information asymmetry, (2) Non-SOEs, (3) firms with absence or low bargaining power of multiple large shareholders, (4) firms with weak institutional environment. This study also provides evidence that share pledging directly increases firms' systematic risk. Finally, the results show that share pledging not only has a higher cost of equity but also a higher cost of debt. Overall, the findings in this study suggest that share pledging causes sever agency issue and information asymmetry and in turn higher cost of capital in emerging markets where there are concentrated ownership structure, and weak legal protection.

5.3 Implications

Given the pervasiveness of controlling shareholder share pledging and its related risks, the findings of this thesis have provide important implications for regulators and investors.

First, share pledging enables the controlling shareholders to create a new source of deviation between control rights and cash flow rights, to reclaim investment in advance, and to transfers share price cash risk to the creditors and minority shareholders, which in turn provides the controlling shareholders with strong incentives to tunnel the listed firms. The tunnelling effect of share pledging is more severe in an emerging market when external monitoring and shareholder protection is relative weak. The regulators could improve the protection for minority shareholders by reinforcing internal and external corporate governance mechanisms, for instance, making effort to improve the law enforcement. Second, this thesis finds that the risk of losing control rights induces controlling shareholder to manipulate disclosure policy to sustain or increase stock price. To reduce the opportunistic disclosing behaviour arising from share pledging, the voting rights of the controlling shareholders should be restricted, which can limit controlling shareholders' opportunistic disclosing behaviour.

Third, the findings in this thesis show that share pledging imposes information risks and agency conflicts on investors. Thus, investors should be vigilant about the potential risks related to share pledging when investing in the equity market.

5.4 Limitations and Future Research

The findings presented in this thesis are subject to a number of limitations, and also act as a precursor to future avenues of research.

First, the results of paper 1 and 2 may not be generalizable outside the Chinese capital market since other countries may have unique institutional environments. In comparison with the China, these countries may have institutional differences in market structures, litigation environments and tax regimes. For example, in Chinese capital market, the largest shareholders hold more than one third of firms' total share (Jiang and Kim, 2015), and the laws for investors' protection is relative weak. These institutional characteristics might be unique for Chinese capital market.

Second, this thesis only focus on the capital market economic consequences of share pledging. This line of literature is emerging. However, due to limitation of data availability, few studies explore controlling shareholders' incentives to pledge shares. The determinants of controlling shareholder share pledging is a promising research area.

Third, paper 2 only focus on how controlling shareholder share pledging behaviour affects the listed firms' corporate decisions. This study assumes that the creditors (the financial institutions) are independent with the controlling shareholders. Future research can explore how the connection between controlling shareholders and the creditors (the financial institutions) affects the listed firms' corporate decisions.

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